

Handbooks of Sociology and Social Research

Michael J. Shanahan
Jeylan T. Mortimer
Monica Kirkpatrick Johnson *Editors*

Handbook of the Life Course

Volume II

 Springer

Handbooks of Sociology and Social Research

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Volume II

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Introduction: Life Course Studies – Trends, Challenges, and Future Directions

Michael J. Shanahan, Jeylan T. Mortimer,
and Monica Kirkpatrick Johnson

The *Handbook of the Life Course* was published in 2003 (“*Handbook I*”) and aspired to provide “an overview of key theoretical perspectives, concepts, and methodological approaches that, while applied to diverse phenomena, are united in their general approach to the study of lives across age phases” (Mortimer and Shanahan 2003). In revisiting *Handbook I*, we were heartened to discover its continued usefulness and relevance. A cursory examination of citation patterns reveals that it has been cited frequently as a corporate work, and many chapters were also well-received. Further, most of its chapters remain relevant, inspiring, and creative contributions more than a decade after they were written. Indeed, with little effort, any of its essays could be updated.

Given the sustained usefulness of *Handbook I*, we agreed to edit a new “*Handbook II*” not as a second edition (i.e., an update) but rather as a

second volume (i.e., with a distinct charge): the identification of new and emerging problems, concepts, methods, research questions, and analytic strategies. Nevertheless, although the handbooks have unique purviews, they are not wholly distinct. *Handbook I* provides an overview of life course studies but also identifies many themes for future research. Indeed, Section VII is entitled “The Future of the Life Course” and includes essays by leading scholars of life course sociology. *Handbook II* is forward-looking, charting directions for future research, yet the chapters in the second volume must necessarily provide foundations on which to build. Thus, many of the present chapters provide concise, selective histories of their topics. In the final analysis, both volumes offer overviews of subfields and directions for future research; the difference is one of emphasis, with the present volume highlighting the latter.

In describing the contents of this volume, we note connections between the two handbooks, and unique features of each. First, however, we revisit an observation made in *Handbook I*: that life course studies is growing by proverbial “leaps and bounds,” in large part because of its growing use in fields beyond sociology. This diffusion creates exciting opportunities for interdisciplinary work, but it also challenges the field to maintain a coherent, paradigmatic core.

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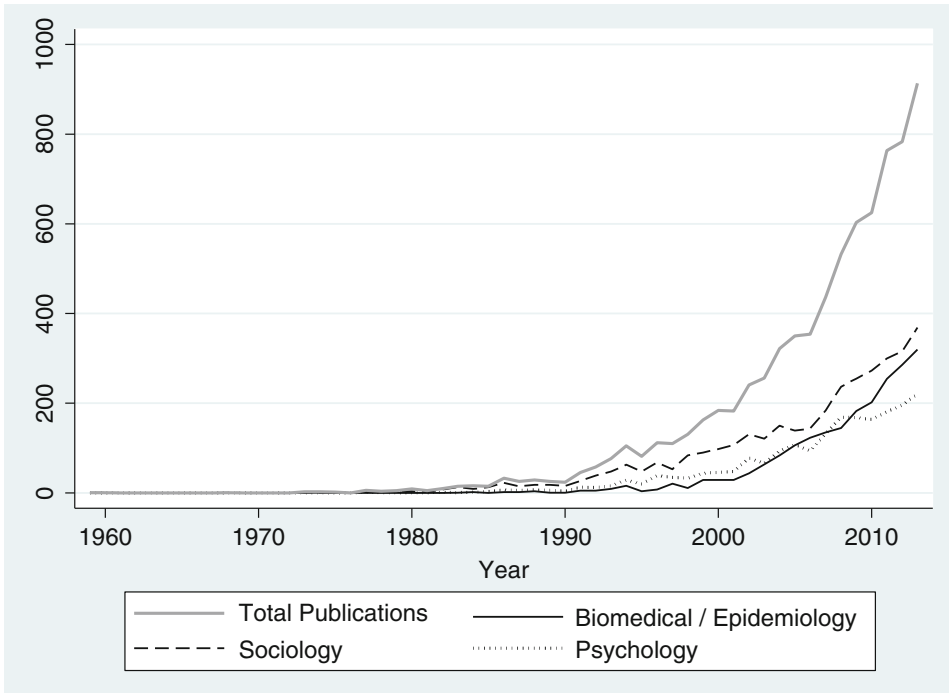


Fig. 1 Number of life course publications per year

1 Growth, Diffusion, Opportunities and Challenges

Although gauging the growth of life course studies is difficult, we gain some descriptive traction by way of a simple citation analysis (Shanahan and Freeman 2012). Drawing on the Thomson/Reuters Web of Science, we searched for papers in which the topic, title, or theme included “life course.” The resulting record count (number of journal publications) can be broken down into year and disciplines (“Web of Science Categories”).¹ This strategy is subject to several important qualifications (principally, papers can be classified into more than one Web of Science category, and books and chapters are often not included), but we doubt the overall conclusions

¹ We thank Autumn McClelland for assistance with these analyses. Results available on request from Michael Shanahan.

would change appreciably if these limitations could be addressed.

Figure 1 shows the number of life course journal publications per year overall and for sociological, psychological, and biomedical/epidemiological Web of Science categories. The results reveal several interesting trends. First, there was very little publication activity prior to 1990. Indeed, as late as 1998, there were only 84 sociological journal articles featuring the life course. (There were, however, citations to books and chapters prior to 1998 that are not included in the figure). Second, 1990 was a “tipping point,” after which the number of life course publications began to increase appreciably. In fact, regression analyses support the hypothesis that 1990 is the likely deflection point for total journal publication count. Third, also confirmed by regression modeling, the growth rate in publications follows a quadratic pattern. This pattern of rapid growth characterizes the total and discipline-specific journal publication count. Finally, annual growth

rates in other disciplines reveal that life course publications in sociology have been at or slightly below the total growth rate (for all publications). Over a 10-year period (from 2000 to 2010), Biomedical/Epidemiology publications increased by 302 %, whereas the total rate of growth for all “life course” publications was 267 % (for Sociology, 249 %; for Psychology, 263 %).

Given limitations to these analyses, we should not be overly concerned with exact estimates. Viewed in broad terms, however, the results are consistent with our impressions: life course studies are clearly characterized by vibrant growth, and much of this growth, especially in the past 5- to 10 years, is driven by publications beyond the discipline of sociology.

This interdisciplinary diffusion is a testament to the value of life course studies, but it also raises the issue of intellectual cohesiveness. The issue of cohesiveness is yet more vexing because of the status of the life course as a paradigm. Traditionally, the *concept* of the life course refers to the age-graded roles that structure (or create patterns in) biography. The concept in turn gave rise to a set of related ideas, hypotheses, and techniques that collectively create a paradigm, or imaginative framework. Compared to a theory—a set of formally interrelated propositions that organizes observations and generates predictions—the content, boundaries, and emphases of a paradigm are less easy to identify with a high degree of consensus. Thus, even within sociology, the life course has a diversity of meanings. This point is vividly illustrated by several chapters in this volume that focus on health, yet with little substantive overlap among them.

The diffusion of the life course and its status as a paradigm create both a challenge and an opportunity for life course studies. On the one hand, as the life course paradigm diffuses from sociology into other fields of study, the challenge of intellectual cohesiveness arises: is there an intellectual core that informs life course studies of diverse phenomena such as occupational careers, criminal careers, cardiovascular disease, cognition, and functional limitations? Or, much as James House (1977) did for social psychology, can we identify distinctly different “faces” of life

course research? Or, has “life course” become an ambiguous rubric? On the other hand, this same diffusion creates opportunities for intellectual cross-pollination. A great deal of scientific progress depends on the concepts and methods from one field of study informing the science of another field. Moreover, many branches of science—natural, behavioral, and social—are adopting a systems view that encourages viewing the full complexity of research questions, thereby traversing traditional disciplinary boundaries. Thus, the challenge facing life course sociology—the coherent core versus interdisciplinary diffusion—is a particular instance of a problem faced by many successful fields of study. We invite readers to consider this tension between cohesiveness and cross-pollination as they peruse the two handbooks.

2 Organization of *Handbook II*

We begin *Handbook II* with essays on the historical emergence of life course studies, explicating and critically evaluating key foundational concepts and ideas that animate this field of inquiry. The historical perspective offered by Bynner emphasizes the importance of longitudinal data to the emergence of life course research and its institutionalization; he urges heightened efforts to connect basic science with policy. Fundamental concepts covered in Section I include the birth cohort, which locates people in history, and age phases, the basic division of the biography into a sequence of age-graded segments. Section I closes with three essays urging researchers to focus on societal forces that create biographic patterns, focusing on the increasing differentiation of age grading and its subjective consequences; on the frequent misuse of models positing a “free-standing individual” in life course explanations of individual differences; and on the central role of intergenerational families in bridging macro and micro perspectives. These essays provide a much-needed corrective as life course scholars continue to study individual-level phenomena such as health and genetics, and as they engage in interdisciplinary research.

Section II applies the life course perspective to the changing institutions and organizations that powerfully shape biographical patterns within and across cohorts and age phases. Traditionally, these social forces have included the family, education, and work, all of which are covered in the present volume. Particularly in the American context, military service in theaters of armed conflict and time spent in the criminal justice system shape the lives of a substantial proportion of the population, and there is now growing awareness across nations of the potentially profound long-term effects of both natural and man-made disasters. Excepting disasters and military service, these topics are also covered in *Handbook I*, and the present contributions seek to highlight recent developments and future directions.

Section III presents a series of essays on health and development. As shown in Fig. 1, health has emerged as a major theme in life course research. In the American context especially, life course studies include a micro interest in individual differences, and this theme is explored in several chapters that offer developmentally-informed life course perspectives on physical and mental health, poverty, cognition, and agency. *Handbook I* also included essays on agency and health, as well as on connections between childhood and adulthood, substance use, personality, and biology.

Having covered fundamental concepts and applications of the life course perspective, *Handbook II* turns to research methods in Section IV. *Handbook I* examines models that are well-suited to common types of data in the life course tradition: age-period-cohort, event-history, panel, and latent pathways. There is also a chapter on the qualitative study of social change and people's narrative autobiographies. *Handbook II* covers new topics that are at the forefront of life course research: longitudinal qualitative research, causal analysis, growth curve models, three-generation studies, and spatial analysis.

Finally, Section V returns to a major theme of John Bynner's first chapter: the increasing necessity to connect life course research with policy. Presently, few life course scholars have been trained in policy analysis and few policy-makers draw on a life course framework. *Handbook II*

closes with essays by leading scholars who are building bridges between basic life course research and policy.

We turn now from this organizational portrait to commentary on the chapters in this volume. Our purpose is not to summarize each chapter, but rather to highlight select themes and future directions for research and, in so doing, encourage close readings of chapters. Table 1 presents a highly select summary of broadly-stated themes for future research that are to be found across essays in this volume. Again, our purpose with Table 1 is not to comprehensively list all future directions for life course studies, but rather to highlight select, major themes and to encourage closer reading of the volume.

3 Section I: Foundations of Life Course Research

John Bynner's essay on the institutionalization of life course studies is an appropriate starting point because he discusses the historical emergence of life course studies and their expansion and consolidation to the present, including the recent founding of the Society for Longitudinal and Life Course Studies. Bynner's thesis is that the history of life course studies is best told in terms of the history and expansion of longitudinal data collection. He provides a superb overview of the proliferation of longitudinal data in Europe and the United States. Indeed, he notes that longitudinal data collection is now "industrial" in scope, with consortia emerging to harmonize efforts and to develop a clear understanding of the types of data that are being collected with respect to broad themes such as child health and household dynamics. *Handbook I* also began with a historical perspective (Elder, Crosnoe, and Johnson), but one told with different emphasis: the emergence of life course principles based on early empirical work. With their differing historiographies—the central role of data and the emergence of theory—these chapters jointly provide a concise, rich story of the emergence of a new, vibrant, multidisciplinary, and international intellectual community.

Table 1 Select recommendations for the future of life course studies^a

I. Increasing the international scope of life course studies
A. Promotion of cross-national data harmonization through consortia (Bynner)
B. Development of international ethical standards governing data collection, storage, and anonymity/confidentiality (Bynner)
C. Extension of data collection to middle- and low-income countries (Bynner, Dornan, Wadsworth)
II. Major substantive themes for future research
<u>A. The role of early childhood and adolescent experiences in the subsequent life course</u>
1. Evaluate the contemporary view that early childhood is a critical or even sensitive period (e.g., via embedding mechanisms) (Dannefer, Hayward, Kalil)
2. Identify the salient features of early environments that predict the later life course (including social context as constituted by forms of adversity, Ferraro; policy, Herd; family, Hofferth)
3. Identify early individual differences that most differentiate people (for later health, Avison, Hayward; for school performance, Crosnoe; for targeting policy to promote education, income, and health, Diewald, Dornan)
4. Identify diverse mechanisms that link early and later life course (for health, Avison, Hayward; for attainment, Blossfeld, Kalil; reflecting spatial differences, Browning)
5. Identify pathways of diversity in early life experiences (reflecting gene-environment patterns and development of soft skills, Diewald; health, Dornan; adversities, Ferraro; family, Hofferth)
<u>B. Cohorts and life course studies</u>
1. Empirical study of “demonstration effects”—how birth cohorts create contexts for subsequent cohorts, facilitating social change (Elder)
2. Increased attention to both inter- and intra- cohort heterogeneity, and explanatory mechanisms (Elder, Hermanowicz)
3. Increased awareness of likely cohort effects (in the study of disasters, DeWaard; health, Hayward; incarceration, Wakefield)
4. Joining of cohort and spatial data to study people in time and place (Elder)
5. Study of structural and cultural lags and ambiguities, difficulties, and possibilities created by them (Dannefer, Moen, Mortimer, O’Rand)
6. Use of age-cohort panel data to study age, period, cohort mechanisms (Elder, Hitlin, Johnson, Hayward)
<u>C. Age phases of the life course</u>
1. Study of different age phases experienced by groups (defined by sex, race, social status, etc.) in a society (Mortimer)
2. Identification of social, economic, legal, and political forces that create, modify, and destroy age phases (Hagestad, Moen, Mortimer, O’Rand)
3. Imagining different legal-regulatory structures that shape the life course and studying them with program field experiments, quasi-experiments (Dannefer, Herd, Moen, Mortimer)
4. Identification of experiences that fundamentally alter pathways through life (mental health, Avison; aging and health, Ferraro; disasters, DeWaard; military, London; incarceration, Wakefield)
<u>D. Intergenerational studies</u>
1. Consequences of changing demographic and institutional contexts for intergenerational ties (using cross-national designs, Hagestad; with respect to family diversity, Hofferth)
2. Studying intergenerational transmission of behaviors, attitudes, etc. as a developmental problem (Thornberry)
3. Studying parental involvement in institutions on life courses of children (education, Johnson; the military, London; incarceration, Wakefield)
4. Connections between biological ties, cultural understandings, legal-policy settings of families, and intergenerational supports (Diewald, Hagestad, Herd, Hofferth)
<u>E. Intersection of human development and the life course</u>
1. Turning points and consequences for trajectories (generally, Alwin, Macmillan; cognitive functioning, Alwin; mental health, Avison; body mass index, Macmillan)
2. Connections between short- and long-term consequences of major life course experiences (education, Johnson)
3. Subjective experience of the life course (and agency, Hitlin; with respect to professional careers, research methods to study, Hermanowicz)

(continued)

Table 1 (continued)

F. The importance of decision-making and soft-skill processes in the life course
1. Knowledge of educational opportunities and constraints such as curricular structures, time demands, etc. (Blossfeld, Crosnoe, Zapata-Gietl)
2. Financial literacy (O’Rand)
3. Cognitive competencies (Alwin, Blossfeld)
4. Soft skills in attainment and overcoming adversities (Diewald, Kalil)
5. Decision-making about the life course as culturally-conditioned deliberation, reflecting societal values, norms (Hitlin)
III. Major methodological challenges
A. Leveraging survey research
1. Increased understanding of respondent burden, retrospectively-recalled data (Bynner)
2. Availability of data, transparency in analyses, replication (Editors)
3. Merging of administrative records to participants in panel studies (Bynner)
4. Increasingly sophisticated use of biological data, including biomarkers, diverse forms of genetic information, microbiome, imaging, and animal models (Avison, Bynner, Dannefer, Diewald, Ferraro, Hayward)
5. Increasing use of spatial data that describes social and physical contexts over time (Browning, Elder, Ferraro)
B. Research methodologies
1. Strengthen causal inference by experiments, naturally occurring experiments, quasi-experiments, and statistical methods (Avison, Hayward, Herd, Johnson, Kalil, Moore, Moen)
2. Increased use of qualitative strategies to identify life course patterns and mechanisms (Hermanowicz)
3. Models that capture temporal complexities of both context and outcome (Alwin, Browning, Macmillan)
C. Measurement
1. Cascades of health; health portfolios; symptoms versus diseases and disorders (Avison, Hayward)
2. Culturally sensitive measures of agency (Hitlin)
3. Political economies for cross-national comparative research (Diewald)
4. Techniques for defining and delimiting age phases and generations (Elder, Mortimer)
IV. Life course and public policy
A. Increased collaboration between policy-makers and life course researchers through all stages of the research process (Bynner, Laub)
B. Increased study of specific laws and regulations from a life course perspective (all chapters; see especially, Herd) and cross-nationally (Bynner, Diewald, Dornan, Hagestad, Wadsworth)
C. Development and test of theory of life course risk management and mitigation cross-nationally (Diewald)
D. Study of policy and the life course in broader framework of rapid global changes with respect to, for example, women and the economy (Moen, O’Rand)

^aFor the sake of concision, listed names refer to first authors of chapters. Names listed alphabetically

Bynner suggests that the future of life course studies will continue to depend on advances in data collection efforts, and this insight leads to several recommendations for future work: increasing the availability of sophisticated forms of diverse data (biological, spatial, administrative, psychological and behavioral); the development of international standards with respect to the ethics of data collection, storage, and the prevention of deductive disclosure; strengthening connections between basic research and policy; the extension of data collection efforts beyond the United States and Europe; and scientific

advances with respect to causal analysis, attrition, respondent burden, and theory. To these many excellent points, we would add that the availability of data, transparency in sharing analyses, and issues of replication are now concerns cutting across the social and behavioral sciences; increased attention to each of these issues will strengthen the knowledge base.

One of the foundational concepts of the life course is the birth cohort because, as Elder and George note, cohorts locate the aging person in historical context, and they also can provide insight into the genesis of social change. The

early statistical work of Schaie and the conceptual work of Ryder laid the foundations for subsequent research. Elder and George provide an incisive review of these and related foundations, noting that although cohort research was originally formulated with reference to between-cohort comparisons, the field quickly realized that within-cohort heterogeneity was equally important in locating people in history. They also argue that although cohort research has productively focused on a vast array of substantive topics, two processes—cohort replacement and cohort diffusion—have emerged as fundamental mechanisms that cut across many of these areas of research. They illustrate these points—the importance of juxtaposing inter- and intra-cohort comparisons and of replacement and diffusion—by considering research on secularization, the Easterlin hypothesis, family structure, and gender role orientations. Alwin and McCammon’s essay on Generations and Glenn’s essay on age/period/cohort models in *Handbook 1* are excellent companion essays; these three essays jointly provide superb foundations and future directions for thinking about aging in historical context.

Elder and George identify several areas for future research. First, they discuss a neglected aspect of cohort research: how cohorts create social change. They elaborate Modell’s point that each succeeding cohort creates a new context for subsequent cohorts, a “demonstration effect” according to which social change influences the life course of individual members of the cohort, and these individual experiences aggregate to constitute a new context for others. Second, future research can profitably explore connections between inter- and intra-cohort heterogeneity. As longitudinal designs spanning many cohorts become increasingly available (e.g., the Health and Retirement Study), such studies will be possible. And third, they recommend the addition of an ecological (spatial) focus to cohort research. Many life course processes (e.g., migration, health, poverty) are known to reflect cohort membership and spatial processes, but studies have not bridged these two perspectives.

Dannefer, Kelley-Moore, and Huang note that life course studies devote considerable attention

to individual-level phenomena such as health. Yet the authors argue that life course scholars have too readily (and perhaps unwittingly) adopted a “functional-developmental” paradigm that compromises the social richness of their explanations. Individual behaviors are socially constituted and, as such, need to be studied in terms beyond the “free-standing individual” and with a skeptical stance toward existing social arrangements—ranging from institutions to the life course itself—as “natural.” Their thesis is illustrated with three probative examples: agency, gene-environment interactions, and early influences on outcomes later in life. In all of these instances, Dannefer and his colleagues argue that sociology has adopted explanations based on individual attributes (e.g., biological embedding) and lost perspective on the fundamental importance of people’s position in society and the “malleability” of both social institutions and the person throughout life. The implications of their chapter for future research are far-reaching: the considerable efforts devoted to the study of individual outcomes need to re-focus, shifting attention to the social forces that create patterns in the life course, social forces that are often dysfunctional.

Mortimer and Moen address the fundamental concept of age. The German word *bauplan* means “building plan” and is used broadly to refer to the fundamental structural features of something (load-bearing structures of a building, morphological features of animals, etc.). Age phases are indeed the *bauplan* of the life course—the basic age-graded segments (e.g., adolescence, old-old age) that are characterized by unique sets of opportunities and limitations, that are widely recognized by society, and that are regulated by norms and societal and economic structures. Mortimer and Moen note that the age phases of the life course have become increasingly differentiated. Indeed, the pace of social change (principally, demographic and economic) and the rise of individualism may be creating new age phases much more quickly than social institutions (especially governmental policies) and expectations adapt, vivid examples of both “cultural and structural lag.”

The result is increasing ambiguity about “appropriate” age-graded behaviors, an ambiguity further compounded by the very different life course experiences of women and men (the gendered life course), of different social classes (the stratified life course) and of different races (the racialized life course). The concept of intersectionality—that inequalities are best understood in terms of complex interactions involving gender, socioeconomic status, and race through time—raises the possibilities that different subgroups in society have unique age phases (e.g., poor black males often experience an “imprisonment phase”) or, in any event, quite unique experiences of age phases that are common to the broader society (e.g., adolescence). These themes are discussed in terms of two specific examples, early adulthood and encore adulthood, though they discuss several others as well, including midcourse (see Moen, *Handbook I*) and old age.

Mortimer and Moen’s analysis raises a series of questions for future research that are—given how much progress has been made in life course studies—surprisingly foundational. How many phases of the life course are there, and how do we know? Or are age phases heuristic devices or ideal types that should not be reified? What social and economic forces maintain, destroy, and create new phases? What are the implications of new age phases for policy-makers? And, finally, what consequences do new age phases have for the individual, who, as John Meyer (1987) has observed, negotiates the tension between having a “legitimate biography” in the eyes of other people, while at the same time creating an individualized biography as well?

The final chapter in Part I is an excellent companion piece to Mortimer and Moen’s essay. Hagestad and Dykstra (with van Baarle) begin with the observation that North American life course research has tended to focus on micro-level experiences of men and women, while European efforts have focused on macro-level phenomena, especially the implications of policy settings and demographic changes for life course patterns. The “next generation” research should bridge this “continental divide” by examining the implications of changing demographics and pol-

icy for the gendered life course. Key to this bridging effort is the mediating role of the family, especially intergenerational family networks. Hagestad and her colleagues explore the many complexities that arise from this basic insight: the consequences of age segregation for intergenerational relationships, shifting roles and responsibilities within intergenerational networks, and the increasing absence of such networks among childless men. Traditionally, roles, opportunities, and limitations in intergenerational networks have varied by gender. Yet, as the authors note, public policy is just beginning to acknowledge this reality by, for example, encouraging “involved dads” in Scandinavian countries, Portugal, and Germany. These themes are explored with reference to the considerable diversity among nations in their policies governing rights and duties within intergenerational networks.

4 Section II: Changing Social Contexts and Life Course Patterns

Hofferth and Goldscheider review social changes since the mid-twentieth century that have affected family structures, family processes, and the socialization of children. The two stages of the gender revolution (the increasing employment of women followed by increase in male participation in domestic work), lengthening education, and shifts in societal norms have dramatically altered the family life course and produced increasing diversity in family forms and child socialization. These trends are evident in aggregate statistics that document increases in single parent families, non-marital child-bearing, divorce, and the ages of marriage and childbirth, as well as in time use studies that describe considerable change in children’s lives (e.g., gender convergence in children’s time spent in housework and sports).

As the “traditional” family life course recedes in prevalence, children are increasingly reared in dual earner families, stepfamilies, single parent families, and with same sex parents. Moreover, they are increasingly exposed to multiple family

structures before they themselves reach maturity and form independent households. The authors review substantial evidence that the character of experience in the highly formative years of childhood and adolescence has major consequences for patterns of family formation and parent-child relationships in the next generation. Their emphasis on family change nicely complements chapters in *Handbook I* by Uhlenberg and Mueller, and by Putney and Bengtson.

Hofferth and Goldscheider emphasize that these changes are manifest quite differently by social class, racial/ethnic and immigrant status, and gender. Increasing diversity in family structures and the timing of family formation and change (e.g. partnership dissolution and re-partnering) raise the potential for greater individual choice. At the same time, low income and minority families face considerable constraints in constructing stable family lives. Disruption in family life is more likely in less educated, lower income families that are the least able to cope with such change.

Hofferth and Goldscheider's essay shows that in the face of great heterogeneity and social change, understanding family life will become increasingly challenging to life course scholars. They call for future research on social class differences in the consequences of cumulative exposure to distinct family structures and experiences; processes of partnering and marital/relationship sorting in youth, young adulthood, and adulthood; immigrant families; same sex couples; and gender roles in retirement.

The following three chapters on changing educational contexts indicate the promise of greater interaction between scholars of education and those who study the life course. These chapters extend earlier considerations of education found in *Handbook I* by Kariya and Rosenbaum, Pallas, and Entwisle, et al. Crosnoe and Benner describe the many ways that disparities in educational achievement and attainment (e.g., by race/ethnicity and social class) develop and increase as the individual moves through childhood, adolescence, and adulthood. As illustrated by Entwisle, Alexander and Olsen's chapter in *Handbook I*, this is a quintessentially cumulative

process, as initial differences in cognitive skills and knowledge become increasingly pronounced through time. Crosnoe and Benner make an important distinction between primary effects that occur by virtue of differences in cognitive skill and preparation, and secondary effects that arise as a consequence of differences in know-how and decision-making. Thus, interventions to erase educational differentials through early skill development (e.g., preschool programs) will only be partially successful if differences in information (the importance of taking math and science coursework for college acceptance, how to navigate financial aid) are not also addressed.

The consequences of education are pervasive throughout the life course, promoting success across numerous adult domains (e.g., occupational status, earnings, health and mortality, marital stability and parenting quality). Increasingly, the central distinguishing feature of "haves" and "have nots" in contemporary society is the acquisition of a 4-year college degree. The authors identify phases of heightened vulnerability and responsiveness that suggest points of effective intervention to reduce gross educational inequalities.

In the next chapter, Zpata-Gietl, Rosenbaum, and their colleagues draw attention to a much-neglected sector of higher education, the community college, which enrolls vast numbers of minority and first-generation college students. Despite its rapid growth (now constituting nearly half of all U.S. college enrollment) and increasing role in the transition from school to work and to adulthood in general, community colleges remain understudied. The authors document the extent of community college expansion and identify key problems for students and their families. Like 4-year college students, they typically take longer than expected to complete their degrees and many never do so; over 40 % of community college entrants do not have an Associates' degree or certificate 8 years later.

Students in community colleges face distinct problems, largely due to their status as first generation college students, lacking parents and other relatives who can guide them through the college entrance and completion process. The disadvantages of community college students

well illustrate the “secondary effects” noted in Crosnoe and Benner’s chapter. That is, community college aspirants often lack basic information about what they need to do in high school to prepare for community college entrance, how to acquire financial aid, how to select programs that mesh well with their career goals, etc. Delays in degree achievement lead them to postpone normative transitions to adulthood, such as marriage, parenthood, and entry to careers, while taking on considerable debt. Those who begin family formation face role conflicts among their student, marital and parental roles. With delays in degree completion, their advancing age and assumption of “adult” statuses (e.g., as marital partner and parent) reduce parents’ tendencies to support them, financially and otherwise.

The authors’ insights have strong policy implications. For example, failure to pass the remedial placement test prior to community college entry leads to remedial classes for the majority of students, which take time and money but do not earn credits towards a degree. The authors recommend that high schools administer such tests in the junior year so that students may be alerted to deficiencies and have their senior year to address them. Timely advising and clearer curricular structures are also advised. The lack of institutional bridges from school to work makes for severe challenges for students (see also Kerckhoff, *Handbook 1*), decreasing their motivation and efforts while pursuing community college programs and reducing their ability, after graduation, to find suitable work. The authors offer several recommendations to increase the integration of community colleges with local employers and call for research on change in expectations and actual decisions regarding family formation and other transitions in the face of extended educational timetables. We need to know much more about what enables community college students to succeed despite the odds.

In a remarkable empirical study highlighting the life course principles of time and place, Blossfeld, Blossfeld, and Blossfeld examine changes in educational inequality in cross-national perspective. They start with the observation that educational attainment has increased

substantially in modern societies, in accord with global shifts in labor force composition and needs. Given universal gains in education, they ask: Which groups (defined by educational origin and gender) have benefited most strongly from educational expansion? How might educational advantages be transmitted intergenerationally? Are the answers to these questions the same across national contexts? Can prominent theories of educational upgrading and expansion, posed as universal trends in contemporary societies, explain the patterns of change across countries?

PIAAC (Program for the International Assessment of Adult Competencies) data from 22 countries collected in 2011 and 2012 enable cross-cohort comparisons of intergenerational inequality in educational attainment in successive birth cohorts from 1947–1952 to 1978–1982. Gender is a strong theme in their chapter, as rising educational attainments of women have reduced male advantage in some contexts and led women to surpass men in others. While girls have advantages over boys in some cognitive skills, in self-regulation, and teachers’ evaluations, these advantages cannot account for women’s steep rise in educational attainment in recent decades. The authors instead link girls’ rising educational attainments to concomitant shifts in gender roles and time use—the increasing prevalence of dual earner families, reduced gender discrimination, and expanded opportunities for women in occupations requiring higher educational degrees. In a previous era, educating girls was considered less important given their lesser contribution to intergenerational social class standing. Increasingly, however, family socioeconomic status depends on two earners. Men’s roles, in contrast, have changed much less over time; many men still seek employment in blue collar and technical occupations for which vocational training is sufficient. Complicating this explanation, more highly educated families, with their egalitarian norms about education, have historically promoted girls’ and boys’ attainments more equally.

The investigators find distinct patterns of change in inequality across both secondary and tertiary levels. With respect to tertiary educa-

tional expansion (i.e., college graduation), in some countries inequality of educational attainment has risen, supporting cultural reproduction theory. In the U.S., women in the most highly educated families are clear “winners,” and children of the least educated parents have not benefited at all. A similar pattern is found in Poland. In contrast, South Korea belongs to a group of countries in which growth in higher educational attainments has drawn in children from all educational origins, reducing inequality, consistent with modernization theory. The authors relate these differences to the rapidity of educational expansion, ideological shifts, and the individualization of risk.

While this brief synopsis cannot convey the richness and scope of this cross-national longitudinal comparison, suffice it to say that the Blossfelds’ analysis illuminates the trajectories of educational careers across nations and over time, the intergenerational transmission of education, and the multifaceted interrelations of cross-national cultures, educational structures, social class mobility, and gender. The authors call for future research to enable a fuller understanding of the manner in which parental education conveys advantages to children (e.g., through cognitive competencies, non-cognitive traits, parental information and decision-making, and teachers’ evaluations). They underscore the need for detailed prospective and cross-national longitudinal data on the long-term relationships between parents and children and how they influence educational careers through the life course.

Moen’s essay, “Work over the Gendered Life Course,” draws our attention to the increasingly precarious and unpredictable nature of work and its implications for the life patterns of men and women (see also Heinz, *Handbook I*). Although the character of employment, the societal context of work, and the attributes of workers have changed drastically since the mid-twentieth century, the normative framework and expectations surrounding work and careers have remained surprisingly constant, constituting, according to Moen, “a relic” of times past. The 1950s breadwinner-homemaker family, with its accompanying “career mystique” for men and “femi-

nine mystique” for women, was founded on the assumption that men’s attention should be primarily, if not exclusively, focused on achieving success in the paid work role, while women’s focus should be confined to the home and rearing children.

Though not all families could successfully enact this structure, the single provider model of the family constituted the blueprint for life routines and objectives, “the way things should be.” For many male workers, structural features of employment promoted this model of life and provided safety net provisions when it was jeopardized. A living wage, more or less stable employment and career ladders, unionization, pensions, unemployment compensation and disability insurance provided structural scaffolding to this regime, promoting family economic security and well-being. In the present era of globalization, increasing competition, non-standard employment contracts, rapid technological and occupational change, wage stagnation and growing inequality, the security of employment, and “lockstep” movements from education to work to retirement have vanished.

At the same time, echoing Hofferth and Goldscheider’s discussion, Moen notes that families have become much more heterogeneous. The need for two earners to secure a satisfactory standard of living, along with women’s widening aspirations, have propelled women into the workforce. Many employed women seek to enact the traditionally male “career mystique”, seeking parity with men in occupational and income attainments. Increasing longevity and extension of the “active” life span, coupled with the growing cost of living, have led many workers, both male and female, to postpone retirement, further increasing labor force heterogeneity. But despite the many societal and workforce changes rendering the traditional life-long full-time homemaker role nearly extinct, women are still expected, even when working full time, to be primarily responsible for child and elder care, as well as the care of their male partners. As a result, women’s labor force participation is intermittent, with interruptions dictated by family needs. This pattern produces long-term disadvantage in

career attainment and resource accumulation both during and after their working lives.

Moen argues for a re-thinking of basic assumptions on the part of scholars as well as the populace more broadly, e.g., that work always is the primary concern, that the male experience is the template for the expected or ideal life course, that the “lock-step” three-pronged life course is inevitable (preparation for work, work, and retirement), and that the individual is the focal unit. She advocates for replacement of these assumptions with recognition of the diverse goals and circumstances of workers, who remain connected to other family members whose changing needs may take precedence; the convergence of male and female employment and family care patterns; the need for greater flexibility in rules governing the acceptable work day, work week, and work year; and greater flexibility in the allocation of time to work, education, child rearing, and elder care to break up the traditional “lock-step” life course (see also Moen, *Handbook I*).

Moen asks, how can we respond to the institutional inertia that is so much a part of the taken-for-granted character of modern existence, with women exerting monumental efforts to fulfill their responsibilities in their first (employment) and second (family) work shifts? To answer this question, she advocates more *experimental designs and field experiments* to demonstrate the benefits (and costs) of organizational accommodation to workers’ changed lives. Then we will know which innovations promote life quality, organizational effectiveness and gender equity. Moen’s ideas are revolutionary in their scope and implications—extending far beyond work to the ways we think about the gendered structure of time and the life course itself. Particularly intriguing is her emphasis on experimental life course innovation—designing and implementing innovations that can test ideas about re-organizing the life course.

While the five initial chapters in Section II focus on changing contexts that have been much studied by life course scholars—the family, education, and work—the last three address contexts that have been given less attention: the military, the criminal justice system, and disasters.

In their assessment of the military as a life course context, London and Wilmoth provide a

wealth of information about the character of military service and the attributes of those who enter the military. They make a convincing case for the importance of this experience, based on the numbers of people who are serving at any given time, who have served, or who are closely linked to persons with past or contemporaneous service, and the potential for pervasive positive as well as negative outcomes.

London and Wilmoth’s essay illustrates the value of life course concepts (life long development, historical time and place, timing and sequencing, human agency, and linked lives) in studying selection to the military, contemporaneous effects on health and well-being, and longer-term consequences for educational attainment, labor force outcomes, family formation, marital stability, and health. They note studies of the military that have become classics in life course studies—e.g., Sampson and Laub’s research on service as a “knifing off” experience, leading to positive turning points away from trajectories of deviance and crime, and Elder’s work demonstrating more positive effects on later outcomes when service occurs earlier rather than later in life, with the greater potential to disrupt ongoing trajectories of family life and work. Drawing on the extant empirical evidence, they illustrate the impacts of military service on child and adolescent offspring of active service members and veterans; and on early and later adults, among those who have served. Longitudinal studies suggest the need for long-term monitoring as detrimental outcomes may dissipate over time, and positive outcomes may take some time to emerge.

Given recent wars in Iraq and Afghanistan, military service in the context of a volunteer army has become a near-constant option for young people. London and Wilmoth argue that in the context of delayed transitions in “emerging adulthood” military service might be aptly considered a pathway to adulthood in itself rather than (as framed in some research) an experience that delays this transition. The authors call for the collection of nationally representative longitudinal data that enables study of selection into the military, the timing and diversity of military experiences, and both positive (educational attainment, earnings) and negative (PTSD, injury,

depression, marital instability) outcomes throughout life. Ideally, such study would include others connected to military service members and veterans, and address variation by gender, race/ethnicity, social class origin, and sexual identity. The research they advocate, which, like the many studies they review, is likely to demonstrate positive as well as negative impacts, has strong policy implications given recruitment difficulties and concerns that the all-volunteer military places undue burden on a very small portion of our population.

With notable exceptions (see *Handbook I* chapters by Sampson and Laub and by Uggen and Massoglia), the criminal justice system is a second institution that has been neglected by life course researchers, despite the fact that crime and punishment are highly age graded and have marked consequences for future trajectories. Wakefield and Apel highlight the life course principles of context and timing: the development of mass incarceration since the 1970s, the disproportionate concentration of criminal justice sanctions in young, minority, and disadvantaged populations, and the consequences of removing individuals on the cusp of adulthood from progressing, along with their age peers, into adult roles. They document the pervasive impacts of incarceration on the “linked lives” of family members (e.g., physical and mental health, harsh parenting, marital dissolution, wages, homelessness, children’s educational achievement). Finally, under the rubric of agency, they discuss the numerous draws of crime and deviance—as a badge of honor in the criminal culture and a mode of acquiring material resources. Nonetheless, felony convictions and incarceration are “occupational hazards” posing numerous risks in terms of “collateral consequences.” Indeed, incarceration has the paradoxical effect of creating a large “population that is hidden, locked out, and living on the margins of society,” given formal exclusion from employment, educational opportunities, and public housing, and informal penalties, including stigmatization, surveillance following prison, and “secondary prisonization,” the pervasive difficulties inflicted on partners and children.

Prison clearly has countervailing consequences for crime. It removes offenders from society, preventing criminal activity while incarcerated. At the same time, it promotes recidivism by increasing “criminal capital” and by preventing the resumption, or initiation, of a conventional life course upon release. As a result, the authors consider it essential for future researchers to address the features of the prison experience that may lead to better outcomes (job training and post-secondary education). Similarly, it is important to know for whom rehabilitative efforts actually work so as to be able to inform effective interventions and reforms. To achieve this end, prospective longitudinal studies that document experiences in prison and that follow ex-prisoners well after leaving prison are necessary.

Disaster, a third area neglected by life course scholars, constitutes an extreme example of contextual change. For DeWaard, disasters are a most promising domain of life course research given their potential to fundamentally alter human lives as people suffer severe injury, disability, homelessness, and other disruptions that threaten ongoing family and work trajectories. Since both “natural” and “man-made” calamities fall under the rubric of disaster studies, a wide range of phenomena are encompassed: wars, terrorist attacks, earthquakes, hurricanes, floods, droughts, and other events that wreak havoc on people and places. DeWaard conceptualizes disasters as processes, not discrete events, and points out that vulnerability to disaster, and the reasons for vulnerability, depend on the life course stage in which it is experienced. For example, for children and adolescents, disasters threaten sensitive processes of emotional and cognitive development; for adults, disasters jeopardize housing and other material resources; for the elderly, disasters disrupt access to and continuity of medical care. Life course consequences depend on pre-existing vulnerabilities of persons and places and features of the disaster itself, especially the sudden or delayed character of onset and desistance. To illustrate these ideas, he estimates a dynamic population model showing how disaster disrupts the age profiles of migration and mobility.

DeWaard calls for longitudinal research that inventories individuals' pre-disaster characteristics, measures the character of their exposure to disastrous events, and surveys long-term outcomes. While extant research provides some indication that persons are differentially vulnerable to disasters as a function of their prior mental health and earlier adverse life events, we know little about what makes people especially at risk at distinct stages of the life course. His essay suggests the potential for research focusing on exposure to particular types of disaster at particular life stages. For example, might youth and young adults be especially vulnerable to disasters linked to climate change (e.g., droughts), since they will be the ones who are called upon to serve in wars over scarce resources? They are also more apt to migrate across national borders as the acquisition of resources fundamental to human life (food, water) becomes problematic. Their attempts to acquire adult role markers, with marked consequences for future trajectories, will be beset with all the difficulties and disadvantages associated with immigrant status.

5 Section III: Health and Development Through the Life Course

Section III applies life course perspectives to individual differences, including aspects of health, poverty, agency, and cognition. Kalil, Duncan, and Ziol-Guest begin this section with a consideration of the extensive literature on the effects of poverty on children's development. They note that, already in the first grade, teachers' ratings of students' skills (e.g., paying attention) are predicted by income, and that childhood poverty has life-long implications for status attainment. Thus, like educational achievement (Crosnoe and Benner, this volume) the study of poverty and its effects on the life course raises issues about the initial mechanisms through which children begin to differentiate and mechanisms that maintain and magnify such differences. And these issues, in turn, are considered

with reference to the timing of poverty and its consequences.

Kalil and her colleagues emphasize study design and internal validity (see Moore and Brand, this volume), and discuss results from experimental and quasi-experimental studies. Their review points to several intriguing avenues for future research. First, research typically begins assessing children when they enter school systems and, consequently, very little is known about the role of poverty (even less, its mechanisms) in the earliest stages of childhood. Second, there appear to be long-term consequences of children's poverty for productivity in adulthood, but these associations may not be mediated by schooling, wage rates, or behavioral indicators. Thus, a major challenge is to identify the operative mechanisms that link early poverty with life-long attainments. Finally, these two themes are complicated by both measurement strategies for assessing income and poverty, and by the wide array of consequences that are studied.

Hayward and Sheehan focus on adult health as a consequence of life-long experiences. Particularly with the publication of Hayward and Gorman's (2004) classic essay on the "long arm of childhood," a considerable body of research suggests associations between childhood socioeconomic circumstances and adult health. In the present essay, Hayward and Sheehan identify three avenues of research that will further elucidate these associations. First, studies will ideally shift from consideration of one indicator of health to a holistic consideration of a "portfolio" of indicators of health and well-being. This recommendation follows from several findings. Clearly, health is multi-faceted, but the authors discuss research showing that specific dimensions of health are differentially responsive to early experiences. Moreover, different groups in society experience distinct patterns of health; they observe, for example, that older foreign-born Hispanics in the US have lower rates of some chronic conditions and mortality (compared to blacks and whites), but higher rates of disability. Finally, a multifaceted assessment of health is necessary to study the distinct possibility that

aging is associated with a “cascade” or career of health, possibly including pre-disease pathways, symptoms, disease states and chronic conditions, disability, frailty, and mortality. The development and use of a health portfolio, particularly involving a cascade of eventualities, is thus a highly promising strategy to learn more about the long arm of childhood.

Second, Hayward and Sheehan urge the incorporation of biological models into life course studies of health. Very early social experiences may (or may not) “embed” in the biology of the person, but this possibility does not obviate the need to study patterns of experiences beyond childhood. Trajectories of health must be described and explained in terms of origins, change, and the initiation and rate of change. At different points in the trajectory, different experiences may become more or less salient, and the balance of childhood and adult influences may change. The authors explore these complexities with the example of atherosclerosis, which reflects diverse factors at different points in life and may (or may not) lead to increasingly serious compromises to health.

Finally, the authors note that the vast preponderance of research on the social precursors to health, even among life course scholars, has not attended to cohort differences (see Elder and George, this volume). Lack of attention to cohort differences is surprising given the many social factors that are both related to health and that have changed markedly in recent decades; for example, the associations between dimensions of social status (e.g., occupation) and demographic composition and access to health resources and medical technology. The authors discuss major technological developments—beautifully captured in a table—that surely have created disease-specific cohort patterns. Taken together, Hayward and Sheehan’s recommendations for future research—cohort-sensitive studies that use a portfolio-approach to health and that consider the full temporal complexity of both health and its antecedents—point the way to highly nuanced research on health disparities.

Johnson, Staff, Schulenberg, and Patrick begin with the observation that education is a “fundamental cause” of health, meaning that education

provides resources that, by a wide variety of mechanisms, consistently promote health. They review the principal mechanisms for this association in recent decades, but note that returns on education may depend on years of schooling and/or degree attainment, and that increased attention should also be devoted to the relationship between education and specific symptoms and disorders, both mental and physical. This recommendation is clearly consistent with Hayward and Sheehan’s “portfolio” and “cascade” approaches.

Also consistent with Hayward and Sheehan, the authors urge a historical perspective that examines age and cohort patterns, although few datasets currently allow for such studies. They especially urge the study of the age-as-leveler and cumulative advantage hypotheses: respectively, that health disparities decrease with age, and that they increase with age. They suggest that both mechanisms can be operative, and they may also vary by cohort. A second key problematic in the study of social status and health remains selection and causation mechanisms: respectively, that health causes status attainment, and that attained status causes health. Both possibilities are likely true to some degree, at least for some aspects of health, although the precise disentangling of these processes remains a formidable challenge (Moore and Brand, this volume). The study of both age/cohort and selection/causation may be further enriched by framing them in terms of familial generations given that health and education tend to reproduce across the generations.

Johnson and her colleagues urge greater attention to short- and long-term mechanisms by which education influences health. Studies typically examine short-term or long-term implications of educational experiences, but rarely attempt to examine connections between short- and long-term consequences. This opportunity seems especially promising with respect to college attendance, which likely increases some unhealthy behaviors in the short-term, but has long-term positive effects on health. More broadly, the authors explain the usefulness of thinking about educational careers extending from the first years of schooling to educational completion and, on the other hand, health

behaviors and well-being as extending from birth to death. That is, they urge a re-focusing from educational completion and later health, to one of life-long, co-occurring experiences comprising trajectories and transitions. Indeed, some scholars have suggested that both health and education are endogenous to traits such as social skills and conscientiousness (e.g., Ross and Mirowsky 2011; Shanahan et al. 2014).

Ferraro adopts an “aging” framework that considers health in old age as resulting from life-long experiences beginning at conception (and, indeed, in prior familial generations). Although a medical perspective on health in old age has gained considerable traction among scholars, so, too, has a “life course lens.” Ideal data—diverse birth cohorts of people studied from conception to 100 years of age and beyond—will likely never exist, and so Ferraro considers the strengths, weaknesses, and opportunities that attend to three practical strategies for studying health and aging.

First, several datasets provide insights into the lives of centenarians, suggesting, for example, three health career patterns among them: *escapers* (people who reach 100 without any major disease or illness); *delayers* (major disease onset at age 80 or later); and *survivors* (major disease onset before age 80). Although the centenarian studies do not use prospective “control groups” of comparable people who die before the age of 100, this body of research has not identified any one factor (e.g., genetics) as decisive in reaching this milestone. Indeed, many centenarians report lives marked by hardships (including, most dramatically, periods of starvation). This surprising conclusion leads to Ferraro’s first recommendation for future research: the study of how multiple, diverse factors—ranging from the biological to the social—combine over the life course to promote long lives, especially how such factors promote recovery in the face of extreme challenges.

Second, prospective panel studies, involving repeated assessments of the same people over time, are now common; many such studies include retrospective data and, increasingly, administrative records describing experiences prior to the initiation of the panel. A major theme

of this research is that childhood adversity—ranging from low SES to maltreatment—is a potentially powerful antecedent to a surprisingly wide-range of disease states in later life. Ferraro urges continued study of these associations but with an emphasis, once again, on resilience: what are the truly salient features of adversity in childhood? And what resources promote recovery from such experiences? These questions encourage the study of early adversity and later health not in terms of two points in time (childhood, adulthood) but rather in terms of life-long experiences.

Third, Ferraro discusses aging and health in terms of familial generations, the study of which provides opportunities to study the transmission (or reproduction) of three key sets of variables from grandparents to parents to children: genetic, socioeconomic, and behavioral (see Thornberry, this volume; Hagestad, this volume). How these different types of influences coalesce, mediate, and moderate one another to promote healthy aging has scarcely been studied and represents a daunting level of complexity. Ferraro urges that, across these three research problematics, researchers draw on cumulative inequality theory (with its emphasis on longitudinal models of status and health trajectories of different groups in the population), biomarkers that may cast light on the black box common to research on early experience and later health, and spatial and physical contexts of aging (see also, Browning et al., this volume). His recurring message, however, is the value of increased attention to sources of resilience across the life course, both for the individual and social groups.

Significant cross-fertilization has occurred between the sociology of mental health and life course studies in the past 15 years. Avison provides an overview of this synthesis, beginning with the seminal papers of Pearlin and his colleagues, who argued that stress is a multifaceted, dynamic process that encompasses life-long experiences of social stressors, coping mechanisms and social supports, and both improvements and declines in well-being (eustress and distress, respectively). Avison identifies several dividends that have resulted from this synthesis, including studies of the “long arm of childhood”

(see Hayward and Sheehan, this volume; Ferraro, this volume), which involve an appreciation for longitudinal patterns in stressors, often reflecting age-graded roles; for trajectories of mental health; and, increasingly, for complex connections over time between stressors and both physical and mental health.

Trajectories of mental health have been the subject of extensive research, with a focus on interconnections between changing social experiences and changing symptoms. Avison notes several limitations to this research, including limited span of age coverage in most datasets, lack of substantively meaningful change in many symptoms, and inattention to specific disorders. Conceptually, issues of timing are especially challenging, including the relative importance of past and present circumstances, mental health at a point-in-time versus trajectories of symptoms, “careers of mental health” that include first occurrence of a disorder, recovery, and later episodes, and the long-standing challenge of selection and causation. Like many authors in *Handbook II*, Avison discusses several natural experiments and urges researchers to search for such opportunities.

Despite these challenges, Avison urges the continued study of trajectories of mental health, and he suggests several themes for future research. First, research in psychobiology and developmental psychology points to the importance of childhood experiences of stressors and their enduring social psychological consequences. Avison urges that studies of trajectories of mental health—which typically focus on adolescents and adults—extend to include childhood exposures and resulting behavioral tendencies. Second, he urges continued study of the complexities of the “stress universe,” especially the extension of research to multilevels of stress (e.g., neighborhoods and other spatial distinctions; see Browning et al., this volume; biomarkers, the Barker hypothesis, and diverse genetic mechanisms; see Shanahan et al., *Handbook I*), the meaning of stressors for the person, and the surprisingly unexplored issue of cumulation (i.e., the functional form of the effects of stressors). A third challenge for researchers is the possibility of turning points that re-direct mental health trajectories, suggesting non-linear

(or discontinuous) change in mental health, and the identification of social experiences that can have such remarkable implications. Avison’s essay thus provides a superb overview of this sub-field, identifying accomplishments, limitations, and future directions.

Two essays in this section focus on individual differences that, while having clear connections to health, are often studied in their own right. Hitlin and Kwon discuss the long-standing interest in agency (see also Gecas, *Handbook I*). They focus attention on agency as a concept that has been traditionally measured in ways that lack content validity. They note that most studies of agency have used survey instruments such as self-efficacy, mastery, future orientations and, less commonly, planful competence; psychological cognates such as conscientiousness are discussed in terms of agency as well. Hitlin and Kwon review research on these topics, showing that a considerable body of knowledge has emerged on how they are socially distributed by social class, gender, and race, and how they are associated with common social experiences (e.g., school performance).

They identify several avenues for future research. First, they explain the value of cross-national and cross-cultural studies of agency. A limited body of research suggests that age-graded trajectories of constructs like mastery differ by political economies, although results are thus far only suggestive. The study of connections between political economies and agency through life is thus one avenue for future research (see Diewald, this volume), which is becoming increasingly possible with the proliferation of sufficiently harmonized cross-national data. With respect to culture, they note that research has been heavily influenced by the long-standing distinction between collectivistic and individualistic societies, but that this distinction has been criticized as too simplistic. There is considerable variability within countries (often between, for example, rural and urban dwellers), and younger cohorts are being influenced by a global culture that promotes individualism. Moreover, it is unclear whether common measures of agency—developed in the West—adequately capture the content validity of the concept in other societies.

Finally, Hitlin and Kwon bridge these concerns for cross-national and cultural differences with issues of timing. They note that, while good progress has been made (e.g., the work of Ross and Mirowsky), there is much about the age-graded nature of agency that is not well understood. Evidence suggests that constructs such as mastery follow an age-graded, inverted U-shape curve, increasing through earlier adulthood and declining in later adulthood. Yet many segments of the curve remain unexplained, particularly in adolescence. Moreover, some evidence suggests that mastery may often reflect notable cohort effects, and they thus urge the study of agency as an age-period-cohort problem. These future directions suggest exciting new lines of research on connections between macro and micro phenomena. First, basic issues of measurement need to be addressed to capture the content validity of agency in diverse countries and cultures. Second, to the extent that such measures are comparable, we need research on how age-trajectories of agency vary by political economic systems, and the factors that explain these age-related patterns. And third, attention should be directed to cohort and period effects that shape agency both within and between societies.

Alwin, Thomas, and Wray consider cognitive development from a life course perspective, which is an intriguing focus given the strong developmental orientation of most research on this topic. We close this section with their essay because, in addition to expertly considering cognition, their work has much broader implications that extend to the study of any individual difference (e.g., personality, health, agency). They note that while life course scholars often refer to human development in abstract terms, “they rarely focus on the ways in which life course events, transitions, and trajectories actually impinge on and are affected by developmental outcomes over the life span.” The authors note that stability in cognitive functioning is very high but that this may reflect increasing stability in social circumstances, especially in adulthood. Echoing Dannefer et al. (this volume), a more probative consideration of the malleability of cognitive functioning would shift focus from

age-related stability to how social location and events in the life course may alter age-graded trajectories.

Growth models of cognitive development almost always examine age-graded change. In contrast, they propose a latent difference score model according to which the observations are organized with respect to the experiencing of an event such as retirement. This “event-centered” growth model can thus reveal change patterns leading up to and subsequent to the event. The authors expertly review extant knowledge about cognitive functioning across the major phases of life, and then suggest extensions, for each phase, that would apply their event-centered approach. This strategy can also be used to study the same event (e.g., transition to retirement) for different subgroups of the population who experience it at different ages, although selection into groups may limit this design somewhat.

As Alwin and his colleagues note, there are many widely-experienced events across the life course that can be studied in this framework, including transitions involving school, work, and family. Thus, broadly viewed, their event-centered model provides insight into the developmental patterns of individual differences, but also how these patterns can be altered by the many transitions and events of the life course. Growth models that are “event-centered” could be applied to the study of diverse outcomes; indeed, their approach meshes well with Avison’s call for research on turning points in trajectories of well-being and Dannefer’s interest in moving away from the “functional-developmental” paradigm.

6 Section IV: Methods for Life Course Research

Section IV begins with an essay on qualitative longitudinal research in life course studies by Hermanowicz, who draws on his extensive experiences in the study of scientific careers. As he notes, long-term interview-based projects are rare, but they offer enormous potential for the description of trajectories, transitions, and the interpretive stances of life-long experiences. This

potential is clearly illustrated in his award-winning book, *The Stars Are Not Enough*, and he discusses this methodology with additional examples from family, health, education, and crime. While showing the promise of this approach, he also points to several avenues for methodological refinement, discussing issues of design, execution, and analysis. Hermanowicz shows that this methodological strategy is well-suited to the study of between- and within-cohort processes, as well as capturing processes related to age. *Handbook I* included an essay on life course narratives by Cohler and Hostetler that largely focused on cohort-related mechanisms.

A common criticism of life course research—indeed, of the largely non-experimental subfields of the social and behavioral sciences—is that findings to date are largely associational or, put differently, they are lacking the internal validity necessary to make solid causal inferences. For example, Adler et al. (2012) notes that although socioeconomic status and health is among the most studied topics in the social sciences (see Frytak, Harley, and Finch, *Handbook I*), very few causal conclusions are warranted in this subarea. Section IV includes an essay by Moore and Brand on causal inference in life course studies.

They present a series of methods (multiple regression, matching models, instrumental variables, and random and fixed effect models) in largely intuitive terms and provide illustrations from life course sociology. They emphasize these methods' strengths, limitations, and assumptions as they pertain to causal inference. They also briefly consider experiments and quasi-experiments, which will likely become more common in the years to come. Moore and Brand then turn to the crucial issue of heterogeneity in treatment effects, meaning that the independent variable has an effect, but that it varies by probability of exposure to the independent variable. They then illustrate the methods with simulated data that allow for comparisons between, on the one hand, the true counterfactual effects, and estimates of causal effects from the methods that they present.

Macmillan and Furstenberg present a unique discussion of growth curve models that details how many core ideas of life course sociology can be tested in this framework. Given repeated mea-

asures of an outcome of interest—the authors use the example of body mass index—how does the analyst model level and change (i.e., trajectories) in terms of social structures, transitions, turning points, accumulation, accentuation, and leveling? Macmillan and Furstenberg work through the essential meaning of these concepts and then show, in intuitive terms, how they can be tested in a random-effects framework. Their contribution is an excellent example of developing tight connections among concepts, hypotheses, measures, and models. *Handbook I* included an excellent companion chapter by Macmillan and Eliason that explored trajectories as scalar variables (i.e., as pathways).

Thornberry discusses the increasingly common possibility of conducting research that examines trends across three familial generations. He proposes a set of criteria that jointly define three-generation research, as well as its promises and limitations. The three-generation framework becomes especially powerful with prospective data for each generation and comparable measures at the same age or developmental stage for (at least) the parent and child generations. As Thornberry explains, the resulting data allow for the study of the intergenerational reproduction of behaviors at the same and differing ages, their precursors and consequences. He especially focuses on the example of parenting, exploring the many unique research questions that can be addressed with three-generation designs, as well as challenges, particularly sampling and measurement issues. Many examples are drawn from the Rochester Youth Development Study, with which Thornberry has worked extensively.

Section IV closes with an essay by Browning, Cagney, and Boettner on another type of data that is becoming increasingly common: data that describe place, or sociospatial contexts, especially neighborhoods. The authors present a substantively rich overview of basic life course ideas and their application to neighborhood and place effects. They distinguish between activity spaces—the places of everyday, routine activities—and ecological networks, which refer to the aggregation of activity spaces into larger meaningful spaces such as cities.

Browning and his colleagues discuss the promise of and current limitations to life course studies of place: mechanisms (e.g., collective efficacy, organizational resources, and social and physical disorder); differential exposure to settings, including what the authors term “eco-networks” that describe people and places and “place trajectories;” differential reception (or experiencing) of contexts by their inhabitants based on, for example, age, gender, and race/ethnicity; concerns about defining (or bounding) spaces such as neighborhoods; selection and causation; the use of new technologies to capture more detailed data; theoretical developments that help explain how multiple contexts simultaneously affect the person; and the extension of studies from their traditional purviews of children and adolescents. By juxtaposing extant research with these many challenges, the authors clearly show that the study of place in the life course holds exciting intellectual opportunities, both substantively and methodologically.

7 Section V: The Life Course and Policy, Building the Nexus

Handbook II concludes by returning to a point made in the opening chapter by John Bynner: given the very large investments that societies are making in the collection of longitudinal data, life course studies must convey their relevance to policy and interventions. The contributions in Section V address many vexing social problems that are both the subject of life course research and public policy: crime, health, poverty, cross-national differences in work and family, youth in the developing world, and implications of large-scale demographic and economic forces on the life course.

Laub begins Section V from a highly unique vantage point: as a leading scholar in criminology and as a former Director of the National Institute of Justice (NIJ) in the Office of Justice Programs in the Department of Justice during the Obama administration. Laub explains how a life course perspective is ideally suited to providing a

larger conceptual framework within which to conduct research and to link findings with policy. He then provides a concise overview of his work with the Glueck data (with Robert Sampson), which resulted in numerous important findings about desistance from criminal behaviors. Laub draws on his experiences at NIJ to reveal the potential and challenges associated with applying science to policy, including the influence of non-scientific considerations such as values and politics. He advocates for “research-practitioner partnerships” and illustrates this concept with his experiences with NIJ’s 4-year project with the Harvard’s Kennedy School of Government on the Executive Session on Policing and Public Safety. Such a venture is rare, but the project was successful and may serve as a model for future efforts to bridge basic science and policy.

Wadsworth and Kuh draw on a lifetime of research in life course epidemiology to outline the basic approach and show its long-standing concerns with applied problems of public health, ranging from infectious diseases to childhood allergies. Indeed, their concise historical review shows how life course epidemiology—perhaps unique among the many subfields of life course research—has always been “driven by the requirements of the medical sciences, policy thinkers, and the social sciences.” Paralleling Laub’s argument, Wadsworth and Kuh argue that life course epidemiology is an excellent conceptual and methodological framework that provides a context to both research and policy.

The life course epidemiology framework encompasses several themes that are especially relevant to the application of basic science to the improvement of population health: a life-long view of the person’s health extending from prior generations to old age, changing attributes of populations, stress processes, and the use of “big data” that encompasses diverse forms of sophisticated data to describe populations. Wadsworth and Kuh note that the bridging of science and policy is becoming increasingly promising and challenging with advancements in technology, particularly involving the use of social and biological data. Echoing Bynner, they urge increased international cooperation in study design and measurement.

Herd's starting point is that research on the effects of policies and life course processes often, unfortunately, do not intersect. She illustrates this point by considering research on the effects of social welfare policies in the United States on health, and the largely distinct literature on socioeconomic status and health across the life course. She argues that the two literatures can inform one another, thus creating an incentive for closer collaboration. On the one hand, life course research has paid little attention to social welfare policies, despite the fact that social welfare spending consumes 60 % of both federal and state budgets. On the other hand, policy research has tended to focus on the short-term implications of policies for health and also on health during the early life course, with relative inattention to later life. Herd expertly weaves these two bodies of research to consider a wide range of specific social welfare spending programs, including childcare, Medicare and Medicaid, and income support programs such as Social Security. Highlighting the possibilities for cross-fertilization between life course and policy research, she identifies several areas for future research, including the long-term implications of welfare programs directed at children, the importance of linked lives in the study of welfare programs, the creation of quasi-experiments with the introduction of new policies and differences among states, and the role of policies in redirecting transitions, trajectories, and pathways in people's lives.

Diewald draws on a central concept in contemporary life course studies, risk, to develop a conceptual model of how welfare policies differ cross-nationally (see also, three chapters by Leisering, Weymann, and O'Rand, *Handbook 1*). He notes that societies differ greatly in how they seek to manage risk (the probability of a hazardous event occurring) and adversity (disadvantages resulting from risk). This distinction underscores the need to understand precursors and consequences of risk, as well as the circumstances in which risk actually results in adversity. Diewald proposes a "life course risk analysis" according to which risk reflects multilevel developmental processes that include early biological

differences and experiences in the family, resulting in "embodied" behaviors and decision-making biases, which then alter the likelihood of risk and adversity.

These developmental processes are complicated by the fact that this basic template—biological differences, experiences in the family-of-origin, and behavioral and decision-making tendencies—differs greatly among groups in a society (men and women, migrants and native-born, low and high status, etc.). Diewald proposes that these developmental processes should be the true focus of policy-makers. And scholars who study the intersection between policy and the development of risk and disadvantage should maintain three distinctions: the extent to which the state prevents risk and/or disadvantage; the types of risk and disadvantages that are especially worthy of public investments; and how differing groups in society benefit, more and less, from policies. He illustrates his model and these distinctions with many examples from Europe. A major challenge for the study of policy and the life course, however, derives from the relative strengths and limitations of focusing on one policy between countries (or states) and policy regimes.

Dornan provides an overview of the highly unique Young Lives study, which brings a life course perspective to the study of youth in middle- and low-income countries, Ethiopia, India (Andhra Pradesh), Peru and Vietnam. He shows that, across these countries, rurality, low socioeconomic status, and ethnicity (minority status) reduce access to basic services, which explains much of the early emergence of inequalities. Further, access to and the structure of schools can mitigate or reinforce these emerging differences. Dornan highlights trajectories of stunting, a key indicator of physical development that is, in turn, associated with cognitive development. As he notes, the life course framework used by Young Lives allowed for the discovery of patterns that ran contrary to common wisdom: the earliest period of life is certainly important to stunting trajectories but later childhood can be a "turn-around phase" and, in any event, experiences in later childhood are needed to maintain normative

growth. Research also reveals the high degree of associations among domains of development, physical, cognitive, and psychosocial.

In contrast to US policy-making (as observed by Laub and Herd), Dornan notes that many international organizations draw on a life course framework, including the World Health Organization, the United Nations Development Program, and UNICEF. Consistent with Laub's and Herd's chapters, he notes that policy needs to have a firmer basis in evidence. He further adds that this is especially true in middle- and low-income countries, the policies of which are often influenced by tradition, ideologies, and politics. Finally, consistent with Laub's observations, Dornan urges that life course researchers involve policy-makers at all stages of their research, extending from problem formulation to interpretation of results and their implications, and communication of science to all of society's stakeholders.

Finally, O'Rand and Bostic argue that life course studies should be placed explicitly in the broad context of global change. They begin with Riley's classic formulation of structural lag, "that social institutions, organizational arrangements and cultural stereotypes [lag] behind demographic change." O'Rand and Bostic argue that the original structural lags that were identified by Riley (e.g., the inadequacies of policies to reflect gender differences in the life course) remain and that new lags have been introduced with the rapid pace of social change, including demographic changes (especially involving aging) and economic globalization. As they observe, "these large-scale trends are having on-the-ground impact on institutional arrangements that affect educational opportunity, job security, health care eligibility and access, and individual and family well-being across the life span."

O'Rand and Bostic suggest three themes that facilitate the study of the life course against the background of rapid, large-scale changes. First, they propose a re-definition of the life course itself, shifting from a sequence of age-graded roles to a "manifold cumulative phenomenon consisting of intertwining processes associated with human development from birth to death, that include biological, cognitive, and social transi-

tions that are interdependent and cumulative in their impact with age." The key definitional shift is from the traditional emphasis on sequences of roles to continuous processes involving, principally, selection and causation, cumulation, agency in context, and inequality. This shift, they argue, is necessary because the phase-based conception has become too restrictive in the wake of rapid change and myriad forms of inequality both between and within societies (see Mortimer and Moen, this volume).

Second, they urge the study of new forms of literacy that guide decision-making in the face of new forms of risk, especially financial and health literacy. This theme complements nicely the conceptual model proposed by Diewald, which emphasized the central-but-neglected role of decision-making in the life course. And third, reflecting the mass movement of peoples across borders, the authors urge the study of migration from a life course perspective (See DeWaard, this volume; Jasso, *Handbook I*). Such research would attend to origin and host countries, cohorts and aging, leavers, stayers, and returners, and relationships among groups in the host society.

Despite our best efforts, we are aware that our summaries and Table 1 fall short of conveying the richness of insight offered by the many chapters in *Handbook II*. We thus urge readers to discover this richness, in the context of their own research interests, through careful study of these essays.

In closing, we express our gratitude to the many people who have contributed to this project since its inception. First and foremost, we express our enormous appreciation to the authors of the chapters. The focus on future directions is an especially challenging intellectual endeavor, but one that pays off by influencing the field, especially young scholars who are formulating their unique syntheses of the life course paradigm and identifying strategic areas of study. All of the contributors expertly draw on their substantial research experiences and knowledge, and we believe that their impressive efforts will indeed be influential. We also thank Esther Otten, Publishing Editor at Springer, who has been most encouraging, and Hendrikje Tuerlings, also at Springer, who provided superb support through the development of this project. Finally, our

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References

- Adler, N., Bush, N. R., & Pantell, M. S. (2012). Rigor, vigor, and the study of health disparities. *Proceedings of the National Academy of Sciences*, *109*(S2), 17154–17159.
- Hayward, M. D., & Gorman, B. (2004). The long arm of childhood: The influence of early life conditions on men's mortality. *Demography*, *41*, 87–107.
- House, J. S. (1977). The three faces of social psychology. *Sociometry*, *40*, 161–177.
- Meyer, J. (1987). Self and the life course. In G. M. Thomas, J. W. Meyer, F. O. Ramirez, & J. Boli (Eds.), *Institutional structure: Constituting state, society, and the individual* (pp. 242–260). Beverly Hills: Sage.
- Mortimer, Jeylan T & Michael J. Shanahan (Eds). 2003. *Handbook of the Life Course*. New York: Springer.
- Ross, C. E., & Mirowsky, J. (2011). The interaction of personal and parental education on health. *Social Science and Medicine*, *72*, 591–599.
- Shanahan, M. J., & Freeman, J. (2012). *Bibliographic trends in life course research*. Paper presented at the 2012 Annual Meeting of the American Sociological Association, Denver, CO.
- Shanahan, M. J., Hill, P. L., Roberts, B. W., Eccles, J., & Friedman, H. S. (2014). Conscientiousness, health, and aging: The life course of personality model. *Developmental Psychology*, *50*(5), 1407–1425.

Part I

**Foundations of Life Course Studies
and Future Research**

Institutionalization of Life Course Studies

John Bynner

The institutionalisation of life course study reflects the culmination of a number of developments that were central to its establishment as a field of scientific inquiry in the form that it takes today. The key component of this transformation are the longitudinal data that supply the empirical basis for life course research. Hence, the development and institutionalisation of life course study reflects the massive growth of longitudinal inquiry. The distinguishing feature of such work is the need for continuity to sustain the study through the good times of high investment and high scientific returns and the more difficult times when funding runs out between surveys. It is during the latter periods, in the absence of any protective infrastructure, when the survival of the study requires the strong leadership and dedicated commitment of staff, often at personal costs to themselves, for the study to survive (Bynner and Goldstein 1998).

In this chapter I chart such progress in the form of a brief *historical overview* of the development of longitudinal survey research, then move to the interrelated technological, methodological, and theoretical changes that led to the growth of scientific and especially, government

interest. The consequence was the transformation of longitudinal study from a research method in the social and behavioural scientists' tool kit into a massive generator of *research resources* demanding substantial *scientific investment*. Such investment resulted in the large and complex data sets on which the major life course research programs are based. The final sections of the chapter document the evolution of institutions and infrastructure as a response to the need for data quality, communication and collaboration. In return, there has been a growing obligation on researchers to ensure that data are accessible and findings are communicated in comprehensible form and as widely as possible to those in the scientific and policy communities who need them. A final section addresses future prospects and challenges ending with some thoughts about next steps.

1 Origins and Development

Life course study is typically described as a 'perspective' or 'approach' rather than a scientific theory in the conventional sense of linked hypotheses deduced from postulates tested by empirical evidence (Mortimer and Shanahan 2003; Elder 1998; Elder and Shanahan 2006; Heinz and Marshall 2003; Heinz et al. 2009). Although originating in post-war sociology, the full realisation of the perspective has come to be

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seen as lying in the interdisciplinary understanding of human development gained from synthesis of findings across a wide range of inquiry. The theoretical contributions -of particularly sociology, psychology, biology, criminology, demography, epidemiology, geography and history, thus all had a part to play.

Such holistic understanding, described by Lerner (2006) as *developmental science*, has in fact been recognised as the goal of the study of human development for some time. Paul Baltes draws attention to the recognition of the value of the longitudinal orientation as early as the eighteenth century in the writings of the German philosopher Nikolaus Tettens. With an uncanny signalling of current life course preoccupations Tettens also urged that such study should take place from cradle to grave and be holistic in conception, thus anticipating the need for multi-disciplinary approaches across the whole life span (Baltes 1987; Baltes et al. 2006). Tettens was followed in the nineteenth century by such writers as the Belgian polymath Adolphe Quetelet who, as Baltes (1995) reports, promoted the idea of ‘social physics’ and similarly life span studies. In ‘A Treatise on Man and the Development of his Faculties’ (1842), he also argued for cohort comparisons to separate age from historical (period) effects.

1.1 Early Studies

The feasibility of conducting such longitudinal studies and realising their scientific potential was not a serious prospect until very much later. The designer of a life course study that is to meet the *ontogenetic* requirement of explanations of development based in human biology interacting with external circumstances across the whole life span (Magnusson 1993) has a number of challenges to meet. Not least of these is that the mortality of those who start the study off means they will not be around to gain the scientific benefit of its later stages, let alone its completion! The founder is therefore in effect bestowing a legacy on those that follow him or her – pointing to the need for *infrastructure* to ensure continuity.

Accordingly, the early longitudinal studies tended to be focused on specific topics in a particular scientific discipline and restricted data collection to a particular phase of the life course, especially the early years. The maximum period to completion was often no longer than 15 years. In contrast, today’s studies, in design and realisation, are typically much broader in their attempt to bridge life course domains, traverse all life course stages, and to engage the concerns of many disciplines.

In his historical overview of longitudinal research, Sontag (1971) reports the blossoming of US longitudinal studies through the early part of the twentieth century taking its stimulus from the series of meetings held in the mid-1920s organised by the National Research Council and involving such influential social and behavioural scientists as Margaret Mead, LL Thurston, Clark Wissler, Robert Yerkes, Richard Scammon, and Arnold Gesell. The outcome was the establishment of the *Society for Research in Child Development* and the journals *Child Development* and *Child Development Monographs*.

Leading institutes in the development of the field included the Institute of Human Development at Berkeley, the Brush Foundation at Cleveland, the Child Research Council of Denver, the Harvard Growth Study, the Fels Research Institute, the Minnesota Child Development Institute and the Iowa Child Welfare Station. The starting point and mission was the need for *multi-disciplinary*, if not *interdisciplinary*, conceptualisation, but this strategy was not maintained. Perhaps because of the early interest in child development, child psychology soon took over as the dominant discipline to supply the main, if not only, theoretical means through which human development was to be understood.

The studies undertaken also suffered from all the difficulties of conducting such long-term work at the time, and many such studies comprised no more than a leading Professor with support staff, most of whose time and energy was devoted to data collection. Sontag (1971) sees the problem as one of inadequately thought out scientific programs lacking hypotheses. There was a tendency of staff to focus their efforts on data collection as a worthwhile end in itself while failing to

see the need to exploit the data to justify their collection in the first place.

As Baltes et al. (2006) point out, the defining feature of these longitudinal studies involved separation between the separate ‘stages’ of development – childhood, adolescence, adulthood, old age – rather than in formulating a holistic, and in his terms, *ontogenetic* account embracing all of them. The change came later with growing interest in aging and old age to which psychologist Bernice Neugarten’s Development and Aging program at the University of Chicago was a major contributor (Neugarten 1996). Matilda White Riley (1988) was another. From her position in charge of Social Science Research in the US National Institute of Aging, Riley promoted longitudinal studies and the concept of aging as a ‘social construction’, thereby opening the door to interdisciplinary approaches. But in practice, as Baltes and colleagues point out, dialogue and certainly integration between the two areas of child study and aging research was virtually non-existent.

There was therefore from the beginning, in effect, a closing off of interest in development across the whole life span. Hence, for some time, there was neglect of the study of the *long-term* consequences for psychological adjustment and physical health of early experience and circumstances. Notable exceptions were: John Bowlby’s (1952) World Health Organisation inquiry into the effects on adult mental health of war-time children’s separation from parents; Emmy Werner’s 1950 Kauai birth cohort study (Werner 2004) focusing on long-term resilience in the face of adverse child circumstances; and David Barker’s (1992) studies that traced the origins of adult illness such as coronary heart disease back to early fetal experience following conception. In fact as Elder and Shanahan (2006) note, the possibility of a *life course* perspective – as signalled, for example, in Thomas and Znaniecki’s (1918–1920) classic text, *The Polish Peasant in Europe and America, 1918–1920* – was largely ignored until 40 years later. Lerner (2006) makes a similar point in referring to the ‘glacial speed’ with which theoretical innovation in human development usually moves, arguing for his interdisciplinary

developmental systems approach to achieve the integrative goals to which, in his terms, *developmental science* should be directed.

Of the few early studies that did survive long term, usually through the efforts of the dedicated individuals who took over responsibility for them or through recognition from their archived information of their scientific potential for life course studies of aging, some key studies became corner-stones of life course research (Elder 1974; Elder et al. 2003; Elder and Shanahan 2006). Notable examples are the FELS longitudinal study starting in the 1920s that followed all children in Ohio and continues to this day; the Oakland and Berkeley Growth and Guidance studies starting in the early and late 1920s respectively; Terman’s 1921 study in Stanford California, with birth years going back to 1900 that followed children in the top quartile range of scores on the Terman-Merrill IQ test (Sears 1977).

The latter study’s focus on the talented, as opposed to low ability and disadvantaged poor performers, is of itself interesting in reflecting the preconceptions and interests in understanding talent and success, rather than failure that prevailed. This was at a time when genetic explanations of cognitive ability were dominant and eugenics in social policy formation was a prominent concept. The focus on cognitive function and its possible decline continued to be reflected in other long term studies such as the Scottish Mental Surveys of children, starting in 1931 and 1947, that also used the Terman-Merrill test. The sample members were traced as recently as the 1990s for follow-up studies of cognitive aging (Brett and Deary 2014). The priorities of the longstanding Malmo study in Sweden starting in 1937 (Husen et al. 1969; Furu 2000) were similarly directed towards the factors underlying the developing intelligence of the followed children.

The common feature of all these pre-war studies was their longevity and the collection of an ever-widening range of age-graded measures as the samples matured. The findings mainly from secondary analysis of archived data supplied, accordingly, the basis for the break-through by which John Clausen (1972, 1986), Director of the Institute of Human Development at Berkeley, and

sociologist Glen Elder (1974, 1985), followed by others such as social historian John Modell and sociologist Frank Furstenberg (Modell et al. 1976; Modell 1989), developed the life course perspective.

1.2 Expansion

Following the second world-war, the focus of longitudinal inquiry still remained fixed on relatively small, usually area-based inquiries, with only the beginnings of the much later shift to large scale national epidemiological surveys such as the Norwegian and Danish birth cohort studies (e.g. Olsen et al. 2001; Martin et al. 2006). Hence a central focus was the conditions of birth and their consequences for physical growth and later health outcomes within the relatively restricted frame of ‘exposures and survival’. The famous Framingham study, devoted to the aetiology of heart disease, was one of these starting in 1947, and it is still collecting data. The origins of *life course epidemiology* can be found in the findings of these early studies (Kuh and Ben Schlomo 1997; Pickles et al. 2007; Halfon et al. 2014). The 1955 Kauai longitudinal survey, extending from birth to the late 40s, as the first to identify predictors of “escape from disadvantage” and adult mental health (Werner 2004), was also seminal in the development of life course thinking.

1.2.1 British Studies

This period also witnessed the beginning of the British population-wide series of birth cohort studies that started with post-war concerns about perinatal mortality (Williams 1997) before broadening out to a wider life course conception (Bynner and Joshi 2007). The *National Survey of Health and Development (NSHD)*, began by James Douglas in 1946 (Douglas 1964), was based on a 5,000 strong national sample taken from the 15,000 babies born in a single week in England and Wales. And in the tradition of pre-war inquiry the survey was weighted towards the more able children through over-sampling the more educated families (Wadsworth (1991).

NSHD was followed in 1958 and 1970 by the first of the series of British birth cohort surveys, starting at 12-year intervals. In each case the sample comprised this time all 17,000 births in a single week in England, Wales and Scotland.

Following the tracing of study members in the initial perinatal mortality survey of mothers and children, for the purposes of a Government commission on primary schooling, and through the efforts of Neville Butler and Mia Kellmer Pringle, the *National Child Development Study (NCDS)* became a longitudinal survey in 1974. The *Child Health and Education Study (CHES)* – later to become the *1970 British Cohort Study (BCS70)* – followed in 1970 when it was launched by Neville Butler as a longitudinal survey from birth. To continue the 12 year interval series, a new survey was expected to begin in 1992, but because of opposition from clinical research interests, the proposal for one was rejected. The grounds for rejection was that little was to be learned from the new survey, not already known from the earlier ones; it was therefore not worth the cost – a notable rejection of the life course perspective! The closest to the ‘missing cohort’ (Martin et al. 2006) was the Bristol area-based *Avon Longitudinal Survey of Parents and Children (ALSPAC)* led by Jean Golding, which started in 1991–1992 based on pregnancies rather than births (Golding et al. 2009).

The series was revived in 2000 with the government-funded ‘Millennium Cohort Study’ led by Heather Joshi based on 19,000 births, this time spread over a whole year in 400 electoral wards rather than concentrated in a single week. There were sample boosts in Scotland, Wales and Northern Ireland and in wards of high economic deprivation. In consequence differential weighting was needed to achieve population representation in analysis based on the survey. Data collection was also extended to fathers as well as mothers for the first time. The survey following, led by Carol Dezateux, is the ‘Life Study’ due to begin in 2015 – is based on 100,000 first trimester pregnancies in a design combining a number of area-based studies with a national probability sample of 20,000 (Bynner et al. 2008; Dezateux 2014).

1.2.2 Swedish Studies

Building on the precedent of the 1937 Malmö study, a number of longitudinal studies of cognitive and behavioural development began in Sweden (reviewed in Janson 2000), including: *Evaluation Through Follow-up*, based on birth cohorts born in 1948 and 1951 that were first contacted in 1961 and 1966; the *Individual Development and Adaptation* programme, starting in 1964–1965 and based on age cohorts starting at ages 10, 13 and 15 respectively; and *Project Metropolitan* based on a cohort of boys born in 1953; girls were added to the sample later.

These longitudinal studies are distinctive in capitalising on the rich stocks of register data collected in Nordic countries from birth onwards across all life course domains for every individual citizen. Project Metropolitan took advantage of such resources comparatively, by means of what were intended to be three parallel longitudinal surveys carried out on cohorts of boys born in 1953 and living in 1963 in the three Nordic capital cities, Stockholm, Oslo and Copenhagen. A projected Finnish study never materialized. The main foci of the project were social mobility, membership of groups and associations and “positive and negative deviance” – the last capturing positive deviation in which the individual “does more than is expected, e.g. becomes a prize winning athlete, a creative artist, or a moral guide” to set against negative deviation reflected in “a physical and mental disease, crime and delinquency, alcohol or drug addiction, social isolation etc.” (Janson 2000, p. 141). First contact with cohort members took place in 1966 when the sample had reached age 13. Prior to that all data utilised were from the registers.

However, the linkage of the register data, especially criminal records, to the personal data collected from cohort members, is where Project Metropolitan came undone. Adverse press reports led to its termination first in Oslo then in Copenhagen, where the restrictive permissions procedures imposed by the authorities made the study no longer scientifically and operationally viable. In Stockholm, the 1966 survey and one follow-up in 1968 went ahead but only on the proviso from the Swedish Data Inspection Board,

first that permission should be sought from every individual cohort member to use any piece of register data about them and finally in 1986 that the data tape containing personal identifiers should be destroyed. Subsequently the study relied on secondary analysis of what had been extracted in anonymized form earlier.

1.2.3 Australasian and Canadian Studies

Other countries contributed to the general expansion of longitudinal studies through the 1970s, including the highly productive New Zealand birth cohort studies begun in Dunedin (Silva and Stanton 1996), and in Christchurch in 1977 (Fergusson et al. 1989). The Dunedin study benefited from major inputs from leading US developmental scientists including Avshalom Caspi and Terrie Moffitt, attracted to fellowships offered by the director, Phil Silva, to analyse the data. Moffitt subsequently became deputy director. A later child study was established in Canada, the 1994–1995 *National Longitudinal Survey of Children*, based on following up a child panel with an age range from birth to age 11. Canada was also the first country to undertake a continuing longitudinal survey of immigrants.

1.2.4 US Studies

US studies also blossomed during this period but this time typically with large national probability samples and a move away from single starting birth dates to age-graded panels starting at different life course stages ranging from early childhood through adolescence to old age. These were located in a number of major university research centers including, Michigan (Institute for Social Research), Berkeley (Institute for Human Development), Minnesota (Institute for Human Development and also the Life Course Center, which houses the Youth Development Study Mortimer, 2012), Chapel Hill, North Carolina (Carolina Population Center), Wisconsin (Wisconsin Center for Demography and Ecology, which houses the *Wisconsin Longitudinal Study* Sewell et al. 2001) and Chicago, National Opinion Research Center e.g. Department of Labor’s *National Longitudinal Studies*.

The focus of these studies tended to be on transitions at different ages such as school entry and the move from education to employment. The basic design varied from the single age cohort, as in the ISR Michigan-run *Youth in Transition Study* (Bachman 1972) through quasi sequential cohorts (age-graded panels) as in the *National Longitudinal Surveys of Youth* (NLSY79, NLSY97) conducted by Ohio State and NORC University of Chicago and the rotating panel high school entrants of ISR's *Monitoring the Future* (Bachman 1986). The North Carolina Population Center's *National Longitudinal Study of Adolescent Health* (Add Health) begun in 1994 and also an age cohort design is a model exemplification of the life course perspective embracing biomarkers, including DNA, as well as a wide range of social, economic, psychological, and biomedical measurement (Harris et al. 2009). A later variant starting in 2001, the 5,000 strong *Fragile Families* study, is based on samples of marital and non-marital families, living in the hospital catchment areas of 75 hospitals in 20 US cities (Reichman et al. 2001).

A major advance was made in the longitudinal study of aging with the *US Health and Retirement Study* (HRS) begun in 1988 and again based at the ISR (Michigan) (Juster and Suzman 1995). The study provided the template, first for the *English Longitudinal Study of Aging* (ELSA) and subsequently, comparable studies in a number of European countries and across the world e.g. India, and Japan. All of these studies follow broadly the same strategy of inquiry but with some national variation reflecting the different policy contexts. Sample members are recruited in this case from cross-sectional time series surveys of health in the different countries. The strategy involves identifying sample members over the age of 50 from which the aging sample for follow-up is constructed.

1.2.5 German Studies

The *National Educational Panel Study* (NEPS) in Germany combines elements of all types of design in following since 2010 a series of six age cohorts totalling over 16,000 individuals, the first starting with newborns and the last, a pre-existing panel of 23–64 year-olds, and other cohorts

starting at ages 4, 10, 14 and 19 in between. With a rich range of follow-up data on circumstances, educational progress, and aspirations collected from sample members, their parents and their teachers, at frequent intervals, the study is in an exceptionally strong position to supply evidence to policy makers on the operations of every element of the education system. This is as well as undertaking more long term investigation of educational dynamics at very age and stage through with individuals are passing (Leuze et al. 2011).

Another different but complementary line of life course study emerged in Germany. 'The Status Passages and the Life Course' centre in Bremen led by Walter Heinz eschewed reliance exclusively on quantitative longitudinal data in favour of a combination of survey and social biographical methods to elucidate the processes of transition from education to the labour market (Heinz 1991, 1996). The ten books the centre produced based on annual workshops that the centre ran include some of the classics in this field, e.g. *Theoretical Advances in Life Course Research* Heinz (1991) and *Society and Biography* (Weyman and Heinz 1996).

1.2.6 Household Panel Surveys

A long standing development paralleling the birth and age cohort studies was the multi-age-group household panel study with annual or biennial data collection initiated by the ISR (Michigan) *Panel Study of Income Dynamics* (PSID) (McGonagle et al. 2012). Launched in 1968, PSID was followed by comparable panel surveys in Europe and internationally ranging from Russia to Mexico and Taiwan. The *German Socioeconomic Panel* (SOEP) was the first replication in 1984 (Wagner et al. 2006), followed in 1991 by the British Household Panel Survey (BHPS) (Now named *Understanding Society*) (Buck and McFall 2012). The *Canadian Survey of Labour and Income Dynamics* (SLID) and the *Australian Household Income and Labour Dynamics* (HILDA) survey are further notable examples.

Although economic questions drive the studies, over time, as the multiple cohorts the panels contain get older, they have increasingly become multi-purpose and multi-module life course

studies. Modules covering different areas of content are rotated at time intervals through the survey of which ‘biomarkers’ are among the most recent examples. The main attraction of the studies is their coverage of the whole 16+ population over all ages and repeated measurement over 1 year, or at the most 2 year, intervals. Their main limitation is the relatively small size of any given birth (or later age) cohort, even when expanded from the initial 5,000 to 40,000 households, as is now the UK case. As a result of emigration and immigration, there is also loss of population representativeness and sample size over time, necessitating periodic sample boosts. The precise specification of what constitutes a *household* longitudinally also remains a problematic feature. Hence most long-term longitudinal analysis is directed at individual household members as the unit of analysis rather than households.

1.2.7 Census- Based Studies

Finally another form of longitudinal survey does not involve the collection of new data at all, relying instead on administrative record linkage to supply the dataset. As noted earlier, Scandinavian studies have always relied on the extensive Scandinavian registers to supply the data in birth cohort studies up to the fourth grade before direct survey measurement of the children takes over. A variant conducted in a number of countries is to base the whole study on a representative proportion of participants in the national census. Vital statistics registration data for such events as births and deaths, and increasingly other administrative data, can then be linked between censuses as the relevant events occur. The major benefit of such studies is their huge potential size at relatively low cost with continuous augmenting and renewal from data routinely collected for administrative purposes. Their weakness, from the life course perspective, is the severe limitations on the range of content covered.

1.3 Review

This brief review of longitudinal studies development across the last century and the beginning of

this one reveals the variety of sample designs while also identifying the shared principles that have shaped the modern form of longitudinal research methodology and commanding large scale research resources. As we shall see, there has also been some convergence within the field of life course study on the theoretical direction the effective use of these resources should take. Table 1 lists the main surveys mentioned in this section organised by world regions. These are the prime examples of a method developed often for small scale scientific inquiry – “cottage industry” – to a major tool that, in the longer term, serves both policy and scientific need on an industrial scale. The table paves the way for the next section of the chapter, which considers the innovations in technology, methodology, and theory that supplied the foundations of the changes through which the modern form of life course study came about.

2 Foundations of Growth

So what supplied the opportunity for the massive lift-off from ‘cottage industry’ to ‘industrial scale’ production of longitudinal data? To understand the origins and institutionalisation of contemporary life course study, it is important to appreciate the developments that lay behind it on a number of fronts: technological, methodological and theoretical.

2.1 Technological

In the absence of the modern statistical software and massive storage now available on any researcher’s desktop, constructing, maintaining, and updating a longitudinal database is very labour-intensive and liable to error, as is analysing the data: ‘daunting’ as one informant told me in a study of the potential for secondary use of the British National Child Development Study data (Bynner 1984). In the early British cohort studies, extending to the end of the 1970s, for example, ‘Holerith cards’ were the only means of extracting survey data for frequency and crosstab analysis to be replaced by punched cards for supplying

data first to card sorters and then to main frame computers, where every minute of computer time used was charged for. Remote terminal access to main frames was the first step towards the digital world, and desk top computers supported by off-the-shelf software.

Such enhancement of IT capability also underpins another development that was critical to later research investment: electronic archiving and the access of the data for the burgeoning 'secondary analysis' that then became feasible (Brooks-Gunn et al. 1991). Prior to electronic archiving, such facilities as the Murray Archive in the Radcliffe Institute of Advanced Studies at Harvard led the way in supplying a repository for the raw data of longitudinal studies. The archive's subsequent absorption into the Institute of Quantitative Social Science signalled completion of the electronic journey on which all data archiving was going to go.

Other ventures that followed located longitudinal data in archives to meet research resource needs across the whole spectrum of social and behavioural science interests. Thus in the UK, for example, the Economic and Social Research Council's Data Archive houses the Economic and Data service in the Universities of Essex and Manchester. The GESIS Leibnitz Institute for the Social Sciences based in Mannheim, Germany, performs the similar task for German data. Most of, if not all, the US centers for research in human development – where the longitudinal research enterprise was founded – developed archiving facilities for housing their own and sometimes other's data (e.g., Michigan, North Carolina (Chapel Hill), Chicago, Ohio State, and Minnesota). Minnesota's Population Center, for example, has a particularly long record in this area, housing the Integrated Public Use Micro Data Series (IPUMS-USA) that has distributed harmonized micro data for the US Census and American Community surveys from 1850.

Another development spreading even more widely was that of the repository for the outputs of inquiry, research papers and monographs, in digital form. This facility is coupled with the massive development, via libraries, of online access to

research literature replacing hard copy library holdings. A full listing can be found of the hundreds of such archives that now exist across the world on <http://www.sociosite.net/databases.phptop>.

But here another part of the story needs to be acknowledged. Traditionally the kinds of studies launched in the early stages of birth cohort study development were concerned with 'newborns' and were based on the clinical model of a scientist collecting data for a personal program of research. The study would be set up on that basis with an explicit agreement with the parents of the babies or children involved that the data collected were confidential to the study personnel and only they had access to the data for research use.

As the interest shifted more towards multidisciplinary inquiry, and expansion to incorporate direct government policy funding as well as science (public or research foundation) funding, the alternative model developed as manifested in the term *investment*. That is to say, the deployment of large scale funding was used to support the production of a *research resource* accessible to all scientists with a proposed program of research based on longitudinal data. In such a scenario, little was demanded of the researcher accessing the *anonymised* archive data other than a formal request and, once released, the data set was in practice usable for any research purpose. The only proviso was that acknowledgment of the source would be given in any publications based on research using the data.

However, the price to be paid for such a resource model lies more now in the demands placed on the researcher in formulating the proposal for funding and the expected output from it. There has been growing pressure for accountability by demonstrating direct 'impact' of the findings produced. In the case of the UK Economic and Social Research Council (ESRC), this takes the form of a section of the funding proposal being devoted to 'pathways to impact' and the requirement for a separate, post-end of award, *impact report*. The other major change is in the much more rigorous requirements placed on users for access to the data even in anonymised form.

Although health science is not a major focus of this chapter, the origins of so many of the major studies in epidemiological inquiries, placing them at the intersection of medical, social and behaviour science, cannot sensibly be ignored. For a period, there was a division between the different policies of the medical as opposed to social science research funding bodies. The former endorsed restricted access limited to the research team, except through collaborative arrangements, and the latter endorsed availability of any anonymized data to the researcher. Such access was constrained only by policies concerned with data protection and prevention of disclosure of study members' identities.

The growth of national 'Biobanks' for building repositories for DNA and other *biomarkers*, as accessible resources for medical scientific use, was another turning point that pushed policy governing the use of longitudinal data in the social science direction. From then on, access to most publicly funded anonymised data became increasingly unrestricted. The conditions of access could, however, as we shall see later, vary considerably depending on the sensitivity of the data, ranging from having to undertake the analysis on secure premises controlled by a government agency (e.g. Stats Canada) or the researcher's own university; having the analysis done for you (e.g. UK Office of National Statistics); having an individual license to use the data classified and restricted for access according to sensitivity, with very tough sanctions on anyone breaking its terms (Martin et al. 2006).

Such restrictions apply in particularly strong form for linkage of government data with variation from one department and one region to the next, presenting often layers of approval procedures that the research has to go through. For example, use of census data under most jurisdictions is ruled out altogether and other data such as medical and criminal records released only under strictly controlled conditions. The experience of Project Metropolitan, considered earlier, and more recent examples such as the abandonment of the Swiss SESAM study, shows how publicly sensitive the research use of such data can be,

especially when heralded by adverse press reports. And despite widening recognition of the value, not to mention efficiency, of using such data rather than collecting the data afresh from study members, the terms under which the dataset is released thus become crucially important for the research to succeed.

The separation of a secure file that contains the name and address database from the (numerical) data collected is thus now standard practice to ensure that protection from disclosure of study members' identities can be maintained. But, despite this safeguard, as geographical indicators are introduced at lower and lower aggregation levels, the easier it becomes to identify study members. Moreover the longer any study continues, the stronger the possibility that the patterns in the longitudinal data across time can reveal the identity of a respondent. Such problems can be exaggerated as most study members trust the researchers' guarantees that the data will not be misused, but when that trust is broken, the result can be devastating for the study.

2.2 Methodological

The transformation of individual IT capability through the high speed and vast storage capacity of modern computers opened the door to the second driver of development: making feasible the use of high powered statistical methodology directed at modelling life course processes. Much of the statistical toolkit used today was developed theoretically long before there was any adequate means of implementation. Technological advance opened the door to actually implementing sophisticated statistical models (Goldstein 1979).

An important initiative that stimulated the application and development of new methods for analysing longitudinal data, especially in Europe, was the European Science Foundation-sponsored *European network of longitudinal studies on Individual development* and an accompanying seminar series. Over the 5 years ending in 1991 during which the network operated, several hundred researchers from across the social

and behavioural science disciplines attended the seminars. The communication output was twofold. The first was a directory of all longitudinal studies meeting certain criteria of sample size and duration across the world (Schneider and Edelstein 1990; Zentralstelle fuer Psychologische Information and Documentation (ZIPD 1994)-hundreds were listed. The second was a series of 8 seminal books including such influential titles as *Problems and Methods in Longitudinal Research* (Magnusson et al. 1991); *Data Quality in Longitudinal Research* (Magnusson and Bergman 1990); *Analysis methods in Longitudinal Research on Individual Development* (Magnusson and Caser 1993).

Thus hazard modelling using the tools of ‘Event History Analysis’ came into its own and accessible to every researcher as popularised by such books as *Event History Analysis* (Blossfeld et al. 1989), *Event history analysis in life course studies* (Mayer and Tuma 1990) and updated with a subtle shift in emphasis, *Techniques of Event History Modelling* (Blossfeld and Rohwer 2002). Multidimensional contingency table analysis using log linear and logistic modelling methods in which time was one of the dimensions was also for a period taken up widely.

Structural equation modelling with latent variables and maximum likelihood estimation, taking measurement error into account, is ideally suited to the large scale timed sequential life course data that longitudinal surveys produce and, coupled with its theory testing through model fitting, became a staple of longitudinal researchers. The method’s availability through the LISREL programme (Jöreskog and Sörbom 1979), now in version 9.1, was the product of a collaboration through the 1980s between Karl Jöreskog (mathematical statistics) and Dag Sörbom (mathematical programming) and spawned a number of further less challenging packages such as Peter Bentler’s EQS (Bentler 1995) and AMOS (Arbuckle and Wothke 1999). The development included perhaps the definitive SEM program, now in its seventh issue, MPlus, written by Bengt Muthén, Joreskog’s one-time PhD student and his partner, Linda Muthén

(Muthén and Muthén 2014) and covering every extension from the basic SEM model to latent growth curve and latent trajectory modelling.

Some omnibus packages emerging through the 1970s also played a crucial part in opening up whole new vistas of basic and advanced statistics. SPSS, first available in 1970, led the way in supplying the basic applications, including for a while, LISREL in its menu. More recently, and more comprehensively STATA created in 1985, with provision for developing personalised software options within the program, opened the door to the widest range of methods for modelling social and econometric processes. Multiple imputation methods became available for dealing with missing data and attrition in longitudinal surveys (Abowd and Woodcock 2004; Brick and Kalton 1996; Rubin 2004; Goldstein 2009) – thus complementing reliance on the weighting solutions for missing cases that had been used previously.

The multilevel extensions of modelling methodology added the ecological dimension to the analysis of variables by multivariate methods (e.g. Goldstein 2011). And ‘integrative data analysis’ (Hofer and Picinin 2009) offers methods for analysis across independent cohorts within and between countries including those with missing data.

In the rather different area of classificatory and person-based methodology the more inductive techniques of Andrew Abott’s sequence analysis (Abbot 1995) using optimal matching (OM) methods also became available. The revival of Lazarfeld’s 1968 latent class analysis, extending to the panoply of different forms of multidimensional scaling and cluster analysis, offered further possibilities. Staunch critiques of the OM approach e.g. Wu (2000), were addressed in a ‘second wave’ of methodological development (Aisenbrey and Fasang 2010; Levy and Widmer 2013). There was now a means of grouping the myriad individual developmental patterns within and across the major life course domains of education, employment, family and health into an optimum number of major trajectory types. Associated typologies could then be constructed of individuals falling within different trajectory combinations.

The standard packages like SPSS, with which longitudinal researchers analysed longitudinal data, have increasingly given way to new, and many would say, more liberating conceptions. The development of such software packages as ‘R’ using the ‘S’ programming language, and available free of charge to any researcher, offers a *programming environment* in which the individual researcher can develop, alongside the standard techniques, his or her own statistical methodology and applications.

Finally, another development in line with the creation of such an analysis environment is the growth of graphical methods such as ‘Directed Acyclical Graphs (DAGs)’ which, through the visualisation of research problems, map more effectively onto methods for modelling the processes involved (Friedman 2008). Pioneers of such work in developing standard packages like LISREL and AMOS for structural equation modelling linked a whole new world of graphical realisations of statistical solutions to research problems. The rationale for such developments parallels that of life course study itself – that is to say the desire to get away from the somewhat narrow confines of conventional multivariate analysis and presentational techniques.

No development of methodology will of course in itself meet the main epistemological challenge for longitudinal research – that of research design. The absence of randomised controls in longitudinal surveys categorises them in Cook and Campbell’s terms (1979) as ‘quasi-experiments’. That is to say, despite the wide range of data collected and repeated measurement and multiple statistical controls applied in testing research hypotheses, the confounding effects of unmeasured variables and selection effects cannot ever be entirely ruled out. However, while the *true experiment* embodied in the randomised control trial supplies the most robust evidence of a causal effect, the price to be paid is the loss of external validity; the generalizability of the findings to all other non-experimental and potentially interacting contexts remains uncertain. Accordingly, validation has to be achieved by other means such as triangulation across

different data sources and methods and reality testing described by Donald Campbell (1991) as *qualitative knowing* (i.e. participant perceptions) to help in deciding one causal narrative as opposed to another. The RCT supplies the ‘gold standard’ for causal inference (Cook and Campbell 1979) and where feasible always adds value in addressing directly the causality question. But as Lee Cronbach argued in *Beyond the Two Disciplines of Scientific Psychology* (Cronbach 1975) that criterion may not be sufficient on its own to formulate a model of a life course process in any given context that in a practical sense works. In challenging the idea of generality of causal conclusions across space and across time he makes the telling point: “Once we attend to interactions, we enter a hall of mirrors that extends to infinity.”

2.3 Theoretical

The third driver of the new opportunities was theoretical: traditionally, as we have seen (chapter “[Introduction: Life Course Studies: Trends, Challenges, and Future Directions](#)”), sociologists and psychologists kept on separate sides of a theoretical divide in human development research. The former focused on societal structures and historical change as influences on the shaping of development and the latter more on individual attributes and their biological basis, almost devoid of any historical and social context in which development took place. Thus life-span developmental psychology, while recognising the importance of context to which the individual organism had to respond, saw such contextualisation in ontological terms rather than as fundamentally shaping and changing, through the exercise of agency, the direction the life course takes. Shanahan and Porfelli (2002) usefully illuminate the distinction between the two positions through identification of the different ‘entry points’.

The life course perspective thus takes synthesis further by bringing into the picture the historical component, which embraces the shaping influences, at different levels of societal changes and

policy shifts, on the *trajectories, transitions* and *turning points* through which people's lives progress (Alwin 1995). The complementary contextualising life course features are the *extrinsic factors* identified with cohort, period, and age effects, control of which is central to longitudinal, and consequently life course, research design (Bynner 2005a).

As we have seen, these ideas came to fruition initially through the work in Berkeley of John Clausen (1972) and especially Glen Elder, whose *Children of the Great Depression* (Elder 1974), relying on the secondary analysis of long-term archived cohort data from the Oakland, Berkeley and Terman studies, effectively crystallised the life course concept. The five defining principles - *development in context, human agency, linked lives, timing and location in time and space* - have been central to the life course approach ever since (Elder 1985; Giele and Elder 1998).

Further extensions followed from recognition of: (1) the need for analysis at different *social ecology levels*, where Bronfenbrenner's (1979) five tier bio-ecological 'conceptualisation of *macro, exo, meso, micro, individual* levels as the basis of social interaction pointed the way; (2) the value of extending data collection to embrace *intergenerational transfer* of resources or capital within families from one generation to the next; (3) benefits of international collaboration in cross-national inquiries to study the interaction between social institutions and developmental processes in different societal contexts.

European contributions came from such work as that from Walter Heinz (1991, 1996; Heinz and Marshall 2003) on the agency component and 'self-socialization'; from Karl Ulrich Mayer (Mayer and Schoepflin 1989) on the role of Institutions and the state; from Ingrid Schoon (2006) on accumulated risk across the life course and resilience to its effects; and from Hans-Peter Blossfeld (2006) on the life course and globalisation processes.

With the advent of desk-based modern ICT there was an expansion of life course study through the exploitation of longitudinal data,

with the turning point not much later than the beginning of the 1990s. The different strands of developmental thinking, life span (ontogenetic), generational and temporal, began to come together in a comprehensive theoretical framework (Elder 1998; Elder et al. 2003; Elder and Shanahan 2006).

By the end of the 1990s a synthesis of approaches to conceptualising and conducting life course study in research areas as diverse as returns to education, family formation and breakdown, health inequalities and obesity, well-being and cognitive aging and retirement, escape from disadvantage and social exclusion (Bynner 1996) was beginning to emerge. *Methods of Life Course Research* (Giele and Elder 1998) not only set out the now classic diagram presenting the five principles on which the life course is constructed but supplied a toolkit of accessible research methods for applying them. The range extends from surveys through social biography, to the practicalities of longitudinal follow-up and integrating qualitative, quantitative and historical methods. The updated version 11 years later (Elder and Giele 2009) notably reorganises the five principles in hierarchical form. The book also expands the scope of inquiry putting into the frame not only more on archived and administrative data but biomedical measurement, including DNA and intergenerational comparative multi-level longitudinal inquiry.

Complementary texts include 'Looking at Lives' (Phelps et al. 2002), which turns attention to the autobiographies of those who conducted the major US studies. The book is unique in showing how researcher biography itself may become effectively a component of the study itself, not only in the shape it took, and whether it continued, but in the ways it was communicated. 'Seven Swedish Longitudinal Studies' (Janson 2000) focuses more on the biographies of the studies themselves, their histories and findings, with much technical and practical detail supplying helpful insights for researchers coming new to the field.

An organisational counterpart to these books with a psychological orientation was the *Life History Society* a loosely connected network with foundations in psychopathology and behavioural science that meets every 2 years in different cities. Its objectives are: (1) to share information that will advance the study of human development and influence the next generation of longitudinal studies; (2) promote multidisciplinary research and interdisciplinary dialogue/collaboration around a common theme (longitudinal research); and (3) foster communication between senior and junior researchers, and researchers and students. *Straight and devious pathways from childhood to adulthood*, based on the 1987 meeting (Robins and Rutter 1990), and involving contributions across the biological, social, and behavioural sciences, is another classic in the field. The *International Journal of Behavioral Development*, established in 1976, though having no direct connections with the LHS, is the major platform for the kinds of output that its contributors produce.

The focus also changed in life course study, with emphasis moving increasingly away from normative patterns towards multiple developmental pathways and outcomes, including the transitions, turning points and interactions between life course variables and socio-political contexts (Schulenberg and Schoon 2012). Analysis of development was not restricted to any one domain but extended to all of them. That is to say, family background, partnership and parenthood, education, employment, health and citizenship were increasingly pursued conjointly.

This is not to deny the significance of any single strand of the whole account; nor the centrality of the five principles of life course analysis; nor interactions between them. Epigenetics postulates environmental shaping of the way genes are expressed and consequently how “the social becomes the biological” (Blane et al. 2013). All components of the life course are seen as potentially in constant dynamic interaction with each other and the ever-changing social and physical environment as the life course unfolds. We can identify here an evolving *developmental system* as Lerner (Lerner et al. 2000; Lerner

2006) describes it. The further development of the system is considered ext.

3 Consolidation and Growth

Examining the foundations of contemporary life course study gives way in this section to the next stage in its growth and institutionalisation. The section considers the mainly post-millennium further enhancements to longitudinal research strategy and protocols. These contribute to the ever expanding field of longitudinal survey research now extending globally. The move towards synthesis and the increasing interest shown by governments in longitudinal research findings is reflected in the latest generation of new studies. I briefly consider these and then move to the widening scope of longitudinal data collection bringing challenges as well as benefits to the life course researcher.

3.1 New Studies

Although the millennium year was no more than a date in a calendar, its symbolic significance provided a stimulus to investment in longitudinal studies across the world, prompting consolidation of what had been until then largely national or local enterprises. The Norwegian¹ and Danish birth cohort studies, with an epidemiological orientation, got underway, together with a host of more explicitly holistic life course studies around the theme of ‘Growing up’ in (most prominently), Ireland, Scotland, New Zealand, Australia, the Netherlands (Generation R),² France, (ELFE)³ – the last, a birth cohort study modelled on the US

¹ Olsen et al. (2001). The Danish national birth cohort – its background, structure and aim; Norwegian Institute of Public Health (2005). *Mother and Child Cohort study*. www.fhi.no/default0.asp

² Hofman et al. (2004). Growth, development and health from early fetal life until young adulthood: the Generation R study. *Paediatric Epidemiology*, 18, 61–72.

³ The ELFE study: how do our children grow? www.elfe-france.fr/index.php/en/

National Children's Study. There were also calls for widening collaboration across countries to harmonise data and establish common standards for data collection and use (e.g. Kogevinas et al. 2004).

A series of strategic reviews in different countries both identified the importance of the life course data the longitudinal studies produced to the policy process and the need for the secure funding, increasingly called *investment*, to insure that the long-term returns sought would be forthcoming. Typical funding, if not coming directly from government, was awarded through a science funding council, often combining support across the medical and social science disciplines to ensure multi-disciplinary approaches. The models developed were increasingly shared between countries, re-enforcing the prospects for research collaboration and comparative study.

Many countries initiated their own life course oriented millennium cohort studies in some cases, as for the French ELFE study, taking years to negotiate with government the terms of the funding that was needed. Others, such as a proposed Swedish birth cohort study failed to get government backing, because it was thought the wealth of Swedish register data rendered it unnecessary. Yet others began but did not get very far, such as the Swiss SESAM study focused on the aetiology of adjustment and mental health. Resonating with the Nordic countries' Project Metropolitan experience discussed earlier, this well-developed birth cohort study foundered at a late stage on ethical grounds concerned with the inability of study members (i.e. new born babies) to give direct consent for the collection of their DNA. It is not surprising that the study failed to recruit mothers to the sample (Kummer 2011).

In the case of the massive US 100,000 pregnancies National Children's Study (NCS), with a major focus on the health effects of environmental exposures (Michael and O'Muircheartaigh 2006), the problems were operational and financial. The study was subjected to a series of re-appraisals, with new design and implementation strategies brought in.

NIH cancelled the study, however, after an evaluation concluded that the study would be too costly and not flexible enough to capitalize on emerging scientific discoveries (e.g., gut microbiome). NCS may well be an example of how very big science has disadvantages. Indeed NIH Director Francis Collins noted that the main point was not that the study was cancelled, but rather that the same research aims should be encouraged and studied via other means.⁴

The NCS was also unusual in certain respects in attempting to begin study of the lives of the cohort members as closely as possible from the moment of conception, so that a full pre-term record would be included in the data for analysis. Its UK counterpart, the 2015 Life Study, has followed suit, targeting 80,000 births for follow-up from the first clinical verification of pregnancy and data collection. The study was first scheduled to begin in 2013 but will now be registering the first pregnancies for the study in 2015. The study combines a national probability sample with a number of area case studies (Dezateux 2014).

In parallel with new studies that had the benefit of the developing infrastructure expertise and data collection protocols inherited from previous and established studies, there was development across the whole life course study enterprise. The scope of data collection increased together with the development of collaborative arrangements to take best advantage of it.

3.2 Intergenerational Studies

As data collection progressed to the adult stage of the life course there had been increasing recognition in many studies of the need to extend the scope of enquiry to the offspring of study members as a basis for understanding intergenerational continuities and transfers (see Thornberry, this volume). For the longest continuing longitudinal study, that of the Fels Institute, data extended to embrace not only children but grandchildren and

⁴ http://www.nih.gov/about/director/12122014_statement_ACD.htm

great-grandchildren.⁵ The four FELS generations all within a single family thus offered extraordinary possibilities for intergenerational study across societal changes spanning over 80 years). The US Add Health study is one of the most recent examples where funding has been raised to enable such investigations.

However there is much variation in the way such extensions are carried out. Longstanding, household panel surveys (such as PSID, SOEP, BHPS) have routinely recruited panel members' children to the study either from birth or from a set age before the adult entry point of the main study, usually age 16, is reached. The 1958 and 1970 British Birth cohort studies recruited to the study the children of one third of the male and female cohort members who had reached aged 3. But this was on a one-off basis without subsequent follow-up. In contrast, since 1986, the US NLSY79 has undertaken assessments every 2 years of all children of female study members. US examples show the kinds of topics addressed: Thornberry (2009), anti-social behaviour; Martin et al. (2010), problem behaviour; and Mortimer (2012) youth development.

Intergenerational studies based on birth cohorts are often wrongly interpreted in terms of creating a population sample representative of the next generation and analysing the data for it accordingly. However there are challenges in making correct inferences from the data such studies yield, not least because the age range of the child sample depends on the mother's age when she gave birth to the sample children. Until child bearing is completed in the cohort, estimates based on the children will thus be biased towards early maternity, which will tend to weight the sample towards the more disadvantaged families. Cohort members' children are therefore more appropriately viewed as an attribute of the cohort members rather than as an independent sample in their own right. That is to say, the inferences drawn about intergenerational continuity and discontinuity are restricted to the cohort to which the studied

children were born at the ages data were collected and their generalizability is limited to that extent.

3.3 Cross-National Studies and Collaborations

The intergenerational aspect of longitudinal studies aligns with another development already signalled – cross-national investigations and the networking arrangements to facilitate them, including sharing experience with new studies. The latter were often put in place largely for practical reasons, especially for new studies, directed at 'learning from experience' and not 'reinventing the wheel'. But they also served the wider scientific goals of extending the scope of coverage, this time to cross-national differences and similarities, capturing particularly the institutional and policy variations with cultural roots, prevailing across the countries involved.

Such joint studies were pioneered by the household panel surveys as a basis for understanding income and associated family dynamics in different national settings. Although these surveys traditionally varied in some features of coverage and frequency of follow-up, reflecting the particular research foci of inquiries based on the data and funding constraints, they all adhere to much the same kind of template with respect to the socio-economic conditions of living and economic activity of panel members. They also collect comparable event histories comprising jobs, house moves, domestic and socio-economic statuses and in some cases, health, on an annual or two yearly basis. Their national representativeness, albeit of the population when the panel survey began in the different countries, is another attraction.

Increasingly the mode of operation is thus towards data harmonisation and consolidation through the formation of networks to support comparative analysis by exploiting the survey data jointly. Collaboration can even extend to the inclusion of new supplementary measures in all studies. A good example is CHER (Consortium of Household Panels for European Socio-economic

⁵<http://medicine.wright.edu/lifespan-health-research-center/fels-longitudinal-study/history>

Research) embracing 17 European countries (plus USA and Canada). Another that brings together 20 European longitudinal surveys (plus Israel) modelled on the US Health and Retirement Survey is SHARE (Study of Health and Retirement in Europe).

An important outcome of such collaborative work is the construction of cross-national files created through data harmonisation across different studies. The now expanded multi country 'Cross National Equivalent File (CNEF)' combined initially harmonized data from the US German, Canadian, UK, Canadian and Australian household panel surveys and is the most well established example (Burkhauser and Liddle 2006, 2007).

Other networks have developed this kind of international collaborative work more widely seeking syntheses of again studies drawing on diverse data sources. Apart from SHARE, the UK 'Healthy Aging across the Life Course' (HALCYON) network and the US based 'Integrative Analysis of Longitudinal Studies of Aging' (IALSA) network are two that have now combined forces.

In the case of new studies, the impetus for collaboration is mainly sharing experience and learning from others. Hence EUCCONET, funded originally by the European Science Foundation and established in 2008, was coordinated by INSERM, the French institute responsible for the ELFE birth cohort study in partnership with the London-based Centre for Longitudinal Studies and involved 12 countries. The aim was to "bring together leaders of national or major regional child cohorts in order to compare practices, exchange experience, share questionnaires and other tools, and encourage comparative analyses".

CHICOS, established in 2010, was another such network, this time funded under the European Union '7th Research Framework' program and comprising 30 child health cohort studies in 19 countries. The network's aims went wider than the design and operational interests of EUCCONET: to "assess and prepare for the collection of robust health data for birth/mother-child cohorts over a substantial time period (the

next 15 years) by evaluating data from existing cohorts, registers and relevant European databases, identifying gaps in knowledge, and developing recommendations for targeted research action at the European level."

More sociologically driven networks with an interdisciplinary orientation are to be found in Switzerland where the 'Centre for the Interdisciplinary Study of Life Courses (PAVIE)' based in Geneva and Lausanne supports a network of longitudinal researchers from a dozen universities working on the theme of 'Overcoming Vulnerability (to new risks): Life Course Perspectives'. LIVE's counterpart is the productive TREE longitudinal survey based in Basel and devoted to transition from post compulsory education to the labour market.

The *Young Lives* project beginning in 2002 and based in Oxford University goes even further globally by linking longitudinal surveys of 12,000 children in 6–18 months and 7–8 years old cohorts of child and adolescent development in Ethiopia, India, Peru and Vietnam. Anthropological inquiry by means of Qualitative studies of selected children and their families of children in each country is another feature.

3.4 New Data

3.4.1 Biomarker Data

An area of major advance aligned to the development of cross-national studies is the collection and storage of biomarker data, such as blood samples and genetic coding of the extracted DNA (Pembrey 2004). In this instance, the developing case for cross national study and standardization of measurement is less a matter of replicating and testing hypotheses under different cultural and economic conditions than pooling the data across studies to produce samples of the huge size that 'gene-environment interaction' and 'gene expression' studies require.

The development of networks of 'Bio Banks' in a number of countries is a parallel development, in which the medical researchers involved are only now beginning to recognise the value of interaction, including data linkage, with the much

more broadly based life course studies. As the adaptability of instrumentation for use in different contexts – at home as well as in a clinic – continues, the inclusion of more demanding measurement such as EEGs and brain scans becomes increasingly feasible. Used cross nationally, the large-scale pooling of such data will similarly often become the goal. The challenges that arise here are likely to do with data protection and preventing disclosure of the identities of the study members.

3.4.2 Geocoded Data

Geo-coding of spatial and locational data is another major area for augmenting cohort study content though raising further challenging issues for data protection and disclosure. Decisions have to be made about setting minimum levels of aggregation to ensure that cohort members' (anonymised) identities remain protected (Elliot et al. 1998; Elliot and Dale 1999; Boyle et al. 2004).

3.4.3 Administrative Data

The data enhancement aims of all such collaborative projects connect with another major development in life course studies – the increasing accessibility and use of the vast amounts of administrative data collected by governments recorded on individuals in longitudinal form. When linked to on-going scientifically driven longitudinal surveys, such resources offer huge research opportunities in two main areas – one is to check and validate the data collected in the study itself about the same life course experiences; the other is to expand the dataset in areas of routine data collection such as educational attainment, health, housing, taxes, and transfer payments. The latter saves space in the questionnaire for more subjective and self-evaluative kinds of information, including, attitudes, values, personality measures, and so on.

The risks of disclosure from such data linkage and the need for clearly specified data protection terms are obvious and are often judged as putting 'out of bounds' some kinds of data enhancing exercise, such as linking criminal records to the survey, for example. The risks also raise again the issue of ethical frameworks for conducting

longitudinal research requiring detailed attention not only to what can legitimately be linked but how the data should be organised in terms of levels of access. Canada permits such research access to any personal data only on the Stats Canada secure premises in various locations that the government agency provides. Other countries are more liberal in their approach, licensing universities to provide secure environments in which such work can be done. In yet other cases, different levels of access are codified depending on the sensitivity of the data: (1) release for desk top analysis; (2) release under special licence; (3) release only in a safe setting; (4) never release but can be analysed by Government employees according to specification (e.g., Add Health).

3.4.4 Social and Psychological Data

Biomarker and associated physical data may be sufficiently objective and robust in measurement terms to be collected in much the same way from one country to the next another. But apart from ethical considerations, the transferability of social, economic, behavioural and psychological data can be more problematic for other reasons. In cross cohort analysis within a single country the cohorts are contextualised by the *historical periods* in which the cohort members were born. Cross-national analysis of cohort studies data compares cohorts contextualised, in addition, by the *institutions, structures and cultural imperatives* of each of the countries in which the studies were carried out. Comparative study is thus bedevilled by the 'problem of equivalence' – the extent to which a measurement taken in one country is strictly commensurate with the measurement of ostensibly the same variable in a different country (Kohn 1987; Scheuch 1990). Educational standards, for example, may mean different things to people in different countries. Even economics variables like socioeconomic status are loaded with culturally grounded meaning. Hence standardization, though a laudable aim, can only go so far. As Kohn argues, the point will often arise in comparative study when a finding fails to replicate across countries. In such a case, resort to historical and cultural analysis is likely to be the only

means of locating where the origin of the inconsistency lies. Qualitative appraisal then becomes the essential counterpart to the quantitative analysis in effective comparative life course study.

3.5 International Standards

Although standardization can only go some of the way towards a generalised consistency of approach and meaning in cross national studies, there is clearly a need to attempt international agreement in all the measurement areas of the study. The United Nations Educational, Scientific and Cultural Organization (UNESCO) have taken the lead in the establishment of the International Standard Classification of Education, ISCED, Achievement Standards Framework the latest version of which was released in 2014. The World Health Organisation's (WHO), International Classification of Diseases ISCED (10) performs a similar function for biomedical and epidemiological measurement and standards. Extending the idea of such schema more generally across all the life course domains including family, housing, employment income citizenship and socio economic status research data becomes the obvious next step. Standardization of ethical codes as applied to longitudinal data is another area where such international agreement, perhaps coordinated by UN agencies, would seem essential.

3.6 Review

The chapter reveals both steady expansion of life course study capability coupled with growing optimism about the prospects for its full realisation though the expanded scientific investment in new longitudinal surveys that is now readily available on an unparalleled scale. Such expansion has many challenges which will be examined in the final section. An important aspect of the picture is the development of the institutions that are needed to give the work a solid professional base and from which to support it. We turn to these in the next section.

4 Institutionalisation

In the UK, where the whole concept of repeated birth cohort studies carried out at national level had perhaps taken root earliest, Government scientific funding is awarded direct in the form of Government department contracts or channelled through science funding agencies such as the Economic and Social Research Council (ESRC) and the Medical research Council (MRC), complemented by the charitable foundation, Wellcome Trust. All began to see the merit of strategic planning in committing funding to longitudinal surveys. The result was that the government's 'Large Scale (Scientific) Facilities' funds were made accessible to the ESRC for the first time but only if bid for in partnership with MRC. In effect, such data collection enterprises as household panel studies and new cohort studies were coming to be seen as large scale "observatories" to address key questions and hypotheses concerning human development in changing times with analogies to those driving astronomy and subatomic physics (Bynner 1993, 1996; Mayer 1993; Wolfson 2006).

In parallel, following a collaboration among key institutions responsible for the national birth cohort studies to support them by collaboration in the form of a 'Joint Centre for Longitudinal Research',^{6,7} the idea began to take shape for a 'think tank' to promote longitudinal study and address issues concerning its coordination and improvement. At a time when I had recently retired from my full-time post in the London Institute of Education I was able to undertake the scoping study that set the parameters for the organisation and operations of the think tank.

The work involved mainly interviews and correspondence with longitudinal research experts and policy people and identified a huge

⁶Reported in Bynner, J. (2005) Challenges for longitudinal research: synopsis of findings from a scoping study <http://www.slls.org.uk/!longview-reports/c8a5>

⁷Comprising Centre for Longitudinal Studies (Institute of Education), Department of Community Epidemiology and Institute of Child Health, University College London and National Centre for Social research).

range of interest, experience, and enthusiasm for longitudinal and life course research across the science/policy divide (Bynner 2005b). All respondents felt that key issues of co-ordination, rationalisation, and cost effectiveness, in a field that had largely grown ad hoc, needed to be resolved. Gaps were identified in the provision and exploitation of longitudinal research resources, in the communication and interpretation of longitudinal research findings and in the capacity to take full advantage of methodological advances by creating effective mechanisms for building competence, fostering commitment, and generating intellectual rewards. The blue print for the think tank *Longview* was drawn up with the aim of enhancing the quality, productivity, and returns to be gained from the whole longitudinal research enterprise.

Longview was established in 2005 with support from the National Centre for Social Research⁸ and the International Centre for Child studies.⁹ Its arrival coincided with the Economic and Social Research Council's newly formulated strategic goals for longitudinal studies and *Longview* was commissioned immediately to undertake a series of scoping studies for achieving them. The most significant of these, the 2006 *Strategic Review of Panel and Cohort Studies* (Martin et al. 2006), carried out by a specially assembled *expert group* established the case.¹⁰ The outcome was a proposal subsequently made by the ESRC to government for substantial investment in the household panel survey. The new funding would support an eightfold increase in the survey's size, i.e. from 5,000 households to 40,000 – the world's largest household panel. The second report, *Scientific Case for a New Birth Cohort Study* (Bynner et al. 2008) was devoted to

the proposed new birth cohort study that would re-establish the 12 year interval, following the 30 year gap between the 1970 and 2000 birth cohort studies. Inspired in part by the ambition of the US NCS, the sample for the new study would be five times the size of its predecessors and begin in pregnancy. *Longview* was commissioned to prepare the scientific case for the project and set out options for its design including the case for biomarkers. The 80,000 strong *LIFE Study*, as it is known, began piloting the new survey in 2014.¹¹

The final recommendation was a coordinating mechanism for bringing all the British cohort studies together in a framework for collaboration on improving the quality and scope of longitudinal data to ensure best value from the investment involved. In 2014 the CLOSER (Cohort and Longitudinal Studies Enhancement Resource) facility and network was established to harmonise, coordinate, and provide support for nine British longitudinal studies based in different universities including the six major birth cohort studies i.e. 1946, 1958 1970, 1991–1992 (ALSPAC area study), 2000 and 2015.

In the latter part of *Longview's* programme, *Longview* trustees, comprising myself as Director and the partner bodies, with all the British cohort studies and the British Household Panel Survey represented, decided to pursue the communication aims of the think tank more directly, with the aim of filling what was perceived to be a gap in the scientific literature. The solution was to develop an international journal devoted exclusively to *Longitudinal and Life Course Studies* (Bynner et al. 2009). Through the support of a scientific funder, the Nuffield Foundation, a 3-year development grant was awarded. Work on setting up the journal began in 2007 and the first issue was published in April 2009.

⁸The UK's leading Survey Research organisation.

⁹Charitable foundation set up in to run the 1970 birth cohort study age-16 follow-up survey and to support research based on it.

¹⁰Jean Martin, John Bynner, Graham Kalton, Paul Boyle, Vernon Gayle, Samantha Parsons, Andrea Piesse, 2006, <http://www.slls.org.uk/#!/longview-reports/c8a5>

¹¹John Bynner, Michael Wadsworth, Harvey Goldstein, Barbara Maughan, Susan Purdon, Robert Michael, Kathy Sylva, James Hall, 2007, <http://www.slls.org.uk/#!/longview-reports/c8a5>

Longitudinal and Life Course Studies, now in its 16th Issue, is published online using as the IT platform the Open Journal System (OJS). An Editorial Board was constituted comprising 60 academic experts from across the world. With myself as Executive Editor, four members of the Board took on the role of Section Editors¹² with responsibility for handling anonymous peer review for submissions in the four areas to which they generally related – ‘Health Sciences’, ‘Social and Economic Sciences’, ‘Development and Behavioural Sciences’, ‘Statistical Sciences and Methodology’. Submissions spanning more than one section were encouraged and processed jointly. A journal manager was appointed to manage the operational side of the peer review process and the various production stages – copy editing, layout – proof-reading and online publication. The readership soon began to grow, rising to over 1,000 registered readers within 2 years and at the last count was approaching 2,000.

Another feature of Longview’s programme had been consultative 2 day conferences as an integral part of the strategic reviews. Five were held, with the first three in Oxford and the last two in Cambridge. Apart from setting the parameters for the design of the expanded household panel study and the new 2012 birth cohort study, the aim was to highlight issues in the planning, development and communication of longitudinal research. These issues included longitudinal survey methodology and practice together with key developmental science policy areas such as *cycles of deprivation* in which longitudinal research had a vital part to play.

In the fifth Longview conference in 2009, devoted largely to the design and implementation of the new birth cohort study, the last item on the agenda was to discuss the establishment of a new society both to meet the field’s associational, communication, and training needs and, through the membership fees raised, ultimately to cover the costs of the journal. The outcome was a new international *Society for Longitudinal and Life Course studies* with the mission of promoting,

supporting, and supplying a platform for longitudinal and life course research internationally. The society’s core function would be to hold a conference annually in different countries at which research findings could be presented and the papers reporting them developed for publication in the journal.

A year was spent establishing the society through an interim committee that I chaired. The first SLLS conference was held in 2010, again in Cambridge, at which research papers ranging across the field of life course study were presented. Karl Ulrich Mayer, Max Plank Institute, Berlin, and Carol Dezateux, Institute of Child Health, London and Director of the new LIFE Study, were the Keynote speakers. Responsibility for the annual conferences and the publication of the journal was passed from Longview to the society. The second conference and the first with an elected president, Heather Joshi, was held in Bielefeld (2011) followed by subsequent conferences in Paris (2012), Amsterdam (2013), and Lausanne (2014) and Dublin (2015).

Some indication of the society’s success is the steadily increasing conference attendances now approaching 300 and membership of the society, 400 – up to 600 including lapsed members. Representation spans 20 countries organised in 20 ‘chapters’ across the world, each coordinated by 1 of 20 ‘Global Representatives.’

Throughout its short life the society has been committed to continuing Longview’s aims through such developments as establishing, at the Paris conference, a ‘Policy Interest Group’ giving a continuing home to Longview in the society, drawing up a directory of members’ policy research expertise and organising collaborative events, including for the Lausanne conference, a series of symposia devoted to the policy/longitudinal research interface. A comparable ‘Biomedical Interest Group’ was established in Lausanne. Postdoctoral training is also supported through an annual methods workshop held between conferences and on the day preceding the conference. A newsletter is also circulated every 2 months to all members. EUCCONET, the European Science Council network set up for the new cohort studies established at the time of the

¹² Michael Wadsworth, Robert Erikson, Barbara Maughan, Harvey Goldstein.

millennium, joined forces with the society in merging its final conference with the society's conference in Paris and has also been given a continuing home in the society.

5 Challenges and Prospects

The establishment of the Society for Longitudinal and Life Course Studies was an important step towards meeting the professional and associational needs of a growing international community of longitudinal and life course researchers. Its development reflects the widening interest in life course analysis, within individual countries to reveal how successive cohorts progress through life from childhood to adulthood under different socio-economic and institutional influences. The existence of the society also plays to the wider issues of cross-national collaboration and comparison where these effects can be replicated or challenged through, for example, identifying differences in effects under different policy regimes. This final section draws together in more general terms the prospects for life course study and the challenges to be met in realising them across all the fronts on which research strategy operates starting with comparative study and ending with conceptualisation.

5.1 Collaboration

International work brings many benefits while placing certain demands on those responsible for the individual studies involved to ensure success. Clearly data harmonisation enabling results of analyses to be compared directly across countries, is sought while maintaining each of the participating studies' unique identity. Another requirement is close collaboration across different national research teams to ensure. But especially for longitudinal surveys, such goals can be difficult to achieve. Somewhat ironically, when EUROSTAT in the 1990s set in place a fixed design for a European Panel Study, feelings grew among those on the ground that

their role was little more than that of data collector. The consequence was a general weakening of commitment leading within a few years to the study's demise.

This experience underlines the point that longitudinal surveys charting the development of individuals over time tend to engender a much stronger sense of personal affinity between subjects and investigators as the life courses of both unfold than is the case with, for example, the repeated cross sectional survey. Without that incentive the longitudinal study may lose momentum to the point where it finally dies. On the other hand, as the US National Children's Study experience shows, too much independence for what were area based research teams can obstruct progress towards the collective aims that the whole study has been set up to achieve. Finding the right balance is thus critical to success.

5.2 Historical Context

Another challenging aspect, common to national and international studies, relying on secondary analysis of archived longitudinal data, is the changing socio political and broader historical context (period effect) in which any longitudinal survey takes place. *Changing Britain Changing Lives* (Ferri et al. 2003) reports comparisons of pathways and outcomes for cohort members up to the early 30s in the 1946, 1958 and 1970 British birth cohort studies. Full interpretation of the differences, however, demands comparative contextual information about the historical landscape through which the cohorts' lives, up to that age, had passed. Yet such information is rarely if ever available as an accompaniment to the archived quantitative data.

Anticipating a development in data archiving in which such information is routinely attached to the deposited data, *A Companion to Life Course Studies* (Wadsworth and Bynner 2011) attempts to do just that in narrative form for the British birth cohort studies. The text charts the socio political, education, economic and health policy histories across the period from the end of the second-world war to the present day.

The longer term goal is to develop the charting of such histories not only at the societal level but at the community (meso) level as well.

5.3 Research Ethics

As the inclusion of ever-more demanding measurement, such as EEGs and brain scans, become increasingly feasible in home settings and access to ever wider banks of administrative data becomes possible, opposition to them is also likely to grow. Fears about the 'surveillance state' raise major challenges to all such scientific enhancements. Resistance to data linkage, for example, may lead to prohibitively cumbersome permissions procedures with respondents on each occasion when the linkage is needed. Again, the international dimension comes into the picture. As suggest earlier, United Nations institutions like the World Health Organisation and UNESCO could have a major role to play in drawing up ethical standards for longitudinal surveys that all member countries could be obliged to implement.

This development also makes the case that public education about the value of life course studies is likely to become a growing obligation of those who undertake them. In fact such studies need to be seen as shared enterprises in which every citizen has as much stake in the outcome as the scientist and policy maker.

5.4 Attrition

The perennial problem of sample attrition has prospects of worsening as the general public become increasingly disenchanted with participation in surveys of any kind. Financial incentives on a large scale may ultimately become inevitable, which could add substantially to the costs of life course studies. Recourse to statistical solutions for missing data and attrition, such as multiple imputation based on data already in the longitudinal record (Rubin 2004), raises further issues of capability to implement them. A parallel pressure then becomes substantial investment in methods training to build the capacity in the

next generation of researchers that the changing situation demands.

5.5 Respondent Burden

Another less obvious problem is the growing burden on survey respondents as the life course data demands increase. As longitudinal studies increasingly move towards the role of multi-purpose research vehicles, there is a widening of core purpose continuously expanding the amount and scope of measurement done, especially on the newly demanded behavioural task front. There is also pressure to supply the control group for intervention studies in an experimental design involving manipulating respondents' experience directly by using the study sample to supply the experimental as well as the control group in behavioural economics experiments. These are already in use in household panel studies such as the German SOEP (Wagner et al. 2006) and are on the agenda for many more.

Among behavioural scientists there is a common preference for using standardized clinically developed instruments for the measurement of psychological attributes rather than short forms. Restricted funding and tight timetables also push research teams to use what is available rather than what is ideally needed on theoretical and practical grounds. Judging the trade-off between the length of an instrument and its reliability needs to be done empirically. This makes the case for much more expenditure of time and effort than is customary on developmental work to optimise the properties of new measures before they are implemented in a new round of data collection and especially in new studies (Bynner et al. 2008).

5.6 Investment and Impact

In one sense there was never a time in which the monitoring of societies' and individuals progress through them was more necessary. However life course studies' rising importance occurs at a time when economic crises, place increasing strains on

public finances, leading to scarcity of scientific resources. The almost limitless expansion of government investment in longitudinal studies is unlikely to continue indefinitely. Not only do the studies become more expensive with time in terms of database maintenance and tracing increasingly dispersed populations, but each new study added to the programme in a series of repeated cohorts, for example, escalates the costs of the whole programme.

But the cost burden is not restricted to the collection of the longitudinal data that each new follow-up brings. There is also an ever-strengthening accountability demand placed on those who use the data to demonstrate 'impact'. To maintain momentum, the pressure building up will have to be met in some way, possibly through much wider use of electronic means routinely for data collection rather than the standard survey interview. It also demands again the need for knowledge transfer expertise and engagement in public education to make the case continually that public investment in life course studies is worthwhile.

5.7 Distribution

Such demands need to be set against perhaps the most pressing problem in life course study development and use – the unequal distribution of longitudinal research resources across the world. Life course studies grew up and became institutionalised in western countries, but the need for longitudinal data to monitor the effect of socioeconomic and technological change on individual development is just as pressing, if not more so, in developing countries across the southern hemisphere. Not only are the resources but the expertise lacking to develop the longitudinal surveys that are needed let alone the infrastructure to sustain them. UNICEF, among other international agencies, has a major initiative going to promote such a development and some small scale enterprises directed at child birth and infancy, such as the 'Jamaica Longitudinal study, have begun. The challenge is to find effective means of spreading the resources and expertise concentrated in the northern hemisphere to the countries

that need them most in the south. The Society for Longitudinal and Life Course Studies (SLLS) is well placed to facilitate the massive boost in capacity building that is needed.

5.8 Conceptualisation

Analogies for the development of life course study moving from cottage industry to major industries make the point that the contemporary situation of life course studies reflects the coming together of societal and scientific challenges with the technological advances needed to meet them. This convergence is manifested through the collection, storage, propagation, enhancement, and analysis of longitudinal data that longitudinal studies produce. What of life course study itself? Its institutionalisation through stakeholder investment adds policy development to what was initially purely scientific interest.

The contemporary life course study, while under pressure to serve multiple purposes, needs the integrity of a scientific program of clearly specified projects underpinning it to ensure that the data generated will contribute to a coherent body of knowledge. That is to say, the risk must be accepted of losing sight of unexpectedness and serendipity in favour of theory testing and development. Without hypotheses informing the design of the study, longitudinal study becomes an exercise in empiricism full of blind alleyways that are mistaken for opportunities. The price to be paid is the lack of any clear conception of the processes underlying potentially the developmental continuities and discontinuities that the study is attempting to model and understand.

These considerations raise the issue of where, theoretically, the development of the life course perspective needs to go next. The Life Course Perspective was crafted in main part from the consequences of pre-second-world war economic catastrophe affecting people differently at different ages and at different times (Elder 1974). The continuities with today's world are obvious, so also are the differences. Ever-accelerating technological change and globalisation of production and markets and the rise of social media need to be

set against the evidence of ever-widening inequality, the phenomenon of an expanding precariat (Standing 2011), the decline in psychological well-being and emerging health problems ranging from rising obesity to drug abuse and new pathogens. All make the case for continual reappraisal.

The five core principles of *development in context*, shaped by individual (and collective) *agency, linked lives, timing of events* (described by age, cohort and period effects) and *history and culture* (Elder and Giele 2009), and now cast in line with a multi-level bio social ecology framework, may need further refinement in the radically transforming electronic world in which we now exist. The consequence will be differential effects defined in new ways of such key classifiers as gender, ethnicity, religion, employment status, education, health, income and social class. The dynamics of societal change are mirrored in the body of data that is needed to understand them (Marshall and Mueller 2003).

6 Conclusion

Such considerations take us back to the theoretical issues with which this chapter began. Baltes (2006) makes the convincing point that for *life span* study to have heuristic value it must not begin and end in childhood but extend across the whole of life guided by a single unified theory. Extending the same perspective to *life course* study while recognising discontinuities and turning points (Elder and Shanahan 2006) and even backwards movement identified with different forms of status passage (Heinz 1991), the same general rule applies. That is to say, life course study must be continuous in scope and interdisciplinary in form rather than being reinvented from different disciplinary sources at the different stages with which human development is usually identified.

Baltes' own prescription, while seemingly interdisciplinary, appears to downplay the more social as opposed to the individualistic components of development – particularly the role of social relations, social structures, social institutions and historical change in the explanation of the processes

through which the life course is constructed (Mayer and Schoepflin 1989; Mayer 2001). The dynamic interactions between, for example, agency as operationalised by such psychological variables as self-efficacy, motivation, aspiration, and the social institutions in which agency is exercised, need to embrace the relational context of choice in life course decision-making. The approach also needs to recognise the role of influential actors such as parents, teachers, employers and peers, not to mention the timing of events and changes, in the broader social, institutional and policy context in which human development takes place.

Life course sociology, life span psychology and human biology, therefore, while recognising their differences also need to seek convergence in an integrated conceptual framework comprising theoretical insights gained from all of them. Perhaps it is time though to move away from the conceptual disjunctions between disciplines to the practical problems and challenges of everyday living – the aging population, health and lifestyle, polarisation and discrimination – and focus attention on those that can only be resolved holistically. In relation to aging, the policy need for a truly holistic life course approach is particularly pressing.

In this respect Richard Lerner's idea of *applied developmental science* (Lerner 2006; Lerner et al. 2000) has much to recommend it as an integrating frame. Taking the concept a step further: to recognise fully the historical and developmental power of life course study the idea of *life course science* is perhaps even better placed as the final piece of the jigsaw puzzle. In life course science, the longitudinal surveys on which the whole edifice stands, become the social observatories through which the scientific models needed for understanding human development are realised and tested. 'Big data' requires effective structures to realise their value; technological and methodological advance applied within a continually developing theoretically driven programme of life course study provide the tools to achieve it.

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Appendix

Table 1 Selected longitudinal life course surveys

Country, region of study	Year initiated	Sample	Follow-up ages
<i>United Kingdom</i>			
National Survey of Health and Development (NSHD) ^a	1946	Nationally representative sample comprising 4,689 births in a single week in England stratified to include more advantaged and therefore better educated families	0, 2, 4, 6, 7, 8, 9, 10, 11, 13, 15, 19, 20, 22, 23, 24, 26, 31, 36, 43, 53, 60–65
National Child Development Study (NCDS) ^a	1958	Nationally representative sample comprising 17,634 births in a single week in Great Britain (England, Scotland and Wales)	0, 7, 11, 16, 23, 33, 42, 46, 50
1970 British Cohort Study (BCS70) ^a	1970	Nationally representative sample comprising 17,287 births in a single week in Great Britain (England, Scotland and Wales)	0, 5, 10, 16, 26, 30, 34, 42
Avon Longitudinal Study of Parents and Children (ALSPAC) ^a	1993–1994	Representative sample comprising 14,120 pregnancies in County of Avon (Bristol region)	Continuous
Millennium Cohort Study (MCS) ^a	2000/2001	Nationally representative sample comprising 18,553 births selected from random sample of 400 electoral wards stratified to have relatively high disadvantaged and ethnic minority populations in United Kingdom (England, Scotland, Wales and Northern Ireland)	0, 2, 4, 7, 11, 14
Life Study ^a	2015	Nationally representative sample comprising 20,000 pregnancies in United Kingdom (England, Scotland, Wales and Northern Ireland) plus four clinically intensive area studies each comprising 15–20,000 pregnancies	Annual
Longitudinal study of young people in England ^a	2004	Nationally representative sample comprising 21,000 13–14 year-olds and their families in a random sample of schools in England stratified to include more disadvantaged and ethnic minority families	Annual
Growing up in Scotland ^a	2005	Representative samples of 5,000 birth and 3,000 2 year-olds resident in Scotland	Annual
British Household Panel Survey (BHPS)/ Understanding Society ^a	1991	5,538 households; 10,264 individuals (age 16+); sample boosts 1999 in Scotland (1,500), Wales (1,500); in 2001 Northern Ireland (2000); from 1994 11–16 year-olds supply data direct	Annual of all current and original household members
English Longitudinal Study of Ageing (ELSA) ^a	2002	12,100 individuals aged 50+ identified though the (cross-sectional) English survey of ageing	Every 2 years
<i>Nordic</i>			
Sweden: evaluation through follow-up study ^a	1961	Nationally representative cohorts comprising 12,000 13 year-olds starting in 1961, 1966, 1980, 1982/1985, 1987/1990, 1992/1995	Continuous relying mainly on government register data plus additional assessment
Danish National Birth Cohort ^a	1997–2002	100,000 pregnant women	Annual
Norwegian Mother and Child Cohort Study ^a	2000–2005	100,000 pregnant women and partners	Annual

(continued)

Table 1 (continued)

Country, region of study	Year initiated	Sample	Follow-up ages
<i>Other European</i>			
German Socio-Economic Panel (GSOEP) ^a	1984	Nationally representative panel comprising initially 7,000 households in the Federal Republic of Germany; 15,000 individuals (age 16+) boost: 1990 boost to 20,000 through bringing in post reunification East German Lande into the survey, 2000 boost to 24,000	Annual of all current and original household members
German: National Education Panel Study (NEPS) ^a	2010	Five nationally representative age cohorts starting in 2010 and at ages, 0 (in 2012), 4, 10, 14, 19, and an adult panel aged 21–50 (part of an earlier age cohort survey followed annually from 2007)	Annual up to age 67 in all cohorts
Netherlands: generation R study ^a	2002	Birth cohort study in a ‘multi-ethnic urban population’ comprising 10,000 pregnancies. Subsample ‘Focus Cohort’ more intensive study based on 1,000 births between April 2003 and April 2004	Five times through pregnancy and from then on annually until age 20
France: ELFE study France ^a	2011	Nationally representative sample comprising 18,000 births	Every few months from birth and annually from age 1
<i>New Zealand and Australia</i>			
New Zealand: Christchurch Health and Development Study (CHDS) ^a	1977	All 1,265 individuals born in Christchurch in 1977	At 4 months and annually from ages 1 to 16 then at less frequent intervals
New Zealand: Dunedin Multidisciplinary Health and Development Study (DMHDS) ^a	1972	All individual born in Dunedin in 1973	At ages 3, 5, 7, 11, 13, 15, 18, 21, 26 and from then on at less frequent intervals
Australia: growing up in Australia – Longitudinal Study of Australian Children (LSAC) ^a	2004	Randomly selected families. Cohort 1 (0–1 year-old) and Cohort 2 (4–5 years-old)	At 2-year intervals from 2004 to 2018
<i>Canada</i>			
National Longitudinal Survey of Children and Youth (NLSCY) ^a	1994, 1998, 2000	Three nationally representative cohorts of individuals (ages 0–11, 0–1, and 0–1) each comprising over 20,000 individuals	Every 2 years, with some sample reductions to meet cost constraints
Survey of Labour and Income Dynamics (SLID) ^a	1993–2010	Composed of two panels, each consisting of two labour force survey rotation groups and includes roughly 17,000 households	A panel is surveyed for a period of six consecutive years. A new panel is introduced every 3 years, so two panels always overlap
Youth in Transition Surveys (YITS)	1998–1999	National samples of 15 year olds and 18–20 year olds	Follow ups every 2 years through 2008–2009
Longitudinal Survey of Immigrants to Canada (LSIC) ^a	2001	National sample of immigrants 15 years and older, arriving between October 1, 2000 and September 30, 2001	Follow ups in 2003 and 2005

(continued)

Table 1 (continued)

Country, region of study	Year initiated	Sample	Follow-up ages
Workplace and Employment Survey (WES)	1999	National sample of employers from the Business Register, freshening with new companies annually; sample of linked employees from sampled employers	Follow ups annually through 2006; employers followed up throughout and employees retained for 2 years before being replaced
National Graduates Survey (NGS) ^a	1982; 1986; 1990; 1995; 2000; 2005; 2009/2010	National sample of graduates from Canadian postsecondary education institutions	Each class followed-up 2 and 5 years after graduation
National Population Health Survey (NPHS)	1994/1995	National household based sample of 17, 276 respondents age 12 and over	Follow-ups every 2 years
<i>US studies</i>			
Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) ^a	2001–2002	Nationally representative sample of 14,000 children born in 2001	Birth through kindergarten entry, 4 waves
Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K) ^a	1998–1999	Diverse sample of 22,000 kindergartners with data from child, parent, teacher, administrator, trained evaluators	Five waves spanning K to 8th grade
National Longitudinal Survey of Youth 1979 (NLSY79) ^a	1979	Nationally representative sample of 12,686 young men and young women aged 14–21 i.e. eight age cohorts. Children of female members of the cohort added from 1986 and followed up every 2 years	Followed up annually,
National Longitudinal Survey of Youth 1997 (NLSY97) ^a	1997	Nationally representative sample of young people aged 12–16 years i.e. five cohorts. Sample boost to increase representation of black and Hispanic youth	Followed up annually
Health and Retirement Survey (HRS) ^a	1992	Nationally representative samples of individuals and their spouses aged 51–61 years Merger with the AHEAD survey sample aged 70 years and over in 1998	Followed up every 2 years. Several companion studies in other countries (China, Japan, England, etc.)
National Longitudinal Survey of Adolescent Health (Add Health) ^a	1994–1995	Nationally representative cohort comprising 27,000 individuals aged 13–18 in a stratified random sample of schools including a ‘core’ sample of 12,000 and a number of boost samples based on questionnaire returns	Followed up at 1 year then rising to 5 then 6 year intervals
Panel Survey of Income Dynamics (PSID) ^a	1966	Nationally representative sample of 22,000 households and a boost sample of high enumeration districts with large non-white populations	Followed up originally Annually and now at 2 year intervals. (Companion studies in other countries)
Fragile families ^a	1998–2000	Representative sample 5,000 individuals and their parents and siblings born in 75 hospitals in 20 cities to families in which three quarters were ‘non-marital’ at the time of the first survey	Followed up at ages 1, 3 5

(continued)

Table 1 (continued)

Country, region of study	Year initiated	Sample	Follow-up ages
Youth development study ^a	1988	Representative sample of 1,139 students attending St. Paul, Minnesota Public Schools. Includes surveys of their parents and 422 adolescent children	Follow-up annually or biannually, with 19 waves from the ages of 14–15 to 37–38
Monitoring the Future (MTF) ^a	1976–current	Representative sample of 2,400 12th graders followed each year, selected from larger school based survey	Followed up every 2 years until age 35 and then every 5 years thereafter
National study of families and households	1987–1988	Primary adult respondent selected from a cross-section of 9,637 households plus an oversampling from certain racial/ethnic groups and family types (N=13,007)	Followed up 1992–1994 and again in 2001–2002
National Longitudinal Study of the High School Class of 1972 (NLS-72)	1972	School-based, nationally representative study of 12th graders	Followed-up in 1973, 1974, 1976, 1979, and 1986
High School and Beyond (HS&B)	1980	School-based, nationally representative sample of 10th and 12th graders	Followed up every 2 years until 1986; 10th grade cohort also followed-up in 1992
National Education Longitudinal Study of 1988 (NELS:88)	1988	School-based, nationally representative sample of 8th graders	Followed-up in 1990, 1992, and 2000
Educational Longitudinal Study of 2002 (ELS:2002)	2002	School-based, nationally representative sample of 10th graders	Followed up in 2004; 2006; 2012
Midlife Development in the United States (MIDUS)	1995/1996	National sample, ages 25–74 with metropolitan oversamples, siblings, and twins	Followed up in 2004/2006 with MIDUS III planned. Companion study in Japan, MIDJA

^aReferred to in the main text

References

- Abbott, A. (1995). Sequence analysis: New methods for old ideas. *Annual Review of Sociology*, 21, 93–113.
- Abowd, J. M., & Woodcock, S. D. (2004). Multiply-imputing confidential characteristics and file links in longitudinal linked data privacy in statistical databases. *Proceedings Annals of the New York Academy of Sciences*, 3050, 290–297.
- Aisenbrey, S., & Fasang, A. E. (2010). New life for old idea: The second wave of sequence analysis: Bringing the “Course” back into the life course. *Sociological Methods and Research*, 38, 420–462.
- Alwin, D. F. (1995). Taking time seriously: Studying social change, social structure and human lives’. In P. Moen, G. H. Elder Jr., & K. Lüscher (Eds.), *Linking lives and contexts: Perspectives on the ecology of human development*. Washington, DC: American Psychological Association.
- Arbuckle, J. A., & Wothke, W. (1995–1999). *Amos 4 users guide*. Chicago: SmallWaters Corporation.
- Bachman, J. G. (1972). *Blueprint for a longitudinal study of adolescent boys* (Youth In Transition, Vol. 1). Ann Arbor: Institute for Social Research, University of Michigan.
- Bachman, J. G. (1986). *From ‘Youth in Transition’ to ‘Monitoring the Future: A tale of two longitudinal studies of youth in the United States’*. Paper presented at symposium on national longitudinal surveys of youth in industrialised countries: Perceptions of funding agencies, researchers and administrators, American Educational Research Association conference, San Francisco.
- Baltes, P. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23, 611–626.
- Baltes, P. (1995). Summary of introductory comments. In National Research Council (Ed.), *Careers in science*

- and technology (pp. 41–42). Washington, DC: National Academy Press.
- Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life span theory in developmental psychology. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 569–664). New York: Wiley.
- Barker, D. J. P. (1992). *Fetal and infant origins of adult disease*. London: British Medical Journal MJ Publishing.
- Bentler, P. M. (1995). *EQS program Manual* Multivariate Software, Inc.
- Blane, D., Kelley-Irvine, M., D'Errico, A., Bartley, M., & Montgomery, S. (2013). Social-biological transitions: How does the social become biological? *Longitudinal and Life Course Studies*, 4, 119–135.
- Blossfeld, H.-P. (2006). *Globalife: Life course in the globalisation process*. Final Report 1999–2005. University of Bamberg.
- Blossfeld, H.-P., & Rohwer, G. (2002). *Techniques of event history modelling: New approaches to causal analysis*. London: Lawrence Erlbaum Associates.
- Blossfeld, H.-P., Hamerle, A., & Mayer, K. U. (1989). *Event history analysis: Statistical theory and application in the social sciences*. New York: Psychology Press.
- Bowlby, J. (1952). *Maternal care and mental health*. Geneva: World Health Organization.
- Boyle, P. J., Cullis, A., Feng, Z., Flowerdew, R., & Gayle, V. (2004). *Adding geographical variables and identifiers to longitudinal Datasets*. A Report to the National Longitudinal Strategy Committee and the UK Economic and Social Research Council.
- Brett, C., & Deary, I. (2014). Realising health data linkage from a researcher's perspective: Following up the 6-Day sample of the Scottish Mental Survey 1947. *Longitudinal and Life Course Studies*, 5, 283–298.
- Brick, J. M., & Kalton, G. (1996). Handling missing data in survey research. *Statistical Methods in Medical Research*, 5, 215–238.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and by design*. Cambridge, MA: Harvard University Press.
- Brooks-Gunn, J., Phelps, E., & Elder, G. H. (1991). Studying lives through time: Secondary data analyses in developmental psychology. *Developmental Psychology*, 27, 899–910.
- Buck, N., & McFall, S. (2012). Understanding society: Design overview. *Longitudinal and Life Course Studies*, 3, 5–17.
- Burkhauser, R. V., & Lillard, D. R. (2006). The contribution and potential of data harmonization for cross-national comparative research. *Journal of Comparative Policy Analysis*, 7, 313–330.
- Burkhauser, R. V., & Lillard, D. R. (2007). The expanded cross-national equivalent file. Hilda joins its international peers. *Australian Economic Review*, 40, 208–215.
- Bynner, J. (1984). *Secondary analysis of National Child Development Study*. Report for the UK Economic and Social Research Council. www.cls.ioe.ac.uk/Bibliography.aspx
- Bynner, J. (Ed.). (1993). *Use of longitudinal cohort studies in the policy process*. London: Anglo German Foundation.
- Bynner, J. (1996). *Use of longitudinal data in the study of social exclusion*. Report for the Organisation of Economic Cooperation and Development.
- Bynner, J. (2005a). Longitudinal cohort designs. In K. Kempf-Leonard (Ed.), *Encyclopedia of social measurement* (Vol. 2, pp. 591–599). San Diego: Elsevier.
- Bynner, J. (2005b). *Challenges for longitudinal research. Synopsis of findings from a scoping study*. Report to the UK Joint Centre for Longitudinal Research. <http://www.slls.org.uk/#/longview-reports/c8a5>
- Bynner, J., & Goldstein, H. (1998). Three generations of children – An edited transcript of a video recording made in March 1982 of the then directors of the three major British cohort studies in conversation. *Paediatric and Perinatal Epidemiology: Special Issue in Honour of Professor Neville Butler*, 12(supplement), 1–14.
- Bynner, J., & Joshi, H. (2007). Building the evidence base from longitudinal data. The aims, content and achievements of the British Birth Cohort Studies. *Innovation the European Journal of Social Science Research*, 20, 159–179.
- Bynner, J., Wadsworth, M., Goldstein, H., Maughan, B., Purdon, S., Michael, R. (2008). *Scientific case for a new birth cohort study*. Report to the Research Resources Board of the Economic and Social Research Council and Appendices, <http://www.longviewuk.com/pages/reportsnew.shtml>
- Bynner, J., Erikson, R., Goldstein, H., Maughan, B., & Wadsworth, M. (2009). *Editorial: Longitudinal and Life course Studies*, 1, 3–10.
- Campbell, D. T. (1991). Methods for the experimenting society. *American Journal of Evaluation*, 12, 223–260.
- Clausen, J. A. (1972). The life course of individuals. In M. W. Riley, M. E. Johnston, & A. Foner (Eds.), *Aging and society: A sociology of age stratification* (pp. 457–574). New York: Russell- Sage Foundation.
- Clausen, J. A. (1986). *The life course a sociological perspective*. Englewood Cliffs: Prentice Hall.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.
- Cronbach, L. J. (1975). Beyond the two disciplines of scientific psychology. *American Psychologist*, 20, 116–127.
- Dezateaux, C. (2014). *Life study: Design and vision*. Paper presented at the conference of the Society for Longitudinal and Life Course Studies, October, Lausanne.
- Douglas, J. W. B. (1964). *The home and the school*. London: MacGibbon Kee.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press. Chicago.
- Elder, G. H., Jr. (1985). Perspectives on the life course. In G. H. Elder Jr. (Ed.), *Life course dynamics: Trajectories and transitions, 1968–1980* (pp. 23–49). Ithaca: Cornell University Press.
- Elder, G. H., Jr. (1998). The life course and human development. In R. M. Lerner (Ed.), *Handbook of child psy-*

- chology, (Volume 1 665–715: *Theoretical models of human development*). New York: Wiley.
- Elder, G. H., Jr., & Giele, J. Z. (Eds.). (2009). *The craft of life course research*. New York: Guilford Press.
- Elder, G. H., Jr., & Shanahan, M. J. (2006). The life course in human development. In R. E. Lerner (Ed.), *Theoretical models of human development* (The Handbook of child psychology 6th ed., Vol. 1, pp. 665–715). New York: Wiley.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence, and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer.
- Elliot, M. J., & Dale, A. (1999). *Scenarios of attack: The data intruder's perspective on statistical disclosure risk*. Netherlands Official Statistics, Spring, pp. 6–10.
- Elliot, M. J., Skinner, C. J., & Dale, A. (1998). Special uniques, random uniques and sticky populations: some counterintuitive effects of geographical detail on disclosure risk. *Research Official Statistics, 1*, 53–68.
- Fergusson, D. M., Horwood, L. J., Shannon, F. T., & Lawton, J. M. (1989). The Christchurch developmental atudy: A review of epidemiological findings. *Paediatric and Perinatal Epidemiology, 3*, 302–325.
- Ferri, E., Bynner, J., & Wadsworth, M. E. (Eds.). (2003). *Changing Britain, changing lives: Three generations at the turn of the century*. London: Institute of Education Bedford Way Papers.
- Friedman, V. (2008). Data visualization and infographics. *Graphics*, Monday Inspiration, 14th Jan 2008.
- Furu, M. (2000). The Malmo Study. In C.-G. Janson (Ed.), *Seven Swedish longitudinal studies* (pp. 44–75). Stockholm: Swedish Council for Planning and Coordination of Research.
- Giele, J. Z., & Elder, G. H., Jr. (1998). Life course research: Development of a field. In J. Z. Giele & G. H. Elder (Eds.), *Methods of life course research: Qualitative and quantitative approaches* (pp. 5–27). London: Sage.
- Golding, J., Birmingham, K. E., & Jones, R. W. (2009). A guide to undertaking a birth cohort study: Purposes, pitfalls and practicalities. *Paediatric and Perinatal Epidemiology, 23*(Issue Suppl 1), 1–23.
- Goldstein, H. (1979). *The design and analysis of longitudinal studies*. London: Academic.
- Goldstein, H. (2009). Handling attrition and non-response in longitudinal data. *Longitudinal and Life Course Studies, 1*, 63–72.
- Goldstein, H. (2011). *Multilevel statistical models* (4th ed.). Chichester: Wiley.
- Halfon, N., Larson, K., Lu, M., Tullis, E., & Russ, S. (2014). Life course health development: Past, present and future. *Maternal and Child Health Journal, 18*, 344–365.
- Harris, K. M., Halpern, C. T., Whitsel, E., Hussey, J., Tabor, J., Entzel, P., & Udry, J. R. (2009). *The national longitudinal study of adolescent health: Research design*, UNC Carolina Population Centre. <http://www.cpc.unc.edu/projects/addhealth/design>
- Heinz, W. R. (1991). Status passages, social risks and the life course. In W. R. Heinz (Ed.), *Theoretical advances in life course research* (9–22). Weinheim: Deutscher Studien Verlag.
- Heinz, W. R. (1996). Status passages and Micro-macro linkages in life course research. In A. A. Weymann & W. R. Heinz (Eds.), *Society and biography* (pp 51–66). Weinheim: Deutscher Studien Verlag.
- Heinz, W. R., & Marshall, V. W. (Eds.). (2003). *Social dynamics of the life course*. New York: Aldine de Gruyter.
- Heinz, W. R., Huinink, J., & Weymann, A. (Eds.). (2009). *The life course reader: Individuals and societies across time*. Frankfurt: Campus Verlag.
- Hofer, S. M., & Piccinin, A. M. (2009). Toward an integrative science of lifespan development and aging. *Journals of Gerontology: Psychological Sciences, 65B*, 269–278.
- Hofman, H., Jaddoe, V. W. V., Machenbach, J. P., et al. (2004). Growth development from early fetal life until young adulthood: The Generation R study. *Paediatric Epidemiology, 18*, 61–72.
- Husén, T., Emanuelsson, I., Fägerlind, I., & Liljefors, R. (1969). *Talent, opportunities and career: A twenty six years follow-up of 1500 individuals*. Stockholm: Almqvist & Wisell.
- Janson, C.-G. (Ed.). (2000). *Seven Swedish longitudinal studies in the behavioural sciences*. Stockholm: Swedish Council for Planning and Coordination of Research.
- Jöreskog, K. G., & Sörbom, D. (1979). *Advances in factor analysis and structural equation models*. Cambridge, MA: Abt Books.
- Juster, F. T., & Suzman, R. (1995). An overview of the health and retirement study. *Journal of Human Resources, 30*(Supplement 1995), S7–S56.
- Kogevinas, M., Andersen, A.-M., & Olsen, J. (2004). Collaboration is needed to co-ordinate 33 European birth cohort studies. *International Journal of Epidemiology, 33*, 1172–1173.
- Kohn, M. (1987). Cross-national research as an analytic strategy. *American Sociological Review, 52*, 713–731.
- Kuh, D., & Ben Shlomo, Y. (Eds.). (1997). *A life course approach to chronic disease epidemiology: Tracing the origins of ill-health from early to adult life*. Oxford: Oxford University Press.
- Kummer, H. (2011). *The Swiss etiologic study of adjustment and mental health: Anatomy of a failure of research project*. www.sulm.ch/pipette_magazin/.../pipette_1-2011_S9-13
- Lerner, R. M. (Ed.). (2006). Developmental science, developmental systems and contemporary theories of human development. In R. E. Lerner (Ed.) *Handbook of child psychology, volume 1: Theoretical models of human development*. New York: Wiley.
- Lerner, R. M., Fisher, C. B., & Weinberg, R. A. (2000). Applying developmental science in the 21st century: International scholarship for our times. *International Journal of Behavioural Development, 24*, 24–29.

- Leuze, K., Ludwig-Mayerhofer, W., & Solga, H. (2011). The German national education panel study: A wealth of potential for research in school-to-work transitions. *Longitudinal and Life Course Studies*, 2, 346–355.
- Levy, R. L., & Widmer, E. D. (2013). *Gendered life courses: Between standardization and individualization*. Zurich: Lit Verlag GmbH & co. KG Wien.
- Magnusson, D. (1993). Human ontogeny a longitudinal perspective. In D. Magnusson & P. Casaer (Eds.). *Longitudinal research on individual development: Present status and future perspectives*. Cambridge: Cambridge University Press.
- Magnusson, D., & Bergman, L. R. (1990). *Data quality in longitudinal research*. Cambridge: Cambridge University Press.
- Magnusson, D., & Casaer, P. (1993). *Longitudinal research on individual development: Present status and future perspectives*. Cambridge: Cambridge University Press.
- Magnusson, D., Bergman, L. R., Rudinger, G., & Törestad, B. (Eds.). (1991). *Problems and methods in longitudinal research*. Cambridge: Cambridge University Press.
- Marshall, V. W., & Mueller, M. M. (2003). Theoretical roots of the life-course perspective. In W. R. Heinz & V. W. Marshall (Eds.), *Social dynamics of the life course*. New York: Aldine de Gruyter.
- Martin, J., Bynner, J., Kalton, G., Boyle, P., Goldstein, H., Gayle, V. Parsons, S., & Piesse, A. (2006). *Strategic review of panel and cohort studies: Report to the research resources board of the economic and social research council* and Appendices. www.longviewuk.com/pages/publications.shtml
- Martin, M. J., Conger, R. D., Schofield, S. J., et al. (2010). Evaluation of the interactionist mode of socioeconomic status and problem behavior: Developmental cascade across generations. *Development and Psychopathology*, 22, 695–713.
- Mayer, K. U. (1993). The German experience in longitudinal population studies. In J. Bynner (Ed.), *The use of longitudinal cohort studies in the policy process*. London: Anglo German Foundation.
- Mayer, K. U. (2001). *The sociology of the life course and life span psychology – Diverging or converging pathways*. Paper presented to the Society for the Study of Human Development conference. Ann Arbor, Michigan.
- Mayer, K. U., & Schoepflin, U. (1989). The state and the life course. *Annual Review of Sociology*, 15, 187–209.
- Mayer, K. U., & Tuma, N. B. (Eds.). (1990). *Event history analysis in life course studies*. Madison: University of Wisconsin.
- McGonagle, K., Schoeni, R. F., Sastry, N., & Freedman, V. A. (2012). The panel study of income dynamics: Overview, recent innovations and potential for life course research. *Longitudinal and Life Course Studies*, 3, 268–284.
- Michael, R., & O’Muircheartaigh, C. (2006). Design priorities and disciplinary perspectives: The case of the National Children’s Study. *Journal of the Royal Statistical Society A*, 171, 465–480.
- Modell, J. (1989). *From youth to adulthood in America 1920–1975*. Berkeley: University of Chicago Press.
- Modell, J., Furstenberg, F. F., & Hershberg, (1976). Social change and transition to adulthood. *Journal of Family History*, 1, 7–32.
- Mortimer, J. T. (2012). The evolution, contributions, and prospects of the youth development study: An investigation in life course social psychology. *Social Psychology Quarterly*, 75, 5–27.
- Mortimer, J. T., & Shanahan, M. J. (Eds.). (2003). *Handbook of the life course*. New York: Springer.
- Müthen, B., & Müthen, L. (2014). *MPlus user’s guide*. www.statmodel.com/ug excerpts.shtml
- Neugarten, B. L. (1996). *The meanings of age: Selected papers of Bernice L. Neugarten*. Chicago: The University of Chicago Press.
- Norwegian Institute of Public Health. (2005). *Mother and child cohort study*. www.fhi.no/default0.asp
- Olsen, J., Melbye, M., Olsen, S. F., et al. (2001). The Danish National Birth Cohort – its background structure and aim. *Scandinavian Journal of Public Health*, 29, 300–307.
- Pembrey, M. (2004). Genetic epidemiology: Some special contributions of birth cohorts. *Paediatric and Perinatal Epidemiology*, 18, 3–7.
- Phelps, E., Furstenburg, F. F., & Colby, A. (2002). *Looking at lives: American longitudinal studies of the twentieth century*. New York: Sage Foundation.
- Pickles, A., Maughan, B., & Wadsworth, M. (2007). *Epidemiological methods in life course research*. Oxford: Oxford University Press.
- Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, 23, 303–326.
- Riley, M. W. (1988). On the significance of age in sociology. In M. W. Riley (Ed.), *Social change and the life course, volume 1: Social structures and human lives* (pp. 24–46). New York: Sage.
- Robins, L., & Rutter, M. (Eds.). (1990). *Straight and devious pathways from childhood to adulthood*. Cambridge: Cambridge University Press.
- Rubin, D. B. (2004). *Multiple imputation for non-response in surveys*. New York: Wiley.
- Scheuch, E. K. (1990). The development of comparative research. In E. Oyen (Ed.), *Comparative methodology* (pp. 19–37). London: Sage.
- Schneider, W., & Edelstein, W. (1990). *ESF inventory of European longitudinal studies in the behavioural and medical sciences*. Berlin: Max Planck Institute for Education and Human Development.
- Schoon, I. (2006). *Risk and resilience. Adaptations in changing times*. Cambridge: Cambridge University Press.
- Schulenberg, J., & Schoon, I. (2012). The transition to adulthood across time and space. *Longitudinal and Life Course Studies*, 3, 164–172.
- Sears, R. R. (1977). Sources of life satisfaction of the Terman gifted men. *American Psychologist*, 32, 119–128.

- Sewell, W. H., Hauser, R. M., Springer, K. W., & Hauser, T. S. (2001). *A review of the Wisconsin longitudinal study 1957–2001*. Madison: Department of Sociology, University of Wisconsin-Madison.
- Shanahan, M. J., & Porfelli, E. (2002). Integrating the life course and life span. Formulating research questions with dual points of entry. *Journal of Vocational Behaviour*, 61, 398–406.
- Silva, P. A., & Stanton, W. R. (1996). *Child to adult*. Oxford: Oxford University Press.
- Sontag, L. W. (1971). The history of longitudinal research: Implications for the future. *Child Development*, 42, 987–1002.
- Standing, G. (2011). *The precariat: The new dangerous class*. London: Bloomsbury Academic.
- Thomas, W. L., & Znaniecki, F. (1918–1920). *The Polish peasant in Europe and America (Vols. 1–2)*. Urbana: University of Illinois Press.
- Thornbery, T. P. (2009). The apple doesn't fall very far from the tree (or does it?): Intergenerational patterns of antisocial behaviour. *Criminology*, 47, 297–325.
- Wadsworth, M. (1991). *The imprint of time: Childhood history and adult Life*. Oxford: Clarendon.
- Wadsworth, M. E. J., & Bynner, J. (Eds.). (2011). *A companion to life course studies: The social and historical context of the British birth cohort studies*. London: Routledge.
- Wagner, G. G., Frick, J. R., & Schüpp, J. et al. (2006). *Enhancing the power of panel studies- the case of the German socio-economic panel study (SOEP)*. Paper presented to the StatsCanada-Conference, Longitudinal Social Surveys in an International Perspective, Montreal.
- Werner, E. E. (2004). What can we learn about resilience from large scale longitudinal studies? In *Handbook of resilience in children*. New York: Kluwer Academic/Plenum Publishers.
- Williams, S. (1997). *Women and childbirth in the twentieth century*. Stroud: Sutton.
- Wolfson, M. C. (2006). *Thoughts on the nature of big science*. Paper presented to the StatsCanada-Conference, Longitudinal Social Surveys in an International Perspective, Montreal.
- Wu, L. L. (2000). Some comments on sequence analysis and optimal matching methods in sociology: Review and prospect. *Sociological Methods and Research*, 29, 41–64.
- Zentralstelle für Psychologische Information und Dokumentation (ZIPD). (1994). *Inventory of European longitudinal studies in the behavioural and medical Sciences, Update 1990–1994*. University of Trier.

Age, Cohorts, and the Life Course

Glen H. Elder, Jr. and Linda K. George

The bond between age and time is central to a theoretical understanding of the life course and its foundational traditions, sociocultural and cohort-historical (Elder 1975). In the sociocultural perspective, age distinctions are expressed as social expectations regarding the timing of events and social roles, whether early, on time, or late. As normative age grades from childhood to old age, these age groups constitute a basis for self-other definition and evaluation as exemplified by the process of leaving childhood for the transition to young adult status. From a cohort-historical perspective, chronological age as birth year locates individuals in historical context and time through membership in a particular cohort, such as the Americans born during the first decade of the twentieth century.

Unlike normatively defined age strata, birth cohorts are not socially recognized or specified, although they may develop a shared mentality. Cohorts may be defined by historical markers of social change, for example, or simply by available data, as in a longitudinal study of people born in a particular year. An example of the latter comes

from the United Kingdom and its extraordinary array of national longitudinal cohort studies, each defined by birth in a single year: 1946, 1958, 1970, 2000, and 2011. Systematic comparison of such ordered cohorts in the rapidly changing society has yielded valuable information for policy makers. It is important to note that a particular social change may influence different subsets of a cohort differentially according to social class, gender, and race-ethnicity. Its impact also tends to vary across successive cohorts according to their career stage at the time of social change. Thus age-related changes both across and within cohorts inform our understanding of the intersection of history and personal biography.

The past half century has witnessed major advances in theorizing about cohorts as a way of understanding the biographical impact of social change and in studying the change process itself. Conceptual elaborations of the diverse meanings of age and the exponential growth of longitudinal studies have contributed to this advance and to the emergence of the life course as theory and field of study. By observing people's lives over many years, we have gained a deeper appreciation of their variation in relation to a changing world. In Part I of this chapter, we highlight the major contributions to such developments.

These contributions provide a framework for taking up the two complimentary approaches to cohort studies, an inter-cohort perspective that

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provides a “window to historical and social change,” and an intra-cohort approach. Part II examines inter-cohort studies, using a systematic survey of the literature’s contributions toward understanding social change and the dynamic transformations of broad social contexts within which lives unfold. The studies in this survey are designed to indicate whether and how society is changing, and do not typically relate social change to the life course. In Part III, a more focused explanatory approach in cohort research is used to reveal the distinctive contribution of intra-cohort studies. It demonstrates the ways in which social change can have very different consequences for specific subgroups “within cohorts” and their life course. The integration of inter-cohort and intra-cohort studies, as well as directions for future research, are addressed in Part IV.

1 Conceptual Issues and Perspectives

A cohort is a group of individuals who experienced an event of interest at the same time. Cohorts can be defined on the basis of any kind of event (e.g., entering college, becoming a parent). In the social and behavioral sciences, unless otherwise specified, cohort generally refers to a birth cohort – to individuals born at the same or approximately the same time. In this chapter, cohorts will refer to birth cohorts. Birth cohorts share one characteristic that is not typical for cohorts based on other events. Members of birth cohorts are the same or approximately the same age. This is untrue for the vast majority of cohorts based on other events. In a cohort of individuals who become first-time parents in the same year, for example, cohort members will vary substantially in age – probably covering an age range of 20 or more years. This inherent link between cohort and age for birth cohorts is the first in a number of complicating factors that arise when attempting to accurately attribute differences across cohorts or across age to specific processes.

1.1 Early Contributions

Although the definition of cohort is straightforward, the history of this concept in the behavioral and social sciences in general, and in life course theories in particular, is less so. It is fascinating that two watershed explications of the concept were published in the same year. Norman Ryder’s now-classic paper, “The Cohort as a Concept in the Study of Social Change,” was published in the *American Sociological Review* in 1965. That same year, K. Warner Schaie’s pioneering article, “A General Model for the Study of Developmental Problems,” appeared in *Psychological Bulletin*. These two journals were and are the flagship journals of sociology and psychology respectively. Because these two articles set the stage for theory and research on cohorts and remain foundational for contemporary studies, we review them in some detail.

Ryder’s primary purpose was to identify the processes by which social change occurs and he proposed that cohorts are the vehicles that bring about social change. In his words, “Cohorts do not cause change; they permit it. If change does occur, it differentiates cohorts of individuals from one another, and comparison of their careers or life trajectories then becomes a way to study change” (1965: 845). Ryder not only posits that cohorts can trigger social change, but that it is virtually axiomatic that they do. “The cohort record is not merely a summation of a set of individual histories. Each cohort has a distinctive composition and character, reflecting the circumstances of its unique origination and history” (1965: 844).

Ryder emphasized that the nature and amount of social change ushered in by cohorts differ widely. He identified five cohort characteristics that play a role in determining the content and size of social change that occurs as a result of cohort differentiation. First, and as implied above, cohorts that experience major social disruptions during adolescence and young adulthood will generate more social change than cohorts that come of age during times of stability.

Thus, events such as wars and major changes in economic conditions, such as the Great Depression, tend to generate large amounts of social change. Second, cohort size will affect the nature and volume of social change, with larger cohorts not only ushering in more change but also having the numerical power to imprint that change more firmly on the rest of society compared to smaller cohorts. Third, immigration has the potential to increase cohort differentiation. The number of immigrants who enter a society matter, with large numbers of immigrants arriving within a relatively short time creating more cohort differentiation than smaller numbers of immigrants. Ryder also suggested that internal migration from rural to urban areas is comparable to immigration from other countries. Fourth, major technological innovations can create significant differences across cohorts. Finally, social movements consisting mainly of young people more significantly affect cohort differentiation because young adults are more open to changes in the status quo than their older counterparts.

Ryder believed that adolescents and young adults constitute major agents of social change in society. He reviewed a number of studies indicating that historical events experienced during young adulthood have lasting effects on cohort members' attitudes and behaviors and that these effects are stronger than those exhibited by older and younger cohorts who also experienced the historical events. He also noted that the factors that create more social change tend to be experienced by and have greater consequences for young adults than for other age groups.

Wars mobilize the armed forces in which the vast majority of soldiers are young men (and now young women). At the time he wrote this article, wars also affected young women by delaying marriage and childbirth and, in some cases, reducing the number of men available for family formation. The majority of immigrants and internal migrants from rural to urban areas are young adults. With regard to cohort size, it is during adolescence and young adulthood that members of very large cohorts become painfully aware of the mismatch between their numbers and openings in the labor market. And lastly the marketing

of technological innovations is targeted disproportionately at younger members of society. Thus age interacts with social conditions to make adolescence and young adulthood the focal point for the history of a cohort and the nature of its differentiation from earlier and later cohorts.

A few of Ryder's other observations are pertinent. First, although Ryder mentioned the confounding of cohort, age, and period, he devoted very little attention to methods of statistically estimating their effects. Second, Ryder never used the phrase "cohort effect," although that has become the label of choice for understanding how cohorts differ. Instead, he used the term "cohort differentiation," which seems to be a more accurate descriptor. Third, Ryder was keenly aware of the substantial variability within cohorts, stating that "Every cohort is heterogeneous" (1965: 847). He recognized the importance of studying within-cohort variability for understanding individual lives and that within-cohort differences may exceed between-cohort differences. For the purposes of studying social change, however, Ryder firmly believed that between-cohort differences were the critical evidence.

At the same time that Ryder was exploring appropriate methods for studying social change, K. Warner Schaie was grappling with the identification problem in age-period-cohort designs and the implications of age effects for developmental science. Schaie endorsed Kessen's definition that "a characteristic is said to be developmental if it can be related to age in an orderly or lawful way" (cited in Schaie 1965: 93). Schaie's contribution to studying developmental change was the recognition that "orderly and lawful" age changes need to be isolated from cohort and period differences.

To achieve this, he proposed the now-familiar grid in which age, cohort, and time of measurement are arrayed in its rows, columns, and diagonals. Most of the paper focuses on what Schaie calls three sequential forms of research design and decision rules to use in identifying age changes that have been disentangled from cohort and time of measurement or period differences. The three sequential research designs are labeled

cohort-sequential, time-sequential, and cross-sequential. They differ only in the placement of age, cohort and time of measurement in the columns, rows, and diagonals of the grid. The decision rules involve estimating the effects of age, cohort, and time of measurement in two of the three sequential designs and using the patterns of results to estimate the extent to which the distribution of the dependent variable of interest reflects those three competing forces.

Today it is generally recognized that there is no way to totally disentangle age, cohort, and time of measurement effects (Yang and Land 2013). However a number of statistical strategies permit estimates of those three forces if the investigator is willing to make an assumption that frees one degree of freedom for estimation, with the nature of that assumption differing across strategies. Schaie's specific strategy is not popular now, but his depiction of the confounding of age, cohort, and period or time of measurement is accurate and compelling. Most importantly, Schaie demonstrated that longitudinal studies are not the panacea for solving this problem that many investigators had assumed in the 1960s.

Ryder and Schaie approached the issue of cohorts from very different disciplinary perspectives. For Ryder, cohort differences are the key to investigating social change. For Schaie, it was important to examine the effects of age with cohort differences taken into account – i.e., to substantiate that relatively uniform age changes are observed regardless of when individuals were born or when they were measured. Ryder's article is primarily conceptual; Schaie's methodological. But there are substantial similarities as well: both authors wanted to isolate one of three processes that are confounded in nature. They shared the view that all three processes are powerful, thus raising the ante for disentangling their effects. Both were interested in aggregate phenomena – as a population-specialist in sociology, Ryder focused more on between-cohort differences and their insights regarding social change in society whereas Schaie's career in studying how people age directed his efforts to isolating age changes that are observed across time and cohort succession in the lives of individuals.

Concepts of the life course and life span were undeveloped at the time Ryder and Schaie had their papers published, but they made substantial contributions to the role of cohorts in life course and life span development. Ryder's thinking about cohorts influenced Matilda White Riley's conceptualization of cohorts and their bio-social processes in aging and the life course, as represented by *Aging and Society* (with Johnson and Foner 1972). Later on she developed greater awareness of the structural lag between social institutions and the life course of aging cohorts. In the late 1970s, Riley organized and chaired a Social Science Research Council committee on the life course and human development.

During the late 1960s and 1970s, Schaie played a central role in promoting an analytic framework for studying trajectories of aging across birth cohorts. He did so in part as director of a training program in life-span development at West Virginia University that included postdoctoral students who became influential figures in the cohort study of human development and aging. One of these students, Paul Baltes, became a leading figure in the emerging life-span study of cohort effects in developmental psychology (Baltes et al. 1979).

1.2 The Challenges of Heterogeneity and Context

Two issues of theoretical and analytic significance became major themes in the social and behavioral sciences during the 1970s and 1980s and remain so: heterogeneity and context. Social and behavioral scientists were searching for ways to generate more nuanced and fine-grained understanding of human attitudes and behaviors. The call for increased attention to heterogeneity came from many sources, from a new focus on gender and socioeconomic variability within racial and ethnic groups to recognition of heterogeneity in the outcomes of stressful life events. Other investigators expressed dissatisfaction with survey data that provided little or no information about the social structural and interpersonal contexts in which individuals live as

well as on their life patterns. Studies began to show that time, place, and macro-, mezzo-, and micro environments had strong effects on human lives and that those effects had been understudied and were not well understood.

Consider the convergence of historical and ecological perspectives in longitudinal studies of birth cohorts. While birth year defines the historical location of a cohort, its specific socio-cultural and historical context is derived from an understanding of its social ecology. This interdependence is most obvious in national birth cohort studies which include adults from vastly different socioeconomic areas of a large country, such as the United States. But the most compelling documentation of this convergence comes from Robert Sampson's cohort-historical and ecological studies (2012) that evolved from the Project on Human Development in Chicago Neighborhoods during the 1990s. Data were obtained from longitudinal cohorts of young people, community surveys, the assessment of social networks and systematic social observations of neighborhoods and local city governance. He found that the culture and residents of a neighborhood were typically influenced by the quality of surrounding neighborhoods. Nearly all neighborhoods in the study were discovered to be linked across the years through the intra-city migration of people. This flow of people, young and old, typically connected neighborhoods of advantage and disadvantage, thereby perpetuating their inequality across the generations.

The increased attention to heterogeneity and context had relevance to cohort-historical analyses that sought to identify social change through cohort differentiation, but it was not a match for their powerful implications in developmental science. Once age changes were examined through the lenses of heterogeneity and context, developmental scientists quickly recognized that developmental processes occur in the context of environments, resulting in substantial heterogeneity in the processes themselves and their outcomes. In short, although developmental scientists did not abandon the search for age changes that are universal or nearly universal across time and place, a majority of developmen-

tal research became focused on variability within cohorts/age groups.

1.3 The Emergence and Consequences of Life Course Theory and Research

Although there were previous and notable attempts to study personal biography and life histories, life course theory and research began in earnest with Elder's now classic *Children of the Great Depression: Social Change in Life Experience* (1974). In the 40 years since its publication, life course research has become a staple of social and behavioral research. It laid the foundation for literally hundreds of studies, spurred the development and adoption of analytic techniques suited to testing its principles, and been usefully linked to a multitude of mainstream sociological and psychological theories (e.g., stress process theory). There is now general consensus that the life course perspective includes five principles: the principle of life-span development, the principle of agency, the principle of time and place, the principle of timing, and the principle of linked lives (Elder et al. 2003). Life course research typically does not address all five principles but all of them are central to the life course paradigm.

Importantly for our purposes, *Children of the Great Depression* (1974/1999) documented the importance of both cohort-historical and developmental (or within-cohort) perspectives on human lives. An important theme of this seminal work was that the social and economic disruptions caused by the Great Depression had very different consequences for cohorts of boys and girls born only 7 or 8 years apart in the 1920s. The Oakland study members were born in 1920–1921 and thus were old enough when hard times came to assist their parents. The Berkeley study members were born just before the Great Depression and consequently were dependent on parents during the most stressful time of family hardship.

The Berkeley boys were more adversely influenced by hard times than the Oakland boys, and

their psychological disadvantage extended into the adult years. However those who entered military service during or after World War II tended to recover their self-confidence and well-being. The Berkeley girls were protected in the Depression years by the emotional support and example of their mothers. In the Oakland cohort, girls in hard-pressed families were drawn into household chores during early adolescence, a time of physical and social maturation, and they often lacked attractive clothes for peer activities. As a result, they were more adversely affected by family hard times than the boys. Taking gender roles into account, these cohort differences are consistent with Ryder's observation about life-stage at time of social change and its consequences (1965; 846). As each cohort encounters historical events, it "is distinctively marked by the career stage it occupies". Moreover, these cohort by gender differences persist well into middle age.

In addition to cohort and gender differences, large amounts of within-cohort variability also were observed. Social class before the Great Depression and the amount of economic deprivation caused by the Depression, for example, generated differences in adult achievements, roles, and attitudes within cohorts. The observed within-cohort heterogeneity demonstrated that although cohort differences, especially those generated by significant social disruptions, have important consequences for biography, they are not equally important for all cohort members. As noted by gender, cohort members are situated in numerous contexts – only one of which is cohort – that combine to provide both opportunities and constraints for individual development.

This chapter is organized around the two major ways in which cohort is important to life course theory and research. The next section reviews the contributions that cohort-historical studies have contributed to our understanding of both social change and, in broad brush, widespread changes in the life course. The following section reviews research that focuses on within-cohort differences and their consequences for personal biography over the long-term. Cohort is an important contextual factor in understanding within-cohort differences, but a more complete and nuanced

understanding of the life course requires an emphasis on within-cohort variability.

A caveat about the concept of generation is needed at this point. The term "generation" has been used in two distinct ways in social and behavioral research (Alwin and McCammon 2003). First and as most frequently used, generation refers to statuses in the family (i.e., grandparents, parents, and children). Research defining generations as positions within the family faces some of the same issues that studies of cohorts do. Observed differences between generations may reflect differences based on family roles per se or they may reflect age or cohort differences. Thus, research on family generations confounds four factors: age, time of measurement, cohort, and family roles. Mannheim (1952) is generally credited with the second meaning of generation. He posited that persons born at approximately the same time (i.e., cohorts, although Mannheim did not use that term) have the potential to become "generations in actuality," although most cohorts do not. A cohort becomes a "generation in actuality" when it develops a "distinctive consciousness." Several conditions are required for the development of a "distinctive consciousness:" (a) a key historical event must occur, (b) the cohorts at-risk of becoming a generation in actuality will be young, (c) and the historical event is sufficiently disruptive as to shape the lives of adolescents and young adults. According to Mannheim, then, generation formation begins with cohorts, but requires an additional intersection of age and social/historical change. Interesting research exists that is based on both definitions of generation. This chapter, however, does not include attention to that research. Our focus is on the concept of cohort per se and its links and contributions to life course theory and research.

2 Cohort Differences: A Window to Historical and Social Change

The primary purpose of studying cohort differences is to monitor historical and social changes over time. Some studies of cohort differences are

based on age-period-cohort (APC) analyses; others are not. The advantage of APC analyses is that, to the extent possible, cohort differences are estimated with the potentially confounding influences of age and period (i.e., time of measurement) taken into account. APC studies are sometimes criticized as being descriptive rather than theory-driven and, indeed, many of them focus on describing time trends in phenomena of interest. But this is not necessarily the case and other APC analyses are based on theories of social change and/or test specific theory-based hypotheses.

The links between studies of cohort differences and the life course perspective are indirect. That is, cohort studies are not life course research in the sense that investigators set out with the objective of applying the five principles of the life course perspective to the substantive topic of interest. Inevitably, inter-cohort studies will accomplish less in terms of advancing life course research than intra-cohort studies, which are addressed in the next section. Nonetheless, inter-cohort studies (also termed here simply cohort studies) are not irrelevant to life course research. Cohort studies paint a broad picture of social and historical changes that is important for understanding individual lives. As an example, the life course implications of cohabitation are far different when 3 % of couples cohabit at some point in the life course than when 40 % of couples cohabit before their first marriage and another 10 % cohabit after divorce. Cohort studies provide valuable information about the social and historical contexts in which lives are embedded.

Inter-cohort studies also differ from intra-cohort studies in important methodological ways (the terms inter-cohort and intra-cohort will be used when they are being compared). Both inter-cohort and intra-cohort studies rely on longitudinal data, but the meaning of “longitudinal” requires specification. If “longitudinal data” refer to comparable data collected over multiple times of measurement, both inter-cohort and intra-cohort studies rely on longitudinal data. If, however, “longitudinal data” refers to panel data in which the same sample members are measured at

multiple times, few inter-cohort studies are longitudinal. Cohort studies do not typically use panel data. Even large panel data sources rarely include sufficient numbers of cohorts and times of measurement to permit inter-cohort studies of the scope needed to observe historical trends. Consequently, most inter-cohort studies use repeated cross-sectional surveys, such as those in the General Social Survey and National Health Interview Survey. It is interesting that Ryder (1965) noted that inter-cohort and intra-cohort studies would typically rely on different kinds of longitudinal data in his classic essay.

Another common difference between inter-cohort and intra-cohort studies is the way that factors other than the independent variable of primary interest are conceptualized and analyzed. By definition, variability in social status, life course transitions, and social resources and deficits is important in intra-cohort studies. These are precisely the kinds of factors that generate differences in life course trajectories. Thus, intra-cohort studies focus on understanding variability across individuals and subgroups. The focus is typically much narrower in inter-cohort studies. The goal is to identify differences across cohorts and the focus is on differences in percentages or averages (i.e., point estimates) across cohorts. APC studies usually control on basic demographic characteristics that may differ across cohorts – e.g., gender, race/ethnicity, education. Only if cohort studies address a research question that requires comparisons will the relationships between personal characteristics and the outcome of interest be examined. Taking attitudes toward traditional gender roles as an example, most APC studies would examine differences in the percentages of cohort members endorsing traditional gender roles across cohorts, controlling on basic demographic variables. Only if theory suggested that the level of endorsement or the rate at which attitude change occurred differed for men and women would gender contrasts be examined. Thus, both inter-cohort studies and intra-cohort studies pay attention to basic demographic characteristics, but they are typically of more substantive interest in intra-cohort studies.

2.1 A Note on Theory and Processes

A common criticism of APC studies is that they are not tightly linked to solid social science theory. A corollary of this critique is that cohort studies are descriptive rather than explanatory. There is some truth in these criticisms. The reasons that cohort studies are less theory-driven than other areas of research merit consideration. First, the extent to which theory guides APC studies is in part a function of the volume and quality of available theory about social and historical change. With the exception of macro-level theories focused on social and historical changes that are decades in the making such as industrialization and urbanization, theories about more modest social and historical changes are quite rare. Thus, there are few theories on which cohort studies can rest. Second, at the same time that theories focus attention on specific relationships and processes, they deflect attention from other relationships and processes. In the social sciences, a large proportion of theories focus on social reproduction rather than social change. There is abundant evidence that social reproduction occurs in a number of life domains at both the individual and population levels. Indeed, a common theme in this research is to demonstrate that despite what appear to be changes, deeper level structural forces manage to reproduce status hierarchies and the distribution of valuable resources. The commitment to identifying patterns of social reproduction deflects attention from theories that focus on social change.

The extent to which cohort studies are theory-driven, however, is highly variable. Cohort studies addressing four domains of life experience are reviewed below. Well-developed theories form the conceptual bedrock for two of these domains. The two other domains are based on predictions about the amounts and directions of hypothesized social and historical change, but are not linked to solid theoretical frameworks. This variability is representative of cohort studies more broadly. Despite variability in the extent of theoretical justification, we argue that cohort studies in all four domains produce important information about

the changing social and historical contexts within which individual lives unfold.

Another common criticism of APC studies is that even when age, period, and cohort are disentangled, each remains a “black box” which offers little, if any, explanation for the antecedents or meanings of those effects. We argue that this is a false critique. In fact, the processes or mechanisms that explain cohort differences are strong relative to other research traditions. Two processes explain virtually all cohort differences in domains in which cohort differences have been examined: cohort replacement and diffusion. These two processes admittedly do not explain why two individuals from the same birth cohort respond differently to social change – that is the job of intra-cohort studies. These two processes do, however, explain the occurrence of cohort differences.

Cohort replacement, also referred to as *cohort succession*, refers to the straightforward fact that cohorts are in a permanent state of flux as old cohorts die and new cohorts are born. The role of cohort succession in social change was first articulated in classic work by Matilda White Riley (1987). White recognized that social change does not result primarily via changes in attitudes and behaviors in individuals, but rather by the replacement of cohorts whose members share specific attitudes and behavioral tendencies by new cohorts with different attitudes and behavioral preferences. As documented below, if the role of cohort replacement in social change is not carefully examined and estimated, attributions about the causes of social change are often simply wrong. We will see this type of misattribution with regard to the Women’s Movement and its effect on gender egalitarian attitudes. Although the Women’s Movement played a role in changing attitudes about gender roles, the appearance of increasingly egalitarian attitudes over time was largely a result of cohort replacement in which cohorts with more traditional gender attitudes died.

The other primary mechanism resulting in social change is *diffusion*. Cohort replacement focuses on the entrance of new and the exit of old cohorts, demonstrating that most social change

results from “personnel changes” rather than within-individual change. In contrast, diffusion focuses on differences within cohorts in the rate or pace at which social change occurs. Diffusion occurs in a sequence, with early adoption of new attitudes or behaviors by cohort members of high socioeconomic status. Specifically, in early years of observation, SES is strongly and positively correlated with increased support for new attitudes or behaviors; in subsequent years, however, correlations between SES and those attitudes or behavior weaken or disappear. These relationships weaken because large proportions of the younger cohorts endorse the new attitude or implement the new behavior. Thus, persons of high SES tend to be the *avant garde* in social change. Over time the attitude changes are diffused to the broader population.

To demonstrate what studies of cohort differences offer to our understanding of historical and social change, this section provides exemplars of research on four topics. We first examine secularization. Because it rests on a well-articulated theoretical framework and testable hypotheses, secularization is arguably the ideal topic for APC analysis. We then turn to two types of demographic change: cohort size, which represents a cohort characteristic per se and family structure and dynamics, which have exhibited rapid changes over the past few decades. The final domain examined is attitudes, for which we review cohort differences in gender egalitarian attitudes. These topical areas differ in several respects, including the consistency of findings across studies, the strength of cohort differences, the methods used to detect cohort differences, the extent to which studies rest on solid theoretical foundations, and the degree to which the investigators attempt to explain observed cohort patterns.

The summaries of the topical areas are not comprehensive, but illustrative of much larger bodies of research. This is especially true where we use a single attitude as exemplar although we identified cohort studies of more than 40 specific attitudes. We briefly trace the origins of research in the topical areas with emphasis on research published in the twenty-first century. Recent studies are typically based on more sophisticated

techniques for disentangling the effects of age, period, and cohort. In addition, because of their recency, findings from these studies are more likely to generate new research questions about cohort differences and their meaning.

2.2 Secularization: Cohort Changes in Religious Participation and Authority

A dominant issue in the sociology of religion for more than half a century has been secularization. Along with industrialization and urbanization, secularization is viewed as a key component of the transition from the pre-modern to the modern world. These social and cultural processes literally transformed every aspect of human life.

What is secularization? In general terms secularization is the transformation of societies from primary dependence on religious values, authority, and institutions to non-religious – or secular – values, authority, and institutions (Sommerville 1998; Taylor 2007). Scholars differ substantially in conclusions about the extent to which secularization has penetrated modern and postmodern societies. Three dimensions have received most attention. One dimension focuses on *declining rates of participation in religious institutions* as a critical feature of secularization (Schwadel 2010; Sommerville 1998). Rates of membership in religious organizations and regular participation in religious services declined gradually, but markedly over the twentieth century in industrialized societies. A second dimension of secularization is the *decline in the authority* that religious institutions have over individual lives and societies more broadly (Chaves 2011; Voyer 1999). Religious leaders are no longer widely viewed as the final authorities on either private attitudes and behaviors or public policies and regulations. The third dimension of secularization is the *increasing privatization of religion* in the modern world (Lambert 1999). Scholars subscribing to this view argue that declines in participation in religious institutions are only part of the story, and that commitment to religious values and practices remains strong in the non-public sphere.

They also view the increasing proportions of people who describe themselves as “spiritual, but not religious” as evidence of a more private, individualized relationship with the sacred. Recent APC analyses have addressed these three dimensions of secularization.

2.2.1 Religious Service Attendance and Beliefs

Without question, attendance at religious services declined precipitously since the first half of the twentieth century in western countries. Two recent APC studies examined attendance data from 1972 to 2006 in the U.S. (Schwadel 2010, 2011) and reported continued decline across cohorts in the early years of the twenty-first century. Year-to-year cohort differences are quite small in absolute terms, but cumulatively they add up to a substantial trajectory of declining attendance. Literally dozens of other studies have documented declines in religious service attendance over much larger numbers of years than the studies by Schwadel. But those studies are not based on APC analyses and, therefore, do not estimate the separate effects of age, period, and cohort.

Declining rates of religious service attendance are not restricted to the U.S. APC analyses of British data covering much of the twentieth century show steady declines in religious service attendance (Crockett and Voas 2006; Voas and Crockett 2005). Using data from ten European countries from 1981 to 2008, Kaufmann and colleagues report cohort-based declines in attendance (Kaufmann et al. 2012). They note that declines have been steeper for cohorts born before 1945; since then, rates of attendance stabilized in younger cohorts, suggesting that further declines (which would result in rates of attendance below 10 %) are unlikely. It is often said that the U.S. is more religious than European countries. This is true in that larger percentages of Americans than Europeans attend religious services once a month or more – a consistent pattern over at least 50 years. But the pattern of declining attendance across cohorts is true of both the U.S. and Europe. Cohort replacement accounts for declining attendance over time.

None of the studies of cohort differences in religious service attendance reported significant age effects. Thus, contrary to popular belief, there is no evidence that individuals become more religious – at least in terms of service attendance – as they age.

Some scholars have speculated that declining rates of religious service attendance have not been accompanied by declines in religious beliefs – a pattern termed “believing without belonging.” Most of the studies that examined APC differences in attendance also examined endorsement of traditional religious beliefs (e.g., belief in the Bible, belief in prayer). In all the relevant studies, religious belief declined to the same degree that attendance did (Crockett and Voas 2006; Kaufmann et al. 2012; Schwadel 2011; Voas and Crockett 2005).

2.2.2 Religious Authority

One dimension of religious authority is the faith of the public in religious leaders. One APC study examined confidence in the leaders of religious organizations for the period of 1973–2010 in the U.S. Confidence in religious leaders was substantially lower during the 1980s than in the years before and since (Hoffman 2013). During the 1980s, several prominent religious leaders made headlines as a result of adultery, child molestation, and embezzlement of church funds. These scandals were accompanied by fairly dramatic declines in confidence in religious leaders. After the 1980s, faith in religious leaders leveled off, albeit at a considerably lower level than before the scandals. The analysis suggests that this pattern was initially a period effect that persisted over time and came to persistently differentiate cohorts exposed to that period effect.

2.2.3 Non-religious Spirituality

Some scholars argue that in the transition from the modern to the postmodern world, highly-individualized forms of spirituality began to replace organized religion as a way for individuals to search for the sacred and for transcendence of the material world. A significant proportion of Americans, for example, describe themselves as “spiritual, but not religious.” With data from 14

western countries, including the U.S. and Canada, Houtman and Aupers (2007) examined the spread of non-religious spirituality from 1981 to 2000. Although the time span was only 19 years, a strong and significant pattern of increased spirituality was observed. The rate of increase, however, varied across countries. France, Britain, The Netherlands, and Norway experienced the highest increases; the U.S. and Canada were intermediate; and southern Europe had the lowest rate of increase. Virtually all the differences were explained by cohort replacement.

Taken together, APC studies tell a coherent story of increasing secularization in developed countries over several decades and hint at the emergence of postmodern spirituality. Secularization theory is ideal for APC analyses because it focuses directly on a form of social change best measured at the population level. Cohort differences are overwhelmingly the result of cohort replacement. There is no evidence that individuals whose initial commitments were to organized religion turn to non-religious spirituality at older ages. Secularization is not the result of aging. Rather it is the turnover in cohorts comprising the population that accounts for its expansion.

Questions remain about the dynamics of secularization. Although the effects of cohort succession on religious participation are strong, it also is possible that indicators of secularization exhibit diffusion. We do not know whether reduced participation in religious services, decreased faith in religious leaders, and increased participation in privatized religion occurred first among cohort members of high socioeconomic status and then diffused to the point that SES is no longer associated with secularized behaviors and attitudes. This is a question worthy of investigation, both as a test of diffusion theory and as a means of generating hypotheses about the probabilities of increased secularization as a result of diffusion.

2.3 Demographic Change Associated with Cohort Size

The baby boom lasted from 1946 to 1964 in the U.S. and at approximately the same time in other

Western societies. Indeed, the term “baby boom” was coined to describe these very large birth cohorts. Long before the baby boom, demographers worked with population pyramids which provided graphic depictions of populations based on the age and sex of population members. Thus, social scientists had long histories of studying “age grades.” This was a far cry, however, from acknowledging the conceptually distinct, but empirically tangled concepts of age, period, and cohort. It was the arrival of the baby boom that focused scientific and public attention on cohort size.

The scholar most strongly associated with theory and research on cohort size is Richard Easterlin. Although he published several papers on cohort size during the 1970s, Easterlin’s theory and research on cohort size was best integrated in his book, *Birth and Fortune: The Impact of Numbers on Personal Welfare* (1980, 1987). The central thesis of this book is that members of large cohorts will experience lower well-being than those in smaller cohorts, due primarily to overcrowding in large cohorts. Cohort size is expected to affect multiple dimensions of well-being, including job stability, earnings, marital stability, fertility, crime, life satisfaction or happiness, political alienation, and suicide and other self-damaging behaviors. A corollary of Easterlin’s theory was his insistence that cohort size should be measured as *relative* cohort size. Measuring relative cohort size is important because it provides a continuous measure of cohort size (as compared to categorizing cohorts as large or small), which in turn permits investigators to determine whether there is a dose-response relationship between cohort size and outcomes of interest.

A substantial volume of research between the late 1970s and early 1990s examined Easterlin’s hypotheses about cohort size. Results were mixed, although most studies supported expectations that large cohorts would fare worse than small cohorts. These studies, however, were not based on APC analyses. Thus, they compared cohorts of different sizes, but did not model or control on age and period effects. After the early 1990s, research on cohort size was relatively

dormant until recently. Earlier studies typically examined outcomes with data that spanned the 1950s or early 1960s to the early or mid-1980s. The earliest years examined in recent studies are typically the 1960s through mid-1970s, but extend the period of observation to the early 2000s. Most recent studies also are based on true APC analyses.

A novel outcome in the cohort size literature is underemployment. Slack and Jensen (2008) examined the associations of cohort size and underemployment in the U.S. between 1974 and 2004. Being labeled as underemployed was based on any of four conditions: being unemployed and having given up after an extended job search; being unemployed and actively looking for work; involuntarily working part-time, but desiring full-time work; and working, but earning less than 125 % of the poverty threshold. This paper is based on a true APC analysis and all three factors are significant. The age effect reveals that across cohorts and times of measurement, young adults have significantly higher rates of underemployment than their older counterparts. With regard to period, not surprisingly underemployment rates are highest for all age groups during times of economic recession. The cohort effect is as expected: rates of underemployment are higher for large than for small cohorts at all ages and times of measurement. In addition, education interacted with relative cohort size such that underemployment was especially common for members of large cohorts with less than a high school education. This paper illustrates two important methodological points. First, the authors documented that age, period, and cohort were all significantly related to underemployment. This demonstrates the importance of disentangling APC to the extent possible. Second, testing for interactions between individual characteristics and cohort size yielded significant and meaningful findings.

Recent studies also include research based on non-U.S. samples. Brunillo (2010), for example, examined the relationship between cohort size and earnings using data from 11 European countries. A significant negative relationship between cohort size and personal earnings was observed in all 11 countries, as predicted by the Easterlin

hypothesis. But there was an interesting difference across countries as well. The relationship between cohort size and earnings was higher in southern European countries than in northern countries. Brunillo suggests that this may reflect size of the welfare state. That is, with their more generous welfare state benefits, Northern countries may use public policy to reduce the size of cohort differences.

APC studies of cohort size are relatively unique because they focus on a cohort characteristic rather than the attitudes or behaviors of cohort members. The theoretical foundations for studies of cohort size are relatively strong. Although the Easterlin hypothesis is simple and straightforward it rests on a well-articulated theory that explains why and how cohort size should affect the life chances of cohort members. An advantage of Easterlin's theory is that it predicts that cohort size affects a wide range of outcomes. Not all of the predicted outcomes have been examined using APC analysis – important topics for future research. In addition, some components of Easterlin's theory have not been adequately studied. He hypothesizes that large and small cohorts will “cycle” over time. This implies marked changes in fertility behavior across cohorts. It is not clear whether there is a cycle of cohort sizes over historical time or whether the Baby Boom was historically-unique. Another unaddressed question is whether the smaller cohorts born after an unusually large cohort fare as well as small cohorts that were born just prior to the large cohort. It is possible that the pressures exerted by a large cohort result in more restricted life chances for cohorts following the large cohort than were available to equally small cohorts born before the large cohort. Despite these unanswered questions, studies of the associations between cohort size and various outcomes provide useful information that is unlikely to be revealed in any other way. Several scholars who examined cohort size state explicitly that within-cohort variability accounts for more of the variance in the outcomes than cohort size does. But focusing on what variables “explain” the most variance misses the point. Examining the opportunities and constraints linked to cohort

size provides unique and useful information about, as Easterlin so aptly called it, birth and fortune.

2.4 Demographic Change in Family Structure and Dynamics

Changes in family structure and dynamics are arguably the most visible societal changes in recent decades. Much of the public discourse on family changes focuses on cohabitation and non-marital births. Social scientists also are interested in those issues, but survey the broader landscape of family structure including marriage, divorce, and total fertility. Here we summarize cohort differences in the U.S.; similar differences exist in all western countries.

Sizeable cohort differences in age of marriage have occurred and changed direction since the end of the nineteenth century in the U.S. Age at first marriage between 1890 and 2010 exhibits a U-shaped curve for both men and women. In 1890, the average age at first marriage for men was 26.4 years. Age at first marriage decreased to its lowest level of 24.0 in 1950 and then increased consistently to its highest level of 28.4 in 2010 (U.S. Census Bureau 2012). Corresponding ages for women were 23.5 in 1890, 20.4 in 1950, and 26.8 in 2010. The proportions of Americans who never marry exhibit the same pattern. Thus recent cohorts are significantly more likely than older cohorts to marry at later ages or not marry at all.

Substantial cohort differences in divorce emerged over approximately the past 70 years. Historical events are often accompanied by changes in family structure and dynamics. For example, divorce rates (already low by today's standards) fell precipitously in the years of the Great Depression, then increased substantially at the end of World War II (Schoen and Canudas-Romo 2006). Divorce rates fell somewhat in the 1950s and remained relatively stable until the 1970s. Divorce rates more than doubled during the 1970s, increased more slowly in the 1980s, and have continued to be high (about half of American marriages end in divorce), but rela-

tively stable since 1990 (Raley and Bumpass 2003). These trends are based on times of measurement rather than birth cohorts – and, indeed, cohorts defined by year of divorce include individuals from multiple birth cohorts. Nonetheless, the odds of divorce differ substantially across cohorts and cohort differences map well with period differences, as demonstrated in life table analyses (e.g., Schoen and Canudas-Romo 2006). Note also that although divorce rates have plateaued, marriage rates have declined, thus decreasing the number of divorced individuals in the population.

As rates of marriage decreased and rates of divorce increased over time, rates of cohabitation increased dramatically, especially since 1980. By 2010, almost half of American men and women cohabited before marriage; about half of these relationships culminated in marriage. According to the National Center for Health Statistics, the percentages of U.S. women cohabiting at the time of interview increased from 3.0 % in 1985 to 11.2 % by 2006–2010 (Copen et al. 2012). Similar percentages were reported by men. In addition, the average duration of cohabitation increased from less than 2 years in 1985 to nearly 4 years in 2006–2010. In 1980 the vast majority of cohabitating couples had never been married. In the 25 years since then, increasing proportions of cohabiting couples include one or both partners who were previously married and are from earlier cohorts than couples for whom cohabitation is their “first union.” This pattern indicates diffusion from younger to older cohorts over the past 25 years.

Easterlin (1980, 1987) hypothesized that fertility occurs in cycles and that “boom cohorts” will be followed by “bust cohorts.” This hypothesis is supported by changes in fertility rates in the U.S. since the baby boom ended. Beginning in the late 1960s and early 1970s, the U.S. fertility rate declined continuously until 1990. Between 1990 and 2007, the fertility rate inched upward. Since 2007, the fertility rate declined to its historical low, probably as a reaction to the Great Recession (Livingston and Cohn 2012). One way of describing the size of the fertility rate fluctuations is to examine the total number of children born to

women at different times. In 1910, average number of children/woman age 15–44 was 3.4. Corresponding numbers are as follows: 1930, 2.2 children; 1955, 3.6 children; 1980, 1.8 children; 2000, 2.1 children; and 2011, 1.8 children (Haines 2008; Livingston and Cohn 2012). In addition to Easterlin's hypothesis of fertility cycles, factors believed to contribute to the fertility declines between 1970 and 2007 include increased availability of contraception, legalized abortion, and public concerns about overpopulation.

Although fertility rates declined considerably over the past 50 years, the proportion of non-marital births to total births increased dramatically. Two studies examined cohort differences in rates of non-marital births (rather than reporting period changes). England et al. (2012) examined rates of pre-marital births for women born between 1925 and 1959. The proportions of women giving birth prior to marriage increased consistently across cohorts. Wu (2008) reported cohort differences in non-marital births by age 30 for cohorts born between 1925 and 1969. The proportion of women with non-marital births increased monotonically over time, increasing from 10 % of the 1929 cohort to 25 % of the 1969 cohort. Note that pre-marital births represent a subset of all non-marital births. In more recent years, increases in non-marital births have been even larger. In 1990 28 % of all births were non-marital births; by 2010, non-marital births comprised 41 % of all births.

Without question, family structure changed considerably since the early 1900s – and this is especially true in the more recent past. Although cohort differences in family structure are dramatic, they do not capture within-cohort differences. Each source cited above makes the point that the overall cohort or period differences masked significant within-cohort differences associated with education, race/ethnicity, and nativity. With regard to the latter, for example, women immigrants have the highest fertility rates in the U.S., although nativity differences have narrowed somewhat over the past decade (Livingston and Cohn 2012).

Overall, cohort differences in family structure and dynamics differ from those observed for

indicators of secularization and cohort size in two important ways. First, very few studies of changing family structure are based on true APC analyses. Thus, most estimates of cohort differences in family structure are not as precise or “pure” as estimates in other domains. Second, theoretical foundations for research on the dynamics of family structure are nearly absent. To the extent that investigators speculate about the antecedents of trends in family structure, discussion is typically post-hoc. One common post hoc interpretation of dramatic cohort and period differences in family structure is the tenant that the life course has become increasingly individualized or deinstitutionalized (Dannefer 2011; Mayer 2009). This perspective is too ambiguous to be considered a theory, but it implies that heterogeneity in life course patterns has expanded to the extent that there is – or soon will be – no modal life course which is recognized by societal members as the “right way” to sequence and/or time life transitions.

The combination of the absence of a theoretical framework and the absence of true APC analyses is especially problematic. For example, as noted above, several investigators attribute the recent decline in fertility to the Great Recession. There is precedent for this interpretation based on the very low U.S. fertility rates during the Great Depression. Nonetheless, this interpretation, while offered as an explanation for cohort differences, is logically more likely to represent a period effect. True APC analyses are needed to disentangle the effects of age, period, and cohort and, thus, permit more credible explanations.

Some cohort differences in family structure appear to represent diffusion. Recall that in diffusion, changes in attitudes or behavior occur initially among persons of high socioeconomic status. Then, as changes became widespread in the population, the relationship of SES with attitudes weaken or disappear. With regard to family structure, cohort differences in cohabitation followed a similar pattern (see Bhrolchain and Beaujouan 2013 for a careful analysis of diffusion of cohabitation in Britain). Other changes in family structure, however, appear to involve diffusion from younger to older cohorts. This is

especially true of cohort differences in non-marital pregnancies, which were initially negatively related to SES. Recent increases in non-marital fertility, however, have occurred disproportionately among higher SES women (although non-marital fertility remains more prevalent among low SES women). The conditions under which diffusion is from higher status to lower status population groups vs. those under which diffusion is from lower status to higher status groups merits both theoretical and empirical attention.

2.5 Cohort Differences in Gender Role Attitudes

The public has long-standing interest in the attitudes of societal members and the extent to which attitudes differ for population subgroups. Politicians frequently quote “opinion polls,” which measure attitudes, to show that the public favors their political platforms. Attitudes toward products and services are an essential part of marketing research. And, of course, attitude formation and change are significant issues for social and behavioral scientists. In all of these venues, it is commonplace for attitudes to be compared across age groups and in many instances public attitudes and other phenomena are monitored over time to determine trends.

Age differences and time trends are often explicit concerns in studies of attitudes, but the term cohort is almost never raised in public discourse and is often not addressed in scientific studies. Yet cohort differences are plausible alternate explanations to presumed age or period differences. All comparisons across age groups are also comparisons across cohorts, raising the possibility that these are cohort differences that have nothing to do with age. Similarly, time trends may be period effects; but it also is possible that they reflect the process of cohort replacement. Thus, examining cohort differences in attitudes is essential to permitting valid attributions about the causes of historical change.

2.5.1 Egalitarian Gender Roles

In response to the Women’s Movement in the 1970s, social scientists consistently hypothesize increases over time in attitudes favoring egalitarian gender roles. Related questions include how rapidly and widespread changes were and whether the move toward egalitarianism differed across demographic subgroups. Several studies report increased egalitarianism; each also sheds light on somewhat different issues and used different periods of observation.

There is substantial evidence that support for egalitarian gender roles increased substantially in the U.S. since the mid-1970s based on true APC analyses. Pampel (2011a) reported this based on repeated cross-sectional data obtained between 1977 and 2006 from 86 birth cohorts. Cotter et al. (2011) reported the same general pattern using repeated cross-sectional data from 1974 through 2008, although there was no significant change in attitudes toward gender roles between 1994 and 2008. They suggested that the Women’s Movement generated significant attitude changes across cohorts during its aftermath (Rossi 1985), but that more recent cohorts simply adopted the attitudes of their parents’ cohorts. Cotter and colleagues also document that half of the change in attitudes observed over the 29 years of observation resulted from cohort replacement. That is, half of the increased support for egalitarian gender roles resulted from the deaths of older cohort members who endorsed more traditional gender attitudes.

Similar patterns of attitude change have been observed in non-U.S. samples. Shu and Zhu (2012) examined two specific gender role attitudes using repeated cross-sectional data from China for the period of 1995–2007. For one attitude – that it is appropriate for women to combine family and work roles – there were no age, period, or cohort effects because virtually all study participants strongly endorsed this attitude. Cohort differences were observed for a more general attitude endorsing gender equality in all aspects of life. More recent cohorts endorsed this attitude in greater proportions than older cohorts.

In addition, within cohorts, education, income, and occupational prestige were positively related to more egalitarian attitudes.

Using 14 waves of data from the mid-1980s to the early 2000s, Kraaykamp (2012) examined attitudes toward gender egalitarianism in Norway. As in other countries, younger cohorts endorsed egalitarian family roles more than older cohorts. In addition, working women were significantly more likely to endorse egalitarianism than non-working women, although this difference narrowed in recent cohorts.

Finally, Pampel (2011b) examined support for egalitarian gender roles from 1988 to 2002 using data from 19 nations that included 84 cohorts. Again, younger cohorts favored egalitarian gender roles significantly more than earlier cohorts. The positive effect of education on gender role equality first strengthened over time, and then weakened considerably, indicating diffusion. Regardless of cohort, women were more likely than men to endorse egalitarian gender roles.

Evidence of cohort differences in attitudes toward gender egalitarianism is strong and consistent, with younger cohorts endorsing significantly more egalitarian attitudes than older cohorts. In addition, research suggests that women and persons of high socioeconomic status are more likely to endorse egalitarian attitudes than men and persons of lower socioeconomic status, although the SES difference appears to be narrowing as a result of diffusion. Two implications of this research merit note. First, these studies used APC analysis and none of them observed significant age or period effects. Thus there is no evidence that individuals develop more gender egalitarian attitudes as they age. It appears that at least half of the increase in gender egalitarian attitudes is the result of the death of cohorts characterized by more traditional attitudes toward gender roles. Second, and related, much – probably most – research on changes in gender roles and gender attitudes attribute changes to the Women’s Movement. Other than APC studies, the literature does not discuss the role of cohort succession in changes in gender attitudes. Because of this, the role of the Women’s Movement is exaggerated in most studies of gender roles and attitudes – the

“consciousness-raising” which the Women’s Movement encouraged was important, but no more important than cohort replacement.

2.6 Final Thoughts on Inter-cohort Differences

Studies of cohort differences at the population level are valuable because they reveal the overall landscape of a society. APC analyses make it possible to estimate the influence of aging, time of measurement, and cohort differences and each is estimated with the other two effects taken into account. Cohort differences in particular permit observation of social and historical change. Given the many cohort differences observed in the topics reviewed here, social change is endemic. Some social changes are decades in the making; others arise quite rapidly. Given data covering sufficiently long periods of time, the extent and pace of social changes can be observed.

Perhaps the principle of the life course perspective that is most ignored in inter-cohort studies is place – i.e., the ecological contexts within which individual lives unfold. Virtually all APC studies to date rely on national samples. This is true of both U.S. and non-U.S. studies. Yet age, period, and cohort effects are possible for smaller geographic units than the nation state. A case in point is the effects of Hurricane Katrina on life course trajectories. Research suggests that the effects of the disruptions and losses generated by Hurricane Katrina remain strong and pervasive for persons directly affected. There is no evidence, however, that Hurricane Katrina generated cohort and period effects for U.S. citizens living outside the direct path of this natural disaster. Logically, there is no reason that APC studies could not be performed for samples from geographic units other than nations (George 2014). Extending the geographical units to which APC analyses are applied is a high priority for future research.

Although valuable, cohort differences are only one window to the life course – and how it changes over time. In many ways, cohort analysis provides a view of the “forest” of life course patterns; but it is intra-cohort variability that allows

us to see the “trees.” Intra-cohort variability is richer and more finely nuanced than can be revealed in cohort studies – even those that pay attention to within-cohort variation due to sex, race/ethnicity, nativity, and SES. In particular, intra-cohort studies are equipped to trace the varying effects of broad social changes on individual lives. We turn now to intra-cohort variability and how it advances our understanding of the life course.

3 Historical Variation Within Cohorts: Life Course and Developmental Effects

Social change tends to differentiate the life course of adjacent cohorts. However change may also take the form of intra-individual trajectories “within cohorts” that are linked to the cross-cutting statuses of its members, such as those of social class and gender. Even age becomes a source of intra-cohort variation when the birth cohort includes multiple years that indicate differing life or career stages. This link to intra-cohort variation occurs through differential exposure to social change. Ryder (1965, p. 847) refers to the “attractive simplicity” of cohort membership and the potential attenuation of its influence due to such status configurations. In his view, every cohort is “heterogeneous”, and cohort comparisons can be “profitably supplemented by relevant compositional variables”. This intra-cohort perspective is designed for a developmental investigation of social change in life experience.

The cross-cutting statuses of a cohort’s members enable us to solve the puzzle of differential exposure to change – not all members of a cohort are exposed to change, such as a drastic decline of the economy. And exposure is not uniform as to its impact. During severe economic declines in the industrialized world, such as the Great Depression, the risk of unemployment was highest among workers in the lower strata, and particularly among males. Employment was especially problematic among both young and older workers. In other national crises, such as mobilization for WW II in the United States, the

risk of being drafted in 1944 was experienced by males, single or married, between the ages of 18 and 35. Cross-cutting statuses among cohort members thus focus attention on high and low risk subgroups of cohorts in terms of the change at hand.

The temporal frame of a birth cohort extends in theory across the life span, and a similar perspective is called for in considering the duration of the social change in question and its life course effects, whatever the data limitations on available measurements. For example, the first half of the 1930s decade include the peak years of the economic decline in the Great Depression. However in the United States only mobilization for World War II brought an end to the prolonged economic hardship of the working class population. We know more about families and children during the first half of the 1930s when longitudinal data were available on economic adaptations than during the late 1930s. The long view of birth cohorts from the 1920s shows a historical path that included the urban prosperity of the 1920s, the hard times of the 1930s, and the challenges of the years marked by world war, postwar development, and the end of an era of affluence, circa 1974. The full impact of this life course journey is beyond the scope of any study, but it is important to be aware of the lifelong historical context, its continuities and disjunctures.

In what follows, we use empirical studies of three historical changes in the United States – Great Depression, World War II, and the decline of the rural farm population – to illustrate an intra-cohort perspective that investigates the influence of social change on the gendered life course trajectories of cohort members. We begin with birth cohorts from opposite ends of the 1920s (the Oakland and Berkeley studies, birth-dates of 1920–1921 and 1928–1929 – Elder 1999). They encountered Depression hardships at different times in their lives as well as World War II. The younger Berkeley men experienced World War II as adolescents and were typically mobilized into military service after the war had ended, whereas nearly all of the Oakland men served in the Second World War and returned to civilian life with access to the educational

benefits of the GI Bill in the booming postwar era. Older recruits with marriages and jobs experienced the greatest degree of disruption in their lives. The later the entry, the greater the risk of a disrupted life course.

The third historical change involves the declining rural farm population in the United States. The prosperity of the postwar era was followed by an expansion of agricultural production to the point of excess in the declining market of the 1980s recession. This economic crisis prompted outmigration from farm states, such as Iowa. In 1989, a research team (Conger and Elder 1994) launched a longitudinal study of families and their young adolescent members. The latter are members of a cohort born at the end of the 1970s who grew up during the rural economic crisis of the 1980s. Their families span a wide range of ties to the land, from full-time farming to families that had recently lost their farm, to those that left the farm some years ago and those with fathers who were born in an urban environment.

3.1 Living Through Depression and War

Children of the Great Depression (1974/1999) documents the importance of locating members of longitudinal studies in their birth cohort and historical context, taking note of their developmental trajectories and social histories. The Oakland and Berkeley study members were born at opposite ends of the 1920s and consequently experienced the same historical times – whether economic depression, war, or postwar prosperity – at different life stages in their gendered roles and class origin. Their particular sequence of different historical times from childhood to mid-life identifies distinctive life histories. In what follows we depict this sequence in life course development through World War II and into the postwar era.

One of the most impressive comparative intra-cohort studies was carried out by Ingrid Schoon (2006) in Great Britain. The United Kingdom has led the way in launching national longitudinal studies that invite comparative cohort studies,

and Schoon compared two cohorts with birth dates of 1958 and 1970. Building on *Children of the Great Depression* and other research, she designed a comparative intra-cohort study of economic deprivation in life course development that spans 40 years and includes data on the major economic recessions of the early 1980s and 1990s. The last adult comparison of the two cohorts at the same age occurred when the study members of the cohorts were in their early 30s. Though socioeconomic disadvantage was more common among young people born in 1958, the study found that growing up in a disadvantaged environment had more adverse life course effects on members of the younger cohort. This may be due to the more vulnerable developmental age of this cohort in the severe recession of the 1980s. Another possible factor is the increasing skill requirements of middle class employment that enhanced the penalty of disadvantaged origins.

Ongoing longitudinal studies of this kind provide the possibility of periodic studies that build upon prior research on cohort trajectories. And in fact, it was this option that enabled the identification of cohort pathways through the Great Depression and World War II for the Oakland and Berkeley study members. But it is the dramatic growth of national longitudinal studies that represents the most exceptional opportunity for the comparison of cohorts on social change effects “over the life course”. Examples include the National Longitudinal Surveys in the United States and especially the pioneering national longitudinal cohorts in the United Kingdom, from the 1946 cohort to 1958, 1970, 2000, and 2011. The ecological diversity of societal populations calls attention to the importance of taking this variation into account in national longitudinal cohorts.

When the 1920s came to an end, the Oakland children were completing grade school, while some of the last additions to the Berkeley cohort had just arrived in their families. The economic times seemed good overall and revealed no sign of the impending crisis, though it soon became a reality over the next 3 years for most of the Oakland and Berkeley families. Among the economically deprived (a loss greater than a third of 1929 income up to 1933) mounting pressures

ignited family tensions and conflicts, especially in families with a history of troubles. The younger boys in the Berkeley study were most often exposed to the arbitrary and punitive behavior of father, an abuse that undermined their self-confidence and sense of independence. The younger girls were shielded from this abuse by their mothers.

The Oakland boys, by contrast, were old enough to hold paid jobs in the community and to help out at home. More of their time out of school was spent with friends away from parental supervision. They were also old enough to understand the economic troubles their parents were having. Most girls in this cohort assumed major responsibilities in deprived households and some also held paid jobs. During their years of physical maturation, they tended to feel less attractive and popular. It is noteworthy that other studies (Elder and Caspi 1990; 226) document a life stage difference in the vulnerability of boys and girls to environmental insults that corresponds with these cohort findings on developmental risk. Boys tend to be more vulnerable during childhood, whereas girls are more vulnerable in adolescence. However neither the Oakland girls nor the boys show psychological effects of economic hardship by graduation from high school. The boys were soon called to military duty and the girls entered the work force or college.

The Berkeley study members were leaving elementary school for junior high in a community that was soon to be mobilized for World War II. War mobilization became the ecology of adolescence for the Berkeley cohort – with block wardens, darkened windows at night, frequent collection drives involving young people, and the constant flow of troop trains and ships to piers in San Francisco Bay. The work demands for employed parents in defense-related jobs increased significantly across a 24 h day, minimizing the daily contact of parents and children. In these ways, the war years further weakened the role of fathers in the lives of their children. But the perceived manliness of military life and the stature of servicemen appealed to the Berkeley boys who grew up in deprived families in which the mother had taken charge (Elder 1986). In

assessments during adolescence, these boys were judged significantly less ambitious, self-confident, and self-directed than the Oakland boys at the same age. The Berkeley girls were spared this developmental outcome, owing to the protective nurturance of their mothers. They were notably more self-confident, ambitious and energetic than the Oakland girls.

The historical paths of the Oakland and Berkeley men from the 1920s to the postwar era were distinguished by experiencing hard times and wars at different ages, a difference in timetable that made a difference in their lives. The Oakland men experienced adolescence across the economically depressed years of the 1930s and then were called to military service in the armed forces. With few exceptions, they used their veteran's benefits to advantage by acquiring further training and higher education. In contrast, the early childhood years of the Berkeley cohort were shaped by the uncertainties and stress of Depression hardship, a disruptive time of heightened marital tensions, punitive discipline, and resource scarcities. A number of these children grew up without self-assurance, goals or a sense of personal worth. Their wartime adolescence may have reinforced this sense of incompetence as well as their perception of military service as a possible "bridge to opportunity."

World War II was winding down when the Berkeley males were old enough to serve, but three out of four eventually joined the military and a substantial number served in the Korean War of the early 1950s. As might be expected, the boys who chose a military occupation in 1943–1944 were most likely to enter before the age of 21. This action had much to do with a background of "disadvantage" that motivated their joining at the earliest possible age. The military offered them a path to greater opportunity through advanced education and a good job, and it was open to young men who did not have an exemplary educational record or the economic resources for college. Two-thirds of the Berkeley veterans with a deprived family origin and below average grades entered the service at the earliest possible age (Elder 1986); a percentage that dropped to insignificance when neither factor was present.

The Berkeley men who entered the military at an early age were more likely to escape their life history of disadvantage along this path when compared to the later entrants and the non-veterans. They were more likely to at least enter college than the non-veterans, owing in part to the educational benefits of the GI Bill, and this educational path enabled them to make the best use of their personal resources in education and work lives. This occurred in large part through the personal assets they acquired in military service, such as the self-discipline to cope with adversity and leadership skills. With these and other resources, military service turned out to be more predictive of occupational attainment through higher education among men from deprived families in the 1930s than among the non-deprived. At mid-life the men from deprived Berkeley families closely resembled the occupational status of the Oakland men from deprived families.

But how did this achievement occur in the lives of men who were so unpromising in adolescence. According to assessments, they lacked ambition, goals and self-confidence. Relevant insights come from evidence of personal change during military service. In adolescence, the Berkeley men who did not enter the military scored notably higher on psychological competence than the early military entrants – as measured by indexes of self-inadequacy, goal orientation, social competence, and submissiveness. However, by the age of 40 this difference in psychological well-being and competence faded to insignificance. The men from deprived families who entered the military as soon as they were old enough had made up their deficit in psychological competence. The precise mechanisms of such personal change are unknown, except that the veterans talked about this change in postwar interviews. They believed that they had learned to manage wartime stresses and noted that this skill had served them well in difficult situations. A medic in the Berkeley study recalled his trying experience on the front line, caring for the severely wounded and dying. “I managed to show a good deal of courage and good judgment. For the first time in my life, I knew I could handle extreme situations”.

This developmental path owes much to the men’s timely transition to military service. Most of the early entrants in the Berkeley cohort joined the military before marriage, college, and a substantial career investment. They typically entered college after their service and thereby had access to educational funds provided by the GI Bill. Their post-military timing of marriage and careers avoided the disruptive effect of military service, such as long separations and frequent residential change. For a picture of this disruptive effect, consider men who entered military service late in life during World War II (Elder et al. 1994). They are members of a gifted sample of California men who were born between 1903 and 1920, known as the Stanford-Terman project. A large number of the men were mobilized into World War II at a late age, beyond the ages of 30–32. The men were first surveyed in 1922 and data collections continued every 5 or so years up to the 1990s.

Mobilization after the age of 32 markedly increased the risk of personal and social disadvantages that persisted up to late life. Their education level exceeded that of other veterans, but they ended up with a significantly higher divorce rate. The men also tended to experience a disappointing work life and income trajectory after the mid-40s to retirement, particularly in the professional class. Their physical health also declined after the age of 50, a misfortune not associated with combat exposure. And not surprisingly, the late entrants were less inclined to report benefits associated with their service experience.

Our focus on the developmental trajectories of Americans born in cohorts at opposite ends of the 1920s has underscored the complexity and pay-off of linking their lives to the economic collapse of the 1930s and then to mobilization in the Second World War with the economic boom it generated. The life course impact of Depression hardship for a younger or older birth cohort could not be adequately assessed without taking into account its path through war mobilization in the early 1940s, as well as the cross-cutting statuses of age as life stage, class and gender. They all shaped the impact of exposure to the change in question.

The Berkeley males illustrate this complexity. As young children of preschool age in the early years of the Depression, they tended to experience the greatest disadvantage of Depression hardship through harsh punishment and the loss of a caring father. Though lacking ambition and goals after high school, they were soon swept up in the military mobilization of the Second World War. However the major battles had been fought before they could be recruited. Nevertheless nearly three out of four entered the service by the early 1950s.

The early military joiners were influenced developmentally by the challenging training demands and service roles they experienced. By the time they completed their military service and their education, they appeared to have changed in many respects. They were more self-directed, confident, and agentic. For these young men, their developmental life course had been turned around. A legacy of impairment from “a hard times childhood” had been replaced by a beneficial legacy of military service.

3.2 Moving Off the Land

The Great Depression and World War II sent a major shock through the life course of successive cohorts. Another major shock occurred 50 years later in the 1970s when a soaring world demand for agricultural commodities led to overproduction in the United States as market demand declined during the economic recession of the early 1980s. Heavy indebtedness and declining land values began to push families off their farms, setting in motion the most severe rural economic crisis in the Midwestern state of Iowa since the Great Depression, a crisis that accelerated the long-term historic movement of Americans out of farming. Twenty percent of Iowa’s farms did not survive this difficult time.

The impact of this economic crisis on rural Midwestern families and the lives of their children provides an intergenerational example of a “within cohort” perspective on rural socioeconomic change in the life course. The Iowa Youth and Family Study (Conger and Elder 1994) was launched in

1988–1989 to investigate this economic crisis in families with a young adolescent and a near sib. The seventh graders (N=451) represent members of a birth cohort defined by birth at the end of the prosperous 1970s. They grew up during the farm crisis of the 1980s, completed high school in 1994 and have been followed into their 1930s. All of the families resided in eight agricultural counties of the north central region of the state.

The Iowa cohort is differentiated along a family gradient from farm to nonfarm of family types in the economic crisis as of 1989. Approximately 30 % of the fathers were still engaged in farming and represented survivors at the end of the 1980s, although the psychological cost was often high. Some of the fathers worked off their land as did a majority of their wives. A number of men had farmed earlier in the 1980s but we see them in 1989 as a casualty of the economic crisis. During the decade they lost their farms through bankruptcy. These displaced farmers represent 13 % of all fathers in the study and their average family income is a third lower than that of the farmers. The remaining comparison group includes families headed by men who grew up on a farm but then followed a nonfarm career, and families headed by men with a continuous history outside farming.

The men who retained their farms despite a very hard struggle were critical of their “way of life” that was so damaging to family life and health. Survival of the family farm often required long days from both parents. The off-farm employment of both partners became an important factor in family survival in farming. But the psychological impact of losing the family farm stands out above all stressors among the Iowa families, especially among the fathers. One of the fathers who had to give up his family farm was asked about recent life changes. He referred to this loss even though he had lost his North Dakota farm over 7 years ago. His wife reminded him that the question asked for “recent changes” and that the Dakota farm was not a recent loss (Conger and Elder 1994; 81). He replied that it didn’t seem that long ago.

Despite the emotional pain and hardship of the crisis years, a follow-up of the study children in

high school did not find significant evidence of an adverse legacy from such experience (Elder and Conger 2000). Even the most troubled youth in the past – those in families that lost their farm – showed no unusual distress at this time. Farm families had been on a downward income trend over this time, but their sons and daughters and even those from displaced farm families were among the athletic, social, and academic leaders by the time they entered high school. Family socioeconomic status did not account for this outcome.

Access to a socially resourceful path through high school made the difference in their lives. Parent investment in their future was especially relevant. Parents with ties to the land were active supporters of their children's school-based activities, from academics and dramatic arts to athletics. "Family connections" also emerged as an important factor. It refers to the shared family life in farming –working together and more generally the routine of "doing things together." The interdependence of family life on a farm generates a sense of being counted on in daily chores and the harvests. Another distinctive feature of family resourcefulness involved the engagement and leadership of farm parents in community life –in church, civic organizations, schools and economic organizations. Their children frequently followed the parental example through leadership in student organizations.

What is it about socially engaged families that contributes to the educational success and leadership of their children? Typically these farm families are intact and have better educated parents, but the enterprise of farming itself is itself family-based, a theme that carries over to community, church, and school involvement, regardless of educational level. Socially-engaged parents know more about issues that pertain to their children, and the latter realize that what they do matters a lot to parents and grandparents. On the farm and even in the community, social life and work life are shared experiences. Not all farm families were characterized by this interdependence and emotional connectedness, but most were.

This account of Iowa farm families stands in sharp contrast to the urban Berkeley deprived families and the children who were born in 1928–1929.

The work lives of Berkeley fathers were generally carried out some distance from their households, and much of their children's non-school time occurred away from parental observation. Most important is the stronger authority position of the Iowa farm fathers when compared to the Berkeley fathers. The hierarchy of social stratification was less differentiated among farm families. They varied in wealth but not as much in life style.

Lastly, consider the issue of size of community. The Berkeley children came of age in a relatively large community with corresponding social institutions, such as schools. By contrast, the Iowa cohort came of age in communities, schools, and churches that were small by comparison. Small worlds tend to maximize participation opportunities for the young and many of the Iowa youth from hard pressed farm families discovered confidence-building opportunities in their schools. An Iowa boy's family lost its land and livestock in the Great Farm Crisis, but he discovered a turning point in school theatre with the recognition, support, and opportunities it provided. In his words, "Drama ... changed my life. It gave me the confidence to speak in front of groups" and then led to other opportunities, including a university scholarship (Elder and Conger 2000; 182). A supportive family provided an important foundation for this life change.

These social themes emerged from a study focused on young people in families with ties to the land, but they are by means exclusive to them. This younger generation grew up in families that were faced with the constant uncertainty of a livelihood in farming. Though some were still attracted to the possibility of living on a farm, they did not see a future in farming. In this way, the Farm Crisis of the 1980s added fuel to the historic decline of the farm population in the United States.

4 The Impact of Life Course Change

In *Children of the Great Depression*, the effects of economic hardship are traced through the lives of adolescents to their middle years. In an early

review of this work (1975; 121), historian John Modell suggests that social change in the life course establishes a new context for cohort trajectories and for members of the cohort itself. The process follows a dialectical dynamic in which social change influences the life course of individual members of the cohort, followed by the “way that those individual experiences are aggregated to constitute a new context for others living through these changes” (Modell 1989; 22). In this way, life course change represents the emergence of a society that is new in some or many features. Accordingly, this perspective views the Oakland and Berkeley cohorts as “collective actors” that shape their world for subsequent cohorts.

The following cases from American history provide examples of contexts shaped by life course change and the trajectories and transitions that emerged from them. We begin with the lives of young people patterned by the Civil Conservation Corps of the New Deal. Through its training, the CCC established a path to military service in World War II. Next and more broadly considered, we view the cohort of men born in the 1920s as Depression children and then military recruits in World War II. The service time of these recruits established a new life context that provided access to the generous educational benefits of the G.I. Bill with financial support for advanced education that in turn motivated the extraordinary civic involvement of non-black veterans in postwar America. By contrast, black veterans focused most of their civic energies on the achievement of their rights as American citizens in the Civil Rights Movement. Most of these linkages and life contexts varied by gender and race.

Depression youth who were “out of school and work” illustrate the agentic role of a social aggregate when their increasingly dire circumstances prompted federal action through the Civil Conservation Corps of Roosevelt’s New Deal (Leuchtenburg 1964; especially p. 109). Perhaps inspired by manpower development experiences in World War I, CCC camps were established and managed by the Army throughout the country to ‘instill martial virtues in the nation’s youth’.

“CCC recruits convened at army recruiting stations; traveled to an army camp where they were outfitted in World War I clothing; were transported to the woods by troop-train; fell asleep in army tents to the strain of ‘Taps’ and woke to ‘Reveille.’” Despite concern over military control and militarism in this mobilization, the program was praised for its role of shepherding the nation’s youth as war shadows darkened in Europe. By late 1940, the onset of a selective service program across the country prompted a wave of CCC enlistees.

Most of the 16 million Americans who served in World War II came from the cohort of men born in the 1920s. Four out of five men born during the decade became veterans of this war. In the Oakland cohort, birthdates of 1920–1921, virtually all of the men served—only 10 % did not. The military induction of youth who grew up in the Depression decade enabled a good many to escape impoverished backgrounds, dysfunctional families, and problematic academic records. As Brotz and Wilson (1946) described the process, military entry “knifed-off” the past through basic training that fostered equality and comradeship among the recruits. The enormous scope of such training and the global diversity of military service posed an unparalleled challenge at War’s end, that of incorporating military personnel back in civilian society with resources and opportunities for a productive and fulfilling life. The G. I. Bill of Rights emerged with the genius to a remarkably successful transition from soldier to citizen.

No recruit in this ‘Greatest Generation’ could have imagined the extraordinary benefits of this G.I. Bill of Rights that had yet to be proposed in the Congress and its transforming effect on their postwar lives. Nearly half of all men from the 1920s who served in the Armed Forces used the educational benefits of the G.I. Bill, a figure that was more than twice the congressional estimate. Other veterans chose instead to get on with a job instead of more training or education. In *Soldiers to Citizens*, Suzanne Mettler (2005) tells the story of how this legislation came to be and its powerful impact on the veterans who put it to use in their training, higher education and life.

Her pioneering study is based on surveys, both retrospective and prospective, of veterans. Like the composition of the Armed Forces at the time, the respondents were mainly white men, along with small samples of African-American men and women.

Motivated by the all too meager provisions for veterans of the First World War, the American Legion became a vigorous advocate of generous and inclusive benefits during the Second World War and mobilized to ensure congressional support in 1944. The resulting legislation was shaped in part by a proposal from the Roosevelt administration, along with Legion support. The legislation's content was influenced by a soldier's request to his Legionnaire father regarding postwar benefits. When prodded on this issue by his father, he and his buddies replied that they simply wanted the opportunity to 'get education or training, and to find work'. This request eventually became key components of the evolving G.I. Bill. Along with unemployment benefits and access to low-interest housing loans, the G.I. Bill offered educational benefits up to 48 months for veterans with at least 3 months of service. Tuition and fees were covered up to a maximum of \$500, along with a monthly subsistence that varied according to dependents.

Veterans born in the 1920s became a large part of what Robert Putnam (2000) called the "most civic generation" in American history. Their civic involvement may reflect in part the impact of basic training with its emphasis on team work and social responsibility – an interdependence expressed in the shared belief in military units that "you have my back and I have yours". The linked lives in a perspective on the life course thus represent a cornerstone of military training. Ties to comrades are known to persist across the years and are often expressed in reunions (Elder and Clipp 1988). The power of this social bond in postwar America stems in part from the large number of men and women who served in the Second World War – a total exceeding 16 million. When veterans returned to their home communities after the war, they did so usually with other veterans who often became members of their social networks.

The rising level of education in postwar America also contributed significantly to its civic culture, and the flood of returning veterans was a major component of this growth. Over half of the college students enrolled in 1947 were veterans, and a majority of those in Mettler's survey of the Class of 1949 made use of the G.I. Bill in doing so. Its generous benefits became a major turning point in their lives. Most claimed that they would not have been able to afford college or more training without such assistance. The most common beneficiaries of this benefit were veterans who came from lower-income families who used it to pursue vocational/technical training that enabled them to both work and continue their training. These men were two and a half times more likely to use education benefits than men who entered college with such assistance. This differential between college and training partly reflects the smaller number of veterans who were qualified for higher education at this time.

The extraordinary civic involvement of the postwar generation also owes much to its "years of experience with a caring government" (Mettler 2005). The 1920s birth cohort of veterans was exposed to federal government in the 1930s and 1940s that was actively involved in responding to the needs of its citizens through social provisions. For returning veterans, G.I. Benefits for education and training represented by far the most influential aspect of such experience for civic involvement. The generosity and inclusiveness of the benefits fostered a desire to make their lives count in community service. These benefits markedly increased their civic involvement well beyond the effects of education. It is noteworthy that the recipients of training from lower-income families were more likely to make use of this resource in civic activity when compared to the recipients of a college education. With these developments in mind, Mettler (p. 11) concludes that "just as the G.I. Bill transformed the lives of veterans who used it, they in turn helped to change America."

The story of the G.I. Bill is largely centered on male veterans, and yet a full appreciation of its benefits leads to the larger framework of the family and generations. A substantial number of the

male veterans were married when they used the G.I. Bill for access to support for the unemployed, for assistance in paying college or training expenses, and for access to a loan to purchase a home. The veterans interviewed by Suzanne Mettler (2005) spoke about their gratitude for what its benefits meant for their families. Veterans who entered college or technical training programs as the first family member to follow this path established a higher standard of educational achievement for their children.

A relatively small number of women served in the U.S. Armed Forces, and those who did were less likely than male veterans to apply for benefits of the G. I. Bill. As one of the women who did serve noted, this benefit was commonly thought to be “for the men”. A postwar cultural emphasis on homemaking strengthened this theme. But those who did take advantage of the educational benefit were more likely than the non-users to obtain at least some college or training. And, similar to the men, the women who took advantage of the G.I. Bill were more likely to become civic activists.

Gender clearly played a major role in structuring military service and access to the G. I. Bill in the 1920s birth cohort. But gender differences were less pronounced than the striking contrast by race (Mettler 2005; Parker 2009). African American men were barred from major roles in World War II, though a large number served – approximately one million, typically in support for frontline troops. They reported being fairly treated on benefit access and in college or training experience, but not at all in the labor market. Experience in the military empowered returning veterans to act on their own behalf and gave them a sense of agency and equality in claiming the rights of an American citizen. This outlook clashed in the segregated South with mistreatment by employers and public officials. Such actions and the denial of voting rights became intolerable, especially for those who had received a college education on the G.I Bill.

One of the Tuskegee Airmen (Mettler 2005; 140–41) noted that when they came home “you couldn’t even be buried in the town cemetery, you had to be segregated. – you were treated like

a second-class citizen. That was painful, very painful.” By the early 1960s, the cumulative experience of racial injustice had prompted greater involvement of black veterans in street demonstrations, protests, and marches in the civil rights movement. Mettler found that over a third of the African Americans in her sample who used the educational benefits of the G. I. Bill were involved in such mobilizations between 1950 and 1964, with many in leadership roles, compared to 8 % of the black nonusers.

5 Conclusion

This chapter brings to mind the progress achieved in recent decades toward a greater understanding of age, cohorts and the life course, coupled with recognition of the challenges that lie ahead. Over 50 years ago, Norman Ryder brought to publication a field-shaping essay that provided a conceptual framework for investigating social change in society by using an inter-cohort approach. This was soon followed by advances in an age/period/cohort design that enabled research to identify the most important sources of change, whether due to aging, historical time, or cohort membership. More recently progress has been made in finding ways to use theory and observations to explain the observed cohort or period effects.

Ryder’s essay also noted that social change may influence cohort members “differentially” by their gender, age, and social class – an intra-cohort dynamic. As pointed out in this chapter, this perspective can illuminate how a changing society influences the individual over his or her life course. And the aggregation of such life course effects provides insight on the changing trajectory and form of social change. Such work is underway in many regions of the globe, encouraged by the continued growth of cohort studies that follow people over their lives through panel research and retrospective life histories. These studies have produced a more generalized case for recognizing that all projects and their findings are bounded by a specific historical time and place. But we too seldom know whether the findings are generalizable or indicate a trajectory of

change. More comparative cohort studies are needed to advance our understanding of social change in the life course.

References

- Alwin, D., & McCammon, R. J. (2003). Generations, cohorts, and social change. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 23–49). New York: Kluwer Academic/Plenum Publishers.
- Baltes, P. B., Cornelius, S. W., & Nesselroade, J. R. (1979). Cohort effects in developmental psychology. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 61–87). New York: Academic.
- Bhrolchain, M. N., & Beaujouan, E. (2013). Education and cohabitation in Britain: A return to traditional patterns? *Population and Development Research*, 39, 441–458.
- Brotz, H., & Wilson, E. (1946). Characteristics of military society. *American Journal of Sociology*, 51, 371–375.
- Brunillo, G. (2010). The effects of cohort size on European earnings. *Journal of Population Economics*, 23, 273–290.
- Chaves, M. (2011). *American religion: Contemporary trends*. Princeton: Princeton University Press.
- Conger, R. D., & Elder, G. H., Jr., in collaboration with Lorenz, F. O., Simons, R. L., & Whitbeck, L. B. (1994). *Families in troubled times: Adapting to change in rural America. Social institutions and social change*. Hawthorne: Aldine de Gruyter.
- Copen, C. E., Daniels, K., Vespa, J., & Mosher, W. D. (2012). First marriages in the United States: Data from the 2006–2010 National Survey of Family Growth. *National Health Statistics Reports*. Retrieved at www.cdc.gov/nchs/data/nhsr/nhsr049.pdf on 12 Sept 2014.
- Cotter, D., Hermsen, J. M., & Vanneman, R. (2011). The end of the gender revolution? Gender role attitudes from 1977 to 2008. *American Journal of Sociology*, 117, 259–289.
- Crockett, A., & Voas, D. (2006). Generations of decline: Religious change in 20th-century Britain. *Journal for the Scientific Study of Religion*, 45, 567–584.
- Dannefer, D. (2011). Age, the life course and the sociological imagination: Prospects for theory. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (7th ed., pp. 3–16). San Diego: Academic.
- Easterlin, R. A. (1980). *Birth and fortune: The impact of numbers on personal welfare*. Chicago: University of Chicago Press.
- Easterlin, R. A. (1987). *Birth and fortune: The impact of numbers on personal welfare* (2nd ed.). Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1975). Age differentiation and the life course. *Annual Review of Sociology*, 1, 165–190.
- Elder, G. H., Jr. (1986). Military times and turning points in men's lives. *Developmental Psychology*, 22, 233–245.
- Elder, G. H., Jr. (1999). *Children of the great depression: Social change in life experience* (25th anniversary edition). Boulder: Westview Press.
- Elder, G. H., Jr., & Caspi, A. (1990). Studying lives in a changing society: Sociological and personological explorations. In A. I. Rabin, R. A. Zucker, R. A. Emmons, & S. Frank (Eds.), *Studying persons and lives* (pp. 201–247). New York: Springer.
- Elder, G. H., Jr., & Clipp, E. C. (1988). Wartime losses and social bonding: Influences across 40 years in men's lives. *Psychiatry*, 51, 177–198.
- Elder, G. H., Jr., & Conger, R. D. (2000). *Children of the land: Adversity and success in rural America*. Chicago: University of Chicago Press.
- Elder, G. H., Jr., Shanahan, M. J., & Clipp, E. C. (1994). When war comes to men's lives: Life-course patterns in family, work, and health. *Psychology and Aging*, 9, 5–16.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–22). New York: Kluwer Academic/Plenum Publishers.
- England, P., Shafer, E. F., & Wu, L. (2012). Premarital conceptions, postconception (“shotgun”) marriages, and premarital first births: Education gradients in U.S. cohorts of white and black women born 1925–1959. *Demographic Research*, 27, 153–166.
- George, L. K. (2014). Taking time seriously: A call to action in mental health research. *Journal of Health and Social Behavior*, 55, 1–14.
- Haines, M. (2008). *Fertility and mortality in the United States*. Economic history association. Retrieved at eh.net/encyclopedia/fertility-and-mortality-in-the-United-States.pdf on 18 Sept 2014.
- Hoffman, J. P. (2013). Declining religious authority? Confidence in the leaders of religious organizations, 1972–2010. *Review of Religious Research*, 55, 1–25.
- Houtman, D., & Aupers, S. (2007). The spiritual turn and the decline of tradition: The spread of post-Christian spirituality in 14 western countries, 1981–2000. *Journal for the Scientific Study of Religion*, 46, 305–320.
- Kaufmann, E., Goujon, A., & Skirbekk, V. (2012). The end of secularization in Europe? A socio-demographic perspective. *Sociology of Religion*, 73, 69–91.
- Kraaykamp, G. (2012). Employment status and family role attitudes: A trend analysis for the Netherlands. *International Sociology*, 27, 308–329.
- Lambert, Y. (1999). Religion in modernity as a new axial age: Secularization or new religious forms? *Sociology of Religion*, 60, 303–333.
- Leuchtenburg, W. E. (1964). The New Deal and the analogue of war. In J. Braeman, R. H. Bremner, & E. Walters (Eds.), *Change and continuity in twentieth-century America*. New York: Harper and Row.

- Livingston, G., & Cohn, D. (2012). *U.S. birth rate falls to a record low: Decline is greatest among immigrants*. Pew Social Trends. Retrieved at www.pewsocial-trends.org/2012/11/29/overall_trends.pdf on 18 Sept 2014.
- Mannheim, K. (1952). The sociological problem of generations. In K. Mannheim (Ed.), *Essays on the sociology of knowledge* (pp. 276–322). London: Routledge and Kegan Paul.
- Mayer, K. U. (2009). New directions in life course research. *Annual Review of Sociology*, 35, 413–433.
- Mettler, S. (2005). *Soldiers to citizens: The G. I. Bill and the making of the greatest generation*. Oxford: Oxford University Press.
- Modell, J. (1975). Levels of change over time. *Periodicals archive online*, September, 116–127.
- Modell, J. (1989). *Into one's own: From youth to adulthood in the United States, 1920–1975*. Berkeley: University of California Press.
- Pampel, F. (2011a). Cohort changes in the socio-demographic determinants of gender egalitarianism. *Social Forces*, 89, 961–982.
- Pampel, F. (2011b). Cohort change, diffusion, and support for gender egalitarianism in cross-national perspective. *Demographic Research*, 25, 667–693.
- Parker, C. S. (2009). *Fighting for democracy: Black veterans and the struggle against white supremacy in the postwar south*. Princeton: Princeton University Press.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Raley, B. K., & Bumpass, L. (2003). The topography of the divorce plateau: Levels and trends in union stability in the United States after 1980. *Demographic Research*, 8, 245–260.
- Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review*, 52, 1–14.
- Riley, M. W., Johnson, M. E., & Foner, A. (1972). *Aging and society* (A sociology of age stratification, Vol. 3). New York: Russell Sage.
- Rossi, A. S. (Ed.). (1985). *Gender and the life course*. Washington, DC: American Sociological Association.
- Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review*, 30, 843–861.
- Sampson, J. R. (2012). *Great American city: Chicago and the enduring neighborhood effect*. Chicago: University of Chicago Press.
- Schaie, K. W. (1965). A general model for the study of developmental problems. *Psychological Bulletin*, 64, 92–107.
- Schoen, R., & Canudas-Romo, V. (2006). Timing effects on divorce: 20th century experience in the United States. *Journal of Family and Marriage*, 68, 749–758.
- Schoon, I. (2006). *Risk and resilience: Adaptations in changing times*. Cambridge: Cambridge University Press.
- Schwadel, P. (2010). Age, period, and cohort effects on U.S. religious service attendance: The declining impact of sex, southern residence, and Catholic affiliation. *Sociology of Religion*, 71, 2–24.
- Schwadel, P. (2011). Age, period, and cohort effects on religious activities and beliefs. *Social Science Research*, 40, 181–192.
- Shu, X. L., & Zhu, Y. F. (2012). Uneven transitions: Period- and cohort-related changes in gender attitudes in China, 1995–2007. *Social Science Research*, 41, 1100–1115.
- Slack, T., & Jensen, L. (2008). Birth and fortune revisited: A cohort analysis of underemployment, 1974–2004. *Population Research and Policy Review*, 27, 729–749.
- Sommerville, C. J. (1998). Secular society, religious population: Our tacit rules for using the term secularization. *Journal for the Scientific Study of Religion*, 37, 249–253.
- Taylor, C. (2007). *A secular age*. Cambridge, MA: Harvard University Press.
- U.S. Census Bureau. (2012). *Median age at first marriage by sex: 1890–2010*. Washington, DC.: U.S. Census Bureau. Retrieved at www.census.gov/hhes/socdemo/marriage/data/acs/ElliottetalPAA2012figs.pdf on 4 Aug 2013.
- Voas, D., & Crockett, A. (2005). Religion in Britain: Neither believing nor belonging. *Sociology: The Journal of the British Sociological Association*, 39, 11–28.
- Voye, L. (1999). Secularization in the context of advanced modernity. *Sociology of Religion*, 60, 275–288.
- Wu, L. I. (2008). Cohort estimates of nonmarital fertility for U.S. women. *Demography*, 45, 193–207.
- Yang, Y., & Land, K. (2013). *Age, period, cohort analysis: New models, methods, and empirical applications*. New York: Chapman and Hall/CRC Press.

Opening the Social: Sociological Imagination in Life Course Studies

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1 Introduction

It has now been a full half century since Leonard Cain's seminal essay "Life Course and Social Structure" appeared in 1964, and more than four decades since the publication of Glen Elder's *Children of the Great Depression* (1974) and since John Clausen (1972) published "The Life Course" as a chapter in Matilda Riley's initial volume on age and social structure. In Germany, Martin Kohli began developing the concept of the life course as a social institution at about the same time (see e.g., Kohli and Meyer 1986).

Since those beginnings, the concept of the life course has expanded its reach within and beyond the sociology of age. In 1997, the American Sociological Association's Section on Aging was renamed the Section on *Aging and the Life Course*. As the relevance of the life course perspective has become recognized across a broad range of other substantive areas of sociological inquiry (e.g., family, criminology, work, education, policy), the proliferation of research on the life course has established the study of the life course simultaneously as both a domain of "normal science", and as an area of intellectual

ferment and vigorous debate, with a steady growth in the number of published studies devoted to life-course questions in the sociology of age and in sociology more generally.

In the decade since the first edition of the *Handbook of the Life Course* was published, life course scholarship has benefited from new analytical tools and expanded data sources, both national and international (see Bynner, this volume), and has expanded its scope across multiple substantive domains, within and beyond the discipline of sociology (Alexander et al. 2014; Dannefer 2013; Gluckman and Hanson 2008; Smith 2005; Priestley 2001; Laub and Sampson 2003); And in this decade, a journal devoted specifically to the life course, *Advances In Life Course Research*, was launched as was an international society dedicated solely to life course scholarship, the Society for Longitudinal and Life Course Studies (SLLS). Clearly, the life course has become an established domain of study in contemporary sociology.

1.1 Common Phenomena, Divergent Explanations

Over recent decades, the energies of life-course researchers have focused heavily on patterns of individual life course outcomes (e.g., health, wealth, family structure) and their causal pathways, fueled by the growth of quality longitudinal

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data on nationally representative samples. While there is broad agreement about the importance of understanding such phenomena, the causal mechanisms and pathways remain much less clear and an arena of considerable debate (see Moore and Brand, this volume). It is our objective in this chapter to contribute to that debate by calling attention both to some undeveloped implications of sociological theory as well as some important empirical discoveries and developments relevant to the life course.

The remarkable advance of empirical knowledge and evidence in multiple fields has made clear that the power of social forces to shape and organize individual lives is in many cases greater than even social scientists anticipated. Such advances include new levels of refinement in several domains of biology, from brain sciences to the mapping of the genome. Despite an initial aversion by many social scientists to embracing such fields of study, it is becoming increasingly clear that the realm of G-E interactions is among those domains that are demonstrating the heretofore unrecognized importance of social and environmental factors in explaining biochemical outcomes, e.g., in metabolic, hormonal and other physiological processes.

Such discoveries open new possibilities for discerning the potential power of social forces and social processes to account for individual-level phenomena, including some that have been traditionally assumed to be largely immune from social influence. For social scientists, this is a circumstance that brings both opportunities and responsibilities, because it offers unusually fertile ground for sociological imagination – that is, for giving careful consideration to the possibility that social forces and processes may be playing a previously unnoticed or underestimated causal role in shaping life course outcomes, even in the realms of biological aging and genetics. These empirically driven developments mean that the social sciences are poised on the brink of fresh and renewed horizons of inquiry, with new opportunities to investigate the possibility of the previously unnoticed power of social forces to shape life course outcomes.

This is where a persistent paradox arises. For what we repeatedly observe in life course studies and associated literatures is that, despite broad new areas of potential explanatory terrain, life course research often continues to avoid such opportunities, in favor of more familiar questions and problems that fit within the comfortable and established paradigmatic frameworks and empirical problem templates. Even while sometimes expressing excitement and intrigue at such discoveries, life course scholars and gerontologists have too often continued to use traditional assumptions that accept both social and individual-level arrangements and explanations as not only legitimate but as natural and inevitable. As has been noted earlier, this is precisely what happened in the aftermath of the original discovery of the importance of cohort analysis (Riley et al. 1972; Schaie 1965). Cohort analysis brought the realization that social context matters for aging. However, instead of embracing the implications of this realization by looking more closely at how context effects aging, the dominant practice was initially to *equate* cohort differences with contextual effects, and treat intracohort variation as error (Dannefer 2011). Synthetic cohort analysis, currently in vogue, reflects yet a further retrenchment away from social causation, since it implicitly assumes that there is a natural and true age trajectory that can be discerned by amalgamating all cohorts together.

The problem that we address here, then, is the continuing danger of ‘containing the social’ – inhibiting key points of inquiry where possibilities present themselves, to open the horizons of sociological explanation. We contend that this tendency to limit the scope of the sociological imagination emanates from the continued reliance of much life-course scholarship on the interlinked paradigms of functionalist sociology and developmental psychology for organizing the explanations for phenomena that occur over the life course (Dannefer 2011). In the following sections, we seek to explicate this problem and then follow with examples from three relevant domains of life course inquiry.

1.2 Containing the Social: The Functional-Developmental Nexus and Sociological Explanation

Critiques of life course scholarship for its tendency to rely on functionalist structural arrangements and developmentally-based individual pathways have been presented elsewhere, including discussions of *microfication* (Hagestad and Dannefer 2001), individual-level *reductionism* (Dannefer 1999b, 2011; Dannefer and Kelley-Moore 2008; Morss 1995) and ideologies of age (Baars 1991; Katz 1996; Riley et al. 1994). While functionalism and developmentalism derive from work in two different disciplines, these two broad paradigms share several key assumptions that inform the study of the life course, as well as related fields such as human development and social gerontology. At the outset, we acknowledge explicitly that many aspects of our accumulated understanding of the life course have been discovered and achieved within the functional-developmental framework. This includes discoveries that contained the seeds of its own critique, such as cohort analysis as we mention above. That is how science often proceeds. Yet despite its contributions, it is equally clear that it has important limitations, to which we now turn.

A full discussion of the assumptions and operating principles central to the symbiotic relationship between functionalism and developmental theory must lie beyond the scope of this paper. For our purposes, it may be useful to map key points of overlap that, for scientists working at their nexus, may serve to perpetuate operating assumptions that remain uncritically applied. Some of the more important such shared notions are (1) an assumption of the legitimacy and functionality of the overall social order and of the generally benign nature of social institutions within which individuals develop and age; (2) an emphasis on the explanatory integrity of the free-standing individual, both through stable individual characteristics (e.g., temperament, personality, resilience) and accentuation processes, and through self-efficacy as expressed in agentic action; (3) given #1 and #2, a further, implicit assumption that the

age-related and other features of existing institutions have been created as accommodations to individual needs (e.g., 4-year-olds “need” kindergarten, nonagenarians “need” nursing homes), an assumption which implies that such institutions warrant no critical analysis; (4) a paradigmatic emphasis on social solidarity, consensus and normative order, and a concomitant disinclination to integrate processes involving power and conflict at any level, including the micro-level, and (5) an assumption that human interests and institutional interests are congruent. Although almost always implicit and unstated, such assumptions underlie the paradigmatic logic and research questions that inform and guide most life course research.

To be sure, one can point to exceptions and to developments in the study of the life course and related areas that have challenged the dominance of explanatory paradigms at the functional-developmental nexus. Examples include the Baltes-Dannefer debate over ontogenetic reductionism (e.g., Baltes et al. 1994; Baltes and Nesselrode 1984; Dannefer 1984a, b, 1994; Dannefer and Perlmutter 1990; Featherman and Lerner 1985); the Bengtson/Connidis debate contrasting solidarity with conflict and ambivalence (Bengtson et al. 2002; Connidis and McMullin 2002a, b; Fingerman and Hay 2004) and the growing emphasis on processes generating patterns of life-course inequality and stratification such as weathering (Geronimus et al. 2006; Newman 2006) and cumulative dis/advantage (e.g., Crystal and Shea 1990, 2002; Dannefer 1987, 2003a, b; Ferraro and Kelley-Moore 2003; O’Rand 2002) – all of which represent challenges to the dominant narrative underlying the functional-developmental nexus. Although such challenges have enlivened and expanded the range of questions and issues that are being fruitfully pursued in the study of the life course, the functional-developmental nexus has manifested a remarkable resilience. As we will show, its underlying logic remains largely intact in key and emerging areas of life course studies.

The key assumptions underlying the functional-developmental nexus (such as those just listed) have in common a tendency toward

naturalization – that is, a willingness to accept as rather permanent, inevitable and even natural, the structural regimes that underlie both established social institutions and individual development, and a concomitant assumption that existing social structures and institutions operate as legitimate accommodations to human needs anchored in developmental processes. This cross-disciplinary symbiosis harmonizes our subject matter into a comfort zone of relatively familiar and routine questions, without creating an opening for more fundamental questions that are warranted by empirical evidence, concerning the forces that underlie the structuring of the life course, biologically as well as socially.

Thus, the functional-developmental nexus has had the effect of limiting, in subtle and often unrecognized ways, attention to the active power of social forces in shaping the lives of individuals. Yet its underlying paradigmatic predispositions comprise a heuristic logic to guide research. This often-implicit logic restricts and contains the effects of social forces – a paradigmatic tendency that has elsewhere been termed a *heuristic of containment*. We argue, instead, for a logic that encourages a more expansive exercise of sociological imagination in understanding the role of the social, which has been called a heuristic of *openness* (Dannefer 2011, 2012).

This is a situation that brings squarely into focus the question of the actual significance of the discipline of sociology and of the sociological perspective. Too often, reading the life course literature, one might get the impression that the task of sociology is merely to add a few contextual variables that influence or constrain the outworkings of causal forces that are located elsewhere – e.g., in individual decision-making or developmental imperatives.

Yet a key element of the meaning of sociology as a discipline is precisely in the capacity to investigate, discover, and scrutinize the role of the social in shaping such phenomena. That cannot be done by an a priori surrender of explanatory terrain to putative individual characteristics such as “temperament” or “volition” nor by uncritically assuming established institutions can be counted on to operate in the human

interest. Rather, social science analysis must begin, as Baars (1991), Berger and Luckmann (1967), Dannefer (1984a, b), Holstein and Gubrium (2000), and Montagu (1989) and others have made clear, with a recognition that the influence of the social is *constitutive* in shaping, regulating, and sustaining the individual, physically and psychically as well as socially. Although a review of the constitutive dimensions of social forces must remain beyond the scope of this chapter, such dimensions encompass several key established domains of sociological explanation and inquiry, including Mead’s analyses of the social genesis of the self (1934), “sociosomatic” analyses of the role of culture in physical development, and recent discoveries concerning the extent of social and environmental influences on brain development and on gene expression and perhaps even gene sequencing. For life course scholars, the expansion of our recognition is especially daunting as well as especially promising, because it adds to these basic claims for social forces the inherent dimension of temporality. Moreover, since many of the postulated effects are highly interactive, tracking their interrelations through a sustained period of time can be analytically and theoretically challenging.

In this chapter, we demonstrate the limits of the functional-developmental nexus for advancing inquiry in the current discourse in life course studies by focusing on three areas of significant developing research, each of which has encountered its own version of “containment” – that is, of the tendency to stick with the status-quo assumptions that tend to restrict inquiry. Instead, we propose that what is needed is precisely the opposite: An *opening* of the more expansive possibilities of sociological explanation that are implied by recent discoveries or debates touching all three of these areas of life course scholarship: (1) concerns arising in formulating and applying the concept of agency in contemporary society, (2) early life influences on adult outcomes, and (3) life-course implications of gene-environment interaction studies. In each case, we will seek to demonstrate the tension between sociological explanation and tendencies toward reductionism. We will suggest

that once again the heuristic of containment, rather than being tempered by recent empirical discoveries of the powerful role of the social, continues to operate to avoid or resist the full implications of a confrontation with the explanatory potentials of social forces.

2 Containing the Social: Three Examples

In the sections that follow, we review recent literature in each of three lively domains of discourse and inquiry in life-course studies. We demonstrate that the dominant approaches in each of these domains, while seeking to advance sociological knowledge, risk constricting and containing the scope of potential sociological imagination because of their grounding in the functional-developmental nexus. The three domains are: (1) efforts to clarify the place of agency and choice in the study of the life course (2) research on the long-term consequences of early life experience; and (3) the growing interest in the importance of gene-environment (G-E) interaction studies. We then conclude by reflecting on what the direction of research in each of these areas implies about life course studies.

2.1 Agency: The “Big Easy” of the Life Course

In studies of the life course and in related fields such as life-span psychology, *individual agency* and related concepts such as “choice” and “decision-making” have regularly appeared as featured terms (see Hitlin, this volume). Agency is one of Glen Elder’s five principles of life course analysis: “Individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstances ...” (e.g., Elder 1998a: 961–962; Elder and Johnson 2003). Elder and associates have been quite consistent in articulating this view as an enduring component of the American life-course perspective that involves choice-making: This view continues to be very

influential, as indicated by the frequent references and expressions of it in the life course literature. Relying on Elder’s approach, for example, Gillespie and van der Lippe state that human agency “... refers to individuals’ ability to navigate their lives within the constraints of their social circumstances” (2014: 2). Settersten’s (1999) reference to “agency within structure” articulates a similar view, as do numerous other formulations offered in life course research.

Despite its continued dominance in the accumulated literature, this general approach suffers from at least two significant problems, one methodological and one theoretical, both of which are grounded in the functional-developmental nexus. Both problems involve the assumption of an unproblematic volitional agent navigating a largely fixed and legitimate social context. The methodological problem is that while agency is frequently invoked, it is seldom actually measured or operationally defined; rather, it is simply assumed to be operative. In our review of studies that use the term “agency” or synonymous words such as “choice” and “decision-making” in the title or as keywords, in four major journals (*Journal of Aging Studies*, *Research on Aging*, *Journals of Gerontology Social Sciences*, and *Advances in Life Course Research*) from 2004 to 2014, only 9 of 49 articles actually attempt to measure agency. To be sure, some of these studies (mainly using survey questions about preferences or qualitative interview discussions that probe decision-making) treat agency in a thoughtful way. Yet what concept can survive and thrive with such a track record of (lack of) empirical scrutiny?

There is a reason for this. As Dannefer (1984a) and Marshall and Clarke (Marshall 2005; Marshall and Clarke 2010) have noted, “agency” is more typically used as the equivalent of the error term. As Marshall puts it, “... agency functions in this theoretical perspective in the same way that ‘unexplained variance’ functions in statistical models” (2005: 63). Thus, as it is used in life course analysis, a remarkable thing about agency is that it is somewhat atypical in having achieved its conceptual status without any requirement that it be empirically measured or

analyzed. From the perspective of modeling and analysis, it is frequently given a “free pass”, allowed into the discourse of life course studies, even asserted as a cardinal principle, despite its lack of a clear empirical referent. It may be thought of as the “big easy” of life course research.

Initially, this may appear paradoxical: how can it make sense to relegate a key variable to the domain of unexplained variance? However, it does make sense, *has to* make sense, if the variable is located in the domain of volition. By definition, it cannot be predicted or analyzed. Thus, agency is rendered off limits to sociological explanation.

The second, theoretical problem concerns the reliance of the dominant approach on a social control or “moral integration” framework (e.g., Wexler 1977) that regards agency and structure as counterposed domains of freedom and constraint, with the limits of the former determined by the strength of the latter. While viewed as outmoded in social theory and in many substantive subfields of sociology, this framework remains resilient in some areas, including in the study of aging and the life course. For example, such an assumption is implicit in the assertion that “Within the constraints of their world, competent people are planful and make choices among alternatives that form and can recast their life course” ...” (Gillespie and van der Lippe 2014: 2) and in statements like “Familial ...or class-based cultural expectations can also constrain choice and action” (Thoits 2006: 314), as though freedom would be greater for those who have no cultural expectations. Making the general point even more explicitly, Csizmadia et al. (2012: 1) assert that “... weakening structural constraints permit overall higher levels of human agency...” The implicit idea is that behavior can be adequately understood as a kind of scrimmage or tug-of-war between structure and agency, which are thus assumed to be two independent and often opposed and competing forces.

In relation to a basic sociological understanding of the genesis and nature of the self and self-society relations, the social control approach is simplistic and inadequate. Such formulations fail to apprehend the dialectical interrelation of structure and

agency. One way to see this is to ask the question: Suppose there were, e.g., no “constraints of social circumstances” – would it then be plausible to say that individuals formulate their plans of action and act unscathed by social structure?

For anyone who takes seriously sociological analysis, the answer is, of course not. It is a fundamental principle of basic social theory that consciousness is itself fundamentally organized by social structure. Individual consciousness – where purposes and agentic intentions are formulated and then externalized in social action – is first of all irreducibly shaped by culture-specific language (Berger and Luckmann 1967; Sewell 1992), by the multilayered complex of structures that pattern social interaction, expectations, taste, and aesthetics within every individual’s consciousness, beginning while she is still in the womb. This is close to what Bourdieu intends with the concept of *habitus*: “...the habitus engenders all the thoughts, all the perceptions, and all the actions consistent with those conditions and no others” (Bourdieu 1977: 95). This recognition is consistent with Mead’s analysis of the social genesis of the self, which has been elaborated by numerous other scholars in the interactionist (e.g., Blumer 1969; Holstein and Gubrium 1999, 2000; Schaie and Hendricks 2000) and constructivist (e.g., Berger and Luckmann 1967) traditions.

When the social structuration of intentionality is recognized, it quickly becomes clear that it is meaningless to treat agency and structure as counterposed forces in a zero-sum game. The agency of each individual actor is profoundly and unavoidably organized by the social structures within which that individual lives her life, and most of her agentic action is inevitably directed toward the reproduction of existing patterns of social life. This is not necessarily an unhealthy state of affairs, for without such social organization of agency, individuals would lack the degree of social integration required for a foundation of mental health and a coherent sense of self. The feral human individual child who has no language is free of humanly produced social structure, and as a result lacks the basic enablement of symbolic engagement even to articulate

or perhaps even to formulate an agentic plan of action (Lane 1976; Perry and Svalavitz 2006). This is why Giddens emphasized that "... structures must not be conceptualized as simply placing constraints on human agency, but as enabling ..." (Giddens 1977: 161; see also Dannefer 1999a; Marshall 2005; Marshall and Clarke 2010).

What this means is that the role of social structure is not merely to constrain agency, thereby defining and limiting the options among which an otherwise "free" actor may choose. Rather, what social structure does is to shape and define the individual's consciousness, within which intentions and purposes are externalized into agentic action. This is, of course what occurs continuously beginning in very early life and continuing on through the life course, through the learning of language and culture (including, e.g., skills and aesthetic preferences) of one's habitus.

It is worth noting that an emergent feature of modern society is the rise of "age consciousness" (Chudacoff 1989) and a societal reliance on age as an organizing principle, which has been key to the institutionalization of the life course (Kohli 2007; Dannefer 2012). Age consciousness refers to that complex of generally unreflected but influential assumptions about "normal aging", "life stages" and other social constructs that are assumed to be part of human nature, although they are historically recent. For better or worse, such assumptions largely define the terms within which contemporary individuals envision the life course.

Of course, the life-course expectations set by one's habitus are culturally specific and contestable. As Francesco Duina (2014: 18–19; Chapter 5) has recently documented, they take radically different forms in North America from the forms they take in Japan and many European countries – in the former celebrating choice and opportunity, in the latter focusing more on institutionally supported continuities, connections and interdependencies, whether provided by extended family relations or by state policy. Does this mean that Americans are more "agentic" than Japanese or Scandinavians? Clearly not, if one understands that citizens in each of these contexts are formulating their intentions with an individual consciousness

that has been organized by their own linguistic and social experience, from the beginning of the life course onward.

Thus conceived, agency does not exist as the error term, relegated to the caprice of free choice. Rather, it is recognized as it empirically exists – as an expression of consciousness that is constituted by and typically integrated into the habitus in which it operates (Baars 1991). As we have noted elsewhere (e.g., Dannefer 1999a), agentic expression also serves to create the social relationships that sustain the world. The task for life course scholars as for other sociologists includes the need to understand how agency is shaped and directed by the field of interaction within which the individual resides.

These criticisms do not exist as mere arcane theoretical abstractions; they have substantive implications for designing research, interpreting findings and extrapolating real-life implications. They have implications for how realistically and responsibly we as life course scholars confront the broader realities within which the individuals we study constitute their own lives.

2.1.1 Agency and Life Transitions

As an example, consider the implications of these principles for reframing the discussion of decisions or "choices" made during key life transitions. A prominent if not dominant theme in the literature on life transitions features choice making. Studies often present survey data suggesting that "choices" (e.g., to retire or relocate) are largely volitional, emphasizing what phenomenologically seem to be the agentic aspects of such choices, with phrasing like "retirement decisions" or "relocation options". An added noteworthy aspect of the North American approach is an increased capacity for self-blame for adverse life-course outcomes even if beyond the individual's control (Dannefer 2000a, b), which appears even more likely among those who encountered early adversity and disadvantage (Newman 2006).

The same applies to other life transitions as well. Especially in North America, cultural narratives to provide a positive reframing of even putatively adverse transitions such as losing one's job are available. Regarding job loss, Francesco Duina writes:

It would be reasonable to expect such a crisis to fuel a very negative interpretation of this transition. In several respects, the evidence validates this expectation. But in other regards we encounter a fair amount of positive and hopeful language... what seems like an unwelcome punishment harbors exciting, even “incredible,” possibilities and potential... (2014: 87)

The same optimism applies to the uncertainties and stresses of the transition to adulthood, where the phenomena such as “boomerang children” or the “crowded nest” (Shaputis 2011) are often framed in ways that emphasize agency and positive resolution, both in scientific and public discourse. For example, Settersten and Ray’s (2010) acclaimed study of the young adults and the transition to adulthood, *Not Quite Adults*, effectively conveys both the diversity and the common themes in the experienced dilemmas and stratified life chances confronting their young respondents, demonstrating in many cases how decisions are economically or culturally constrained. Settersten and Ray make clear that many if not most young adults encounter an educational system that lacks the resources in terms of both education and guidance to facilitate their learning potentials. For many young adults, they write “... because the system as set up simply has no room for them... there were no other options, at least not ones that could be identified” (2010: 17); others are excluded from access to educational options because “(t)he economy makes that choice for them.” (2010: xiii). In the context of such sobering and informative assessments that point to serious external challenges for many teenagers and young adults, their parallel emphasis on choice, reflected in the subtitle – *Why 20-Somethings Are Choosing a Slower Path to Adulthood, and Why It’s Good For Everyone* – seems disconnected from the actual experiences of young adults, which form a central part of the book’s message.

Some indication of the salience of such interpretive processes at the level of lived experience may also be gauged by the reaction to Adam Davidson’s (2014) NYT article, “It’s Official: Boomerang Kids Won’t Leave”. This article quickly generated more than 1,600 comments – an inordinate reaction from readers. It offers a

window the ambivalences in the reasoning processes that are part of the process through which individual actors formulate their intentions. Consider the case of Annie Kasinecz, with whom Davidson begins his article:

Annie Kasinecz has two different ways of explaining why, at age 27, she still lives with her mom. In the first version – the optimistic one – she says that she is doing the sensible thing by living rent-free as she plans her next career move. After graduating from Loyola University Chicago, Kasinecz struggled to support herself in the midst of the recession, working a series of unsatisfying jobs – selling ads at the soon-to-be bankrupt Sun-Times, bagging groceries at Whole Foods, bartending – in order to pay down her student loans. But she inevitably grew frustrated with each job and found herself stuck in one financial mess after another. Now that she’s back in her high-school bedroom, perhaps she can finally focus on her long-term goals.

But in the second version – the bleaker one – Kasinecz admits that she fears that her mom’s house in Downers Grove, Ill., half an hour west of the city, has become a crutch. She has been living in that old bedroom for four years and is nowhere closer to figuring out what she’s going to do with her career. “Everyone tells me to just pick something,” she says, “but I don’t know what to pick.”

In the experience of the many young people of whom Ms. Kasinecz serves as an example, it seems clear that such processes are characterized less by an experience of volition than by ambivalence, uncertainty and temporal contingencies.

As Settersten and Ray note, it is important to locate the empirical analysis of such meaning-making processes in a consideration of the broader social context. For young people, the broader context is daunting. The unemployment rate of workers under 25 in the USA is more than double the overall unemployment rate (14.5 % as opposed to about 6 % overall) and more than triple (18.1 %) if one includes “missing” youth who are not seeking work. New college graduates’ unemployment rate is better (8.5 %), but still a third higher than the overall average (Bureau of Labor Statistics 2014; Shierholz et al. 2014: 5–6). Moreover, overall wages of young workers have been in a long-term decline (Shierholz et al. 2014: 15). Discussions of agency and the choices young people make must acknowledge the existential context imposed by such realities.

2.1.2 Agency and Precariousness

The same realities apply to the factors influencing transitions in adulthood. The U.S. economy, like those of all late modern societies, has been reshaped by globalization and by pressures to “flexibilize labor” and the accompanying eradication of the “social contract” between the owners of capital and corporate employees and home towns. Such shifts have been accompanied, among other things by widespread warnings the idea of a stable one-career life is over.

Precariousness is a word that has been used on both sides of the Atlantic to describe the circumstances faced by individuals that derive from these powerful trends. In the USA, Robert Reich (2000: 98) writes that “the new precariousness” is reflected in the eradication of the institutionalized life course defined by the corporate world through much of the Twentieth Century:

Steady work – a predictable level of pay from year to year – has disappeared for all but a handful of working people... To stay competitive ... organizations have to turn all fixed costs into variable costs... As a result, earnings have become less and less predictable. (Even) ...a job that is formally classified as full time but whose pay varies considerably from month to month ... is not, as a practical matter, a job one can rely on.

Although as much as a third of the work force were estimated to be temporary workers, part timers, independent contractors, or freelancers in the year 2000, Reich (2000:98) argues that “... the portion of employees uncertain about how much they’ll earn ... is far bigger than even the largest estimates” due to the shift in modes of compensation of corporate employees to commissions, time-limited contracts and so on.

In Europe, the term *precarariat* (Standing 2011) refers to a large and growing segment of the population which is excluded from the primary economy and are identified by a collective lack of opportunity and economic uncertainty and vulnerability shared by such groups. These developments make clear the degree to which the individual agency is shaped by economic, political and technical developments at the societal or corporate levels, where the opportunity structures within which individuals must make meaning of

their lives are generated. Such trends are often portrayed as troubling and in conflict with the interests of most individuals, or at least most individuals in advanced industrial societies who enjoyed high levels of security and a relatively high standard of living through the decades of the late twentieth century.

The results of these changes are generally argued to include the rapid growth of contingent labor, boomerang children, chronic and structural underemployment of middle aged workers, and retirees who cannot afford retirement. At the same time, much is sometimes made of success stories of celebrated individuals who, in response to a sudden termination, manage to start a successful business and become featured role models of the entrepreneurial spirit. Our point is not to offer an evaluation of such trends, but simply to indicate the situations confronted by contemporary individuals and the individual and collective life course patterns that result from their efforts cannot adequately be characterized by an assumption that the domain of agency represents a straightforward volitional act that requires no interrogation. The existential position from within which the world is viewed and intentions are formulated is a key point of every individual’s life-course narrative.

From our perspective, it is a disconcerting signal of the continued force of the heuristic of containment, that in the face of such massive global trends that have diminished opportunities for the young and that are reflected the erosion of economic security, the discourse and narratives of life course analysis continues to emphasize the importance of agency and choice with relatively little interrogation either of the reasoning processes through which decisions are made, or of how to respond to such changes.

Interestingly, in public and sometimes scientific discourse, volitional action is blamed for helping to create the adverse social circumstances. For example, Settersten and Ray (2010: 30) attribute the economic downturn to the extravagant choices of parents:

As the 2008–2009 economic crisis exposed, Americans had been living beyond their means. While debt was once a four-letter word in America,

adults- young and old alike – had become too comfortable with red ink. Savings were at historic lows. Families had fed their spending habits by refinancing their mortgages...

Thus, choice and volition are invoked not only to describe the agentic action of youth, but also of parents – whose choices are offered as an explanation of the problems to which youth must respond. Such claims, while not entirely inaccurate, omit acknowledgment of the broader political and economic forces that are widely recognized as underlying the 2008 recession, as discussed by Reich (above) and many others.

In any case, the problems identified by Settersten and Ray at the individual level and by Reich at the structural level do indeed call forth agentic responses from all individuals, at every point in the life course and on a daily basis.

A final issue in a consideration of agency concerns the form of those agentic responses. As discussed within the life course framework (including in our own prior work), virtually all references to agency conceptualize agentic action as an individual matter, coping with the local micro-world confronted on a daily basis. Yet especially for dealing with crises that impact large segments of a society's population, collective responses – exemplified by large-scale social movements – have often been decisive. In Europe, the concept of the precariat has derived its viability, at least in substantial part, from visible social movements through which marginalized and excluded individuals have come together. The Occupy Wall Street movement obviously tapped into similar concerns in the USA. While no such movements on either of these continents have to date been efficacious, they represent a form of agentic response expressed now by millions of individuals.

For life course scholars and other social scientists interested in the possibilities of agentic action, they represent an opportunity to consider whether it may be useful to contrast different types of agency (based on the extent to which it is individual vs. collective, spontaneous vs. formally organized, etc.) A recognition of the potentials of collective agency in life course studies and related fields is rare, although not altogether absent (see Elder 1974; Crockett 2002). Of

course, neither the goals nor results of collective agency are necessarily salutary; fascism, terrorism and suicide cults are among the enterprises to which individuals have joined together in collective agency. Nevertheless, to the extent that life course scholars are seriously interested in agency as an explanatory concept (as opposed to a name for “error variance”, as Marshall observed), a typology of forms of agency may offer a useful way to move the understanding of such issues forward. Clearly, such a development would resonate strongly with C. Wright Mills' call to study history and biography conjointly, as is often and appropriately invoked as vision to which life-course scholars should respond (Aronowitz 2003, 2012).

In sum, an empirical analysis of agency must, at minimum, recognize the social organization of the consciousness from within which intentions are internalized into action. Such recognition is not possible from the assumptions of the functional-developmental nexus, which centers on a “choice-making” individual, navigating a largely fixed and legitimate social context. And in such a context, the very notion of collective action for social change has no place, since social change appears as neither warranted (since the system is prejudged as by and large legitimate) nor possible.

The implication for life-course researchers is to incorporate the concept of agency carefully, conditional on two premises: (a) a recognition of the factors that organize agentic intentions in the actor's consciousness, so that agency has the potential to carry explanatory power, thereby making it a meaningful independent variable or (b) if agency is positioned as a dependent variable, so that the research objective is to show how agency itself is organized by broader forces (which may represent an interaction of both physiological and social forces).

2.2 Early-Life Circumstances in Life Course Context

Recently in life course research, scholars have undertaken significant new efforts to articulate the role of early-life circumstances for adult

outcomes. The early origins literature has exploded over a number of areas of social science, ranging in both the childhood circumstances and in the adult outcomes under study. These include: the influence of childhood family structure on adult wealth attainment (Kiester 2004); child abuse on adult religiosity (Bierman 2005); early-childhood education on adult utilization of social welfare (Cunha and Heckman 2007); childhood adversity on adult life evaluations (Schaefer et al. 2011); and adolescent delinquency on long-term crime careers (Moffitt and Caspi 2001).

As scholars begin to sort through the bevy of empirical findings that link early-life circumstances to adult outcomes, a number of theoretical frameworks have emerged that differ in the hypothesized magnitude of direct and indirect influence of the early-life circumstances on later-life health, wealth, and well-being. These include, but are not limited to, fetal programming, critical and sensitive periods, pathway or chains of risk, and cumulative dis/advantage. A more thorough treatment of the family of these hypotheses appears in other places (Ferraro 2011; Shanahan 2013; Kuh and Ben-Shlomo 2004) and we make no attempt to summarize them here. For our purposes, most of the relevant explanatory frameworks can be sorted into two broad categories, each in its own way located at the nexus of functionalism-developmentalism. The first we term the *Latency* framework, which is drawn from the critical/sensitive period model and focuses on acute exposures in very early life that have a lasting impact on growth, development, and functioning during adulthood (Hertzman et al. 2001; Barker 1995; Kuh and Ben-Shlomo 2004). These crystallized individual-level characteristics (IQ, organ function, stress sensitivity) get carried forward throughout life and their explanatory power is thus seen as residing within the individual, with a presumption of relative permanency. Although exposures in other parts of the life course may have influence, these are frequently framed as effect modifiers, to use Kuh and Ben-Shlomo (2004)'s terminology, or as mediators. Thus the presumed causal link of an early life exposure and an adult outcome remains intact.

The second family of explanatory mechanisms are labeled Path Dependency. Pathway or "chains of risk" models frame social and health circumstances in very early life as the starting berth for a lifetime of opportunities, or for stressors or barriers (Dannefer 2003a; Kuh and Ben-Shlomo 2004; Ferraro and Shippee 2009). A unique feature of the Path Dependent perspective is the operating assumption that these risk pathways or accumulative processes are generated and sustained by a relatively fixed opportunity structure through which an individual must navigate. [Think of tournament mobility (Rosenbaum 1978): there is a predictable order in the progression through brackets, and a set of probabilities based on starting berth.] Following this logic, the predominant solution for escaping such a deterministic structure lies in individual-level action and characteristics, such as positive coping or resilience (Landes et al. 2014; Zimmer-Gembeck and Skinner 2011), or attempts to improve one's relative status (Elman and O'Rand 2004). Although not taken up explicitly here, the latent class perspective, which argues that one's early, middle, and later life socioeconomic circumstances represent an underlying construct of placement in the social hierarchy, similarly relies on assumptions of a stable opportunity structure.

These two frameworks have in common the intent to locate the role of early-life social circumstances in a broader life course framework. Our attempt to distinguish between these two categories is not intended to exacerbate a perceived competition between them as explanatory frameworks. Indeed, conceptual and empirical work suggests strongly that both kinds of processes are often operant simultaneously (Shanahan 2013; Montez and Hayward 2011; Ferraro and Shippee 2009). However, we will show that the research assumptions and analytical practices of each of these two approaches, in their own distinct way, serve to contain the potential explanatory influence of the social world. Below, we take up each of these categories separately to discuss their embeddedness in the functional-developmental paradigm, and then present some evidence pointing to the potential expansiveness of the sociological imagination.

2.2.1 Latency of Early Childhood Exposures

Just as the life course framework was solidifying in the early- to mid-1990s, emphasizing not only the proximate influences on health and well-being, but also the more fundamental causes, new epidemiologic work presented evidence that opened up fresh possibilities with regard to the importance of very early life, even in utero, for understanding the causes of adult chronic disease. In 1995, Barker and colleagues published an observational study showing that adults with cardiovascular disease had been disproportionately low birth weight babies.

Now famously called the Barker hypothesis, this study helped launch a rich line of inquiry in epidemiology and biology referred to as Fetal Origins of Adult Disease (FOAD). Drawing from the critical or sensitive period model in epidemiology whereby an early-life exposure may be more influential on later-life health outcomes because it occurs during a period of vulnerability or rapid development, early origins hypotheses started to appear in epidemiology, sociology, and public health (Gluckman and Hanson 2008; Kuh and Ben-Shlomo 2004; Doblhammer 2004). [see Skogen and Overland (2012) for a review of the development of FOAD research.]

As one marker of the explosion of interest in the early-origins idea, Barker's (1995) original study was cited more than 2,500 times between 1995 and 2014. The vast majority of the empirical papers citing Barker's work focused on physiologic or biologic mechanisms operant in neonates that may link fetal or early-life conditions to adult disease. Yet roughly one-quarter of those citing Barker have been social science studies examining the potential link between childhood circumstances and an observed health outcome in adulthood.

The Latency framework in life course studies is an important first step in specifying the impact of the early-life social environment for sociological analysis because it has identified and documented an array of exposures that may decisively influence the individual's development or potential. Thus, Latency-based research compels attention to the importance of childhood social factors in

the health-related development and life-course outcomes. The problem is not that the influence of the social world is not considered in the other parts of the life course, but that its *causality* is often *limited* to early childhood when relatively stable characteristics are assumed to be "locked in" to the individual. This is, of course, a clear example of *Time 1 Encapsulation* (Dannefer and Kelley-Moore 2009; Hagestad and Dannefer 2001), which implies that the impact of the social world is internalized early in life, and thus can be thought of as a stable, obdurate characteristic for the individual that is carried forward through time.

When it is assumed that experience in adulthood does not matter beyond mediating the effects of very early life, or it serves solely as an effect modifier, the potential dynamic, even transformative, influence of social world is ignored. If, as we argue at the beginning of this chapter, the social world is constitutive, continuously shaping (and either stabilizing or changing) the individual at all ages, then privileging the social world's impact at a particular age neglects the broader potentials of the social world to shape individuals throughout the life course.

This tension between the Latency perspective and one that purports a more dynamic role of the social world over the life course can be seen in the interpretation and policy application of the Nobel Economist James Heckman's research on the impact of early-childhood education on long-term outcomes. Heckman's research has focused on the economic returns of intervention and investment in disadvantaged children and adolescents, focusing specifically on the exact timing in young life when such intervention would yield the greatest return in adulthood. For instance, he and his colleagues (Cunha et al. 2010) undertook an evaluation of an early-childhood program, concluding that every dollar spent on a 4-year-old child from a disadvantaged family would range between a 7 % and 10 % annual "return to society" in the form of less dependence on social welfare, less frequent engagement with the criminal justice system, and increased income tax revenue. Compelling economic data such as this has fueled wide bi-partisan support for early childhood education programs

such as Head Start. Interestingly, the recent economic recession actually saw an *increase* in investment in such programs, as part of a comprehensive strategy to combat the long-term effects of the economic slide of American families (*Business Week* January 2014).

Heckman's interpretation of his work provides a strong endorsement for the critical/sensitive period model for developing cognitive and non-cognitive (e.g., social interaction) skills. As he wrote in a *New York Times* editorial, "Quality early childhood programs for disadvantaged children ... foster human flourishing and they improve our economic productivity in the process. There is no trade-off between equity and efficiency, as there is for other social programs. Early investment in the lives of disadvantaged children will help reduce inequality, in both the short and the long run" (Heckman 2013).

From an economic point of view, which is Heckman's vantage point, his research certainly supports early childhood investment as economically efficient to the overall system. However, it is a mistake to use his work as definitive evidence of latency effects of early childhood on human development. Indeed, a closer examination of Heckman's own evidence, as well as complementary research, shows clearly that if early investment in disadvantaged children (the target population for programs such as Head Start) is not followed up by later investment, its effect at later ages is lessened substantially (Cunha et al. 2010). In other words, its success is contingent

on continued and ongoing investment beyond the program years that target ages 3–5. This is largely attributed to the fact that the "melt" from the early-life intervention begins as soon as the children return to their disadvantaged environments and relatively lower levels of social investment (Currie and Thomas 1995).

The greatest challenge to the argument that the effectiveness of a critical/sensitive period investment occurs solely in early childhood is data from Cunha and Heckman (2007) showing that the returns in adulthood with regard high school graduation, interactions with the criminal justice system, and receipt of public assistance are the greatest, by more than three times for certain outcomes, when early intervention is partnered with continuous intervention through late adolescence. In Table 1, reproduced from their report in the *American Economic Review*, we observe indicators of several positive and adverse outcomes for a control group (no intervention) and three experimental groups: early-childhood intervention only; adolescent intervention only; both early-childhood and adolescent intervention. The rates of success, for every measure, were substantially higher for those who receive the sustained intervention in both early childhood and adolescence.

This means, of course, that the salutary effects of Head Start or other effective early childhood programs are not internalized in ways that mean they no longer require further support; rather it means that the social environment continues to

Table 1 Comparison of different investment strategies^{a,b,c}

	Baseline	Early-childhood only intervention	Adolescent only intervention	Balanced early-childhood and adolescent intervention
High school graduation	0.4109	0.6579	0.6391	0.9135
Enrollment in college	0.0448	0.1264	0.1165	0.3755
Conviction	0.2276	0.1710	0.1773	0.1083
Probation	0.2152	0.1487	0.1562	0.0815
Welfare	0.1767	0.0950	0.0968	0.0259

^aReproduced from Cunha and Heckman (2007)

^bIntervention population: Disadvantaged Children: First Decile in the Distribution of Cognitive and Noncognitive Skills at Age 6; Mothers are in the First Decile in the Distribution of Cognitive and Noncognitive Skills at Ages 14–21

^cProportion of sample

be important after the pre-school period. Thus a supportive social environment (or lack thereof) is decisive well beyond early childhood.

To be clear, we are not arguing that the social environment during the fetal period, infancy and early childhood should be viewed as unimportant. Clearly, they are extremely important. But the true measure of the staying power of such early-life effects independent of later environmental conditions with which they are likely correlated cannot be gauged unless their relationship to/interaction with later environmental conditions is also measured. This is not just a technical academic point. As we see with Heckman and colleagues' work above, it is a matter with real-life implications when we think about the chances and opportunities for change of those who endured disadvantage in childhood.

2.2.2 Path Dependency

The second framework, Path Dependency, relates to a broader family of theories that attempt to articulate how adult outcomes manifest from experiences, opportunities, and reactions to these that occur throughout the life course. Such an ambitious undertaking covers a relatively longer period of time and inevitably yields numerous hypotheses, ranging from mechanistic chains of risk (Kuh and Ben-Shlomo 2004) to more abstract concepts of cumulative dis/advantage processes (Dannefer 2003a; Crystal and Shea 2002). Some scholars have attempted to create comprehensive frameworks that blend these levels of analysis (Ferraro and Shippee 2009; Shanahan 2013; Slavich and Cole 2013).

Most notably across this family of theories, and for our purpose here, these Path Dependence frameworks are distinguished from the Latency framework based on their treatment, either explicitly or implicitly, of very early life (see Kuh and Ben-Shlomo 2004 for discussion). Indeed, some scholars who use these frameworks have referred to early-life conditions as "setting in motion" pathways or risks that play out over the life course (c.f., Haas 2008; Montez and Hayward 2011; Ferraro 2011). Such phrasing is often invoked to refer to more complex accumulative processes that likely operate to link a childhood

circumstance to an adult outcome but are not explicitly explored in a given study. If, as Shanahan (2013) states, such rigorous inquiry requires more extensive multilevel and longitudinal data than are presently available to capture fully the dynamics between individuals and their social worlds over the entire life course, then even the most high quality empirical studies must necessarily acknowledge their inability to engage in full hypothesis testing. Thus, "set in motion" may be used most often as a conceptual stand-in to convey the complexities of the dynamics over the life course that are as-yet unobserved.

There is no utility in complaining that sufficient data are not yet available to test fully the life course models of path-dependency and that is certainly not our intent here. However, phrases such as "set in motion," or "chains of risk" are conceptually problematic, because they generally do not include an attempt to specify the actual structural forces in adulthood that sustain the path. Thus, social structure is both assumed to be rigid and determinative of individual life chances, yet kept invisible, keeping social structure in a conceptual "black box."

The net result is that one must accept the premises that opportunity structures are not only stable and are part of the realities of the social order, but also are homogeneous and undifferentiated. Thus, that the exposure-outcome relationship will work relatively similarly for individuals with the same early-life circumstances. In reality, the opportunity structures of adulthood – even for those who begin with similar childhood backgrounds, are not homogeneous and undifferentiated. Key sociological work already challenges the idea that adverse childhood circumstances "set in motion" pathways of disadvantage and has emphasized the important roles of other social institutions such as family, education, and the military. Alexander et al. (2014), in their long-term study of disadvantaged youth in Baltimore, documented differences in adult education, employment, and family status and emphasized important differentiators in these outcomes. In sum, they found that interactions with key social institutions – at sensitive periods in the life course *after* childhood – were the

predictors of long-term outcomes. Likewise, Laub and Sampson (2003) found that early experiences with delinquency did not ubiquitously “set in motion” careers in crime. Rather, some young men’s transformative encounters with social institutions such as marriage or the military were better predictors of their long-term trajectories.

Relegating causality to opportunity structures in early life is, by default, to contain explanation for observed variation in outcomes to individual-level characteristics and action. Thus, individual characteristics, such as coping resources (Landes et al. 2014; Zimmer-Gembeck and Skinner 2011) or attempts to improve one’s relative status (Elman and O’Rand 2004) are elevated in explanatory power above adult social circumstances.

Some scholars have leveled this critique on the field of life course sociology, particularly regarding path-dependent formulations of the life course that include early-life structural causality followed by individual-level mediators in adulthood (Hoffman 2008; Link and Phelan 1995). In short, while the path-dependent approach recognizes that the opportunity structures of adulthood frame risk and opportunity as a gauntlet through which the individual must navigate, it is unwarranted to consider it an undifferentiated gauntlet that affects all individuals with similar early backgrounds in the same way. To do so is to miss the chance to observe the active social dynamics that occur over the entire life course, relegating explanation back to the individual level.

2.3 From G-E 1.0 to G-E 2.0: Gene-Environment Interactions, Social Control and the Social Regulation of Genetic Expression

2.3.1 G-E Interaction 1.0: Social Control of Gene-Based Characteristics

Interest in gene-environment interaction is expanding rapidly among life-course scholars, driven in no small part by its potential relevance to a variety of life course processes and outcomes and also by the incorporation of genomic data into

large-scale studies such as The Health and Retirement Study (HRS) and National Longitudinal Study of Adolescent Health (Add Health) in the USA and similar studies in other countries. Gene-environment interaction can be broadly defined as “situations in which genetic effects connected to a phenotype are dependent upon variability in the environment, or when genes modify an organism’s sensitivity to particular environmental features” (Seabrook and Avison 2010). Over the past decade, a number of intriguing sets of findings have been published to indicate that there are few if any situations in which such G-E dynamics are not operative in the life course.

We present the study of G-E interactions as a third example of the pervasive assumptions of the functional-developmental nexus that are driving life course inquiry. Of particular relevance here, we take up the concern that the individual genetic characteristics are treated as fixed, and as a result the role of “environment” in G-E interactions is limited to various modes “social regulation” or control of genetic predispositions, – for example, through legal or normative constraints, through which environment either suppresses or allows for behavior that “expresses” specific genetic tendencies. This approach has yielded an array of interesting results (E.g., Boardman et al. 2010; Guo et al. 2009; Shanahan 2003; Shanahan and Hofer 2005) and has enjoyed considerable popularity. Yet it represents another example of “containing the social”, because it restricts consideration of the effect of social forces to behavioral outcomes, and does not acknowledge how social factors also affect gene expression at the molecular level. As knowledge of epigenetic and related interactive processes through which environment affects gene expression at the molecular level, it is clear that the social environment could interact with genes over the entire life course. We explicate these points in more detail below.

In the logic of social regulation, a key premise of G-E interaction is that the manifestation of genetic predispositions, which are considered fixed and unchanging, will vary by the regulatory aspects of the environment. Specifically, the focus is on whether an environment inhibits, encourages or is essentially indifferent to behavior that

manifests or “expresses” a hypothesized or presumed genetic predisposition. The general argument is that gene-driven variability in activity patterns and behavior will be based on salient features of the environment in relation to fixed genetic predispositions. As Shanahan and Hofer (2005) earlier put it:

... [I]n settings marked by high levels of social control, [heritability] attenuates, whereas in contexts marked by low levels of social control, [heritability] increases. In other words, in circumstances marked by high levels of social control, a large percentage of the sample exhibits the same phenotype; in settings marked by low social control, people’s choices and behaviors are more apt to reflect their genotype. (p. 68)

It should be noted that Shanahan and Hofer offer a fourfold typology of G-E interactions (trigger, control, compensation enhancement) in which the term “control” is used to describe only one of four alternative types. However, all four types share the key feature of a fixed genetic tendency whose manifestation in behavior is regulated by environmental factors, and it is in this broader sense that we use the term “social control”. For example, Guo et al. (2009) tested the hypothesis that “the genetic contribution to adolescent drinking is subject to the influence of friends’ drinking behaviors” (2009: 221) and found that a “highly controlled” environment (i.e., low level of friends’ drinking behavior) contributes to the low level of “genetic contribution to alcohol use”. Presumably, a less controlled environment in which friends consume relatively high levels of alcohol would enhance that genetic propensity, for better or worse.

As research in this general area has progressed, numerous refinements and novel forms of G-E processes and effects have been proposed. For example, differential susceptibility theory (DST) proposes that certain genetic variants may be more sensitive than others to environmental conditions, whether positive or negative (Ellis et al. 2011). Such ideas are also being applied and extended by social scientists. As one example Mitchell et al. (2013) describe a similar approach which they term genetic differential sensitivity to social environment (GDSE). In

these and related approaches, individuals with different genotypes are hypothesized to react differently under different environmental conditions: an individual with sensitive genetic makeup is likely to have worse outcomes in an unfavorable environment, and better outcomes in a favorable environment, while the environment will have no effect on individuals with a less sensitive makeup. Such models may be thought of as an elaborated version of the “trigger” and/or “compensation” models described by Shanahan (2005). The models continue to assume a tension between environmental variation and a fixed characteristics of the genome, in this case, genetic sensitivity. This can be seen as an extension of Belsky, Steinberg and Draper’s (1991) earlier arguments postulating genetically fixed differences in reproductive strategies.

In such a case, gene-based characteristics remain viewed as fixed and unchanging, yet their relevance for behavior is predicted to vary under differing environmental conditions. Therefore, although one cannot understand or predict outcomes without considering genes and environment conjointly, genes themselves are understood as independent of environmental influence. Thus, despite their added refinement, DST, GDSE and related approaches, are, like the “social control” approach, consistent with the Central Dogma of molecular biology, which assumes that genes are fixed and “hard-wired” – in James Watson’s words, “... the central thing from which everything else flows.” (Rennie 2003: 69), and not subject to external influences upon their own internal processes of effects. While this familiar notion obviously remains influential, the assumptions on which it is based are facing a growing set of challenges.

2.3.2 From G-E 1.0 to G-E 2.0

While social science research on G-E interactions has grown in the past decade, the same time period has also seen a concomitant and dramatic expansion of discoveries in molecular genetics and related fields of demonstrating that genetic effects are actually not so independent of external influence as the Central Dogma assumed. Instead, gene expression at the molecular level is recognized as conditional on forces external to the cell,

including forces in the social environment. Thus, it is increasingly recognized that "... social experiences regulate genetic activity" at the level of intracellular chemistry (Shanahan 2013: 1; see also Cole 2009; Dannefer 2011; Gluckman and Hanson 2008). The growing recognition of the extent the chemistry of the cell itself is regulated by the environment has led to a suggestion that the study of G-E interactions has entered what some scholars have called a "postgenomic" (Plomin et al. 2002) or "neogenomic" (Charney 2012) era, and the emergence of several new sub-fields of research, including environmental epigenetics and social genomics. Environmental epigenetics has been defined as "the study of factors such as nutrition, pollution, and stress in relation to gene regulation" (Landecker and Panofsky 2013: 334). In addition to the physical environment that contains proximate determinants of gene regulation, more attention has been attached to social environment which organizes individuals' daily life and determining their exposure to gene-regulating conditions.

To borrow Silicon Valley language, these developments can be thought of as heralding a paradigm shift – "from G-E 1.0 to G-E 2.0" – from research that assumes a fixed and chemically impenetrable genome, to research that recognizes the broad ranging environmental impacts on gene expression. Thus, these new developments create a tension in social science between those who continue to treat the social environment as a functional, invisible "press" on individual genetic variation and those who seek to expand the role of the social environment into more dynamic, interactive and transformative types of causality. In this way, we can view GE 1.0 as is consistent with the functional-developmental nexus, while GE 2.0 refers to research and findings that invite an expand the scope of sociological explanation by demonstrating how social factors affect gene expression at the molecular level.

Social genomics is described as the study of processes by which "... the external social world gets not only "under the skin" but "onto the

genome" to shape complex behavioral phenotypes and susceptibility to disease" (2013: 2). Such discoveries encompass the study of domains including epigenetics (involving processes such as DNA methylation and histone modification), retrotransposition, transcription, and other mechanisms surrounding gene expression. Based on a recognition of the inadequacy of the assumptions of the Central Dogma, these approaches entail a new order of magnitude for sociological explanation in G-E interactions throughout the life course.

Recognition of the importance of exogenous effects on gene expression has been growing since the 1970s (Holliday 2006). The significance of this broadly ecological approach is grounded in the recognition that genetic effects can only be realized if genes are expressed, and gene expression is conditioned by external influences, ranging from the cellular environment to cultural symbols whose physical impact is mediated through consciousness or, as Shanahan notes, by "complex mediating chains involving many levels of analysis, possibly extending, for example, from political economies to people's reactions to their immediate circumstance to intracellular mechanisms (2013: 2).

During cell differentiation and even day-to-day cell reproduction, genes can be turned on and off in response to the transcription factors which can be directly and indirectly influenced by environmental signals (Holliday 2006; Slavich and Cole 2013). With the advance in molecular biology and the deepening understanding of the multiple levels of environment, it is recognized that genotypes and environment are mutually engaging in producing differentiated behaviors (Shanahan and Boardman 2009; Slavich and Cole 2013). In reality, the environment exerts more complicated influence on gene expression through an array of mechanisms. For instance, Slavich and Cole (2013) introduce social signal transduction as a mechanism that "external social conditions get converted into genome-regulating biochemistry" (p. 6) characterized by the central role of central neuron system. As Cole (2009) illustrates:

“Social-environmental processes regulate human gene expression by activating central nervous system processes that subsequently influence hormone and neurotransmitter activity in the periphery of body. Peripheral signaling molecules interact with cellular receptors to activate transcription factors, which bind to characteristic DNA motifs in gene promoters to initiate (or suppress) gene expression.” (Cole 2009: 133) Social signals can be transduced through epigenetic processes (e.g., DNA methylation and histone modification) which regulate gene expression.

Unlike the fixed sequence of DNA which is determined in germ cells, epigenetic and other processes regulating gene expression are dynamic, partially regulated by social life, and occur throughout the life course. At the beginning of the life course, such effects include fetal programming which occurs in response to a specific maternal environment as illustrated by the Barker hypothesis (Barker 1995; see also Gluckman and Hanson 2008) and then, possibly, by biological embeddedness which is postulated to occur in sensitive periods, mainly in childhood. Many such mechanisms also appear to operate throughout the adult life course, as individuals respond to environmental stimuli. Some such processes are characterized by reversibility, which holds the possibility for interventions to counteract the adverse early experiences (Holliday 2006).

While some have contended that epigenetics is a process through which “nurture shapes nature” (Powledge 2011), in many cases such effects may interact with specific features of the genome. Thus, it is more precise to recognize that such outcomes cannot be possibly understood without crossing or even dissolving such disciplinary lines: The continuous interaction of the social and the biochemical appears to be inherent in nature itself. In other words, the mechanisms through which social experience of individuals shape the performance of their organisms is an unavoidable feature of the phenomena being studied in the life sciences.

As these developments have occurred, biologists, geneticists and others working on such problems from a biological perspective have themselves articulated their own “life course perspective” (Adair 2007; Gluckman and Hanson 2008) and for an “ecological developmental

biology”. For instance, epidemiology has embraced this perspective to study the developmental process of health, and life course epidemiology has incorporated the dynamic social process that shape individuals health outcomes by studying both proximate and distal causes (Halfon and Hochstein 2002; Kuh et al. 2003).

Within sociology generally and specifically within the study of the life course, a number of scholars have called for more research attention to the interaction of social processes and gene expression (e.g., Dannefer 2011; Landecker and Panofsky 2013; Rose and Rose 2014; Shanahan 2013). Shanahan has traced out in detail the potential payoffs of such possibilities. As social genomics entails the possibility of multilevel modeling of social context beyond the proximate risk factors that may contribute to explanations based on critical and sensitive period effects, to consider also accumulation effects and more distal contextual factors.

Such developments notwithstanding, very little sociological research has yet confronted this possibility. Apart from the conceptualization and measurement difficult of genetic and environmental effects, researchers have raised cautions concerning unmeasured genetic variation. Gene-environment correlation (r_{GE}) can influence the validity of causal inference, because “...measured environments may be correlated with unmeasured genetic variation” (if, for example, the perceived stress level which is measured as an environmental factor is actually a manifestation of certain genetic makeup) (Fletcher and Conley 2013: e1). In other cases, gene-gene interaction has been proposed to account for a portion of the identified G-E interaction, in the form of “measured genotypes with unrecognized genetic variation in the environment moderator” (Manuck and McCaffery 2014: 62). Other researchers distance themselves from epigenetics and social genomics for other reasons, for example, because it is seen as difficult, or of limited importance (see Bliss 2012). In a study of cohort differences in smoking behavior, environmental effects have been dismissed as “noise” that obstructs researchers’ ability to see “true genetic effects” in their presumed purity (see, e.g., Boardman et al. 2010). However articulated, such responses have

in common a disinclination even to consider the importance of social causation of gene expression.

It is true that some researchers and others have made increasing reference to the need for further explorations of epigenetics and other processes relevant to social genomics (e.g. Dannefer 2011; Guo et al. 2008; Mitchell et al. 2013). However, among social scientists this possibility has yet to gain much traction in the design of research. Instead, researchers continue to rely on the assumption of a fixed effect from a genetic variant (e.g., Boardman et al. 2014; Guo et al. 2008). Ironically, interest in the genetic consequences of social forces seems, at least so far, to be of greater interest to biologists (Gilbert and Epel 2009; Gluckman and Hanson 2008) and psychologists (Slavich and Cole 2013) than it does to sociological researchers.

More specific to sociological approaches to theorizing the life course, research on social genomics is raising issues that prompt new problems and opportunities for life course theorizing. Interestingly, social genomics has been launched as a field by psychologists, and from the vantage point of basic ideas in sociological theory and the “received wisdom” of much social science, the implications of social genomics are anything but simple and straightforward.

For example, in a pioneering line of research, Cole and associates have demonstrated the impact of subjective awareness (e.g., of loneliness and stress) on gene expression that impacts immune system functioning (e.g., Cole et al. 2011; Slavich and Cole 2013). Yet surprisingly – at least from a social science perspective – they find that measurable social characteristics such as socioeconomic status, network size or marital status (Slavich and Cole 2013: 6–7) are not directly related to gene expression.

Such a set of findings raises a number of interesting sociological questions. First, how should we understand this lack of association, given the centrality of the socioeconomic gradient, marriage and other social circumstances in accounting for variation in health, including mental health? What is the relationship between isolation and such social characteristics (socioeconomic status, network size or marital status)? In part, this may be accounted for by the small and non-representative samples used in these

studies (see also Shanahan 2013: 5), or perhaps by definitional issues or by other factors in the relationship between social location and subjective factors such as the perception of loneliness. If, indeed, no empirical evidence exists of a relationship between, e.g., social class and subjective perceptions of loneliness or stress, while at the same time perceptions of stress are clearly related to gene expression in ways that are consequential for health, it would raise intriguing questions of how to reconcile such a finding with the socio-economic gradient.

Such a finding could pose an especially vexing challenge for those who work within theoretical traditions that emphasize the role of ideology and false consciousness in accounting for health differentials (through, e.g., unhealthy consumer practices in nutrition, smoking, etc.) For if “don’t worry, be happy” can be shown to have a salutary health effect independent of one’s objective social location and circumstances, then “false consciousness” may be argued to be more “adaptive”, at least in some circumstances than an “objective” appraisal of one’s circumstances. Such a finding could return us to the questions of the conditions under which a long-term habituation to what objectively appear to be lower expectations may foster mental health better than do high aspirations (see., e.g., Campbell et al. 1976; Phillips 1978).

It must be acknowledged that the challenges of studying the social regulation of gene expression at the molecular level is unquestionably a daunting enterprise. Moreover, its complexity is amplified when considered in life course perspective. Yet if a fundamental objective of science is, in Herbert Blumer’s terms, to be true to its subject matter, it is the complex reality that must be pursued. In this particular case, it has to be noted that these findings point not only to a more intricate set of G-E interactions, but also to the potential of a considerably enhanced explanatory role for sociology. Despite what some have seen as a slow start (Bliss 2012), this appears to be an area where an expanded interest in the explanatory role of social forces is growing. It is perhaps ironic that this has been driven most energetically by discoveries in biology (e.g., Gluckman and Hanson 2008) and psychology (Cole 2009; Slavich and Cole 2013).

3 Conclusion

The fresh opportunities for specifying sociological explanation in the study of life course phenomena extend across wide domains of inquiry – from the biosocial (with the continued expanse of new discoveries of the importance of social causation in G-E interactions) to political economy (with its dramatic implications for the shaping of agentic intentions and the possibilities of agentic action).

The prospects for engaging the sociological imagination to pursue fully such opportunities will be enhanced by adopting a paradigmatic willingness to interrogate more fully the reach of social forces into individual consciousness and individual biology, as well as the impact of forces operating at the level of political economy. Such an energetic interrogation will require an awareness and willingness to reject long-standing paradigmatic assumptions and theoretical commitments within the sociology of the life course and related fields (including human development, the sociology of age and social gerontology) which have systematically tended to inhibit or “contain” the possibilities of sociological explanation. As we have demonstrated, assumptions inherent to sociological functionalism and developmental theory define reality in ways that tend to restrict the depth with which either domain can be explored. By examining recent developments in three domains – (1) agency and social action, (2) early childhood effects on adult outcomes and (3) gene-environment interaction – we have sought to demonstrate why a more paradigmatically flexible and open approach to the empirical world of the life course is required.

The impact of social forces upon individuals are now recognized as extending from the organization of perception and individual consciousness that shapes agentic intentions to the regulation of gene expression in early life and throughout the life course. This means that the social gets not only “into one’s head” and “under the skin” but “onto the genome”, as Slavich and Cole have put it. These are matters that are not easily apprehended by traditional theories of individual development, change and aging.

Similarly, we are operating in a world in which the overall political economy reinforces tendencies toward social exclusion that impacts life-course trajectories and the age-graded institutions (e.g., schools, careers, nursing homes) within which they constituted. In this way, institutions are operating in ways that are often not congruent with the needs of the individuals who occupy or seek to occupy them. These are matters that are not easily grasped within framework that assumes the legitimacy of the social order and the congruence of interests of individuals and of social institutions. It requires an intellectual approach that can apprehend the life course in the context of a more critical and thoroughgoing interrogation of how such institutions function operate. Thus, both individual development and social systems and institutions must be understood as constituted through that human activity that daily reproduces the social world.

It is hopeful to consider that the parallel but seemingly unrelated events of (a) the contemporary global economic strains, reflected in growing inequality and social exclusion, and (b) new discoveries in the domain of G-E interactions, may jointly encourage, cajole and ultimately compel life course theorizing to embrace an orientation that is truer to the goal of advancing a full understanding of our subject matter, and of simultaneously advancing the sociological imagination.

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References

- Adair, L. (2007). Developing a different perspective on disease. Review of developmental origins of health and disease. In P. Gluckman & M. Hanson (Eds.), *Developmental origins of health and disease* (pp. 600–601). Cambridge: Cambridge University Press.
- Alexander, K., Entwisle, D., & Olson, L. (2014). *The long shadow: Family background, disadvantaged urban youth, and the transition to adulthood*. New York: Russell Sage Foundation.
- Aronowitz, S. (2003). A mills revival? *Logos*, 2(3), 67–93.

- Aronowitz, S. (2012). *Taking it big: C. Wright Mills and the making of political intellectuals*. New York: Columbia.
- Baars, J. (1991). The challenge of critical gerontology: The problem of social constitution. *Journal of Aging Studies*, 5(3), 219–243. doi:10.1016/0890-4065(91)90008-G.
- Baltes, P. B., & Nesselrode, J. R. (1984). Paradigm lost and paradigm regained: Critique of Dannefer's portrayal of life-span developmental psychology. *American Sociological Review*, 49(6), 841–847. doi:10.2307/2095533.
- Baltes, P. B., Mayer, K. U., Helmchen, H., & Steinhagen-Thiessen, E. (1994). Reply to and reflections on commentaries. *Ageing and Society*, 14, 589–604.
- Barker, D. J. P. (1995). Fetal origins of coronary heart disease. *BMJ*, 311(6998), 171–174.
- Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization. *Child Development*, 62(4), 647–670. doi:10.2307/1131166.
- Bengtson, V., Giarrusso, R., Mabry, J. B., & Silverstein, M. (2002). Solidarity, conflict, and ambivalence: Complementary or competing perspectives on intergenerational relationships? *Journal of Marriage and Family*, 64(3), 568–576. doi:10.1111/j.1741-3737.2002.00568.x.
- Berger, P. L., & Luckmann, T. (1967). *The social construction of reality: A treatise in the sociology of knowledge*. Garden City: Anchor Books.
- Bierman, A. (2005). The effects of childhood maltreatment on adult religiosity and spirituality: Rejecting God the father because of abusive fathers? *Journal for the Scientific Study of Religion*, 44, 349–359.
- Bliss, C. (2012). *Race decoded: The genomic fight for social justice*. Stanford: Stanford University Press.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs: Prentice-Hall.
- Boardman, J. D., Blalock, C. L., & Pampel, F. C. (2010). Trends in the genetic influences on smoking. *Journal of Health and Social Behavior*, 51(1), 108–123.
- Boardman, J. D., Menard, S., Roettger, M. E., Knight, K. E., Boutwell, B. B., & Smolen, A. (2014). Genes in the dopaminergic system and delinquent behaviors across the life course: The role of social controls and risks. *Criminal Justice and Behavior*. doi:10.1177/0093854813514227.
- Bourdieu, P. (1977). *Outline of a theory of practice*. Melbourne: Cambridge University Press.
- Bureau of Labor Statistics. (2014). <http://data.bls.gov/timeseries/LNS14000000>. Retrieved 22 Dec 2014.
- Cain, L. (1964). Life course and social structure. In R. E. L. Faris (Ed.), *Handbook of modern sociology* (pp. 272–309). Chicago: Rand McNally.
- Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). *The quality of American life: Perceptions, evaluations, and satisfactions*. Russell Sage Foundation.
- Charney, E. (2012). Behavior genetics and postgenomics. *Behavioral and Brain Sciences*, 35(5), 331–358.
- Chudacoff, H. P. (1989). *How old are you? Age consciousness in American culture* (Vol. x). Princeton: Princeton University Press.
- Clausen, J. A. (1972). The life course of individuals. In M. W. Riley, M. E. Johnson, & A. Foner (Eds.), *Ageing and society: Vol. III. A sociology of age stratification* (pp. 454–574). New York: Russell Sage Foundation.
- Cole, S. W. (2009). Social regulation of human gene expression. *Current Directions in Psychological Science*, 18(3), 132–137.
- Cole, S. W., Arevalo, J. M., Takahashi, R., Sloan, E. K., Lutgendorf, S. L., Sood, A. K., Sheridan, J. F., & Seeman, T. E. (2010). Computational identification of gene-social environment interaction at the human IL6 locus. *Proceedings of the National Academy of Sciences of the USA*, 107, 5681–5686.
- Cole, S. W., Hawkey, L. C., Arevalo, J. M., & Cacioppo, J. T. (2011). Transcript origin analysis identifies antigen presenting cells as primary targets of socially regulated gene expression in leukocytes. *Proceedings of the National Academy of Sciences of the USA*, 108, 3080–3085, epub ahead of print.
- Connidis, I. A., & McMullin, J. (2002a). Ambivalence, family ties, and doing sociology. *Journal of Marriage and Family*, 64, 594–601.
- Connidis, I. A., & McMullin, J. (2002b). Sociological ambivalence and family ties: A critical perspective. *Journal of Marriage and Family*, 64, 558–567.
- Crockett, L. J. (2002). *Agency in the life course: Concepts and processes*. <http://digitalcommons.unl.edu/psychfacpub/361>
- Crystal, S., & Shea, D. (1990). Cumulative advantage, cumulative disadvantage, and inequality among elderly people. *The Gerontologist*, 30(4), 437–443.
- Crystal, S., & Shea, D. G. (2002). Introduction: Cumulative advantage, public policy, and inequality in later life. *Annual Review of Gerontology and Geriatrics*, 22, 1–13.
- Csizmadia, A., Brunsmas, D. L., & Cooney, T. M. (2012). Racial identification and developmental outcomes among black-white multiracial youth: A review from a life course perspective. *Advances in Life Course Research*, 17(1), 34–44.
- Cunha, F., & Heckman, J. J. (2007). The technology of skill formation. *American Economic Review*, 97(2), 31–47.
- Cunha, F., Heckman, J., & Schennach, S. (2010). Estimating the technology of cognitive and noncognitive skill formation. *Econometrica*, 78, 883–931.
- Currie, J., & Thomas, D. (1995). Does head start make a difference? *American Economic Review*, 85(3), 341–364.
- Dannefer, D. (1984a). Adult development and social theory: A paradigmatic reappraisal. *American Sociological Review*, 49, 100–116.
- Dannefer, D. (1984b). The role of the social in life-span developmental psychology, past and future: Rejoinder to Baltes and Nesselrode. *American Sociological Review*, 49, 847–850.
- Dannefer, D. (1987). Aging as intracohort differentiation: Accentuation, the Matthew effect, and the life course. *Sociological Forum*, 2(2), 211–236.
- Dannefer, D. (1994). Commentary (invited): Special issue on the Berlin Aging Study (BASE). *Ageing & Society*, 14,

- Dannefer, D. (1999a). Freedom isn't free: Power, alienation, and the consequences of action. In J. Brandstader & R. Lerner (Eds.), *Action & development: Origins and functions of intentional self development*. New York: Springer.
- Dannefer, D. (1999b). Neoteny, naturalization and other constituents of human development. In C. Ryff & B. Marshall (Eds.), *Self and society of aging processes* (pp. 67–93). New York: Springer.
- Dannefer, D. (2000a). Paradox of opportunity education, work, and age integration in the United States and Germany. *The Gerontologist*, 40(3), 282–286. doi:10.1093/geront/40.3.282.
- Dannefer, D. (2000b). Bringing risk back in: The regulation of the self in the postmodern state. In K. W. Schaie & J. Hendricks (Eds.), *The evolution of the aging self: The social impact on the aging process* (pp. 269–280). New York: Springer.
- Dannefer, D. (2003a). Cumulative advantage/sisadvantage and the life course: Cross-fertilizing age and social science theory. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 58(6), S327–S337. doi:10.1093/geronb/58.6.S327.
- Dannefer, D. (2003b). Toward a global geography of the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 647–659). New York: Springer.
- Dannefer, D. (2011). The life course, aging, and the sociological imagination: New prospects for theory. In R. Binstock & L. George (Eds.), *Handbook of aging and social sciences* (pp. 3–16). New York: Academic.
- Dannefer, D. (2012). Enriching the tapestry: Expanding the scope of life course concepts. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 67, 221–225. gbr148.
- Dannefer, D. (2013). Age and sociological explanation: Expanding horizons in the study of aging and the life course. *Contemporary Sociology: A Journal of Reviews*, 42(6), 793–800.
- Dannefer, D., & Kelley-Moore, J. (2008). New twists in the paths of the life course. In V. L. Bengtson (Ed.), *Handbook of aging theory* (2nd ed., pp. 389–409). New York: Springer.
- Dannefer, D., & Kelley-Moore, J. A. (2009). Theorizing the life course: New twists in the paths. In *Handbook of theories of aging* (pp. 389–412). New York: Springer.
- Dannefer, D., & Perlmutter, M. (1990). Development as a multidimensional process: Individual and social constituents. *Human Development*, 33(2–3), 108–137.
- Davidson, A. (2014, June 20). It's official: The Boomerang kids won't leave. *The New York Times*. http://www.nytimes.com/2014/06/22/magazine/its-official-the-boomerang-kids-wont-leave.html?_r=0
- Doblhammer, G. (2004). *The late life legacy of very early life*. Berlin: Springer.
- Duina, F. (2014). *Life transitions in America*. Malden: Policy.
- Elder, G. H., Jr. (1974). *Children of the great depression*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1998). The life course and human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (Vol. 1, pp. 939–991). New York: Wiley.
- Elder, G. H., & Johnson, M. K. (2003). The life course and aging: Challenges, lessons, and new directions. In *Invitation to the life course: Toward new understandings of later life* (pp. 49–81). Amityville, N.T: Baywook Pub. Co.
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: An evolutionary-neurodevelopmental theory. *Development and Psychopathology*, 23(1), 7–28. doi:10.1017/S0954579410000611.
- Elman, C., & O'Rand, A. M. (2004). The race is to the swift: Socioeconomic origins, adult education, and wage attainment. *American Journal of Sociology*, 110(1), 123–160.
- Featherman, D. L., & Lerner, R. M. (1985). Ontogenesis and sociogenesis: Problematics for theory and research about development and socialization across the lifespan. *American Sociological Review*, 10, 659–676.
- Ferraro, K. F. (2011). Health and aging: Early origins, persistent inequalities? In R. A. Settersten & J. L. Angel (Eds.), *Handbook of sociology of aging* (pp. 465–475). New York: Springer.
- Ferraro, K. F., & Kelley-Moore, J. A. (2003). Cumulative disadvantage and health: Long-term consequences of obesity? *American Sociological Review*, 68, 707–729.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49, 333–343.
- Fingerman, K. L., & Hay, E. (2004). Intergenerational ambivalence in the context of the larger social network. In K. Pillemer & K. Luescher (Eds.), *Intergenerational ambivalences: New perspectives on parent-child relations in later life* (pp. 133–152). Oxford: Elsevier Science.
- Fletcher, J. M., & Conley, D. (2013). The challenge of causal inference in gene-environment interaction research: Leveraging research designs from the social sciences. *American Journal of Public Health*, 103(Suppl 1), S42–S45. doi:10.2105/AJPH.2013.301290.
- Geronimus, A. T., Hicken, M., Keene, D., & Bound, J. (2006). 'Weathering' and age patterns of allostatic load scores among blacks and whites in the United States. *American Journal of Public Health*, 96(5), 826–833.
- Giddens, A. (1977). *New rules of sociological method*. London: Constitution of Society.
- Gilbert, S. F., & Epel, D. (2009). *Ecological developmental biology: Integrating epigenetics, medicine and evolution*. Sunderland: Sinauer Associates.
- Gillespie, B. J., & van der Lippe, T. (2014). Intergenerational cohesiveness and later geographic distance to parents in the Netherlands. *Advances in Life Course Research*. doi:10.1016/j.alcr.2014.07.001.
- Gluckman, P., & Hanson, M. (2008). *Mismatch: The lifestyle diseases timebomb*. Oxford: New York.
- Guo, G., Tong, Y., & Cai, T. (2008). Gene by social-context interactions for number of sexual partners among white male youths: Genetics-informed sociology. *American Journal of Sociology*, 114(Sppl), S36–S66.

- Guo, G., Elder, G. H., Cai, T., & Hamilton, N. (2009). Gene-environment interactions: Peers' alcohol use moderates genetic contribution to adolescent drinking behavior. *Social Science Research*, 38(1), 213-224. doi:10.1016/j.ssresearch.2008.04.002.
- Haas, S. (2008). Trajectories of functional health: The 'long arm' of childhood health and socioeconomic factors. *Social Science and Medicine*, 66, 849-861.
- Hagestad, G. O., & Dannefer, D. (2001). Concepts and theories of aging: Beyond microfication in social science approaches. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (5th ed., pp. 3-21). New York: Academic.
- Halfon, N., & Hochstein, M. (2002). Life course health development: An integrated framework for developing health, policy, and research. *The Milbank Quarterly*, 80(3), 433-479. doi:10.1111/1468-0009.00019.
- Heckman, J. J. (2013). Lifelines for poor children. *New York Times* Opinionator. September 14. http://opinionator.blogs.nytimes.com/2013/09/14/lifelines-for-poor-children/?_r=0
- Hertzman, C., Power, C., Matthews, S., & Manor, O. (2001). Using an interactive framework of society and lifecourse to explain self-rated health in early adulthood. *Social Science and Medicine*, 53, 1575-1585.
- Hoffmann, R. (2008). *Socioeconomic differences in old age mortality*. Dordrecht: Springer.
- Holliday, R. (2006). Epigenetics: A historical overview. *Epigenetics*, 1(2), 76-80. doi:10.4161/epi.1.2.2762.
- Holstein, J. A., & Gubrium, J. F. (2000). *Constructing the life course*. Dix Hills: General Hall.
- Holstein, J. A., & Gubrium, J. F. (2000). *The self we live by: Narrative identity in a postmodern world*. New York: Oxford University Press.
- Katz, S. (1996). *Disciplining old age: The formation of gerontological knowledge*. Charlottesville: University of Virginia Press.
- Keister, L. A. (2004). Race, family structure, and wealth: The effect of childhood family on adult asset ownership. *Sociological Perspectives*, 47, 161-187.
- Kohli, M. (2007). The institutionalization of the life course: Looking back to look ahead. *Research in Human Development*, 4(3-4), 253-271. doi:10.1080/15427600701663122.
- Kohli, M., & Meyer, J. W. (1986). Social structure and social construction of life stages. *Human Development*, 29, 145-161.
- Kuh, D., & Ben-Shlomo, Y. (Eds.). (2004). *A life course approach to chronic disease epidemiology* (Vol. 2). Oxford: Oxford University Press.
- Kuh, D., Ben-Shlomo, Y., Lynch, J., Hallqvist, J., & Power, C. (2003). Life course epidemiology. *Journal of Epidemiology and Community Health*, 57(10), 778-783. doi:10.1136/jech.57.10.778.
- Landecker, H., & Panofsky, A. (2013). From social structure to gene regulation, and back: A critical introduction to environmental epigenetics for sociology. *Annual Review of Sociology*, 39, 333-357.
- Landes, S. D., Ardel, M., Vaillant, G. E., & Waldinger, R. J. (2014). Childhood adversity, mid-life generativity, and later life well-being. *Journal of Gerontology: Psychological Sciences*, 69, 942-952.
- Lane, H. (1976). *The wild boy of Aveyron*. Cambridge, MA: Harvard University Press.
- Laub, J. H., & Sampson, R. J. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge, MA: Harvard University Press.
- Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, Spec No, 80-94.
- Manuck, S. B., & McCaffery, J. M. (2014). Gene-environment interaction. *Annual Review of Psychology*, 65, 41-70. doi:10.1146/annurev-psych-010213-115100.
- Marshall, V. W. (2005). Agency, events, and structure at the end of the life course. *Advances in Life Course Research*, 10, 57-91. doi:10.1016/S1040-2608(05)10002-1.
- Marshall, V. W., & Clarke, P. J. (2010). Agency and social structure in aging and life-course research. In D. Dannefer & C. Phillipson (Eds.), *The SAGE handbook of social gerontology*. London: SAGE.
- Mitchell, C., McLanahan, S., Brooks-Gunn, J., Garfinkel, I., Hobcraft, J., & Notterman, D. (2013). Genetic differential sensitivity to social environments: Implications for research. *American Journal of Public Health*, 103(Suppl 1), S102-S110. doi:10.2105/AJPH.2013.301382.
- Montagu, A. (1989). *Growing young*. Greenwood Publishing Group.
- Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology*, 13(2), 355-375.
- Montez, J. K., & Hayward, M. D. (2011). Early life conditions and later life mortality. In R. G. Rogers & E. M. Crimmins (Eds.), *International handbook of adult mortality* (International handbooks of population, Vol. 2, pp. 187-206). New York: Springer.
- Morss, J. (1995). *Growing critical: Alternatives to developmental psychology*. NY: Routledge.
- Newman, K. (2006). *A different shade of grey: Midlife and beyond in the inner city*. New York: New Press.
- O'Rand, A. M. (2002). Cumulative advantage theory in life course research. *Annual Review of Gerontology and Geriatrics*, 22, 14-30.
- Perry, B., & Svalavitz, M. (2006). *The boy who was raised as a dog: And other stories from a child psychiatrist's notebook: What traumatized children can teach us about loss, love and healing*. New York: Basic.
- Phillips, D. L. (1978). What's one to believe? *Contemporary Sociology*, 7, 392-395. doi:10.2307/2064314.
- Plomin, R. E., DeFries, J. C., Craig, I. C., & McGuffin, P. E. (2002). *Behavioral genetics in the postgenomic era*. Washington, DC: American Psychological Association.
- Powlledge, T. M. (2011). Behavioral epigenetics: How nurture shapes nature. *BioScience*, 61(8), 588-592.
- Priestley, M. (2001). *Disability and the life course: Global perspectives*. Cambridge: Cambridge University Press.
- Reich, R. B. (2000). *The Future of Success*. New York: Alfred A. Knopf.

- Rennie, J. (2003). Celebrating the genetic jubilee: A conversation with James D. Watson. *Scientific American*, 288(4), 66–69.
- Riley, M. W., Johnson, M., & Foner, A. (Eds.). (1972). *Aging and society, volume 3: A sociology of age stratification*. New York: Russell Sage Foundation.
- Riley, M. W., Kahn, R. L., & Foner, A. (1994). *Age and structural lag: Society's failure to provide meaningful opportunities in work, family, and leisure*. New York: Wiley.
- Rose, H., & Rose, S. (2014). *Genes, cells, and brains: The promethean promises of the new biology* (Reprint edition.). London/New York: Verso.
- Rosenbaum, J. (1978). The structure of opportunity in schools. *Social Forces*, 57, 236–256.
- Schafer, M. H., Ferraro, K. F., & Mustillo, S. A. (2011). Children of misfortune: Early adversity and cumulative inequality in perceived life trajectories. *American Journal of Sociology*, 116, 1053–1091.
- Schaie, K. W. (1965). A general model for the study of developmental problems. *Psychological Bulletin*, 64, 92–107.
- Schaie, K. W., & Hendricks, J. (Eds.). (2000). *Evolution of the aging self: Societal impacts*. New York: Springer.
- Seabrook, J. A., & Avison, W. R. (2010). Genotype–environment interaction and sociology: Contributions and complexities. *Social Science & Medicine*, 70(9), 1277–1284.
- Settersten, R. A., Jr. (1999). *Lives in time and place: The problems and promises of developmental science*. Amityville: Baywood Publishing Company.
- Settersten, R., & Ray, B. E. (2010). *Not quite adults: Why 20-somethings are choosing a slower path to adulthood, and why it's good for everyone*. New York: Bantam.
- Sewell, W. H., Jr. (1992). A theory of structure: Duality, agency, and transformation. *American Journal of Sociology*, 98, 1–29.
- Shanahan, M. (2013). Social genomics and the life course. In L. J. Waite & T. J. Plewes (Eds.), *New directions in the sociology of aging*. Washington, DC: National Academies Press.
- Shanahan, M. J., & Boardman, J. D. (2009). Genetics and behavior in the life course: A promising frontier. In *The craft of life course research* (pp. 215–235).
- Shanahan, M. J., & Hofer, S. M. (2005). Social context in gene–environment interactions: Retrospect and prospect. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 60(Special Issue 1), 65–76. Cambridge University Press
- Shanahan, M. J., Hofer, S. M., & Shanahan, L. (2003). Biological models of behavior and the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 597–622). New York: Springer.
- Shaputis, K. (2011). *The crowded nest syndrome*. Olympia: Clutter Fairy Publishing.
- Shierholz, H., Davis, A., & Kimball, W. (2014). *The class of 2014: The weak economy is idling too many young graduates*. Washington, DC: Economic Policy Institute.
- Skogen, J. C., & Øverland, S. (2012). The fetal origins of adult disease: A narrative review of the epidemiological literature. *JRSM Short Reports*, 3(8), 59.
- Slavich, G. M., & Cole, S. W. (2013). The emerging field of human social genomics. *Clinical Psychological Science: A Journal of the Association for Psychological Science*, 1(3), 331–348.
- Smith, R. C. (2005). *Mexican New York: The transnational lives of Mexican immigrants*. Berkeley: University of California Press.
- Standing, G. (2011). *The precariat: The new dangerous class*. London: Bloomsbury Publishing.
- Thoits, P. A. (2006). Personal agency in the stress process. *Journal of Health and Social Behavior*, 47(4), 309–323.
- Wexler, P. (1977). Comment on Ralph Turner's "The Real Self: from Institution to Impulse". *American Journal of Sociology*, 83(1), 178–186.
- Zimmer-Gembeck, M. J., & Skinner, E. A. (2011). The development of coping across childhood and adolescence: An integrative review and critique of research. *International Journal of Behavioral Development*, 35, 1–17.

The Changing Social Construction of Age and the Life Course: Precarious Identity and Enactment of “Early” and “Encore” Stages of Adulthood

Jeylan T. Mortimer and Phyllis Moen

Though existing age periods and life stages seem natural, they are socially constructed, that is, shaped and defined by cultural beliefs, structural arrangements, policies and practices that have been institutionalized in particular societies at particular times and places (Buchmann 1989). This social organization of the life course defines the pool of possibilities and constraints that individuals experience as they move through their lives. Massive cultural and social changes (such as the industrial revolution) raise new challenges, often resulting in a reworking of the character of the life course. In this chapter we argue that the confluence of today’s massive and rapid economic, technological, demographic and social transformations is reconstructing the twenty-first century life course, including individuals’ (and families’) strategies and the quality of their experiences as they move through time.

Nonetheless, scholars as well as social observers tend to take existing categories as “given.” For example, segmentation in the fields of sociology and developmental psychology encourages them to focus exclusively on widely recognized, long established age-graded life stages. Thus, in the American Sociological Association, the Section on Children and Youth examines childhood and

the transition to adulthood; the Section on Aging and the Life Course seeks unifying principles applicable to all stages of life while, historically, many members of this section have focused on the latter phases of adulthood. But there is recognition that a wider purview can be useful. Both sections changed their names in the late 1990s in attempts to signal a more expansive scope. The Section on Aging became the Section on Aging and the Life Course in 1997. The Section on Childhood became the Section on Children and Youth in 1998. Almost two decades later, these two sections are again re-assessing boundaries and considering whether insights from studies of children and youth might inform studies of mid-life adults and the elderly, and vice versa. Scholars affiliated with each section are also considering whether the recognition of new stages might be useful, as education and economic realities delay the transition to adulthood (for some), and both extended healthy life expectancy and the aging of the large Boomer cohort (born from 1946 to 1964) suggest a stage beyond conventional adulthood but before conventional old age. (Such reassessment inspired a session, co-sponsored by the two sections, at the Annual Meeting of the American Sociological Association in 2012.)

Our goal in this chapter is to underscore the socially constructed character of age and life stages. That is, the manner in which we conceptually organize and demarcate the life course is not based on universal biological progressions.

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Rather, these age-graded stages emanate from past historical conditions as modified by changing institutional, demographic, and cultural realities, altering the ways individuals perceive and experience their own life biographies. As a result, socially recognized life stages differ across historical periods, as well as across cohorts. It is important to note, however, that in times of transformation, those with material, social, and psychological resources are usually the ones first exposed and best positioned to take advantage of newly defined life course categories, accentuating within cohort inequalities based on the accumulation of advantage and disadvantage in distinct subgroups of the population.

We wish to raise several interrelated questions (not all of which we can address in this chapter) in hopes of stimulating further discussion about the changing nature of the life course in the early twenty-first century:

- To what extent do new age-related life course phases reflect changes in statuses, positions, and roles, as well as the quality of experiences, in terms of commitments, identities, and self-definitions, as traditional transition markers (and their timing) become blurred?
- How do we define and study a life course in flux? Does the conceptualization and sometimes reification of existing age categories contribute to research and theory development about the life course, or do they hamper the recognition of its fluid and socially constructed nature?
- What criteria can or should be used to delineate or assess the utility of new life stages in the face of demographic, economic, and political transformations?
- What are the implications of new life stages – or the in-between-ness that they convey – for scientific study? For example, investigators might examine the extent to which periods of the life course are affected by the continuity or discontinuity built into existing (and often outdated) educational, organizational, and governmental policies and practices.
- How are large-scale social forces – demography, technology, a global information econ-

omy, and declines in social protections – changing expectations and options associated with age and the life course? And how do the changing features of age influence inequalities across social groups?

These are big questions that implicate large bodies of literature, including investigations of social disparities across class, gender, race and ethnicity, as well as across age divides.

The chapter is organized as follows. We first point to trends in the social construction of age, noting increasing differentiation historically, extending across the life span. Second, we suggest that such differentiation has been accentuated by the pace of social change, disruptive to existing, seemingly “natural” norms and expectations about age and life stage. The unraveling of age-graded expectations and protections invariably generates ambiguities and uncertainties in age-linked identities and behavior as old norms no longer apply and new ones have yet to evolve. Third, we discuss the development of two new life stages – early adulthood and encore adulthood – in part a consequence of the mismatch between outdated, institutionalized age-graded structures and key economic and demographic changes, as well as modifications in the goals, values and preferences of people in these two age groups. Shifting (often lagging) structural contexts together with shifting individual orientations produce striking cross-cohort variation in the experiences of individuals of the same ages in different time periods. Finally, we point to increasing diversity within age categories and cohorts, accompanied by cumulative inequalities across phases of life.

1 Increasing Differentiation in the Social Construction of Age

The social construction of age (Buchmann 1989; Elder 1975a; Mayer 2004, 2009; Settersten 2003; Settersten and Mayer 1997) is a dynamic, continuously evolving process in contemporary societies, characterized by increasing age

differentiation as new age categories come to be socially recognized. The social construction and recognition of each newly identified age group parallel major macro-structural changes in social institutions (e.g., in education, work, health care, public policy, science/technology, etc.), which prompt the development of a new social organization of age-graded roles, expectations and activities encompassing newly defined segments of the population. These changes prompt shifts in the culture, affecting myriad ideas surrounding what roles persons of different ages should take on, what attributes of character they should embody, and what activities they should engage in. Changing norms and values surrounding age mark the chronological ages that are considered “right” and “on-time” for particular roles and activities (e.g., marriage, retirement); they specify “age deadlines” before which transitions should occur (e.g., parenthood); and they enable identification of individuals who are clearly “on” or “off time” (Neugarten and Hagestad 1976; Hagestad and Neugarten 1985; Neugarten et al. 1965; for a review, see Settersten 2003). When newly constructed age categories emerge and are increasingly recognized, they become the template for and/or reflect social policies that, in turn, serve to “institutionalize” the revised age-graded life course (Kohli 2007; Kohli et al. 1991; Mayer 1986, 2004, 2009; Moen and Spencer 2006; Mortimer and Shanahan 2003; O’Rand and Henretta 1999).

In his classic albeit controversial study, *Centuries of Childhood*, Aries (1962) contended that only two distinct age categories were socially recognized through the middle ages: infants and adults. As soon as infants were able, they began to assume adult-like functions, taking on various work tasks in imitation of their elders. Though differences in physiological capacity, skill, and maturity were surely noticed, according to Aries the age category of “child” only began to be identified as a separate stage of life with the advent of schooling in the seventeenth century, affecting upper-class groups initially, and boys earlier than girls.

Historically in the United States, people of all ages were expected to work in agriculture, small

shops, and later in the emerging industrial economy. However, Osterman (1979) documented how technological changes at the end of the nineteenth century lessened the demand for unskilled youth in the textile, glass, and other manufacturing industries, and in retail trade, even as large numbers of immigrants increased the unskilled labor supply. With the introduction of mass production technology, both skilled craftsmen and their unskilled child helpers were no longer needed. As a result of these trends, together with the contracting agricultural sector, children were driven out of paid employment, and employers lessened their opposition to laws that restricted child labor and extended compulsory schooling. The social construction of the child’s role was thus fundamentally altered – from productive worker to student. Instead of assets to the family economy as farm hands and earners, children became “priceless” (Zelizer 1985), valued in their own right. As education expanded historically, the central task of the child’s life was increasingly seen as attending school (Mortimer 2003).

In succeeding years, the age differentiation of children has continued. Whereas traditionally young children were not formally differentiated until they entered school, advances in developmental child psychology, as well as the proliferation of day care centers and other preschool facilities, have fostered the recognition of multiple early stages. Childhood is now separated into “early,” “middle,” and “late” stages. Multiplication of age categories has affected even the very youngest children. These are not unnoticed by children themselves. Jeylan’s granddaughter Eileen, on turning 3, announced proudly that she used to be a “toddler” (assigned to the toddler room in her day care center) but now she was a “preschooler.” She went on to inform her grandmother that “babies” come before “toddlers” (a budding life course scholar!)

By the turn of the twentieth century, when schools had become more age-graded and increasing numbers of students were attending secondary schools, G. Stanley Hall (1904) heralded the emergence of a “new” phase of life, in between childhood and adulthood, that of

adolescence. One hundred years later, with the expansion of higher education and extension of the time needed to acquire adult role markers (e.g., leaving home, becoming financially independent, completing education, obtaining full-time work, marrying, and parenting), scholars have introduced still another transitional phase that is increasingly recognized by the lay public. Sociologists refer to this new phase as “the transition to adulthood,” “early adulthood,” or “youth,” while some psychologists have adopted the term “emerging adulthood.”

Like the age categories of “childhood” and “adolescence” that were recognized long ago, many features of the lengthening transition to adulthood are more characteristic of advantaged than working-class youth. “Emerging adulthood” (Arnett 2000), as a time of exploration, growth, opportunity, freedom from firm commitments, and extension of the valuable “adolescent moratorium,” characterizes the experience of many middle and upper class young people. For them, it is a time of exploration through higher education, internships (often unpaid), tentative intimate relationships that prepare youth for more lasting adult commitments, financial dependence on parents, and extended co-residence with the family of origin (Arnett 2000).

However, working class and poor youth’s extension of the “post-adolescent” period may not be characterized by any of these experiences (Furstenberg 2008), though they may remain in or return to the parental home for financial reasons. Contemporary young people at lower socioeconomic levels often experience a more rapid transition from school to work and acquire adult responsibilities that come with early family formation. For the least educated, a dearth of work opportunities may drive them out of the labor force entirely. The most disadvantaged young people are the most at risk; some are attracted to the risky “fast life” and criminal careers. Incarceration has become a highly prevalent experience in the transition to adulthood among minority, especially African-American, male youth (Wakefield and Apel this volume). Thus, early adulthood has become, for many young people, a period of uncertainty, difficulty, and

risk rather than exploration and opportunity (Cote 2014).

At the other end of the age spectrum the category of “old,” up through much of the twentieth century, was defined largely by retirement for men and employed women, and for homemaking wives, by the retirement of their husbands, and sometimes by grandparenthood (Kaufman and Elder 2003). As a result of enactment of public “social security” pensions (in response to the Great Depression in the U.S. and earlier in Germany), by the mid-1960s age 65 had become the age around which retirement clustered in the U.S. and Europe. Retirement thus became an effective reference point for a variety of purposes, including the passage into old age. Retirement in the 1960s and 1970s became a scripted and distinct stage in the life course. However, paralleling the differentiation of younger age categories, increasing longevity and healthy life expectancy have prompted categorical division of the previously “old” into ad hoc “young-old,” “old-old” and “oldest-old” groupings (Youmans 1977; Garfein and Herzog 1995). So too, came recognition of the “frail elderly” in accord with the reduction in their physiological capacities, health status, and social activities that often come with advancing age.

However, the “retirement” life stage has become more problematic, as a result of recent changes in the employer-employee contract, a global information economy, and economic downturns, together with aging workforces and populations (in Europe, Japan, and North America). Traditionally defined-benefit private pension programs (offering income for life) are disappearing. Older workers both advance and delay their retirement timing, leaving (or being laid off from) their career jobs at different ages, and sometimes taking on new jobs (Han and Moen 1999; Moen and Flood 2013; Rix 2011; Warner et al. 2010; Williamson 2011).

These demographic and labor market trends have led some scholars to argue that a new phase of the later life course has developed – somewhere between the family- and career-building years and the frailer years of late adulthood (Flood and Moen 2015; James and Wink 2007;

Laslett 1989; Moen 2003, 2011b; Moen and Flood 2013; Moen and Spencer 2006; Sadler 2006; Silva 2008; Weiss and Bass 2002). This “encore adulthood,” “third age,” or “midcourse” stage both emerges from and is fostering macro-level transformations in society. This new stage of life is reflected in micro-level changes in the biographies of individuals and families (Moen 2013). Encore adulthood is being constructed in part by scholars as a way of capturing the changes they are observing in the life course, but also by individuals and families in the large cohort of Boomers now moving through their 50s, 60s, and their 70s. Older Boomers may have relinquished, for the most part, those roles that provided central focus for their adult lives – active parenting of young children and working full-time in career-related jobs – but they do not consider themselves “any kind of old.” The maintenance of relatively good health, with increasingly effective control of chronic ailments, has enabled Boomers to pursue a wide range of activities and remain socially connected well beyond the traditional ages of retirement.

Paralleling recognition of a new phase of early adulthood, social observers describe men and women in “encore adulthood” (roughly age 55–75) as having freedom to adopt new roles, taking up new jobs or starting their own businesses, volunteering or engaging in other service to their communities, developing new avocational pursuits like music, art, and writing (activities that might have been “hobbies” earlier, when there was scarce time to develop them), or becoming highly involved in their grandchildren’s lives (Alboher 2013; Carstensen 2011; Freedman 2007). Growing numbers in this life stage are choosing to prolong their work careers or take on new jobs in light of new economic uncertainties associated with retirement. Such work provides a continuing income stream as well as a sense of meaning or at least routine to their lives. But, as with past life stage constructions like “adolescence” and contemporary “emerging adulthood,” the opportunities, health, and other advantages associated with this new life phase are more likely to be experienced by relatively well-off, college-educated segments of

the Boomer population, producing some critiques of the focus on engagement and productivity as part of this life stage (Carr and Manning 2010; Estes 2004; Holstein and Minkler 2003; Liang and Luo 2012).

The boundaries around “early adulthood” and “encore adulthood” are blurred and somewhat contested. Millennials (coming to their 20s after the turn of the twenty-first century) may consider themselves adults far earlier than their parents (or scholars) might acknowledge, despite their delays, relative to the timetables of previous cohorts, in acquiring the traditional markers of adulthood – buying homes, marrying, or having children. Similarly, Boomers will be reluctant to acknowledge moving from encore adulthood to old age until they join the ranks of the frail elderly, severely limited in their abilities and activities.

There may be yet another emerging stage in later adulthood. A final increasingly recognized age differentiation, thus far of greater interest to health professionals than sociologists, occurs at the very end of life, as individuals move from the stage of “frail elderly” to hospice care.

2 Ambiguity and Uncertainty in Age Constructions, Interactions, and Identities

In addition to the blurred boundaries of new life stages, with social change and new images and realities surrounding children, youth, and older adults come new cultural contradictions and ambivalences (Mortimer and Moen 2012).

2.1 Children, Adolescents, and Early Adults

Contemporary children are considered innocent and vulnerable, and at the same time precocious and growing up “too fast” (Levin 2013). As Graff (1995) points out, cultural images of young people, though specific to their age, tend to stress problems and crises. Thus, youth are variously described as rebellious, defiant, delinquent,

drug-addicted, promiscuous, and “a lost generation,” while sample surveys show the vast majority exhibit conforming attitudes and behavior. In the 1960s, when the Boomers were children and youth,

A romantic (and increasingly nostalgic) mystique that weaves together the Beatles, rebels with and without a cause, cultures counter and alternative, free love, political struggles for rights and for peace only rarely culminated in what Kenneth Keniston calls ‘postmodern’ or ‘postconventional’ youth. Most young people are ‘normal,’...a category that embraces a diverse range of individuals who are neither visionaries nor victims. (Graff 1995: pp. 339–340)

Similarly, contemporary media portrayals and commentaries depict the new stage of “early” or “emerging adulthood” with negative terms such as “adulolescents,” “boomerang children,” and “failure to launch” (Swartz 2009). The reality is far more complicated, with considerable divergence in youth orientations, behaviors, and pathways to adulthood by social class, race/ethnicity, and gender. This diversity is sometimes reflected in differential willingness on the part of adults to support policies designed to help “our own” and “other people’s” children (Graff 1995).

Each time a “new” age group emerges, as scholars propose novel categorical designations that reflect new social circumstances, these new labels filter outwards to inform lay understandings. Recognition that old labels do not “fit,” and that new ideas about age are warranted, is often prompted by multiple ambiguities arising from the mismatch between existing age-graded policies, practices and expectations, on the one hand, and new experiences, problems, opportunities and realities that have fostered the new life stages, on the other.

These ambiguities foster uncertainty and ambivalence on the part of those who find themselves in the “new” life phases, as well as those in other more established age groups who interact with them. For people in each “new” age category find themselves between individuals in adjacent stages that have been recognized for much longer periods of time, institutionalized in existing cultural norms and organizational arrangements, and therefore more clearly demarcated

and understood. For example, when the life stage “adulthood” was introduced, it was not clearly defined (Elder 1975b). But in time, adulthood became institutionalized in high school education and a consumer economy aimed at molding teenagers’ tastes and spending habits. Still, it remains as an “in between” stage, involving many uncertainties and unclear expectations, as young people assume increasing autonomy from parents and alternately take on behaviors characteristic of “childhood” and “adulthood” (Fine 2001). How much freedom should parents give their teenage children? If they ease up on their monitoring, will their children come to harm? How much, if at all, should teenagers be allowed to assume adult behaviors, like holding part-time jobs (Mortimer 2003)?

Youth in the early or “transition to adulthood” phase are likewise caught between adolescence and adulthood. They are expected to engage in post-secondary education and often face a lengthy “floundering” period as they seek work that matches their abilities and skills. As a result, financial and residential dependence on parents often continues longer than either party would like (Swartz 2009; Furstenberg et al. 2004). The fact that parents can now provide health insurance until their “children” are age 26 (as a result of the Affordable Care Act) reflects recognition of this longer-term dependency. Youth in transition to adulthood only gradually relinquish behaviors typically associated with adolescence – risky and “irresponsible” behaviors, like partying, binge drinking, and driving too fast – as they acquire adult role markers (Massoglia and Uggen 2010).

Along with unclear expectations surrounding appropriate behaviors for persons in newly emergent age categories comes uncertainty regarding the subjective self-definition of age. For example, given the problematic character of age identity for persons in transition to adulthood, researchers have examined the circumstances that lead young people to take on the identity of an adult (Johnson and Mollborn 2009; Johnson et al. 2007; Benson and Furstenberg 2006; Shanahan et al. 2005). Whereas psychologists emphasize youth’s own embrace of

independence, responsibility, nurturance and other indications of maturity as hallmarks and self-defining criteria of adulthood (Arnett 1997, 2000), sociologists find that demographic markers, particularly those associated with family roles, are predictive of actually considering oneself an adult (Shanahan et al. 2005; Eliason et al. 2015). Clearly, both are intertwined, as the assumption of role markers of adulthood (especially, becoming a parent) encourage, even require, classic emblems of maturity.

2.2 Encore and Older Adults

Turning to later phases of life, encore adulthood is evolving as an “in between” stage between conventional adulthood (replete with full-time jobs and raising children) and the frailties acquired as individuals approach old age. In the 1980s, the British historian Peter Laslett (1989) first identified this as a “third age” (after the first age of childhood and the second age of adulthood, but before the fourth age of frailty). It was marked by the transition to retirement and ended with either frailty or death (see also Kertzer and Laslett 1995).

But this formulation of a stage between family/career building and old age is only beginning to be recognized in the U.S., as the taken-for-granted “naturalness” attributed to the culture and structure of the lock-step transition to retirement has evaporated. Seniority is no longer accompanied by job security for increasing numbers of men and women (Moen and Peterson 2009; Sweet and Meiksins 2013). The result is risk and ambiguity in tandem with the unraveling of traditional career and retirement patterns. Boomers now face great uncertainty regarding employment security, retirement timing, and economic stability in the later adult years (Estes 2004; Kotter 1995; Moen 2011b, forthcoming; O’Rand and Bostic this volume; Warren et al. 2012; Williamson 2011; Wong and Hardy 2009). Lacking cultural traditions and role models, individuals (and couples) may not know how to plan and prepare for the exigencies or the promise of this new life stage. They may look forward to

many years of relatively good health (including the successful management of chronic health conditions), in the absence of traditional social obligations associated with full-time work and child-rearing. This hopeful prospect is paired, however, with the risks of layoffs, economic hardship, and the onset of new health problems in a tumultuous economic climate replete with unraveling safety nets (Carr and Muschert 2009).

But the ambiguities and uncertainties go beyond economic security to the very lifestyles of those in this new encore adult stage. As Moen (2003) points out, people don’t plan much financially, but are much more likely to plan for their financial needs in retirement than to anticipate how they will spend their time. The new bonus years are coming not at the end of life but between career and family building on the one hand, and old age (defined as debilitating conditions severely limiting social participation), on the other.

Marc Freedman (2007, 2011) and others (see Alboher 2013; Farrell 2014; Moen forthcoming) are writing about the opportunities for meaningful engagement in the form of “encore careers” in which encore adults can work for the greater good. To be sure, some Boomers follow the traditional retirement transition to full-time leisure, but many say they want to work in retirement (AARP 2014), typically in “not so big jobs” (Moen 2007) that provide them considerable flexibility and less stress than conventional full-time work.

As is the case for early adulthood, language and ideas surrounding encore adulthood have yet to be institutionalized, producing ambiguities in the culture and in the policies, practices, identities, and attributes associated with the latter part of adulthood. Despite similarities in the increasing recognition of an “in between” status, orientations to “early adulthood” and “encore adulthood” differ. Young people approach their new stage with ambivalence (Hartmann and Swartz 2007), as “adult” responsibilities are sometimes considered onerous and lessening of opportunities to engage in youthful and enjoyable pursuits. However, youth generally welcome the roles and identities linked to adulthood, given

the considerable resource and status advantages such age progression entails. In contrast, biological aging and the structure of existing social institutions mean that age identities at the other end of life often signify losses – of career jobs and even paid work, marriage partners, health, and independence. As Rosow (1974) pointed out some time ago, retirement is a “roleless role,” even moreso given the unraveling of conventional “gold watch” exits and a “golden years” framing of retirement security (Estes et al. 2007; Liang and Luo 2012).

Riley (1987, 1994) underscored that while older people are healthier and living longer, society has not yet “caught up” by delineating new social definitions and productive social roles for recent cohorts of retirees. She called this disjunction “structural lag.” We are witnessing the deinstitutionalization of existing regimes that defined age boundaries in the past, such as the demise of private pensions, job security, and legislation that contributed to a clearly defined age of retirement (Brückner and Mayer 2005; Moen 2013).

As a result, age-linked identities are uncertain and often problematic among encore adults, albeit for different reasons. We have already commented on the multiple possibilities for new commitments and self-definitions for those entering what is emerging as an “encore” to adulthood. Nonetheless, the period post 65 remains devalued, often associated with disability and disease, and those who are no longer employed or raising children are often stigmatized with labels and connotations many see as negative, such as “old people,” “elderly,” or “aged” (Levin 2013). This stereotyping is fostering efforts to substitute new images, identities, and definitions of what it means to be beyond the peak responsibilities of middle adulthood. Older adults tend to think of themselves as less “old” than they are chronologically, and, as they grow older, their subjective ages (the ages they feel) become increasingly younger than their chronological ages (Kaufman and Elder 2002). As the large Boomer cohort (born 1946–1964) moves through their 50s, 60s, and 70s, new age categories, such as “encore adulthood,” “partially retired” or “third age” are likely to provide alternative and potentially quite

positive identities to counteract the negative self-definitions and stereotypes widely associated with this age group. People in this age range do not consider themselves “old,” “aging,” “senior citizens,” “elderly,” or other labels, as these are more fitting to the frailties associated with the next stage of infirmity (Moen *forthcoming*). The convention in data collection and analysis to categorize people as “65 and over” or “55 and over” diminishes the possibility of capturing the realities of two life stages: encore adulthood and a later old age.

3 **Linked Lives and the Gendered Life Course**

A focus on the social construction of particular age groups emphasizes individuals as the focal unit, obscuring the “linked lives” dimension of the life course (Elder et al. 2003). People in different life stages constitute “social convoys” (Kahn and Antonucci 1980; Moen and Hernandez 2009), leading lives that are intertwined with one another. For example, their early adult children’s own stressful situations create distress for their parents in the encore adult years as well (Milkie et al. 2008). The increasing numbers, longevity, and visibility of the “frail elderly” have prompted a situation in which some of the same ambivalences (Willson et al. 2003) and fears that characterize parents vis-à-vis adolescent and “early adult” children now typify the orientations of adult and “encore adult” children toward their aging parents.

Understandably, older adults are reluctant to move from identities and roles associated with the second acts implied by “encore” adulthood to being “elderly” or “senior citizens” and on to the next “oldest old” or “frail elderly” status. Adult children (boomers) worry about their elderly parents’ increasing social isolation and risk, even as their parents insist on living independently in their homes, while their mental faculties and physical capacities erode. How much autonomy should their aging parents retain? At what point should the adult children take over financial

responsibilities, becoming co-signers on their parents' bank accounts and trustees of their estates? Will their adherence to parents' wishes to remain independent increase the risks of falls, fires, or other calamities? Such problems arose less often in previous eras when people typically did not live long enough to join the ranks of the "frail elderly." A recent spate of magazine articles and self-help books have arisen in response, documenting the trials of such middle-aged and older children and offering advice (Alderman 2010; Considine 2012; Delehanty et al. 2008). In fact, a Google search on "caring for elderly parents" yielded over one million entries. Issues of quality vs. length of life arise as adult children, along with medical personnel and other advisors, wrestle with difficult decisions regarding end-of-life treatments and care.

A "linked lives" framing also reminds us of the gendered nature of the life course (Drobnič and Blossfeld 2004; Moen 2011a; Moen and Spencer 2006; Williams and Umberson 2004). For example, caregiving for older parents and spouses is gendered, with women disproportionately caring for their parents and ailing husbands (Chesley and Moen 2006; Dentinger and Clarkberg 2002; Pavalko and Woodbury 2000). Moreover, earlier ways of navigating work and family obligations by women (still assumed to be the family care providers) have deleterious consequences for them. For example, taking time to raise their young children by scaling back work hours or moving out of the labor force for a time, or moving to follow husbands' careers mean that women in encore adulthood (and older) have less savings, are less apt to have pensions, and have lower social security benefits than men.

4 Disjunctions Between Structural Opportunity and Individual Preference/ Need

Superimposed on the dilemmas and uncertainties surrounding the forging of new age-linked identities among younger and older adults are contemporary social trends that lessen the capacity to see

what lies ahead, to plan for upcoming role transitions and new circumstances and, when age-linked changes do occur, to satisfactorily adjust to the new realities. Most important, rapid social, technological, and economic changes have rendered existing age-graded blueprints (such as marrying or retiring at a certain age) obsolete, limiting the capacity of people at all stages of the life course to set realistic goals, to envision future challenges, and to actualize their preferences. Whether in early or later adulthood, such preferences are often based on expectations congruent with prior social conditions or needs. Outmoded age-related identities and templates, characteristic of earlier times, may preclude effective anticipatory socialization, so useful in subsequent adjustment. At the same time, new, more realistic schema may not have yet taken hold. Individuals, as they move from one age status to another are on shifting sands – what is age "normative" behavior and identity may be quite unclear.

When new destinations, that is, new age-graded social roles, are unclear, it is difficult to know how to prepare for them or when one is ready for them. Instead of manifesting forward progress, trajectories may be experienced, and objectively characterized, as floundering, turbulence, and failure. Individuals, especially those with less education and other resources, may feel a pervasive sense of being off-time, heading toward a precarious and uncertain future.

While numerous examples could be offered, let us take two cases in point: youth in transition from school to work, a primary marker of adulthood, and adults moving toward retirement. In both cases, there appears to be decreasing opportunity to take on "normative" and desirable age-graded social roles. Expectations based on typical conditions in the middle of the twentieth century no longer hold, resulting in widespread anxiety, disappointment, and uncertainty about what lies ahead.

Numerous and widely recognized economic changes since the 1970s (accentuated since the onset of the "Great Recession" by the financial, housing and other crises) have heightened inequality in the distribution of income and

wealth, reduced real wages for most Americans, squeezed families financially, increased debt, worsened employment opportunities across the board, and eroded publicly-provided safety nets. These are the subjects of prodigious research and continuous discussion in the media (for examples, see Edsall 2012; Grusky et al. 2011; Reich 2011). More to the point here, these macro-economic trends exacerbate the uncertainties associated with movement into contemporary, highly differentiated, age-linked social roles and the acquisition of corresponding age-graded identities.

Let us first consider the plight of youth moving through the transition from school to work. Traditionally, up through the mid-twentieth century, teenagers could anticipate a fairly rapid movement from high school or college, to full-time work. As a result, a large part of vocational development occurred during the teen years. Adolescents held paid part-time jobs while they attended high school, which enabled them to acquire familiarity with the workplace while gaining a sense of responsibility, independence, and “work readiness.” They learned the importance of timeliness, how to interact with supervisors and customers, and appropriate dress, styles of speaking, and other behaviors on the job (Mortimer 2003). This important venue of anticipatory socialization has now been lost due to the virtual collapse of the teenage labor market (Fogg and Harrington 2011; Staff et al. 2014). Echoing some of the same social and economic trends described by Osterman (1979) at the turn of the last century, contemporary opportunities for teen work have declined as a result of displacement by newly-arrived immigrants and older workers, changes in the distributions of occupations and industries, e.g., disappearance of the “paper boy” (or girl) and full-service gas stations, internet marketing, and increasing self-service in retail and other sectors.

At the same time, continuing occupational changes, rapid technological shifts, particularly related to ICT (information and communications technology), and a multiplex of trends associated with globalization (increasing competition, cost-cutting, out-sourcing, mergers, and downsizing)

have diminished job opportunities for early and encore adults alike and reduced the commitment of employers to employees. Career-like, full-time jobs and standard employment contracts have been overtaken by non-standard, short-term arrangements.

The transition from school to work in the United States has historically taken longer and has involved more uncertainty than in other countries with stronger institutionalized pathways from school to work, e.g., Germany, Austria, and Denmark with their apprentice systems, or Japan, with linkages between schools and employers (Mortimer and Krüger 2000; Kerckhoff 2003). But under the labor market conditions of the “new global economy,” “floundering” has taken on new meaning as young people encounter exceedingly tight employment markets after leaving school and long periods of job search. While most attention has been focused on high school dropouts, who have the poorest prospects, in recent cohorts even college graduates and recipients of Ph.D.’s and professional degrees are experiencing more difficulty making this key transition to adulthood – the acquisition of full-time “career-like” work. Young people try to obtain as much education as they can, but those who obtain just “some college” (without any degree receipt) may find themselves in just as poor circumstances, with respect to their capacity to obtain adult-like “career” jobs, as those who only have high school diplomas (Vuolo et al. 2009).

As a result, the transition from school to work, a hallmark of transition to adulthood, is no longer a discrete shift. Instead, youth move from school to work and back again, as they find that their educational credentials are insufficient for the kinds of jobs they want. They often pursue both work and educational degrees in tandem, or neither, as they suffer bouts of unemployment or engage in other pursuits – homemaking, or, for the most advantaged, travel abroad or voluntary service work. Many youth work without pay, volunteering or in unpaid internships, in attempts to build valuable employment networks or gain the kinds of work-related experience that employers seek.

In the “new economy,” early adults are told that they must carve out their own careers rather than climb well-established career ladders (Heinz 2003). They must become self-employed entrepreneurs, free-lancers, and consultants, generating their own “start-ups” and clientele. A recent article in the *New York Times* (Rampell 2012) declared that personal trainers had become one of the fastest growing occupations. Employment is quite unstable as young people try their luck with various entrepreneurial pursuits.

Lengthening education and difficulties in acquiring work that enables economic independence generally preclude independent residence (resulting in “boomerang” children) and delay a sense of “readiness” to marry and have children. Many young people settle on less stable cohabiting and childless arrangements; others have children out of wedlock. Along with these trends come further uncertainty and difficulty in acquiring a firm identity as an adult (Eliason et al. 2015).

Difficulties in the contemporary transition from school to work, and to adulthood more generally, could be offset by ameliorative social policies. For example, public colleges have experienced major cutbacks in state education spending in recent decades, placing the economic burden of college education more squarely on families and increasing both student and parent debt. Restoration of such funding would lower the high costs of post-secondary education, borne by students and their families, and lessen the need for young adults to live with their parents, with potential improvement in intergenerational relationships. The disappearance of teenage work in the free market economy could be offset, at least partially, by government sponsored work programs, more opportunities for volunteer work for teens, and closer connections between high schools and workplaces (e.g., providing internships, job shadowing, and more congruence between knowledge and skills learned in school and those needed in the workforce). Just as investment in paid work during high school reduced “floundering” during the school to work transition in an earlier era (Vuolo et al. 2014), such experiences may likewise be beneficial, promoting anticipatory socialization to work among contemporary teenagers.

At the other end of the life span, deteriorating economic conditions and retirement protections have exacerbated the uncertainties and difficulties that have traditionally characterized the movement into retirement. Adults in their 50s may find it difficult to keep what were formerly “secure” jobs, and may call themselves “retired” when they are unable to find employment. Paralleling youth’s meandering movements between school and work, a smooth transition from work to retirement no longer characterizes many older workers’ expectations, experiences, or preferences, even though existing time clocks and calendars constrain their options (Moen et al. 2005). Instead, they often move in and out of the labor force, from full- to part-time jobs, and back again, or from career-like to non-career employment (Moen 2003, forthcoming). The outdated social organization of work (linking, for example, health care and other benefits to full-time jobs, or policies encouraging one-way, one-time retirement exits) lessens encore adults’ capacity to enact their preferences for greater flexibility and less time-consuming or less physically demanding work.

As work has become more precarious, adult work careers become more make-shift, more like successions of jobs interspersed with periods of unemployment, rather than progressive movements, building on growing knowledge and skills that heighten occupational allegiances and identities (Moen this volume). Adult workers increasingly view their jobs much like free-lance musicians view their “gigs,” temporary respites from unemployment. But as workers grow older, a weak economy together with age discrimination, age-based stereotypes, and an age-stratified labor market (presuming “entry” level jobs go to young people) make it difficult for older workers who are laid off (or forced to take early retirement packages) to become reemployed, or for retirees to find post-retirement employment. Contemporary older workers confront heightened job insecurity, unemployment, and non-standard employment – all of which have been shown to affect health (c.f. Price and Burgard 2008). Because unemployed older workers find it more difficult to obtain new work, they suffer from long-term unemployment more often than

younger workers who lose their jobs. Many are forced into what becomes a “too early” retirement as repeated unsuccessful job searches give way to becoming “discouraged workers,” dropping out of the labor force. Whereas unemployed or discouraged workers in their mid-60s at least qualify for Medicare and Social Security benefits (if they have sufficient work experience), unemployed men and women in their 50s face wholly inadequate safety nets (e.g., food stamps and tight limits on welfare income).

5 Increasing Diversity Within Age Categories and Continuity Over Time

Of course, the timing of earlier transitions has long-lasting consequences, as earlier decisions and circumstances play themselves out through the individual and family life spans. As the passage to adulthood lengthens for those who extend their educations to the highest levels, others drop out of high school and begin child bearing in their teens and early 20s. Thus, late child-bearers may be sitting alongside parents half their age in elementary school PTA meetings. The delay of child-bearing until the early 40s and even beyond, coupled with a lengthening “transition to adulthood” in the next generation, means that many contemporary parents may have to delay the freedoms of the “empty nest,” the opportunities of a third age of reinvention, and the joys of grandparenthood until they are in their 70s.

The timing of occupational career acquisition has major consequences for subsequent attainments. A latent class analysis of data from the longitudinal Youth Development Study (Vuolo et al. 2009) found that a bare majority (53 %) of youth who left high school in the early 1990s were able to find what they themselves considered “career” jobs; these were likely to have obtained Associates or BA/BS degrees. Almost half the panel did not locate such work even by the age of 30. What this means is that discrepancy in occupational circumstances and career progress early on continues through the work life, as same-age individuals find themselves in very different phases of their careers.

Decisions about marital and parental timing and divorce earlier in adulthood also have implications for those in later life course stages. Fundamental changes have occurred in the institutions of marriage and the family (c.f. Cherlin 2009) and in family demography, including fewer children, parenthood initiated at later ages, increasing divorce and remarriage rates, growing legitimacy of same-sex marriage, the high proportion of unwed pregnancies, and marriage or parenthood forgone. These changes are challenging established norms about filial responsibility and reducing (or sometimes expanding) the networks of kin available for, and willing to care for, ailing older relatives. Extended durations of family relationships as a result of increasing longevity also change the nature of kinship ties, meaning that the linked lives of kin are lasting longer than ever (Saraceno 2008; Silverstein and Giarrusso 2011). Extended longevity also increases the odds that older adults will become care-providers for even older aging parents/infirm spouses, as well as sources of economic support for their adult children. Marriage is an important form of social support that is linked to reduced illness and increased longevity. But while many older adults continue to enjoy support provided by adult children and grandchildren, divorce and step-families, along with lower fertility rates, have increased the odds that older adults will move through their later years alone, with little family support. Women are more apt than men to be or to become single (due to differential widowhood, remarriage, and mortality rates), and to be more at risk of social isolation.

Despite such diversity in circumstances within age categories and greater uncertainty and unpredictability throughout life, many individuals still experience continuity, over time, in attitudes, behaviors, and life circumstances. In his study of Americans born in the 1920s, Clausen (1993) found that adolescents who exhibited “planful competence” made better life choices and, as a result, had smoother and more satisfying lives (e.g., more stable careers and marriages). Similarly, in a recent cohort of youth born in the mid-70s, those who manifested a sense of economic efficacy during adolescence (Lee and Mortimer 2009) were found to more successfully

acquire the markers of adulthood. Agentic orientations and behaviors (Hitlin and Elder 2007; Marshall 2005) during the transition to adulthood were measured by the maintenance of high aspirations, career certainty, and active job search (Mortimer et al. 2014; Vuolo et al. 2012). Youth who exhibited continuingly high agency had higher socioeconomic status, more stable work careers, and more intrinsically-satisfying work experiences in their mid-30s, and were more successful in weathering the “Great Recession.” In contrast, youth who exhibited low and declining agency during the transition were more likely to suffer unemployment and poor work conditions. These differences were not explained by the youth’s educational attainments. Since successes, as well as adversities, are likely to cumulate (Dannefer 1987; Schafer et al. 2011) over time, it is likely that youth who exhibit these patterns of agency will further diverge, as they move into their middle and older years, in economic status as well as other dimensions of well-being.

Furthermore, the advantages and disadvantages associated with long-term patterns of agency, occupational attainment and career stability through the adult career affect economic standing in later adulthood. Pensions, social security payments, and personal savings and investments depend on earlier career progress, stable employment, and economic well-being. The fact that individual retirement accounts are quickly replacing defined pension-like retirement benefits (a trend that O’Rand 2003, calls the “individualization” of risk) makes it incumbent upon workers to start their investment programs early and to save consistently in order to accumulate sufficient resources to obtain a secure retirement. The increasing turbulence of individual work careers makes it less likely that workers will be able to do so (Arthur and Rousseau 1996).

6 Conclusion

Full recognition of the socially constructed and malleable character of the highly diversified phases of life gives rise to several interrelated questions with strong implications for life course

scholars. In view of the continuing differentiation of age stages, historically and across cohorts, it cannot be assumed that the life course has the same meaning through time. Instead, as they “come of age” successive cohorts develop distinct expectations about the course that their lives will follow, based largely on the experiences of their own parents and grandparents and various cultural cues.

But in periods of rapid change, these expectations may not be fulfilled, causing new opportunities for some and distress for others. Thus, the more advantaged “emerging adults” may relish the greater opportunities for exploration that their extended freedom from adult responsibilities allows. Less advantaged segments of the “early adult” population cannot take advantage of such opportunities (e.g., those attendant on extended higher education, travel, unpaid internships, etc.). They are greatly disadvantaged in competition for jobs that offer a “livable” wage, enabling forward movement with respect to the traditional markers of adulthood (leaving home, marrying, becoming a parent, etc.). Similarly, “encore” adults may be able to find new sources of fulfillment in later-life entrepreneurial ventures or careers as volunteers when they are no longer “tied down” by demanding work and family roles. Others, subject to forced “early retirement” as a result of layoffs and unemployment, may experience deprivation, lack of purpose, and ill health, without meaningful roles to structure their time and provide material sustenance. The most disadvantaged elders may not even live long enough to experience either “encore” or deprived adulthoods.

At the same time, different cohorts, with their distinct conceptions of what the life course is, or should be like, come together in their continuingly linked lives. For example, Newman (2012) documents the ambiguities and sometimes conflicts that arise when young adults around the world continue to live at home well into their 20s and even 30s, much to their parents’ dismay at their children’s failure to enact the parents’ expectations, based on their own experience, for a more accelerated transition to adulthood. Similarly, contemporary elderly people, who

have provided substantial care to their own, now departed parents, may have developed expectations about filial caregiving based on their own experience. In the present era of enhanced longevity, and with declining numbers of adult children who can share this responsibility, these elders may not comprehend why their own adult or “encore adult” children cannot provide care for them in their own more lengthy period of frailty.

What methodological implications follow from these changing and diversified concepts of age and life stage? This perspective argues for continued monitoring of age-graded shifts in social roles, identities, and meanings in successive cohorts to reveal change and stability across these dimensions over time. Macmillan and Eliason (2003) make a strong case for multi-level latent class analyses to identify shifting pathways to adulthood; this method could also be applied to the latter phases of life. Configurations of roles at given ages and pathways across such configurations through time can thus be monitored (see Eliason et al. 2015). Representative samples of the population, with oversampling of racial/ethnic minorities, immigrants, and other groups, which are likely to experience distinct life courses, are of utmost importance. Systematic assessment of the prevalence of pathways, by socioeconomic status, race, and gender, will illuminate potentially changing bases of stratification of the life course. To understand the changing structure of the subjective life course, this role-based approach requires supplementation by studies, both quantitative and qualitative, of age-based identities, meanings, and evaluations.

Not that it is easy, as social changes unfold, to identify precisely when a “new” phase has emerged, nor to understand the features that differentiate it from contiguous earlier and later life stages. New socially constructed age grades may come to light when old ways of thinking about the life course no longer fits, as new stages are recognized and named by those experiencing them as well as by social commentators, the media, and the organizations that alter their practices in an attempt to accommodate new age-graded realities. The very contradictions,

ambiguities, ambivalences, and dilemmas that signal the obsolescence of prior age-graded concepts and norms may at the same time suggest that a new phase is emerging.

We conclude that there are many reasons for both scholars of children and youth and aging and the life course to come together to share their insights. Through collaborative investigations, they are likely to reveal parallels in the social constructions of age, problematic self-definitions of age identity, increasing difficulties in assuming and enacting age-linked social roles, diversity within age groups, and linkages between earlier and later events across all phases of the life course. The proliferation of socially-defined age categories affects both younger (most recently, “early adults”) and older people (“encore adults”). These new life stages provide strategic research sites for considering larger issues of social change, structural lag, identity, inequality, diversity, socialization, linked lives, and transitions. Members of newly-emergent age categories encounter difficulties in finding their place and acquiring normative age-linked identities (e.g., as an “adult,” or one who is in “encore adulthood”). While age differentiation continues, recent economic trends make it less likely that both younger and older individuals will be able to move into preferred age-graded social roles (e.g., as full-time adult worker with a “career” or as an economically secure and engaged encore adult). Variation in the timing of key role transitions (e.g., parenthood, the acquisition of stable “adult-like” work, retirement) results in a diversity of life circumstances for persons of the same chronological age, with important implications for age group solidarity and political action. Continuing attention to agency and life conditions, structural constraints throughout the life course, and the potential outdated character of age-graded policies is necessary to understand long-term patterns. Advantages and disadvantages cumulate over time, but in different ways for women and men (Bird and Rieker 2008; Hudson 2005, 2009; Marshall 2005; Moen *forthcoming*; Mortimer 2003; Schafer et al. 2011; Willson et al. 2007). Long-term expressions of individual agency, which are more or less effective given structural

constraints and opportunities, produce stratification across multiple dimensions of well-being (economic security, psychological and physical health) in old age.

These considerations make it necessary to rethink programs and policies geared to earlier times, in which socially constructed age categories were more clearly demarcated, more closely tied to chronological age, and less strongly differentiated. For example, policies in the second half of the adult life course are designed to provide social protections around the transition to retirement (e.g., Social Security and Medicare). At the same time, rigid, age-determined benefits, expectations, and practices may have adverse consequences. Consider, for example, the effects of taken-for-granted policies that limit access by age (such as Medicare at 65), or age discrimination that restricts the rehiring of older laid off workers, or the employment options of encore adults seeking new ways of working or volunteering. Social policies need to be better calibrated to the exigencies and preferences of early and encore adults as they navigate this uncertain terrain.

Given the formative period of early childhood, the growing importance of schooling in modern economies, and the cumulative character of academic achievement, interventions for young children are largely focused on enhancing school readiness and the transition to first grade (e.g., publicly funded universal preschool and the Head Start program for children in low-income families). Kuh and Ben-Shlomo (2004, p. 458) argue for the need for life course epidemiologists and policy makers to move beyond childhood interventions to “identify opportunities to break adverse chains of risk at other life stages” (see also Berkman et al. 2011; Dannefer et al. this volume). Their emphasis on the need for policies addressing adolescent and early adulthood transitions “to provide not just safety nets but springboards to alter life course trajectories with benefits for subsequent health” could be applied to transitions throughout the life course. Increasing risk, turmoil, and uncertainty throughout the life span, with frequent and often unpredictable change in life circumstances, argue for

more flexible social policies, safety nets, and interventions, less closely tied to chronological age and existing (increasingly obsolete) age categorizations, and better adapted to the new, more flexible and challenging life courses of contemporary cohorts. Both early and encore adulthood offer strategic opportunities to rethink and reset mindsets, research agendas, organizational arrangements, and policies in ways that open up rather than constrain the twenty-first century life course.

References

- AARP. (2014). *Staying ahead of the curve 2013: AARP multicultural work and career study: Older workers in an uneasy job market*. Washington, DC: AARP. Retrieved from www.aarp.org
- Alboher, M. (2013). *The encore career handbook: How to make a living and a difference in the second half of life*. New York: Workman Publishing Company.
- Alderman, L. (2010). Deciding on care for elderly parents in declining health. *New York Times*. 12 March 2010.
- Aries, P. (1962). *Centuries of childhood*. New York: Vintage.
- Arnett, J. J. (1997). Young people's conceptions of the transition to adulthood. *Youth and Society*, 29, 1–23.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55, 469–480.
- Arthur, M. B., & Rousseau, D. M. (1996). *The boundaryless career: A new employment principle for a new organizational era*. New York: Oxford University Press.
- Benson, J., & Furstenberg, F. F., Jr. (2006). Entry into adulthood: Are adult role transitions meaningful markers of adult identity? *Advances in Life Course Research*, 11, 199–214.
- Berkman, L. F., Ertel, K. A., & Glymour, M. M. (2011). Aging and social intervention: Life course perspectives. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 337–351). San Diego: Academic.
- Bird, C. E., & Rieker, P. P. (2008). *Gender and health: The effects of constrained choices and social policies*. New York: Cambridge University Press.
- Brückner, H., & Mayer, K. U. (2005). De-standardization of the life course: What it might mean? And if it means anything, whether it actually took place? *Advances in Life Course Research*, 9, 27–53.
- Buchmann, M. (1989). *The Script of Life in Modern Society*. Chicago, IL: University of Chicago Press.
- Carr, D. C., & Manning, L. K. (2010). A new paradigm for qualitative research in the United States: The era of the third age. *Qualitative Sociology Review*, VI(1), 16–32.

- Carr, D. C., & Muschert, G. W. (2009). Risk and aging. In J. Powell & A. Wahidin (Eds.), *Risk and social welfare*. Hauppauge: Nova Science Publishers.
- Carstensen, L. L. (2011). *A long bright future: Happiness, health and financial security in an age of increased longevity*. New York: Public Affairs.
- Cherlin, A. (2009). *The marriage-go-round: The state of marriage and the family in America today*. New York: Alfred A. Knopf.
- Chesley, N., & Moen, P. (2006). When workers care: Dual-earner couples' caregiving strategies, benefit use, and psychological well-being. *American Behavioral Scientist*, 49(9), 1248–1269.
- Clausen, J. A. (1993). *American lives: Looking back at the children of the great depression*. Berkeley: University of California Press.
- Considine, A. (2012). For millions, a poignant bond. *New York Times*. 13 June 2012.
- Cote, J. E. (2014). The dangerous myth of emerging adulthood: An evidence-based critique of a flawed developmental theory. *Applied Developmental Science*, 18, 177–188.
- Dannefer, D. (1987). Aging as intracohort differentiation: Accentuation, the Matthew Effect, and the life course. *Sociological Forum*, 2, 211–237.
- Delehanty, H., Ginzler, E., & Pipher, M. (2008). *Caring for your parents: The complete family guide*. New York: Sterling Publishing Company.
- Dentinger, E., & Clarkberg, M. (2002). Informal caregiving and retirement timing among men and women: Gender and caregiving relationships in late midlife. *Journal of Family Issues*, 23(7), 857–879.
- Drobnič, S., & Blossfeld, P.-B. (2004). Career patterns over the life course: Gender, class, and linked lives. In A. L. Kalleberg, S. L. Morgan, J. Myles, & R. A. Rosenfeld (Eds.), *Inequality: Structures, dynamics and mechanisms. Essays in honor of Aage B. Sørensen* (Research in social stratification and mobility, Vol. 21, pp. 139–164). Amsterdam: Elsevier.
- Edsall, T. (2012). The hollowing out. *New York Times*. 8 July 2012.
- Elder, G. H., Jr. (1975a). Age differentiation and the life course. *Annual Review of Sociology*, 1, 165–190.
- Elder, G. H., Jr. (1975b). Adolescence in the life cycle. In S. E. Dragastin & G. H. Elder Jr. (Eds.), *Adolescence in the life cycle* (pp. 1–22). Washington, DC: Hemisphere/Halsted Press.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer.
- Eliason, S. R., Mortimer, J.T., & Vuolo, M. (2015) The transition to adulthood: life course structures and subjective perceptions. *Social Psychology Quarterly*, 78 (3).
- Estes, C. L. (2004). Social security privatization and older women: A feminist political economy perspective. *Journal of Aging Studies*, 18(1), 9–26.
- Estes, S. B., Noonan, M. C., & Maume, D. J. (2007). Is work-family policy use related to the gendered division of housework? *Journal of Family and Economic Issues*, 28, 527–545.
- Farrell, C. (2014). Encore careers affect planning for retirement. *StarTribune*: Minneapolis. Retrieved, August 11, 2015 at <http://www.startribune.com/sept-21-farrell-encore-careers-affect-planning-forretirement/275815821/>
- Fine, G. A. (2001). *Gifted tongues: High school debate and adolescent culture*. Princeton: Princeton University Press.
- Flood, S., & Moen, P. (2015). Healthy time use in the encore years. Do work, resources, relations, and gender matter? *Journal of Health and Social Behavior*, 56, 74–97.
- Fogg, N. P., & Harrington, P. E. (2011). The collapse of the labor market for 16–24 year-olds. *Cascade*, 78 retrieved August 11, 2015 at https://www.philadelphiafed.org/community-development/publications/cascade/78/04_collapse-of-16-to-24-labor-market
- Freedman, M. (2007). *Encore: Finding work that matters in the second half of life*. New York: Public Affairs.
- Freedman, M. (2011). *The big shift: Navigating the new stage beyond midlife*. New York: Public Affairs.
- Furstenberg, F. F., Jr. (2008). The intersection of social class and the transition to adulthood. *New Directions for Child and Adolescent Development*, 119, 1–10.
- Furstenberg, F. F., Jr., Kennedy, S., McLloyd, V., Rumbaut, R. G., & Settersten, R. A., Jr. (2004). Growing up is harder to do. *Contexts*, 3, 33–41.
- Garfein, A. J., & Herzog, A. R. (1995). Robust aging among the young-old, old-old, and oldest old. *Journal of Gerontology: Social Sciences*, 50B, S77–S87.
- Graff, H. J. (1995). *Conflicting paths. Growing up in America*. Cambridge, MA: Harvard University Press.
- Grusky, D. B., Western, B., & Wimer, C. (2011). *The great recession*. New York: Russell Sage Foundation.
- Hagestad, G. O., & Neugarten, B. L. (1985). Age and the life course. In E. Shanas & R. Binstock (Eds.), *Handbook of aging and the social sciences* (2nd ed., pp. 46–61). New York: Van Nostrand Reinhold.
- Hall, G. S. (1904). *Adolescence: Its psychology and its relations to physiology, anthropology, sociology, sex, crime, religion, and education* (Vol. 1). New York: D. Appleton & Company.
- Han, S.-H., & Moen, P. (1999). Clocking out: Temporal patterning of retirement. *American Journal of Sociology*, 105, 191–236.
- Hartmann, D., & Swartz, T. T. (2007). The new adulthood? The transition to adulthood from the perspective of transitioning young adults. *Advances in Life Course Research*, 11, 255–289.
- Heinz, W. R. (2003). From work trajectories to negotiated careers: The contingent work life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 185–204). New York: Springer.
- Hitlin, S., & Elder, G. H., Jr. (2007). Time, self, and the curiously abstract concept of agency. *Sociological Theory*, 25, 170–191.
- Holstein, M. B., & Minkler, M. (2003). Self, society, and the “New Gerontology.”. *The Gerontologist*, 43(6), 787–796.
- Hudson, R. B. (2005). *The new politics of old age policy*. Baltimore: The Johns Hopkins University Press.

- Hudson, R. B. (2009). From industrialization to institutionalism: Theoretical accounts of aging policy development in the United States. In V. L. Bengtson, M. Silverstein, N. M. Putney, & D. Gans (Eds.), *Handbook of theories of aging* (pp. 531–554). New York: Springer.
- James, J., & Wink, P. (2007). *The crown of life: Dynamics of the early postretirement period*. New York: Springer.
- Johnson, M. K., & Mollborn, S. (2009). Growing up faster, feeling older: Hardship in childhood and adolescence. *Social Psychology Quarterly*, *72*, 39–60.
- Johnson, M. K., Berg, J. A., & Sirotzki, T. (2007). Differentiation in self-perceived adulthood: Extending the confluence model of subjective age identity. *Social Psychology Quarterly*, *70*, 243–261.
- Kahn, R. L., & Antonucci, T. C. (1980). Convoys over the life course. Attachment, roles, and social support. In P. B. Baltes & O. G. Brim (Eds.), *Life-span development and behavior* (pp. 254–283). New York: Academic.
- Kaufman, G., & Elder, G. H., Jr. (2002). Revisiting age identity: A research note. *Journal of Aging Studies*, *16*, 169–176.
- Kaufman, G., & Elder, G. H., Jr. (2003). Grandparenting and age identity. *Journal of Aging Studies*, *17*, 269–282.
- Kerckhoff, A. C. (2003). From student to worker. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 251–267). New York: Springer.
- Kertzner, D. I., & Laslett, P. (1995). *Aging in the past: Demography, society, and old age*. Berkeley: University of California Press.
- Kohli, M. (2007). The institutionalization of the life course: Looking back to look ahead. *Research in Human Development*, *4*(3), 253–271.
- Kohli, M., Rein, M., Guillemard, A.-M., & van Gunsteren, H. (1991). *Time for retirement: Comparative studies of early exit from the labour force*. Cambridge: Cambridge University Press.
- Kotter, J. P. (1995). *The new rules: How to succeed in today's post-corporate world*. New York: Free Press.
- Kuh, D., & Ben-Shlomo, Y. (2004). *A life course approach to chronic disease epidemiology*. New York: Oxford University Press.
- Laslett, P. (1989). *A fresh map of life: The emergence of the third age*. Cambridge: Harvard University Press.
- Lee, J. C., & Mortimer, J. T. (2009). Family socialization, economic self-efficacy, and the attainment of financial independence in early adulthood. *Longitudinal and Life Course Studies*, *1*, 45–62.
- Levin, J. (2013). *The declining significance of age*. New York: Routledge.
- Liang, J., & Luo, B. (2012). Toward a discourse shift in social gerontology: From successful aging to harmonious aging. *Journal of Aging Studies*, *26*, 327–334.
- Macmillan, R., & Eliason, S. R. (2003). Characterizing the life course as role configurations and pathways: A latent structure approach. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 529–554). New York: Kluwer Academic/Plenum Publishers.
- Marshall, V. W. (2005). Agency, events, and structure at the end of the life course. In R. Levy, P. Ghisletta, J.-M. LeGoff, D. Spini, & E. Widmer (Eds.), *Advances in life course research* (Vol. 10, pp. 57–91). Oxford: Elsevier.
- Massoglia, M., & Uggen, C. (2010). Settling down and aging out: Toward an interactionist theory of desistance and the transition to adulthood. *American Journal of Sociology*, *116*, 543–582.
- Mayer, K. U. (2004). Whose lives? How history, societies and institutions define and shape life courses. *Research in Human Development*, *1*, 161–187.
- Mayer, K. U. (2009). New trends in life course research. *Annual Review of Sociology*, *35*, 493–514.
- Meyer, J. W. (1986). The self and the life course: Institutionalization and its effects. In A. B. Sorensen, F. E. Weinert, & L. R. Sherrod (Eds.), *Human development and the life course: Multidisciplinary perspectives* (pp. 199–216). Hillsdale: Erlbaum.
- Milkie, M. A., Bierman, A., & Schieman, S. (2008). How adult children influence older parents' mental health: Integrating stress-process and life-course perspectives. *Social Psychology Quarterly*, *71*(1), 86–105.
- Moen, P. (2003). Midcourse: Navigating retirement and a new life stage. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 269–291). New York: Springer.
- Moen, P. (2007). Not so big jobs and retirements: What workers (and retirees) really want. *Generations*, *31*(1), 31–36.
- Moen, P. (2011a). Living the gendered life course in time and space. In R. Settersten & J. Angel (Eds.), *Handbook of the sociology of aging and the life course* (pp. 655–657). New York: Springer.
- Moen, P. (2011b). A life course approach to the third age. In D. C. Carr & K. Komp (Eds.), *Gerontology in the era of the third age: Implications and next steps* (pp. 13–32). New York: Springer.
- Moen, P. (2013). Constrained choices: The shifting institutional contexts of aging and the life course. In L. Waite (Ed.), *Perspectives on the future of the sociology of aging* (pp. 175–216). Washington, DC: National Research Council.
- Moen, P. (Forthcoming). Encore Adulthood: Boomers on the Edge of Risk, Renewal, and Purpose. New York: Oxford University Press.
- Moen, P., & Flood, S. (2013). Limited engagements? Women's and men's work/volunteer time in the encore life course stage. *Social Problems*, *60*(2), 206–233.
- Moen, P., & Hernandez, E. (2009). Social convoys: Studying linked lives in time, context, and motion. In G. Elder Jr. & J. Giele (Eds.), *The craft of life course research* (pp. 258–279). New York: Guilford Press.
- Moen, P., & Peterson, J. (2009). A third path? Multiplex time, gender, and retirement encores in the United States. *Nova Acta Leopoldina*, *106*(370), 41–58.
- Moen, P., & Spencer, D. (2006). Converging divergences in age, gender, health, and well-being: Strategic selection in the third age. In R. Binstock & L. George (Eds.), *Handbook of aging and the social sciences* (pp. 127–144). Burlington: Elsevier Academic Press.

- Moen, P., Sweet, S., & Swisher, R. (2005). Embedded career clocks: The case of retirement planning. *Advances in Life Course Research, 9*, 237–265.
- Mortimer, J. T. (2003). *Working and growing up in America*. Cambridge, MA: Harvard University Press.
- Mortimer, J. T., & Krüger, H. (2000). Pathways from school to work in Germany and the United States. In M. Hallinan (Ed.), *Handbook of the sociology of education* (pp. 475–497). New York: Kluwer Academic/Plenum Publishers.
- Mortimer, J.T., & Moen P. (2012). The social construction of age through the life course: Precarious identity and enactment of age-graded social roles. Paper presented at the annual meeting of the American Sociological Association. Denver, August 17–20.
- Mortimer, J. T., & Shanahan, M. J. (2003). *Handbook of the life course*. New York: Plenum Press.
- Mortimer, J. T., Vuolo, M., & Staff, J. (2014). Agentic pathways toward fulfillment in work. In A. C. Keller, R. Samuel, M. M. Bergman, & N. K. Semmer (Eds.), *Psychological, educational, and sociological perspectives on success and well-being in career development* (pp. 99–126). Dordrecht: Springer.
- Neugarten, B. L., & Hagestad, G. O. (1976). Age and the life course. In R. Binstock & E. Shanas (Eds.), *Handbook of aging and the social sciences* (pp. 35–55). New York: Van Nostrand Reinhold Company.
- Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology, 70*, 710–717.
- Newman, K. (2012). *The accordion family: Boomerang kids, anxious parents, and the private toll of global competition*. Boston: Beacon Press.
- O’Rand, A. (2003). The future of the life course: Late modernity and life course risks. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 693–701). New York: Springer.
- O’Rand, A., & Henretta, J. (1999). *Age and inequality: Diverse pathways through later life*. Boulder: Westview Press.
- Osterman, P. (1979). Education and labor markets at the turn of the century. *Politics and Society, 9*, 103–122.
- Pavalko, E. K., & Woodbury, S. (2000). Social roles as process: Caregiving careers and women’s health. *Journal of Health and Social Behavior, 41*(1), 91–105.
- Price, R. H., & Burgard, S. A. (2008). The new employment contract and worker health in the United States. In R. F. Schoeni, J. S. House, G. A. Kaplan, & H. Pollack (Eds.), *Social and economic policy as health policy: Rethinking America’s approach to improving health* (pp. 201–228). New York: Russell Sage.
- Rampell, C. (2012). A jobs boom built on sweat in an age of belt tightening. *New York Times*. 30 June 2012.
- Reich, R. (2011). Why inequality is the real cause of our ongoing terrible economy. *New York Times*. 4 Sept 2011.
- Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review, 52*(1), 1–14.
- Riley, M. W. (1994). Aging and society: Past, present, and future. *The Gerontologist, 34*(4), 436–446.
- Rix, S. E. (2011). Employment and aging. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 193–206). San Diego: Academic.
- Rosow, I. (1974). *Socialization to Old Age*. Berkeley: University of California Press.
- Sadler, W. A. (2006). Changing life options: Uncovering the riches of the third age. *LLI Review, 1*, 11–20.
- Saraceno, C. (2008). *Families, ageing and social policy*. Cheltenham: Edward Elger.
- Schafer, M. H., Ferraro, K. F., & Mustillo, S. A. (2011). Children of misfortune: Early adversity and cumulative inequality in perceived life trajectories. *American Journal of Sociology, 116*, 1053–1091.
- Settersten, R. A., Jr. (2003). Age structuring and the rhythm of the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 81–98). New York: Springer.
- Settersten, R. A., Jr., & Mayer, K. U. (1997). The measurement of age, age structuring and the life course. *Annual Review of Sociology, 23*, 233–261.
- Shanahan, M., Porfeli, E. J., Mortimer, J. T., & Erickson, L. (2005). Subjective age identity and the transition to adulthood: When does one become an adult? In R. A. Settersten Jr., F. F. Furstenberg Jr., & R. G. Rumbaut (Eds.), *On the frontier of adulthood: Theory, research, and public policy* (pp. 225–255). Chicago: University of Chicago Press.
- Silva, L. R. F. (2008). From old age to third age: The historical course of the identities linked to the process of ageing. *História, Ciências, Saúde – Manguinhos, 15*(1), 155–168.
- Silverstein, M., & Giarrusso, R. (2011). Aging individuals, families, and societies: Micro-meso-macro linkages in the life course. In R. A. Settersten Jr. & J. L. Angel (Eds.), *Handbook of the sociology of aging* (pp. 35–49). New York: Springer.
- Staff, J., Johnson, M. K., Patrick, M. E., & Schulenberg, J. E. (2014). The great recession and recent teenage employment trends in the United States. *Longitudinal and Life Course Studies, 5*(2), <http://dx.doi.org/10.14301/llcs.v5i2.275>.
- Swartz, T. T. (2009). Intergenerational family relations in adulthood: Patterns, variations, and implications in the contemporary United States. *Annual Review of Sociology, 35*, 191–212.
- Sweet, S., & Meiksins, P. (2013). *Changing contours of work: Jobs and opportunities in the new economy* (2nd ed.). Thousand Oaks: Pine Forge Press.
- Vuolo, M., Mortimer, J. T., & Staff, J. (2009). *Floundering during the school-to-work transition: A latent life path approach*. Detroit: Population Association of America. April 30–May 2, 2009.
- Vuolo, M. C., Staff, J., & Mortimer, J. T. (2012). Weathering the great recession: Psychological and behavioral trajectories in the transition from school to work. *Developmental Psychology, 48*, 1759–1773.

- Vuolo, M., Mortimer, J. T., & Staff, J. (2014). Adolescent precursors of pathways from school to work. *Journal of Research on Adolescence, 24*, 145–162.
- Warner, D. F., Hayward, M. D., & Hardy, M. A. (2010). The retirement life course in America at the dawn of the twenty-first century. *Population Research and Policy Review, 29*(6), 893–919.
- Warren, J. R., Knies, L., Haas, S., & Hernandez, E. M. (2012). The impact of childhood sickness on adult socioeconomic outcomes: Evidence from later 19th century America. *Social Science & Medicine, 75*(8), 1531–1538.
- Weiss, R. S., & Bass, S. A. (2002). *Challenges of the third age: Meaning and purpose in later life*. Oxford: Oxford University Press.
- Williams, K., & Umberson, D. (2004). Marital status, marital transitions, and health: A gendered life course perspective. *Journal of Health and Social Behavior, 45*, 81–98.
- Williamson, J. B. (2011). The future of retirement security. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 281–294). San Diego: Academic.
- Willson, A., Shuey, K. M., & Elder, G. H., Jr. (2003). Ambivalence in the relationship of adult children to aging parents and in-laws. *Journal of Marriage and Family, 65*, 1055–1072.
- Willson, A., Shuey, K. M., & Elder, G. H., Jr. (2007). Cumulative advantage processes as mechanisms of inequality in life course health. *American Journal of Sociology, 112*, 1886–1924.
- Wong, J. D., & Hardy, M. A. (2009). Women's retirement expectations: How stable are they? *Journal of Gerontology: Social Sciences, 64B*(1), S77–S86.
- Youmans, E. G. (1977). Attitudes: Young-old and old-old. *The Gerontologist, 17*, 175–178.
- Zelizer, V. (1985). *Pricing the priceless child*. Princeton: Princeton University Press.

Structuration of the Life Course: Some Neglected Aspects

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1 Our Point of Departure

Since both authors have studied and worked in Europe as well as in North America, it is natural for us to take a comparative view, exploring contrasts and similarities between European and North American perspectives. We start from two basic premises: First, life course studies are a perfect arena in which to raise and seek solutions to some fundamental analytical puzzles that have faced social scientists since the start of our disciplines. Central among them are relationships among *levels* and units of analysis. Among major figures in classic social science, Durkheim, through his emphasis on *social facts*, took the clearest stance with regard to levels: "...collective life does not derive from individual life..., [and] the latter cannot explain the former" (Durkheim 1895/1982, p. 134). Second, there is a much better chance of building new insights, filling knowledge gaps, and

solving analytical puzzles if there are *international dialogues* and collaboration across research communities.

After a brief historical overview of approaches to the life course on two continents (Sect. 2), we highlight some classic work on men's and women's lives and raise the issue of whether life course scholars on two continents have met the empirical and analytical challenges of analyzing how *gendered life courses* are shaped by cultural expectations as well as contrasting positions in society (Sect. 3). We ask: to what extent do macro-level forces create different patterns of interdependence, divergent and contrasting life trajectories for men and women in the early decades of a new century? As part of the focus on macro-level structures, we include a Sect. 4 outlining key *demographic shifts*. Subsequently, we explore how demographic context, laws and policies create contrasting patterns of *interdependence* (Sect. 5) and different *transition patterns* for men and women (Sect. 6). In the final Sect. 7 we attempt to restate and discuss key analytical and empirical challenges facing life course researchers who aim to understand the influences of demographic contexts, welfare regimes and methodological traditions.

It is important to note that in attempting a rather panoramic view of complex issues, our aim is not to provide a comprehensive overview of facts and findings, but rather to highlight dimensions and perspectives that we feel have not received the attention they deserve.

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In several recent overviews of life course research, authors have argued that North American and European scholars have tended to focus on different levels of analysis, emphasizing contrasting dimensions of social context. For example, Leisering (2004) suggests that US researchers have tended to take a social-psychological perspective, emphasizing the micro-and meso levels of individuals and their families, contemplating culture and shared meaning as the main organizing force in shaping lives. Many of them build on what is referred to as “the Chicago school of sociology”, with E. Hughes, G.H. Mead, W.I. Thomas and F. Znaniecki among the key figures. This tradition within life course research goes back to the mid-twentieth century. In contrast, European scholars have focused on macro-level social structures and the institutionalized life course. This tradition builds on classic sociological accounts of social change, with M. Weber as a key figure.

2 A Comparative Lens: Perspectives on Lives in Different Contexts

2.1 Structuring the Life Course: Early North American Contributions

In the 1950s, scholars of human development conducted the pioneering Kansas City Study of Adult Life, collecting complex interview data. Questions covered perceptions of “the normal expectable life”: culturally shared expectations of age-appropriate behaviors and the “right” timing of key transitions (e.g. Neugarten 1969; Neugarten et al. 1965). Implicitly, the project explored concepts that sociologist Robert Merton (1942/1979) called “the three Ps”: prescription, proscription and permission, in this case linked to age status. Since then, similar studies have been carried out in the Chicago area (Settersten and Hagestad 1996a, b), in Japan (Plath and Ikeda 1975) and in more than 20 European societies (Billari et al. 2011; Spéder et al. 2014).

In the 1960s and 1970s, key publications marked a new epoch for the study of how social structure and culture assign social meanings to maturation and aging, as well as to “metered” biographical time, i.e., chronological age. In 1964, Leonard Cain published a pioneering paper on life course and social structure. He based his presentation on classic anthropological studies of age differentiation, age grading and rites of passage. Focusing on age-status systems, Cain concentrated on a sequence of age-linked roles and emphasized the importance of historical generations and cohort flow. His discussion, however, had little or no consideration of sex/gender. Surprisingly, neither did Riley and collaborators, whose ground-breaking volumes on age stratification were published in the late 1960s and early 1970s (e.g., Riley et al. 1972). These authors elaborated how the social structuring of age is tied to the division of labour and a system of stratification. While both Cain and Riley emphasized the importance of cohort flow and historical context, Elder’s (1974) landmark volume on *Children of the Great Depression* made this principle come to life. Furthermore, his book presented evidence of how *families* are a critical mediating force, between macro-level historical events and changes, such as the Depression, and the micro-level of individual lives. Inspired by this view, researchers have later shown that the family realm may not only intensify, but can also soften or diffuse the force of societal conditions. For example, many African American parents, under conditions of racial segregation and discrimination, instilled confidence and courage in their children, enabling them to reach occupational goals despite massive structural and cultural barriers in the wider societal context (e.g., Fields-Smith 2005; Loder-Jackson et al. 2007). Scholars focusing on the mediating role of families clearly illustrate that knowledge of *intra-cohort variation* is necessary for understanding *inter-cohort contrasts*.

Work on family contexts also raises fundamental issues about gender. Elder (1974) suggested that boys were more negatively affected by changes in the family’s economic circumstances than were girls, because the latter were

better able to maintain a sense of continuity and stability as “mother’s helpers” in the household. Here, we touch on a question that has often been raised in anthropological work: are women’s lives more structured on a micro-level of social context, while men’s life trajectories are more heavily shaped by macro-level institutional anchoring (Neugarten and Hagestad 1976; Young 1965)? Building on Angrist’s (Angrist and Almquist 1975) discussion of women’s contingency orientation, Moen (2001) states that “women’s lives are typically contingent lives, shaped around the experience of others: their husbands, children, and parents (p. 189)”. In other words, she argues that *interdependence among lives* is a more powerful force for women than for men. We return to this challenging issue in a later section.

Following up his volume on the Depression, Elder (1979) worked to systematize perspectives and concepts for studying lives in changing historical contexts. Central in his framework were four organizing concepts: transitions, trajectories, interdependence among lives, and agency. To describe transitions and trajectories, key concepts are timing, sequencing and duration. The strong emphasis on culturally shared expectations and proximal conditions in families, communities and social networks highlights how time and place shape lives. One might think that Elder’s framework includes macro-level structuring through social policy, but as Leisering (2004) points out, the discussion of how lives were marked by the Depression did not include the possible impact of the New Deal. Subsequent consideration of interdependent lives shows that his perspective is mostly social psychological: “Lives are lived interdependently and social-historical influences are expressed through this network of shared relationships.... Interdependent lives highlight the role of significant others in regulating and shaping the timing of life trajectories *through a network of informal control*” (Elder et al. 2015, p. 31, emphasis added).

Several authors have pointed to problematic aspects of agency as an organizing concept, given the realities of interdependent lives on micro-and

meso-levels and structural constraints on the macro-level (Diewald 2000; Kohli 1986; Levy 2013a, b). Settersten (2003) speaks of “agency in structure”, while Elder et al. (2015): argue that: “Individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstance” (p. 29). Mayer (2003) takes a somewhat different view, stating that:

Sociologists tend to believe more in selection than in choice....Within given institutional contexts, individuals are probably more frequently being selected than selecting themselves....If material resources, power, authority, information and symbolic goods are distributed very unequally within given societies, then it follows that more people have to accommodate than have the opportunity to control (p. 466).

As he has done many times, Mayer points out that social groups, in which lives are interwoven, are highly structured by the temporal dynamics of social institutions and organizations.

2.2 Shaping the Life Course Through Laws and Policies: European Perspectives

In 1976, Cain pointed to the role of law in shaping lives, but he later stated (Cain 2003): “Most scholarly literature on age-related phenomena *has lacked curiosity* about the legal basis for the status of various age-categories” (p. 310, emphasis added). In the same year, anthropologist Fry (2003) discussed the baffling variety of age/time concepts in modern western societies, suggesting that we use the term *legislative time*. Quite a few years earlier, Hernes (1987), in a collection of essays on *Welfare states and woman power* (within a Nordic context), used the term *chronopolitics* and called for more scholarly attention to the politics of time, age and gender. By the late 1980s, European, mostly German, writing on the life course examined how *macro-level* structural conditions shape transitions and trajectories. Going back to Cain’s (2003) assessment of the US, one could argue that the central curiosity in

Europe was, indeed, legal and policy-bases for age markers and the definition of life phases. Much of this literature emphasized that the state, through laws and policies, *deliberately* creates opportunities and constraints, (in German *Rahmenbedingungen*) an overarching framework for shaping lives. This point is emphasized by Leisering (2004), who explicitly states that “Life course policies are intended to change the structure of the life course” (p. 210). He goes on to say that researchers must search for tacit objectives, not only those that are openly stated. Furthermore, he makes a distinction between positive and negative life course policies. The latter occur when policy-makers leave it to markets or charity to form life course patterns.

In the 1980s, German scholars, with Kohli (1985, 1986), Mayer and Müller (1986), and Mayer and Schöpflin (1989) among the pioneers, argued that the modern nation-state, through its laws, institutions and modern bureaucracies gave rise to the institutionalized life course. States structure the life course by delineating phases through legally stipulated chronological markers and by defining rights and duties linked to chronological age. States can also contribute to individual life course continuity through risk management and safety nets. Some of these policy efforts aim at supporting and minimizing risks for families. A focus on state-provided risk reduction and support is illustrated in two more recent comparative projects: Leisering and Leibfried’s (1999) study of poverty in Germany and the US and an examination of the extent to which nine contemporary European welfare states provide support for men’s and women’s key adult transitions (Anxo et al. 2010).

Early work on welfare state reduction of life risks focused on wage labor (e.g., Esping-Andersen 1990), thereby neglecting the fact that participation in the labor market presupposes a support-system of unpaid family work. Feminist scholars pointed out that programs developed to protect workers from the vagaries of the market sometimes acted to reproduce and reinforce inequalities originating from the unequal distribution of care responsibilities at home (Lewis 2002; Orloff 1993). These scholars have

examined how welfare states create different “care regimes” for young and old, which in turn present starkly contrasting opportunities and constraints in men’s and women’s life course and structure parent-child ties in several generations. We return to the issue of care regimes in Sect. 5.4. In considering the organization of men’s and women’s lives, both European and US researchers could benefit by returning to classic discussions of how age and sex in combination present the two sexes with different cultural expectations as well as contrasting locations in society’s division of labor and social institutions.

3 Her and His Life: Revisiting Classics

In a presentation to the 1941 meetings of the American Sociological Society, Ralph Linton invited colleagues to enter new research terrain by studying what he called the “age-sex system”. He emphasized that “the characteristics of age and sex may be treated *as a unit*, since membership in a particular age-sex category.....will be found to be a prerequisite for the occupation of practically any status within a social system” (Linton 1942, pp. 589–590, emphasis added).

The issue of the *American Sociological Review* in which Linton’s presentation was published also has a paper by Talcott Parsons (1942). He highlighted age-sex roles in the nuclear family, especially the “asymmetrical relation of the sexes to the occupational structure” (p. 605) and its consequences for men and women in different phases of adulthood. Later, Parsons worked with social psychologist Robert Bales on the dichotomy between “emotional expressive” and “instrumental” roles (Parsons and Bales 1955). Contemporary feminist critiques of work/family arrangements still return to this distinction, especially in discussions of parenthood as the “big divide” in differentiating her and his adulthood (Levy 2013a; O’Connor 1996).

In the wake of the feminist movement in the 1960s and 1970s came growing research recognition that men and women have different adult lives. Based on their comprehensive studies of

American life, Campbell, Converse and Rogers (1976) concluded: “To an important degree, men and women grow up in different cultures, develop different expectations, learn different roles, and live different lives” (p. 395). When Cain (1976) argued for studying the role of law in age structuring, he reminded the reader that in classic legal codes, such as the *Code Napoleon*, different age limits were set for men and women’s transitions. For marrying, they specified age 15 for women, 18 for men. To a very limited extent have the calls for new knowledge, voiced in the 1970s, been systematically followed up. McMullin (1995) and Ginn and Arber (1995) expressed dismay that the issues identified by Linton have not been addressed in research, but both focus on old age.

Two decades after the American life studies, McMullin (1995) stated that “the lack of theoretical development concerning the relationship between gender and ageing seems incomprehensible” (p. 30). She identified three “add on” paths that have been followed in past work: adding gender and/or age to mainstream sociological theorizing, adding gender to sociological theories of ageing (“gendered ageing theory”), and adding age relations to feminist theory (“feminist aging theory”). She argued that “if age and gender are organizing dimensions of the social world, then separating these systems makes no sense. Older people are not just old, they are either men or women” (p. 37). In the same volume, two European researchers (Ginn and Arber 1995) remind us that “Gender and ageing are inextricably intertwined in social life; each can only be fully understood with reference to the other” (p. 1). Yet, they go on to say that ageing and gender have rarely been researched in terms of their joint influence. Like McMullin (1995), Ginn and Arber (1995) suggest that “sociologists concerned with ageing and ageism have tended to “add on” gender, *treating it as a variable* rather than integrating it as a fundamental relationship of social organization” (p. 2, emphasis added).

In the late 1980s “intersectionality” was introduced as an analytical tool to elucidate the creation and reproduction of inequalities associated with salient social categories like gender, sexuality, race, age, and class (Crenshaw 1989). Rather

than examining these social categories as producing distinctive cleavages, the principle of intersectionality leads to scrutiny of how they mutually interact with one another. Nevertheless, we argue that even limiting attention to two statuses, little progress has been made in understanding age and gender as intertwined systems. In a recent special issue of *Signs* on intersectionality studies (Cho et al. 2013), age is not mentioned at all.

Alice Rossi, as president of the American Sociological Association three decades ago, selected age and gender as the theme of the annual meeting. The goal she expressed in the resulting volume (Rossi 1985) is still programmatic, but unmet: “Hopefully, the next time an editor puts together a volume on these core constructs of age and gender, the state-of-the art will permit a sophisticated integration of new theory and research that is beyond our contemporary ability to provide” (p. 17). Since the book was published, numerous overviews devoted to the life course have appeared, for the most part focusing on age but sidestepping gender. A notable exception is Levy and Widmer (2013), who challenge scholars to return to sociological work published in the mid twentieth century to gain an analytical understanding of structural conditions that may differentially shape men’s and women’s life course.

In Sects. 5 and 6, we discuss the extent to which societies, through laws and policies, create distinct patterns of interdependence, transitions and life trajectories on the basis of age/sex/gender. Before we turn to such macro-level structuring, we focus on demographic conditions, another *Rahmenbedingung* that creates different patterns of interdependence and divergence in life phases for men and women. Demographic contexts have, to a great extent, been neglected in discussions of forces shaping the life course, on both sides of the Atlantic. Mayer (2004) reminds us that

It is not single individuals but populations that are allocated through and streamlined through the institutional fabric of society across the life time—for example, the size of one’s cohort, as well as the preceding and succeeding cohorts, influences individuals’ opportunities way beyond individual or situational conditions (p. 165).

4 Demographic Context of Lives and Relationships

4.1 Altered Age Structures

The demographic transition (Davis 1945) with its reduced mortality and fertility rates has created markedly longer lives and altered the balance between young and old in the population. Researchers face many challenges in mapping how new demographic circumstances have dramatically affected micro-level life course patterns and interdependence in *intergenerational matrices*. Such matrices need to be considered on a societal level, across cohorts and age groups, as well as in families, communities and social networks. The paucity of appropriate data is part of the problem facing researchers interested in social change and relations across generational boundaries.

In popular media and policy discussions, the demographic transition is almost uniformly seen as a massive increase in the number of old people—a big “grey wave”. The emphasis in scholarly work is also on the older segment of a changing population. In contrast, a few authors (e.g. Hagestad 2008; Uhlenberg 2009) have argued that demographic changes have altered the social worlds of *children*. Children now represent a much smaller proportion of the population than has been the case throughout human history, reflecting altered mortality and fertility. Victor (2010) comments that in 1901, 40 % of all deaths in England and Wales occurred among children aged 0–14, while 44 % were among individuals aged 65 and older. In 2008, the corresponding figures were 1 % and 83 %. Uhlenberg (1980) illustrated how experiences of family deaths have undergone dramatic changes over the last century. While losing at least one child was an expectable part of parenthood in the early 1900s, it is now so rare that parents experiencing such loss need national organizations to find peer support. Another change in the patterning of family deaths is that widowhood and the loss of parents have developed clearer timing patterns, a trend that may increase potential support from “transition peers”.

Vaupel (2009) commented that in 1840, Swedish women had the world’s highest life expectancy at birth – 46. Today, Japanese women hold the world record – a bit over 87. While populations for most of human history have consisted of at least 50 % children and under 5 % old people, we have witnessed increasing “top-heaviness”; the proportions of young and old are now about equal. According to the 2014 Population Reference Bureau (PRB) *World Population Data Sheet*, the more developed countries now, on a global basis, have 16 % of the population under the age of 15; 17 % 65 and older. These are also the average figures for Europe. North America is a bit younger – 19 % and 14 %. The oldest population in the world is the Japanese, where the figures are 13 % and 26 % – in other words – there are twice as many old people as children. Variations in the balance between young and old become more striking when we consider gender differences in survival to old age.

So far, population aging has entailed a “feminization”, due to an increasing gap between life expectancies of men and women, which results in imbalanced sex ratios. In many old populations, there are more than twice as many women as men over the age of 80. The figures for 2013 (PRB 2014) show that in more developed countries, the average difference in life expectancy at birth is 7 years. This is also the average figure for Europe. In the US, the number is now 5 years. Looking across Europe, the smallest gender difference is in Iceland, where women can expect to live 3 years longer than men. In sharp contrast, six countries in Eastern and Central Europe have a difference of 10 years or more. Belarus, Lithuania and Russia show a difference of 11 years.

Thus, demographic conditions for interdependence between old and young vary widely across societies. In 2005, there were 81 women aged 65 and older per 100 children under 15 in Italy. The corresponding figure for old men was 57 per 100 children. The figures for the Russian Federation were 62 women and 29 men per 100 children. It is reasonable to conclude that Russian children grow up having highly limited contact with old men. Because of changes in life expectancy,

women's friendships and intergenerational ties are typically characterized by "co-longevity" and long durations. This fact has to a limited degree been recognized in the life course literature.

The magnitude and complexity of demographic change have not permeated scholarly or policy discussions of how men and women spend the last decades of life, studies of relationships across age groups in society, or research on intergenerational family ties. However, in his important discussions of the institutionalized life course, Kohli (1986, 2007) emphasized the significance of population change in the twentieth century, suggesting that a new demographic stability and altered age structures lead to a greater emphasis on measurable time, central in the development of modern bureaucracies and essential to modern society's division of labor. Kohli (1986) pointed out that during the first half of the 1900s, *chronological age* became increasingly significant as a basis for marking transitions and assigning rights and duties. He stressed that demographic stability is a major factor in the emergence of *the tripartite life course*: a first phase focused on preparation through schooling, a second centered on involvement in work and family building, and a third without work, a time of retirement. These phases were also outlined by Cain (1964). In addition to age, Kohli pointed to *duration* as a key dimension of social placement. Indeed, some legislation (reflected in the German concept of *Dienstalter*), assumed that duration of work (reflected in the seniority principle) nearly coincided with chronological age. Such assumptions, however, were based on a male life course (Moen 2001; O'Rand 1988; Sørensen 1987). Gender is conspicuously missing in path-breaking German work on the institutionalized life course.

4.2 Life Maps Out of Step with Demographic Reality?

In their discussion of age stratification, Riley and colleagues (1994) argued that in many aging societies, we observe structural lag: demographic shifts have been so rapid and complex that social

structures are out of step with the new reality. The same argument could also be made using the more traditional concept of *cultural lag*: shared expectations linked to age status have not kept pace with demographic change. As life expectancies increased, also in old age, and actuarial patterns became increasingly predictable, scholars and policymakers suggested a shift in emphasis from *time lived* (chronological age) to *time left* in defining rights (e.g., Sanderson and Scherbov 2007; Vaupel 2009). Interestingly, this distinction was made by Neugarten in a 1968 pioneering paper on awareness of *middle age*. She argued that between the ages of 40 and 60, individuals become increasingly aware of finitude and start to think in terms of time left, rather than time lived. Ryder (1975), trying to define a threshold for old age, also wrote about the time remaining until death as a marker.

Currently, the world average for the age at which individuals can expect to live 15 more years is 67 (Scherbov et al. 2014). By the end of the century, the figure is estimated to be the age of 78. In Denmark, Greece, Italy, the Netherlands, Portugal, and Spain, there is now discussion of pension reform that links the statutory retirement age to remaining life expectancy (OECD 2014). Recent analyses using cross-national European data show that a higher expected length of life increases the chances of working close to and past the official retirement age (Börsch-Supan et al. 2009).

In the US, several recent books take a cultural perspective on the new old age, calling for revised life maps (see Moen, current volume). They speak of becoming old as entering a *new country*, starting with Hendricks' (1980), *Country of the Old*. In 1995, Smith titled her book *Old Age is Another Country*. Pipher (1999) used the same metaphor. Recently, anthropologist Bateson (2010) has urged older adults to *compose a further life*, advocating new educational opportunities for seniors who try to negotiate unmarked life trails. In Europe, sociologist Rosenmayr, now age 90, takes a positive view of missing life scripts, emphasizing freedom (Rosenmayr 1983). In his latest volume on the issue, published in 2007, he discusses the philosophy of old age,

with a focus on creativity. Freedom and playfulness are also central themes in a rapidly growing international organization of old women, *The Red Hat Society* (Van Bohemen et al. 2014). Several authors argue that to create a meaningful old age, contact with children is essential. As Margaret Mead (1970) emphasized, children and old people need to exchange teaching and learning, especially in societies undergoing rapid change. Such considerations bring us to broader perspectives on how demographic shifts, in combination with other societal change, have affected relationships between age groups.

4.3 Altered Opportunities for Relationships Among Age Groups: Increasing Segregation?

Before Kohli's account of the tripartite life course, US social scientists had voiced concerns that the new segmentation of life might lead to age segregation. Lofland (1968) described colleges as "youth ghettos". Coleman (1961) wrote about *The Adolescent Society*, expressing concerns over the exclusion of children and youth from places of work; adults are "away" much of the day in work spaces where there are no children and no old people. Later, Coleman (1982) argued that age segregation deprives the young of a proper view of mid-life and old age, and produces adults who have little understanding of the young. A recent US study based on successive waves of the General Social Survey shows that such concerns are warranted: young adults have become increasingly isolated from older age groups outside the family (Smith et al. 2014). More than two decades after Coleman's warnings, Hagestad and Uhlenberg (2005, 2006) raised concerns about three types of age segregation: institutional, spatial and cultural. Institutional segregation is created by policies that block interdependence between young and old by allocating issues relating to the two age groups to separate ministries and administrative units. In the spheres of education and leisure, one of the age groups is typically excluded. Little is

known about age segregation in residential patterns, with the exception of "old age ghettos", such as retirement communities and care institutions. Spatial segregation is now being addressed by social geographers and city planners (e.g., Vanderbeck 2007) but has not been discussed by a wider social science community. Cultural gaps between age groups are often associated with the two first types of segregation and are observed in contrasting language, dress, food, and music preferences (Hagestad 2008).

What are the consequences of age segregation? It makes contact and personal knowledge of one another difficult for members of different age groups, thus giving rise to ageism; it blocks socialization across generational lines, and limits the spectrum of interpersonal resources in social networks.

Cross-age ties are an under-researched topic (Riley and Riley 2000), perhaps because homogeneity is a tenet of friendship research. Homogeneity or "homophily" (Lazarsfeld and Merton 1954) refers to the tendency to form relationships with others who are similar in some designated aspect such as age, sex, ethnic background, and social class (McPherson et al. 2001). As Mollenhorst et al. (2008) show, the age composition of the contexts in which people meet is an important determinant of the likelihood that cross-age ties develop. In their network study, the mean age difference between confidants who met each other at school, in leisure activities, or via friends was about 9 years, but the mean age difference between those who became acquainted via family members was almost 16 years. Few authors have addressed the question of whether there are gender differences in the likelihood of having cross-age friendships. A common practice is to "control for" gender in analyses of age homogeneity in networks rather than to explicitly address gender differences (e.g., Mollenhorst et al. 2008). Most research shows that women have larger and more diversely composed networks than men (Antonucci 2001), but patterns are not always clear cut: gender differences in personal networks vary by life stage, socioeconomic status and marital history (e.g., Ajrouch et al. 2005).

Scholars concerned about societal age segregation and lack of contact between young and old are often told that such contact is a key function of the family, where members of different age groups and cohorts meet, form durable ties and engage in reciprocal socialization.

4.4 Altered Opportunities for Interdependence Across Family Generations

To describe intergenerational family networks, one cannot rely on standard demographic measures such as fertility rates, life expectancy, dependency ratios and household composition (Connidis 2014; Herlofson and Hagestad 2011). An overview of intergenerational ties requires careful attention to *anchoring* (Herlofson 2013): whose family network are we describing? Uhlenberg (2004) offers an example: decreases in adult mortality have little relevance for the availability of grandchildren among mature adults. Any person who survives to an advanced age—regardless of time period—is likely to have an adult grandchild. However, decreases in adult mortality are particularly relevant from the perspective of grandchildren, because there is an increase in the supply of grandparents and expanded potential for young adults to develop adult relationships with grandparents.

Many modern societies have myths about the good old days, when children practically grew up on grandma's lap. Demographers have an alternative story about the *absence* of grandparents in the first part of the twentieth century, especially for the younger children in large sibships. Reduced fertility has also led to clearer sequencing between active parenting and grandparenting, especially among women, resulting in less "competition" between the parent and grandparent roles. Uhlenberg (2009) points to one more factor affecting contact and closeness between grandparents and grandchildren: a reduction in the number of grandchild sets. What might be called a revolution in grandparenthood reflects the main drivers of the demographic transition. We have seen a dramatic increase in the proportion of

children with all four biological grandparents alive. According to Uhlenberg's (1996) estimates, 5 % of 10-year-olds in the US at the start of the 1900s had four grandparents; by 2005, the figure was 40 %. This last figure is very similar to what emerged from the 2005 Norwegian grandparenthood study, a survey anchored in children aged 10–12: 41 % had all four (Hagestad 2006). Microsimulation models reveal an increase in the proportion of 0–20 year olds with four surviving grandparents in the Netherlands from 10 % in 1950 to 20 % in 1990 (Post et al. 1997).

The availability of grandparents is not limited to childhood. Estimates for the US (Uhlenberg 1996) show that the proportion of 30 year-olds with a grandparent alive more than tripled between 1900 and 2000, from 21 % to 75 %. The expectation for 2020 is a further increase to 80 %. Uhlenberg presents a powerful example of historical change: 20-year-olds in 2000 were more likely to have a grandmother still living (91 %) than 20-year-olds in 1900 were to have a mother living (83 %).

Studies of intergenerational ties focus on "the matrifocal tilt" and "women as kin-keepers", but such descriptions of women's involvement in intergenerational relationships have mostly emphasized cultural constructions of family roles, not the demographic basis of gender patterns. An example is repeated reports that maternal grandmothers are the most involved grandparents. Such accounts often neglect the fact that these women typically become grandparents at the youngest age (reflecting timing of parenthood in two generations), are the healthiest, and can expect the longest duration of role occupancy. Work on the availability of vertical kin typically uses non-gendered terms, such as grandparents and great-grandparents (e.g., Grundy et al. 1999; Puur et al. 2011), concealing the fact that women are heavily over-represented in the older generations. Relevant to life course research is the fact that the sequencing of parental death and entry into the grandparent role differs for men and women. Given gender differences in age at marriage and life expectancy, men are more likely to lose fathers before a new generation is added, whereas women typically become grandmothers while their mothers are still alive.

Cross-national differences in the generational structure of families are not easily determined, because the joint effect of demographic trends on family units is not always obvious. An example is the countervailing effects of increased longevity and postponed childbearing on the generational structure of families (Matthews and Sun 2006). Declining adult mortality means that older family members are living longer than they did in the past, which increases the likelihood that three, four or even five generations may be alive at the same time. In contrast, delayed childbearing means that the age gap between generations is widening, which reduces the likelihood that multiple generations will be alive at the same time. A comparison between Hungary and the Netherlands of the number of descending family generations of people aged 70 and over illustrates decelerated generational turnover in connection with late childbearing (Knipscheer et al. 2000). Since the 1970s, the age at parenthood has been higher in the Netherlands than in Hungary. Not surprisingly, a lower proportion of Dutch (24 %) than of Hungarian older adults (39 %) reported four descending family generations, even though life expectancy is higher in the Netherlands.

4.5 Family Generations: Recognizing Multiple Links

An abundant literature underscores the importance of intergenerational family relationships in shaping the life chances of the young, the middle-aged, and the old. Nevertheless, this literature is made up of separate foci (Moen et al. 2014): “parenting” tends to be about young families, “intergenerational transmission” typically focuses on early and middle adulthood, whereas “informal care” is about adult children and ageing parents. Studies of “grandparenting” are exceptional in the sense that multiple generations of family members are often considered simultaneously: grandchildren, the middle generation, and grandparents.

A focus on both the young and the old in families points to forms of life course structuration that have been neglected in earlier work (Dykstra

and Komter 2012). For example, research on labor force exit has benefitted from looking at the retirement decision in a multigenerational perspective rather than solely focusing on the retiring generation. Van Bavel and De Winter (2013) examined whether grandchild care might encourage older workers to leave the labor force before the official retirement age. Their analyses revealed that grandparenthood speeds up retirement, particularly for women—an illustration that interdependence plays a stronger role in women’s lives than in men’s. The finding is all the more compelling, given policy efforts to increase labor force participation in the context of an ageing Europe. Whereas having grandparents taking care of grandchildren enables the middle generation to be gainfully employed, it suppresses the economic activity of the older generation, and may constitute an expensive form of childcare.

The “discovery” of grandparents (Segalen 2010) by fertility researchers is another example of new insights gained from considering interdependence in the lives of young and old in families. A number of studies have shown that the decision to have children is taken more readily when support from grandparents is available (e.g., Hank and Kreyenfeld 2003). Using Dutch longitudinal data, Kaptijn and colleagues (2010) demonstrated that men and women who received frequent childcare support from their parents were more likely to have a second or third child than offspring who received no such support. Based on longitudinal data from 11 European countries, Aassve et al. (2011) concluded that the positive effect of grandparental help on childbearing was much greater in Mediterranean countries than in western and northern Europe.

Research on grandparental care and fertility shows how levels of analysis matter. At the micro-level of individual lives there is a positive association between grandparental help and childbearing. At the macro-level, however, the association is negative. Fertility rates tend to be highest in countries with the most generous public childcare facilities and parental leaves (Castles 2003; Gornick and Hegewisch 2015; McDonald 2006), that is, in countries where

governments support the combination of parenting duties and employment, thus reducing the necessity of grandparental care.

With people living longer and reaching old age in better health (Vaupel 2010), grandparenthood is becoming a more important part of the life course. In Norway, grandparenthood is being called “life’s dessert”.

4.6 Limited Vertical Ties: Increased Life Course Vulnerability?

What happens to the lives of individuals who do not fit the picture presented above—those with no or limited vertical family ties? An issue that is of particular current interest is rising childlessness rates among men. Some authors, on both sides of the Atlantic (e.g. Dykstra and Keizer 2009; Eggebeen and Uhlenberg 1985), are concerned about men’s social integration, support through interdependent relationships, and investment in their community, especially in the second half of adulthood. North American social psychological research based on Erikson’s concept of generativity, i.e. investment in younger generations, indicates that the concern is warranted. McAdams and de St. Aubin (1992) found self-reported generativity to be associated with parenting for men but not for women. Compared to fathers, more childless men felt disconnected from their communities and were not involved in local organizations. A more recent study (McKeering and Pakenham 2000) similarly found parental generativity (time invested in care activities and psychological involvement in parenting) more strongly related to societal generativity for men than for women. In rural parts of Europe, social services have difficulties organizing care for old childless men because they are severely isolated and often live in remote areas (e.g., Wenger 2009).

Other authors (e.g. Esping-Andersen 2002; Heckman 2006; Sørensen 2005) have raised concerns about how children and young people with limited vertical ties (e.g. with single parents and no available grandparents) find life course

supports. These authors argue that the availability or lack of intergenerational family relationships, especially with grandparents, is a major factor in the widening inequality among young people. In other words, cross-generational ties in the family are a source of economic, cultural and social capital. Such concerns have also been raised in discussions of societal age segregation (Hagestad and Uhlenberg 2005) because it is hard to find arenas in which young and old can meet outside the family realm.

5 Webs of Interdependent Lives: Micro and Macro Perspectives

5.1 Two Faces of Interdependence

When Elder introduced the concept of interdependence in lives, he focused on family groups: individual lives are influenced by what happens to other family members, whose circumstances are considered when making life course decisions. Elder et al. (2004) give the following description: “Lives are lived interdependently and socio-historical influences are expressed through this network of shared relationships” (p. 13). Family historians (Hareven 1982; Modell 1989) argue that with the emergence of the institutionalized life course, lives became less contingent on conditions in the family realm. In a home-based economy, the production and reproduction of the household took precedence over the interests of its members. The transition to a wage labor economy, as well as new educational opportunities, set individuals free from the bonds of the family of origin. Buchmann (1989) speaks of *Freisetzung*, a liberation, giving individuals (especially young people) more opportunity to build their own adult lives. The liberation also brings uncertainties, as Beck (1992) has argued; when individuals are the “architects of their own lives,” they run the risk of being left with a sense of personal failure (see also Furlong and Cartmel 1997). To what extent do modern youth actively plan their future? A recent analysis of data from 23 European nations (Hellevik and Settersten

2013) shows that both micro and macro levels need to be considered. Individuals with greater personal security were more likely to plan than those who had fewer personal resources. Yet, young adults who lived in countries with less favorable societal conditions were more likely to plan than those in countries with more favorable conditions.

It is interesting to note that several of the authors cited above seem to take a somewhat negative view of interdependence. Clearly, it is a multi-faceted phenomenon, in that it represents rights, support, continuity and protection against risks, as well as obligations, vulnerabilities related to events and resources of others, and transitions beyond a person's control. Anthropologist David Plath illustrated both faces of interdependence. In an analysis of a Japanese novel, he showed how a young woman had her life "on hold" until her older sister had made the transition into marriage (Plath 1980). Plath also wrote of how we need a convoy (Kahn and Antonucci 1980) of consociates (Schütz 1967), who can serve as co-biographers (Ferrarotti 1981).

5.2 Interdependence as a Policy Issue

Europeans often find it paradoxical that the US—quite possibly the most individualized country in the world—offers many examples of the power of family interdependence. Part of this power stems from the lack of state mechanisms for risk reduction. The first author, while teaching in US academic institutions, had students crying in her office on numerous occasions because a parent had become unemployed or seriously ill, leaving no money for tuition.

In all developed societies, the caring and financial responsibilities for young and old family members are shared between families and the state (Kohli et al. 2010), but countries differ greatly in their understanding of "proper" intergenerational family relations (Viazzo 2010). Laws define rights and duties of family members towards each other, while policies (or their absence) reward or discourage particular family

practices (Grandits 2010; Leira 2002; Saraceno 2010). In many European societies, laws create or assume interdependence among lives, including legal stipulations of age and duration requirements across family relations. Using Norway as an example, laws "cross lives" in a number of ways:

- A's duties are tied to B's age. Parents are financially responsible until the child reaches the age of 18.
- A's rights are tied to B's age. Parents are entitled to child support (public transfer) until the child turns 18.
- A's rights are tied to B's duration of role occupancy. To qualify for full paid parental leave, the father must have worked for a given number of months prior to the pregnancy, but he also must have a partner (the mother) who meets these duration requirements.
- A's duration has negative effects on B's duration. The law provides a given duration of paid care leave (for sick children or other family members), but when the illness period exceeds the stipulated amount of leave time, the care provider may lose the continuous duration at work needed for full pension rights.

In many countries, primogeniture still makes first-borns' life progress dependent on their parents dying or giving up the farm or firm. In some countries, daughters and sons have equal rights; in other societies, sons have first rights, even when they are not first-born.

Family responsibility laws define clear rights and duties across and within generations. Policies and institutional arrangements may also *block interdependence*, as for example when grandparents are not granted the right to raise grandchildren when parents cannot provide adequate care, or when parents have court orders prohibiting them from visiting their children after divorce.

How interdependence is shaped on a macro level has not been systematically examined, but in many modern societies, and in many ways, laws and policies create contingent lives. We agree with Esping-Andersen (1997), who states that lives and relationships must be seen within a

matrix of life-course policies: services, transfers to the old, care for children, support of parenting. In other words, we treat interdependence as a *policy issue*, with social psychological consequences. This is an underdeveloped domain of life course work, for the most part neglected in European scholarship on the institutionalized life course. Can we find explicit policy efforts to shape interdependence by regulating and structuring marriage and parenthood, or intergenerational ties? To what extent do legal frameworks assume, create, and reinforce interdependence among lives? Under what circumstances does legal regulation create continuity and security versus discontinuity and risk for individuals whose lives are interconnected? Is A's risk B's security?

As sociology students, we were taught that most social roles are reciprocal: Ego's rights are Alter's duty. From this premise, we would conclude that Ego's rights face Alter with prescriptions. However, we can find a number of examples, especially in relationships between minor children and parents, of how this is not always the case. Following divorce that defines one custodial parent, the non-custodial parent has legal visitation rights. However, these rights typically take the form of *permission*. As a consequence, children do not have a right to contact with a non-residential parent. Similar examples of "relational asymmetry" are found in states that grant grandparents visitation rights.

5.3 Examples of Laws and Policies Structuring Interdependence

Legal obligations to provide financial support or care to family members can be viewed as *mandated interdependence*. A power of attorney to act on behalf of an older person deemed legally unfit to make independent decisions, or having to accept the authority of parents and guardians, are other examples of mandated interdependence. European nations vary widely regarding the range of family members included in civil laws regulating maintenance responsibilities

(Saraceno and Keck 2008).¹ The Mediterranean countries have the most extensive regulations. In Italy, for example, grandparents, siblings, aunts and uncles are legally obliged to financially support children if their parents are not able to support them. Many Central European countries (e.g., Austria, Latvia) legally obligate grandparents to provide financial support. Western and Northern European countries (e.g., Sweden, the Netherlands, the United Kingdom) typically do not legally oblige family members to support children if their parents cannot provide for them. In a number of countries, adult offspring are under legal obligations to financially support parents. In Italy such rules also hold for grandchildren, as well as for sons-in-law and daughters-in-law, but only if they are legally married (Saraceno and Keck 2008). The countries that have no legal obligations for adult children to financially support their parents tend to be in Northern and Western Europe, but there are exceptions (Belgium, the Netherlands, France, and Germany). The countries that legally oblige children to provide for their parents tend to be in Southern, Central and Eastern Europe, but again, there are exceptions to this pattern (Hungary, Estonia, Bulgaria, and the Czech Republic).

Bordone et al. (2012) empirically illustrate how policy arrangements structure generational interdependence across three generations. Combining data from the Survey of Health and Retirement in Europe (SHARE) with data from the Multilinks Database on Intergenerational Policy Indicators,² they examined the likelihood that grandparents care for the children of an employed daughter on a daily basis. Findings show that grandparents are most likely to be daily caregivers in countries where public childcare services and parental leaves are least generous (Italy, Greece, Spain, and Poland). They are least likely to care for grandchildren on a daily basis in countries that score the best in terms of childcare services (e.g., Belgium), parental leave (e.g., the

¹ See the Multilinks Database on intergenerational Policy Indicators for details. <http://multilinks-database.wzb.eu/>

² *Ibid*

Czech Republic), or both types of arrangements (e.g., Denmark). Tobío (2007) argues that grandparental care in Southern European countries is part of an effort to improve the life chances of the middle generation. Paradoxically, she notes, Spanish grandmothers assume an old-fashioned role to enable their daughters to adopt modern gender roles. Grandparental care in Southern Europe is a clear example of what Leisering (2004) would call “negative” life course policy shaping interdependence between family generations.

An example of what Leisering would label “positive” life course policy, aiming to shape the life course by explicit intervention, can be found in parental leave policies, especially leaves for fathers. Here, the Nordic countries were pioneers. In line with Leisering’s view, Swedish sociologist Therborn (1989) has argued that the Nordic welfare state is based on the assumption that policies can indeed lead to personal change, e.g. create caring fathers and egalitarian partners! Iceland, Norway, and Sweden and, most recently, Germany and Portugal (Moss 2014) have introduced a “daddy quota”: weeks of parental leave exclusively reserved for fathers. Arnlaug Leira (2000) highlighted the importance of non-transferable (“use or lose”) leave entitlements for men, describing them as “fatherhood by gentle force”. The expanding literature on the gendered consequences of leave designs shows increases in men’s use of parental leave with the introduction of such non-transferable “daddy days” (Hegewisch and Gornick 2011).

Has the special quota for fathers made men more caring? Kotsadam and Finseraas (2011) would say the answer to this question is “yes”. They treated the implementation of the daddy quota in Norway as a natural experiment, and compared parents with children born just after the reform to parents with children born just before the reform. Parents in the “treatment” group were less likely to have conflicts over the division of household tasks, and more likely to share them. In their study of leave policies in Sweden, Norway, the Netherlands, Canada, Germany, the United Kingdom, Finland and Italy, Boll and colleagues (2014) found increased

levels of child involvement by the father after the introduction of daddy quota, particularly for highly educated men. Herlofson and Ugreninov (2014) report that Norwegian men are more involved in childcare after the introduction of the “daddy quota”, but *not* more involved in care for frail parents. Apparently, the policy reform does not make men generally more caring. Looking after children seems to result in such a depletion of men’s care resources that little is left for the older generation.

5.4 Intergenerational Care Regimes

Rather than focus on individual laws and policies, some scholars have attempted to create models of “care regimes”, including both care for the young and the old (e.g., Anttonen and Sipilä 1996; Bettio and Plantenga 2004; Daly and Lewis 2000; Korpi 2000; Leitner 2003; Sainsbury 1999). An attractive feature of these efforts to map intergenerational care regimes is that they overcome a “chopped up” view of families by considering multiple generations. A recent example is a model developed by Saraceno and Keck (2010), who examine how legal and policy frameworks affect the degree to which country-specific institutional frameworks impose reliance on family members and/or support individual autonomy/agency. The first pattern is *familialism by default*; situations where there are few or no publicly provided alternatives to family care and financial support. The second is *supported familialism*, where there are policies, usually in the form of financial transfers and leaves, which support families’ financial and caring responsibilities. The third is *defamilialisation*, where needs are partly addressed through public provision (services, income replacement). By identifying and measuring actual public provisions rather than using ideal types of welfare regimes, Saraceno and Keck capture the nuance that differentiates countries.

An important issue is whether policies involve *payments* for care, (*paid*) *leaves*, or the provision of *care services* (Javornik 2014).

When public support is offered in money rather than in kind, families can use it to buy help or to augment the family budget while providing care directly. This tradeoff might be different for families in different socioeconomic circumstances (cf. Gornick and Meyers 2008; Leitner 2003). The strategy of staying at home to provide care is more readily adopted by members of the working class (in practice: women). This reduces their ability to remain in the labor force and contributes to the likelihood of old-age poverty for themselves.

Cross-national comparisons reveal that the type of public provision offered has consequences for gender inequality. Using data from the Survey of Health, Ageing, and Retirement in Europe (SHARE), Schmid et al. (2012) confirm findings from many studies that show that women are more likely to provide intensive care to aging parents than men. However, the “imbalance” in the proportions of men and women providing such care is higher when aging parents receive public support—in addition to the care received from adult children—in the form of cash for care payments than when they receive public services (e.g., home help and home nursing). Apparently, the public provision of support services helps to keep both men and women involved in caring for frail parents, whereas care payments are a greater incentive for women than for men. Abendroth and colleagues (2014) demonstrate the differential effect of cash benefits, paid leaves, and child care services on women’s employment. Using data from the European Community Household Panel (ECHP), they show that the motherhood occupational status “penalty” is lower in European countries with high expenditures on public childcare. Contrary to expectations, they did not find a higher “penalty” in countries with high spending on family cash benefits. The authors argue that paid leaves and public childcare prevent mothers from being sidelined at critical career junctures, whereas cash benefits seem to maneuver women into the “mommy track”. These two studies clearly demonstrate how policies (or their absence) shape interdependence within and across family generations.

6 Structuring the Lives of Men and Women: Gender in Laws and Policies

Although there is a massive literature on cultural constructions of gender, differential socialization and role engagements, we have limited knowledge of how societal laws and policies create different social landscapes and structural maps for life trajectories of men and women.

In what follows we explore how gender, in combination with age, is a foundation for assigning rights and duties. We also examine gender differences in age boundaries for life phases or transitions. Our focus is on the EU-28 and OECD countries. Where it seems relevant, we expand our focus to other countries.

6.1 Roles Limited to One Gender

Are there adult roles which have legal rights/duties tied to only one gender? Do we find countries where citizenship rights, such as *suffrage*, differ between men and women? Saudi Arabia is the only United Nations member state in which women do not have the right to vote in national elections (Inter-Parliamentary Union 2014). Nations differ widely in the introduction of women’s suffrage. Early adopters of women’s right to vote were New Zealand (1893), Finland (1907), and Norway (1913). Late adopters are Switzerland (1971), Portugal (1976), and Bhutan (2008).³

Military service has long been the domain of men only. Of 33 nations surveyed (EU-28, Norway, Switzerland, the US, Canada and Israel), nine have a system of general *conscription*: Austria, Cyprus, Denmark, Estonia, Finland, Greece, Israel, Norway and Switzerland (Central Intelligence Agency 2014). In six of these, only men are subject to compulsory military service. Denmark, Israel and Norway have adopted conscription for women as well. In Denmark the type of duties might differ, whereas in Israel the conscript service obligation has a shorter duration for women.

³Source: <http://www.ipu.org/wmn-e/suffrage.htm>

Since it has been documented that women, across societies, are more likely to provide unpaid care than men, whereas men are more often gainfully employed, it is important to ask whether rights to *care leaves* are differentiated by gender. Among the OECD countries, Switzerland is the only one with a statutory maternity leave, but no leave for fathers (Family Database OECD 2014). The US is the only OECD member that has no statutory entitlement to any kind of parental leave. Several countries (e.g., Austria, Croatia, Finland, France, Germany, Iceland, Italy, Norway, Portugal, Sweden) have introduced a “daddy quota” (a period of leave that is for the exclusive use by fathers on a use-it-or-lose-it basis), or a “father bonus” (a payment, tax break or additional time away from work) to encourage fathers to take parental leave (Moss 2014). It is important to note that the design of leave policies differs considerably across countries in terms of length, level of wage replacement, the flexibility for taking leave, and rules governing fathers’ access to leave and/or the distribution of leave between parents (Ray et al. 2010). In Iceland, Norway and Sweden, uptake of paternal leave is mandatory if the full paid parental leave is to be granted.

An expanding number of developed countries offer leave entitlements to care for a wider range of family members (Moss 2014). Conditions for taking leave vary from relatively common sickness to critical illness or severe disability. Length, payment and other dimensions of leave also vary considerably. However, even though descriptions of the policies are gender neutral, using terms such as “employees” and “family members”, men are far less likely to make use of such leaves than are women, particularly if the leaves are unpaid (Moss 2014).

6.2 Gender Differences in Age Borders

Do men and women have different markers between life phases? Do rights/duties tied to age differ for men and women? We start by examining gender differences in the *age of majority*,

which is a key element in a wide range of legal regulations (Katz et al. 1973). Examples are the right to sign a contract and being subject to the juvenile or the adult criminal system. Utah state law provided a clear example: up until 1975, this state had a lower age of majority for women (Goldstein 1988). Parents were mandated to financially support men up to the age of 21, women up to age 18. The assumption was that women would marry earlier and be supported by their husbands.

Our search revealed no gender differences in the age of majority in OECD countries, but the actual ages differ across countries. In almost all OECD countries, the age of majority is 18 years (Family Database OECD 2013). Exceptions are Canada (19 in certain territories), Japan (20), Korea (19), New Zealand (20), and the United States (19 in certain states). Some countries in the Middle East stand out. Iran and Saudi Arabia have 8 as the age of majority for girls and 14 for boys (OECD/CAWTAR 2014). In Ireland, Portugal and Slovenia, a person can reach the age of majority below the legally defined age if he or she marries (Family Database OECD 2013).

The *marriageable age* is not necessarily identical to the age of majority. Again we find virtually no gender differences (Family Database OECD 2013) in OECD countries. The marriageable age is mostly set at 18, and is the same for both men and women. An exception is Luxembourg (18 for men and 16 for women). In most member states, persons can marry before the marriageable age, normally at 16, subject to parental consent or permission from the courts under special circumstances, such as pregnancy.

Legislators must strike a fair and reasonable balance between adolescents’ right to be protected from unwanted sex and the freedom to engage in self-determined sexual relationships through *age of consent*. Definitions of age below which all sexual contact was illegal were first introduced approximately 200 years ago (Graupner 2002). At the time the limits were set around the ages of 10–12. By the 1950s, legislators started to raise the age of consent. In the earliest laws, the minimum age limits covered vaginal intercourse only. Recently, minimum age

limits have been extended to lesbian and gay relationships. Traditionally, girls were seen as more vulnerable, so the age of consent was higher for girls than for boys. A 2002 overview showed that Estonia, Cyprus and Scotland still had different age limits for girls and boys (Graupner 2002). Current legislation shows no gender difference in the age of consent in OECD countries (Family Database OECD 2013). The minimum age typically varies between 14 and 16.

Public pensions are a set of policy arrangements that have assumed gendered and partnered life courses, with wives being primarily responsible for homemaking and family care, and husbands primarily responsible for generating income. The differential *pensionable age* fits this breadwinner model. In 2012, 22 EU and OECD countries had a lower statutory retirement age (age at which people gain the right to public old-age pension benefits) for women than men, but this number is decreasing (European Commission 2014; OECD 2012, 2014). European countries are currently in flux about whether the statutory retirement age also implies a mandated exit from the labor market (Marin 2013). Increasingly, countries are enabling employees to work longer. The US is rather special with its 1976 Supreme Court ruling that mandatory retirement is unconstitutional (Abramson 1977). Pension reforms are leading to an increasing equalization of retirement ages of men and women. After 2020, only Bulgaria, Chile, Israel, Romania and Turkey will continue to have different ages for men and women, given what is known about plans for reforms. Though the equalization of pensionable ages is reasonable, given women's longer life expectancy (Sundén 2010), women with histories of interrupted employment will have difficulty meeting the requirements for full pension benefits because they are often forced to retire (Marin 2013). It appears that pension reforms are assuming a further *masculinization* of women's life courses.

A variety of reasons are provided for having an earlier retirement age for women (Brocas et al. 1990). One is that it is a compensation for the "double shift" in many women's lives: combining housework, family care and a paid job. Another is that the couple can retire at the same

time. This logic clearly assumes that women are part of a couple as they near retirement. They tend to marry older men, so having an earlier retirement age for her implies that husband and wife can leave the labor market at approximately the same time. Ginn and Arber (1995) view the earlier retirement age as a means to maintain male financial dominance, by avoiding the possibility that still-working wives have higher incomes than retired husbands. Another argument is that women experience greater difficulty finding a new job once they pass a certain age. Arber and Ginn (1995) note that the lower age of pension eligibility may have reinforced the widespread prejudice that women "age" earlier than men, or that physical signs of aging are more detrimental for women (the so-called "double standard of aging") who become unfit for work in their 50s. This might especially apply to work in service industries, or other occupations in which physical appearance is important. The lower pensionable age is particularly problematic for divorced women, because it limits their options to accrue a late-life income of their own.

Women's permission or prescription for earlier labor force exit and public pension benefits might be viewed as a "privilege", but as Marin (2010) points out, an earlier retirement age is only an advantage in a pension system that provides women who retire early a higher rate of return on contributions, so that their pension income matches that of men who retire at a later age. With the move from defined benefit pension systems to defined contribution systems that is taking place across all advanced economies, women are losing the financial advantages of their "privilege" to retire early. A shorter qualifying period is likely to lead to lower pension income and increased poverty risks—particularly for women who cannot rely on a pension shared with a husband. Chłoń-Domińczak (2013) points out that a lower retirement age for women might lead to discrimination by employers, who run less risk of losing personnel with a 50 year old man who is probably interested in working at least 15 more years than with a 50 year old woman who might leave after 10 years. Perhaps the "years left" principle, currently under

consideration in the context of pension reform, will imply that women run less risk of discrimination by employers because they must work longer.

As yet, it is unclear what the income consequences will be of a pensionable age linked to developments in life expectancy. Will women be penalized because they live longer? A critical and gender-sensitive view is needed of the hidden and implicit assumptions underlying recent reforms. Do they build on a typical male life course with a long, uninterrupted work history? Do they build on breadwinner assumptions?

Taking the previously described laws and policies together, our conclusion is that there is a *convergence* between her and his age boundaries, rights and duties. Political pressure, leading to the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), has undoubtedly fuelled this development. The CEDAW is an international treaty adopted in 1979 by the United Nations General Assembly. Described as an international bill of rights for women, it came into force in 1981 and has been ratified by 188 of the 193 UN member states. In its 30 articles, the Convention explicitly defines discrimination against women and sets up an agenda for national action to end such discrimination.⁴ Our overview has briefly touched upon differences between de jure and de facto practices (e.g., marriageable age, take-up of care leaves). Societies have not yet bridged the gap between legislation aimed at achieving gender equality and established patterns of everyday lives of men and women. One issue requiring attention is gender-bias in the *implementation* of policies. For example, a recent Dutch study revealed that frail older women living with a partner were more likely to receive publicly funded home help than frail older men living with a partner—even though their circumstances were quite comparable (Schenk et al. 2014). The authors suggest that the public servants processing the home help requests perceive older men as less

able to provide care to their spouses. Another explanation is that the men more strongly feel they are entitled to public support because they perceive themselves as lacking the necessary caring skills. The gap between de jure and de facto practices represents a major challenge for social scientists with an interest in societal structuring of her and his adulthood.

6.3 Gender Differences in Credits for Role Engagement

Above, we focused on legislation structuring role entry and exit. Gendered life courses also serve as the basis for receiving publicly funded benefits through duration requirements. Are there differences in duration “credits” for men’s and women’s role engagement in terms of eligibility for unemployment benefits or pensions?

In many European countries, women may claim pension benefits as mothers and as family care providers. They receive credits in recognition of the unpaid work of child rearing and family care. *Care credits*, by acknowledging the time invested in childrearing and looking after dependent relatives, are not based on the norm of an uninterrupted work life until retirement. However care leaves are the only absences from work where *fixed flat rates* are sometimes applied (i.e. predetermined amount)—rather than the contributory social insurance principle (i.e. based on job history) that prevails in the more “male” social security arrangements of unemployment, health or accident insurance (Marin 2010). Flat-rated benefits generally have advantages for less qualified and less paid women workers but are detrimental to skilled and well-remunerated women. The more strides women make in the world of paid work, the greater the gaps between earnings-related and flat-rate pension credits will be. Countries that have residence-based minimum pensions (e.g., Iceland, the Netherlands and Norway) have a guaranteed retirement income based on years of residence and has no contributory payments or means-testing. Such minimum pensions are favorable to women

⁴For more information, visit <http://www.ohchr.org/en/hrbodies/cedaw/pages/cedawindex.aspx>

because they are not based on employment history (Marin 2010).

Care credits are a source of debate between “care feminists”, who call for greater recognition of women’s distinct contributions as caregivers and “employment feminists”, who feel that many women would benefit from stronger (not weaker) ties to paid work (Ray et al. 2010). The latter point to *disincentives* to work and reinforcement of traditional assumptions about gender roles, particularly when care credits are only awarded to women or only to men if women waive their rights (Expert Group on Gender Equality 2011).

Whereas men receive pensions largely as a result of their own employment history, women—as wives, divorcees, and widows—are more likely to be entitled to derived benefits, such as *survivor’s benefits* and benefits from pension sharing (Lewis 1997). Though benefits for the widowed tend to be couched in gender-neutral terms, the differences in life expectancy between men and women (and men marrying younger women) imply that women are the most likely recipients. In most European countries, divorcees are entitled to survivor’s benefits if they have received maintenance payments from the ex-spouse and have not remarried (MISSOC 2014). Systems of old-age assistance based on derived rights and marital status make gainful employment less rewarding for women, and lock them into domestic work or into work in the informal sector (Sundén 2010).

Marin (2010) points out that survivor’s benefits do not redistribute to women per se, but rather to ever-married couples. Never-married men and never-married women subsidize single breadwinner families and homemakers in particular. The most conspicuous example of such subsidization is the granting of generous survivor’s pension rights to as many women a man might have wished to marry over the course of his life—without any cost-sharing on his part. This policy of what Marin (2010, p. 216) calls “state subsidized serial monogamy” was apparently quite widespread in the civil service and occupational corporatist pension regimes in Central European countries. Cut backs were introduced only when young women professionals reported that more

pensions were being paid to surviving ex-wives of older colleagues than to retired members who had contributed to the pension schemes.

7 Returning to the Point of Departure

In the opening of the chapter, we drew some contrasts between foundational North American and European perspectives on the life course, arguing that the former often emphasized the impact of micro- and meso-levels of social context, such as families, social networks and communities, on individual life trajectories. A number of early North American scholars had a strong connection to the “Chicago school of sociology”. This tradition emphasized shared *meaning* and its creation, exemplified in Thomas’ concept, “definition of the situation”. In contrast, European classics focused on the macro-level, building especially on the works by Max Weber. They underscored how social institutions shape lives. Interestingly, while the early North American work recognized contrasts between her and his lives, Europeans initially had very little discussion of gender.

Today, it is very clear that if we want to understand contemporary structuring of men’s and women’s lives, we need to build on *both* macro- and micro perspectives. Silverstein and Giarrusso (2011) sum it up nicely: “Micro-interactions in the family may be shaped by the political economies and cultures within which those interactions are embedded, specifically the way in which welfare production is allocated among state, market and family” (p. 39). In our chapter, we have focused on some structural factors that have not been adequately considered in work on gendered life courses and interdependence among lives.

7.1 Neglected Structural Factors

The first area of neglect is *demographic change*: increasing longevity, combined with reduced fertility, is creating new late life potential and new opportunities for intergenerational connections. We argue that crucial insights into life course

structuring in the family context would be gained if scholars adopt a multigenerational focus, moving beyond the current main foci: couples raising children, and adult offspring caring for frail older parents. Demographic shifts are also increasing differences between men's and women's lives. Since women live longer, they have greater opportunities for longstanding relationships across family generations and with age peers.

The second area of neglect is the role of *laws and policies* in structuring interdependence among lives and the shaping of gendered lives. Overall, we find gender convergence in life structuring by laws and policies. Yet, we also observe strong contrasts between how men and women actually live their lives.

Levy, using a concept developed by E. Hughes, argues that men and women have different *master statuses*, locating them differently in the worlds of family and work (Levy 2013a, b; Krüger and Levy 2001). His perspective reflects Linton's (1942) and Parsons' (1942) discussions of roles based on age and sex. The master status implies that participation in other roles may be developed only insofar that it does not interfere with the primary responsibility. Thus, men's involvement in family tasks is secondary to breadwinner obligations, women's employment is subsidiary to the requirements of their caring roles. Recently, researchers have shown that such potential role conflict is not limited to mothers of young children, but increasingly also to women in the next generation: grandmothers who struggle to maintain a work career as well as provide the care for grandchildren (Meyer 2014).

7.2 Analytical and Methodological Challenges in Bridging Levels

We have discussed Kotsadam and Finseraas's (2011) comparison of "before" and "after" daddy quota cohorts, which indeed shows that policy change results in altered lives. Yet, natural experiments like theirs amply illustrate the unanswered questions in research that attempts to connect macro- and micro levels. How can we identify

underlying *mechanisms*? Do changing economic, political and legal contexts influence beliefs about what is possible, desirable, and normal? Do societal conditions take on personal meaning only when they get "translated" into family situations and family meaning systems? To what extent are individuals aware of societal forces that have shaped their choices and behaviors? If they are part of a clear cohort pattern, are they aware of it? Do we end up telling different stories if we aggregate from individual biographical accounts or examine macro-level societal patterns?

In order to begin to address the questions sketched above, we need dialogue and collaboration between research communities on two continents—one emphasizing culture and shared meanings on a meso-level; the other stressing macro-level structural conditions. We also need to overcome another "continental divide"—the chasm between qualitative and quantitative methodologies. As Levy (2013a) comments, the difference between a "subjectivist biographical" and a "factual life history" is often translated into a radical divide.

To arrive at a better understanding of macro—meso—micro links, we feel that a combination of methodological approaches is the route to follow. *Mixed-methods* are often espoused, but not often practiced in life course research. Scholars practicing quantitative and qualitative approaches seem to live in separate worlds. It is unusual to find publications that demonstrate the complementarity of the two approaches. Rare examples are Melinda Mills' research on non-standard work schedules in the Netherlands (Mills and Täht 2010), Laura Bernardi's work (Bernardi et al. 2007) on fertility in East and West Germany, and Helga Krüger's study (Krüger and Levy 2001) on the employment careers of German women. Interestingly, the authors started from substantive puzzles on the supposed influences of macro-level conditions that their quantitative data were not able to solve. Mills, for example, aimed to unravel why Dutch non-standard work schedules did not have negative effects on Dutch families—which was completely contrary to previous research based on American families.

She returned to her respondents whose biographical accounts revealed that Dutch couples voluntarily *choose* non-standard work schedules so they can spend more time with their families. We feel that life course researchers should emulate this kind of work. The ideal next step is to have a community of researchers who work on recorded *and* observed life histories, with comparisons across time and societies.

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References

- Aassve, A., Meroni, E., & Pronzato, C. (2011). *Grandparenting and childbearing in the extended family* (Dondena Working Paper No. 38). Milan: University of Bocconi.
- Abendroth, A. K., Huffman, M. L., & Treas, J. (2014). The parity penalty in life course perspective: Motherhood and occupational status in 13 European countries. *American Sociological Review*, *79*, 993–1014. doi:10.1177/0003122414545986.
- Abramson, L. W. (1977). Compulsory retirement, the constitution and the Murgia case. *Missouri Law Review*, *42*, 25–52.
- Ajrouch, K. J., Blandon, A., & Antonucci, T. C. (2005). Social networks among men and women: The effects of age and socioeconomic status. *Journal of Gerontology: Social Sciences*, *60*, 311–317. doi:10.1093/geronb/60.6.S311.
- Angrist, S. S., & Almqvist, A. M. (1975). *Careers and contingencies*. New York: Dunellen.
- Antonucci, T. C. (2001). Social relations: An examination of social networks, social support, and sense of control. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (pp. 427–453). San Diego: Academic Press.
- Anttonen, A., & Sipilä, J. (1996). European social care services: Is it possible to identify models? *Journal of European Social Policy*, *6*, 87–100. doi:10.1177/095892879600600201.
- Anxo, D., Bosch, G., & Rubery, J. (Eds.). (2010). *The welfare state and life transitions: A European perspective*. Cheltenham: Edward Elgar.
- Arber, S., & Ginn, J. (1995). Connecting gender and ageing: A new beginning? In S. Arber & J. Ginn (Eds.), *Connecting gender & ageing* (pp. 173–178). Buckingham: Open University Press.
- Bateson, M. C. (2010). *Composing a further life: The age of active wisdom*. New York: Vintage Books.
- Beck, U. (1992). *Risk society: Towards a new modernity* (M. Ritter, Trans.). London: Sage. (Originally published as *Risikogesellschaft: Auf dem Weg in eine andere Moderne*. Frankfurt am Main: Suhrkamp Verlag, 1986).
- Bernardi, L., Von der Lippe, H., & Keim, S. (2007). Social influences on fertility: A comparative mixed methods study in eastern and western Germany. *Journal of Mixed Method Research*, *1*(23–47), 2007. doi:10.1177/2345678906292238.
- Bettio, F., & Plantenga, J. (2004). Comparing care regimes in Europe. *Feminist Economics*, *10*, 85–113. doi:10.1080/1354570042000198245.
- Billari, F. C., Goisis, A., Liefbroer, A. C., Settersten, R. A., Aassve, A., Hagestad, G., & Spéder, Z. (2011). Social age deadlines for the childbearing of women and men. *Human Reproduction*, *26*, 616–622. doi:10.1093/humrep/deq360.
- Boll, C., Leppin, J., & Reich, N. (2014). Paternal childcare and parental leave policies: Evidence from industrialized countries. *Review of Economics of the Household*, *12*(1), 129–158. doi:10.1007/s11150-013-9211-z.
- Bordone, V., Arpino, B., & Aassve, A. (2012). *Policy perspectives of grandparents in Europe* (Dondena Working Paper No. 51). Milan: University of Bocconi.
- Börsch-Supan, A., Brügiavini, A., & Croda, E. (2009). The role of institutions and health in European patterns of work and retirement. *Journal of European Social Policy*, *19*, 341–358. doi:10.1177/1350506809341515.
- Brocas, A., Cailloux, A., & Oget, V. (1990). *Women and social security: Progress towards equality of treatment*. Geneva: International Labor Office.
- Buchmann, M. (1989). *The script of life in modern society: Entry into adulthood in a changing world*. Chicago: University of Chicago Press.
- Cain, L. D., Jr. (1964). Life course and social structure. In R. E. L. Faris (Ed.), *Handbook of modern sociology* (pp. 272–309). Chicago: Rand McNally.
- Cain, L. D., Jr. (1976). Aging and the law. In R. H. Binstock & E. Shanahas (Eds.), *Handbook of ageing and the social sciences* (pp. 342–368). New York: Van Nostrand Reinhold.
- Cain, L. D., Jr. (2003). Age-related phenomena; The interplay of the ameliorative and the scientific. In R. A. Settersten Jr. (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 295–325). Amityville: Baywood Publishing.
- Campbell, A., Converse, P., & Rogers, W. (1976). *The quality of American life*. New York: Russell Sage Foundation.
- Castles, F. G. (2003). The world turned upside down: Below replacement fertility, changing preferences and family-friendly public policy in 21 OECD countries. *Journal of European Social Policy*, *13*, 209–227. doi:10.1177/09589287030133001.

- Central Intelligence Agency. (2014). The world fact book. <https://www.cia.gov/library/publications/the-world-factbook/fields/2024.html>. Accessed 4 July 2014.
- Chłoń-Domińczak, A. (2013). *Female transition to retirement* (Neujobs working paper no. D16.2B). Retrieved from http://ibs.org.pl/projekty/files/neujobs/Female_transition_to_retirement_Agnieszka_Chlon-Dominczak.pdf
- Cho, S., Crenshaw, K. W., & McCall, L. (2013). Intersectionality: Theorizing power, empowering theory. *Signs*, 38, 785–810.
- Coleman, J. S. (1961). *The adolescent society: The social life of the teenager and its impact on education*. Glencoe: The Free Press.
- Coleman, J. S. (1982). *The asymmetric society*. Syracuse: Syracuse University Press.
- Connidis, I. A. (2014). Age relations and family ties over the life course: Spanning the macro–micro divide. *Research in Human Development*, 11, 291–308. doi:10.1080/15427609.2014.967050.
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, 4, 139–167.
- Daly, M., & Lewis, J. (2000). The concept of social care and the analysis of contemporary welfare states. *British Journal of Sociology*, 51, 281–298.
- Davis, K. (1945). The world demographic transition. *Annals of the American Academy of Political and Social Science*, 237, 1–11.
- Diewald, M. (2000). Continuities and breaks in occupational careers and subjective control: The case of the East German transformation. In J. Bynner & R. K. Silbereisen (Eds.), *Adversity and challenge in life in the new Germany and in England* (pp. 239–267). London: Macmillan.
- Durkheim, E. (1982). *Rules of sociological method* (S. Lukes, Ed.; W. D. Halls, Trans). New York: Free Press. (Originally published in 1895 as *Les règles de la méthode sociologique*).
- Dykstra, P. A., & Keizer, R. (2009). The well-being of childless men and fathers in mid-life. *Ageing & Society*, 29, 1227–1242. doi:10.1017/S0144686X08008374.
- Dykstra, P. A., & Komter, A. E. (2012). Generational interdependencies in families: The MULTILINKS research programme. *Demographic Research*, 27, 487–506. doi:10.4054/DemRes.2012.27.18.
- Eggebeen, D. J., & Uhlenberg, P. R. (1985). Changes in the organization of men's lives: 1960–1980. *Family Relations*, 34, 251–257.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1979). Historical change in life patterns and personality. In P. Baltes & O. Brim Jr. (Eds.), *Lifespan development and behavior* (Vol. 2, pp. 117–159). New York: Academic Press.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2004). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer.
- Elder, G. H., Jr., Shanahan, M. J., & Jennings, J. A. (2015). Human development in time and place. In M. H. Bornstein & T. Leventhal (Eds.), *Handbook of child psychology and developmental science* (Ecological settings and processes, Vol. 4, pp. 6–54). Hoboken: Wiley.
- Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton: Princeton University Press.
- Esping-Andersen, G. (1997). *The comparative political economy dimension. Life course profiles within different welfare regimes*. Paper prepared for the 1st International POLIS project workshop, European University Institute, Florence.
- Esping-Andersen, G. (2002). A child-centred social investment strategy. In G. Esping-Andersen, D. Gallie, A. Hemerijck, & J. Myles (Eds.), *Why we need a new welfare state* (pp. 26–67). Oxford: Oxford University Press.
- European Commission. (2014). *Adequacy and sustainability of pensions*. Retrieved from http://ec.europa.eu/europe2020/pdf/themes/04_pensions_02.pdf
- Expert Group on Gender Equality and Social Inclusion, Health and Long-Term Care Issues (EGGSI). (2011). *The socio-economic impact of pension systems on the respective situations of women and men and the effects of recent trends in pension reforms*. Retrieved from http://ec.europa.eu/justice/gender-equality/files/equal-economic-independence/pensions_report_en.pdf
- Family Database OECD. (2013). *PF 1.8: Legal age thresholds regarding the transition from child- to adulthood*. Retrieved from http://www.oecd.org/els/family/PF_1_8_Age_threshold_Childhood_to_Adulthood_Dec2013.pdf
- Family Database OECD. (2014). *PF 2.1 Key characteristics of parental leave systems*. Retrieved from http://www.oecd.org/els/soc/PF2_1_Parental_leave_systems_1May2014.pdf. Accessed 4 July 2014.
- Ferrarotti, F. (1981). On the autonomy of the biographical method. In D. Bertaux (Ed.), *Biography and society: The life history approach in the social sciences* (pp. 19–27). Beverly Hills: Sage.
- Fields-Smith, C. (2005). African American parents before and after Brown. *Journal of Curriculum and Supervision*, 20, 129–135.
- Fry, C. L. (2003). The life course as a cultural construct. In R. A. Settersten Jr. (Ed.), *Invitation to the life course: Toward new understanding of later life* (pp. 269–294). Amityville: Baywood Publishing.
- Furlong, A., & Cartmel, F. (1997). *Young people and social change: Individualisation and risk in the age of high modernity*. Buckingham: Open University Press.
- Ginn, J., & Arber, S. (1995). ‘Only connect’: Gender relations and ageing. In S. Arber & J. Ginn (Eds.), *Connecting gender & ageing* (pp. 1–14). Buckingham: Open University Press.
- Goldstein, L. F. (1988). *The constitutional rights of women: Cases in law and social change*. Madison: University of Wisconsin Press.

- Gornick, J. C., & Hegewisch, A. (2015). Gender, employment, and parenthood: The consequences of work-family policies. In D. Keleman (Ed.), *Lessons from Europe? What Americans can learn from European public policies* (pp. 17–41). Los Angeles: Sage.
- Gornick, J. C., & Meyers, M. K. (2008). Creating gender egalitarian societies: An agenda for reform. *Politics & Society*, 36, 313–349. doi:10.1177/0032329208320562.
- Grandits, H. (2010). Introduction: The reshaping of family and kin relations in European welfare systems. In H. Grandits (Ed.), *Family, kinship and state in contemporary Europe* (The century of welfare: Eight countries, Vol. 1, pp. 23–46). Frankfurt: Campus Verlag.
- Graupner, H. (2002). *Sexual consent: The criminal law in Europe and overseas*. Keynote-Lecture presented at the 7th International Conference of the International Association for the Treatment of Sexual Offenders, Vienna, Austria. Retrieved from <http://members.aon.at/graupner/documents/Graupner-paper-kn-ofN.pdf>
- Grundy, E., Murphy, M., & Shelton, N. (1999). Looking beyond the household: Intergenerational perspectives on living kin and contacts with kin in Great Britain. *Population Trends*, 97, 19–27.
- Hagestad, G. O. (2006). Transfers between grandparents and grandchildren: The importance of taking a three-generation perspective. *Zeitschrift für Familienforschung*, 18, 315–332.
- Hagestad, G. O. (2008). Changes in children's age and generation mosaics: Challenges to research and policy. In A. Leira & C. Saraceno (Eds.), *Childhood: Changing contexts* (Comparative Social Research series, Vol. 25, pp. 113–132). Bingley: Emerald.
- Hagestad, G. O., & Uhlenberg, P. (2005). The social separation of old and young: A root of ageism. *Journal of Social Issues*, 61, 343–360. doi:10.1111/j.1540-4560.2005.00409.x.
- Hagestad, G. O., & Uhlenberg, P. (2006). Should we be concerned about age segregation? Some theoretical and empirical explorations. *Research on Aging*, 28, 638–653. doi:10.1177/0164027506291872.
- Hank, K., & Kreyenfeld, M. (2003). A multilevel analysis of child care and women's fertility decisions in western Germany. *Journal of Marriage and Family*, 65, 584–596.
- Hareven, T. K. (1982). *Family time and industrial time*. Cambridge, UK: Cambridge University Press.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900–1902. doi:10.1126/science.1128898.
- Hegewisch, A., & Gornick, J. C. (2011). The impact of work-family policies on women's employment: A review of research from OECD countries. *Community, Work & Family*, 14, 119–138. doi:10.1080/13668803.2011.571395.
- Hellevik, T., & Settersten, R. A., Jr. (2013). Life planning among young adults in 23 European countries: The effects of individual and country security. *European Sociological Review*, 29, 923–938. doi:10.1093/esr/jcs069.
- Hendricks, J. (Ed.). (1980). *The country of the old*. Farmingdale: Baywood.
- Herlofson, K. (2013). How gender and generation matter: Examples from research on divorced parents and adult children. *Families, Relationships and Societies*, 2, 45–62. doi:10.1332/204674313X664699.
- Herlofson, K., & Hagestad, G. O. (2011). Challenges in moving from macro to micro: Population and family structures in ageing societies. *Demographic Research*, 25, 337–370. doi:10.4054/DemRes.2011.25.10.
- Herlofson, K., & Ugreninov, E. (2014). Er omsorgsfulle fedre omsorgsfulle sønner? Likestilling hjemme og hjelp til eldre foreldre [Are caring fathers caring sons? Gender equality at home and help to ageing parents]. *Tidsskrift for Samfunnsforskning*, 55, 322–346.
- Hernes, H. M. (1987). *Welfare state and women power: Essays in state feminism*. Oslo: Norwegian University Press.
- Inter-Parliamentary Union. (2014). *Women in parliament 2013. The year in review*. Retrieved from <http://www.ipu.org/pdf/publications/WIP2013-e.pdf>
- Javornik, J. (2014). Measuring state de-familialism: Contesting post-socialist exceptionalism. *Journal of European Social Policy*, 24, 240–257. doi:10.1177/0958928714525815.
- Kahn, R. L., & Antonucci, T. C. (1980). Convoys over the life course: Attachment, roles and social support. In P. B. Baltes & O. G. Brim (Eds.), *Life-span development and behavior* (pp. 253–286). New York: Academic.
- Kaptijn, R., Thomése, F., Van Tilburg, T. G., & Liefbroer, A. C. (2010). How grandparents matter: Support for the cooperative breeding hypothesis in a contemporary Dutch population. *Human Nature*, 21, 393–405. doi:10.1007/s12110-010-9098-9.
- Katz, S. N., Schroeder, W. A., & Sidman, L. R. (1973). Emancipating our children: Coming of legal age in America. *Family Law Quarterly*, 7, 211–241.
- Knipscheer, K., Dykstra, P. A., Utasi, A., & Cxeh-Szombathy, L. (2000). Ageing and the family. In G. Beets & K. Miltenyi (Eds.), *Population ageing in the Netherlands and Hungary: A European perspective* (pp. 181–199). Amsterdam: Thela Thesis.
- Kohli, M. (1985). Die Institutionalisierung des Lebenslaufs: Historische Befunde und theoretische Argumente [The institutionalization of the life course: Historical findings and theoretical arguments]. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 37, 1–29.
- Kohli, M. (1986). The world we forgot: A historical review of the life course. In V. W. Marshall (Ed.), *Later life: The social psychology of ageing* (pp. 271–303). Beverly Hills: Sage.
- Kohli, M. (2007). The institutionalization of the life course: Looking back to look ahead. *Research in Human Development*, 4, 253–271.
- Kohli, M., Albertini, M., & Künemund, H. (2010). Linkages among adult family generations: Evidence from comparative survey research. In P. Heady & M. Kohli (Eds.), *Family, kinship and state in*

- contemporary Europe* (Perspectives on theory and policy, Vol. 3, pp. 225–248). Frankfurt: Campus Verlag.
- Korpi, W. (2000). Faces of inequality: Gender, class, and patterns of inequalities in different types of welfare states. *Social Politics*, 7, 127–191. doi:10.1093/sp/7.2.127.
- Kotsadam, A., & Finseraas, H. (2011). The state intervenes in the battle of the sexes: Causal effects of paternity leave. *Social Science Research*, 40, 1611–1622.
- Krüger, H., & Levy, R. (2001). Linking life courses, work and the family: Theorizing a not so visible nexus between women and men. *Canadian Journal of Sociology*, 26, 145–166.
- Lazarsfeld, P., & Merton, R. K. (1954). Friendship as a social process: A substantive and methodological analysis. In A. Theodore & C. H. Page (Eds.), *Freedom and control in modern society* (pp. 18–66). New York: Van Nostrand.
- Leira, A. (2000). Combining work and family: Nordic policy reforms in the 1990s. In T. P. Boje & A. Leira (Eds.), *Gender, welfare state and the market: Towards a new division of labor*. New York: Routledge.
- Leira, A. (2002). *Working parents and the welfare state: Family change and policy reform in Scandinavia*. New York: Cambridge University Press.
- Leisering, L. (2004). Government and the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 205–225). New York: Springer.
- Leisering, L., & Leibfried, S. (1999). *Times of poverty in western welfare states*. Cambridge, UK: Cambridge University Press.
- Leitner, S. (2003). Varieties of familialism: The caring function of the family in comparative perspective. *European Societies*, 5, 353–375. doi:10.1080/1461669032000127642.
- Levy, R. (2013a). Analysis of life courses: A theoretical sketch. In R. Levy & E. D. Widmer (Eds.), *Gendered life courses: Between standardization and individualization. A European approach applied to Switzerland* (pp. 13–36). Zurich: LIT Verlag.
- Levy, R. (2013b). Life course analysis: A field of intersections. In R. Levy & E. D. Widmer (Eds.), *Gendered life courses: Between standardization and individualization. A European approach applied to Switzerland* (pp. 315–337). Zurich: LIT Verlag.
- Levy, R. & Widmer, E. D. (Eds.). (2013). *Gendered life courses: Between standardization and individualization. A European approach applied to Switzerland*. Zurich: LIT Verlag.
- Lewis, J. (1997). Gender and welfare regimes: Further thoughts. *Social Politics*, 4, 160–177. doi:10.1093/sp/4.2.160.
- Lewis, J. (2002). Gender and welfare state change. *European Societies*, 4, 331–357. doi:10.1080/1461669022000022324.
- Linton, R. A. (1942). Age and sex categories. *American Sociological Review*, 7, 589–603.
- Loder-Jackson, T. L., McKnight, A. N., Brooks, M., McGrew, K., & Voltz, D. (2007). Unmasking subtle and concealed aspects of parent involvement: Perspectives from African-American parents in the urban south. *Journal of School Public Relations*, 28, 350–379.
- Lofland, J. (1968). The youth ghetto: A perspective on the cities of youth around our large universities. *Journal of Higher Education*, 39, 121–143.
- Marin, B. (2010). Gender equality, neutrality, specificity, and sensitivity – And the ambivalence of benevolent welfare paternalism. In B. Marin & E. Zólyomi (Eds.), *Women's work and pensions: What is good, what is best? Designing gender-sensitive arrangements* (pp. 203–224). Farnham: Ashgate.
- Marin, B. (2013). *Welfare in an idle society? Reinventing retirement, work, wealth, health, and welfare*. Farnham: Ashgate.
- Matthews, S. H., & Sun, R. (2006). Incidence of four-generation family lineages: Is timing of fertility or mortality a better explanation? *Journal of Gerontology: Social Sciences*, 61, S99–S106.
- Mayer, K. U. (2003). The sociology of the life course and lifespan psychology: Diverging or converging pathways? In U. M. Staudinger & U. Lindenberger (Eds.), *Understanding human development: Dialogues with lifespan psychology* (pp. 463–481). Dordrecht: Kluwer Academic.
- Mayer, K. U. (2004). Whose lives? How history, society and institutions define and shape life courses. *Research in Human Development*, 1, 161–187. doi:10.1207/s15427617rhd0103_3.
- Mayer, K. U., & Müller, W. (1986). The state and the structure of the life course. In A. B. Sorensen, F. Weinert, & L. R. Sherrod (Eds.), *Human development and the life course* (pp. 217–245). Hillsdale: Lawrence Erlbaum.
- Mayer, K. U., & Schöppflin, U. (1989). The state and the life course. *Annual Review of Sociology*, 15, 187–209. doi:10.1146/annurev.so.15.080189.001155.
- McAdams, D. P., & de St. Aubin, E. (1992). A theory of generativity and its assessment through self-report, behavioral acts, and narrative themes in autobiography. *Journal of Personality and Social Psychology*, 62, 1003–1015. doi:10.1037/0022-3514.62.6.1003.
- McDonald, P. (2006). Low fertility and the state: The efficacy of policy. *Population and Development Review*, 32, 485–510.
- McKeering, H., & Pakenham, K. I. (2000). Gender and generativity issues in parenting: Do fathers benefit more than mothers from involvement in child care activities? *Sex Roles*, 43, 459–480.
- McMullin, J. (1995). Theorizing age and gender relations. In S. Arber & J. Ginn (Eds.), *Connecting gender and ageing: A sociological approach* (pp. 30–41). Bristol: Open University Press.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415–444. doi:10.1146/annurev.soc.27.1.415.
- Mead, M. (1970). *Culture and commitment: A study of the generation gap*. New York: Doubleday.

- Merton, R. K. (1979). The normative structure of science. In R. K. Merton (Ed.), *The sociology of science: Theoretical and empirical investigations* (pp. 267–278). Chicago: University of Chicago Press (Originally published as Merton, R. K. (1942). Science and technology in a democratic order. *Journal of Legal and Political Sociology*, 1, 115–126).
- Meyer, M. H. (2014). *Grandmothers at work: Juggling families and jobs*. New York: New York University Press.
- Mills, M., & Täht, K. (2010). Nonstandard work schedules and partnership quality: Quantitative and qualitative findings. *Journal of Marriage and Family*, 72, 860–875. doi:10.1111/j.1741-3737.2010.00735.x.
- MISSOC. (2014). European Commission. <http://www.missoc.org/MISSOC/INFORMATIONBASE/COMPARATIVETABLES/MISSOCDATABASE/comparativeTablesSearchResultTree.jsp>. Accessed 4 July 2014.
- Modell, J. (1989). *Into one's own: From youth to adulthood in America, 1920–1975*. Berkeley: University of California Press.
- Moen, P. (2001). The gendered life course. In R. Binstock & L. George (Eds.), *Handbook of ageing and the social sciences* (pp. 179–190). San Diego: Academic Press.
- Moen, P., Lam, J., Melanie, N. G., & Jackson, M. N. G. (2014). Aging families and the gendered life course 2014. In J. Treas, J. Scott, & M. Richards (Eds.), *The Wiley Blackwell companion to the sociology of families* (pp. 444–463). New York: Wiley.
- Mollenhorst, G., Völker, B., & Flap, H. (2008). Social contexts and core discussion networks: Using a choice-constraint approach to study similarity in intimate relationships. *Social Forces*, 86, 937–965. doi:10.1353/sof.0.0010.
- Moss, P. (Ed.). (2014). *International review of leave policies and research 2014*. Retrieved from http://www.leavenetwork.org/lp_and_r_reports/
- Neugarten, B. L. (1968). The awareness of middle age. In B. L. Neugarten (Ed.), *Middle age and ageing: A reader in social psychology* (pp. 93–98). Chicago: University of Chicago Press.
- Neugarten, B. L. (1969). Continuities and discontinuities of psychological issues into adult life. *Human Development*, 12, 121–130.
- Neugarten, B. L., & Hagestad, G. O. (1976). Age and the life course. In R. Binstock & E. Shanas (Eds.), *Handbook of ageing and the social sciences* (pp. 35–55). San Diego: Academic Press.
- Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology*, 70, 710–717.
- O'Connor, J. S. (1996). Citizenship, welfare state regimes and gender stratification. *Current Sociology*, 44, 48–77. doi:10.1177/001139296044002005.
- O'Rand, A. M. (1988). Convergence, institutionalization and bifurcation: Gender and the pension acquisition process. *Annual Review of Gerontology and Geriatrics*, 9, 132–155.
- OECD. (2012). *OECD pensions outlook 2012*. Paris: OECD Publishing.
- OECD. (2014). *OECD pensions outlook 2014*. Paris: OECD Publishing.
- OECD/CAWTAR. (2014). *Women in public life: Gender, law and policy in the Middle East and North Africa*. Paris: OECD Publishing.
- Orloff, A. S. (1993). Gender and the social rights of citizenship: The comparative analysis of gender relations and welfare states. *American Sociological Review*, 58, 303–328.
- Parsons, T. (1942). Age and sex in the social structure of the United States. *American Sociological Review*, 7, 604–616.
- Parsons, T., & Bales, R. F. (1955). *Family, socialization and interaction process*. Glencoe: Free Press.
- Pipher, M. B. (1999). *Another country: Navigating the emotional terrain of our elders*. New York: Riverhead Books.
- Plath, D. W. (1980). *Long engagements: Maturity in modern Japan*. Stanford: Stanford University Press.
- Plath, D. W., & Ikeda, K. (1975). After coming of age: Adult awareness of age norms. In T. R. Williams (Ed.), *Socialization and communication in primary groups* (pp. 107–124). The Hague: Mouton.
- Population Reference Bureau. (2014). *2014 world population data sheet*. http://www.prb.org/pdf14/2014-world-population-data-sheet_eng.pdf. Accessed 12 Dec 2014.
- Post, W., Van Imhoff, E., Dykstra, P. A., & Van Poppel, F. (1997). *Verwantschaps-netwerken in Nederland: Verleden, heden en toekomst* [Kinship networks in the Netherlands: Past, present and future] (NIDI Report no. 51). Den Haag: NIDI.
- Puur, A., Sakkeus, L., Pöldma, A., & Herm, A. (2011). Intergenerational family constellations in contemporary Europe: Evidence from the Generations and Gender Survey. *Demographic Research*, 25, 135–172. doi:10.4054/DemRes.2011.25.4.
- Ray, R., Gornick, J. C., & Schmitt, J. (2010). Who cares? Assessing generosity and gender equality in parental leave policy designs in 21 countries. *Journal of European Social Policy*, 20, 196–216. doi:10.1177/0958928710364434.
- Riley, M. W., & Riley, J. W., Jr. (2000). Age integration: Conceptual and historical background. *The Gerontologist*, 40, 266–270.
- Riley, M. W., Johnson, M., & Foner, A. (Eds.). (1972). *Ageing and society, vol. 3: A sociology of age stratification*. New York: Russel Sage Foundation.
- Riley, M. W., Kahn, R. L., & Foner, A. (Eds.). (1994). *Age and structural lag: Society's failure to provide meaningful opportunities in work, family and leisure*. New York: Wiley.
- Rosenmayr, L. (1983). *Die späte Freiheit: Das Alter, ein Stück bewußt gelebten Lebens* [The late freedom: Old age, a piece of consciously experienced life]. Berlin: Severin & Siedler Verlag.

- Rosenmayr, L. (2007). *Schöpferisch Altern, eine Philosophie des Lebens* [Creative ageing: A philosophy of life]. Münster: LIT Verlag.
- Rossi, A. S. (Ed.). (1985). *Gender and the life course*. Hawthorne: Aldine.
- Ryder, N. B. (1975). Notes on stationary populations. *Population Index*, 41, 3–28.
- Sainsbury, D. (1999). Gender, policy regimes, and politics. In D. Sainsbury (Ed.), *Gender and welfare state regimes* (pp. 245–276). Oxford: Oxford University Press.
- Sanderson, W. C., & Scherbov, S. (2007). A new perspective on population aging. *Demographic Research*, 16, 27–58. doi:10.4054/DemRes.2007.16.2.
- Saraceno, C. (2010). Social inequalities in facing old-age dependency: A bi-generational perspective. *Journal of European Social Policy*, 20, 32–44. doi:10.1177/0958928709352540.
- Saraceno, C., & Keck, W. (2008). *The institutional framework of intergenerational family obligations in Europe: A conceptual and methodological overview*. Deliverable 1.1 for the FP-7 funded project “How demographic changes shape intergenerational solidarity, well-being, and social integration: A multilinks framework”. Retrieved from http://www.multilinks-project.eu/wp-content/uploads/2009/04/Report_Saraceno_Keck_Nov081.pdf
- Saraceno, C., & Keck, W. (2010). Can we identify inter-generational policy regimes in Europe? *European Societies*, 12, 675–696. doi:10.1080/14616696.2010.483006.
- Schenk, N., Dykstra, P., Maas, I., & Van Gaalen, R. (2014). Older adults’ networks and public care receipt: Do partners and adult children substitute for unskilled public care? *Ageing & Society*, 34, 1711–1729. doi:10.1017/S0144686X1300469.
- Scherbov, S., Sanderson, W. C., Samir, K. C., & Lutz, W. (2014). Re-measuring twenty first century population ageing. In W. Lutz, W. P. Butz, & S. Kc (Eds.), *World population & human capital in the twenty-first century* (pp. 563–590). Oxford: Oxford University Press.
- Schmid, T., Brandt, M., & Haberkern, K. (2012). Gendered support to older parents: Do welfare states matter? *European Journal of Ageing*, 9, 39–50. doi:10.1007/s10433-011-0197-1.
- Schütz, A. (1967). *The phenomenology of the social world*. Evanston: Northwestern University Press.
- Segalen, M. (2010). The modern reality of kinship: Sources and significance of new kinship forms in contemporary Europe. In P. Heady & M. Kohli (Eds.), *Family, kinship and state in contemporary Europe* (Perspectives on theory and policy, Vol. 3, pp. 249–270). Frankfurt: Campus Verlag.
- Settersten, R., Jr. (2003). Propositions and controversies in life-course scholarship. In R. Settersten (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 15–45). Farmingdale: Baywood.
- Settersten, R. A., Jr., & Hagestad, G. O. (1996a). What’s the latest? Cultural age deadlines for family transitions. *The Gerontologist*, 36, 178–188.
- Settersten, R. A., Jr., & Hagestad, G. O. (1996b). What’s the latest? II. Cultural age deadlines for educational and work transitions. *The Gerontologist*, 36, 602–613.
- Silverstein, M., & Giarrusso, R. (2011). Aging individuals, families, and societies: Micro–meso–macro linkages in the life course. In R. A. Settersten Jr. & J. L. Angel (Eds.), *Handbook of sociology of aging* (pp. 35–49). New York: Springer.
- Smith, J. A., McPherson, M., & Smith-Lovin, L. (2014). Social distance in the United States: Sex, race, religion, age, and education homophily among confidants, 1985 to 2004. *American Sociological Review*, 79, 432–456. doi:10.1177/0003122414531776.
- Sørensen, A.-M. (1987). Married women’s economic dependency, 1940–1980. *American Journal of Sociology*, 93, 659–687.
- Sørensen, A.-M. (2005). Family structure, gender roles and social inequality. In S. Svallfors (Ed.), *Analyzing inequality. Life chances and social mobility in comparative perspective* (pp. 108–128). Palo Alto: Stanford University Press.
- Spéder, Z., Murinkó, L., & Settersten, R. A. (2014). Are conceptions of adulthood universal and unisex? Ages and social markers in 25 European countries. *Social Forces*, 92, 873–898. doi:10.1093/sf/sot100.
- Sundén, A. (2010). A discussion of retirement income security for men and women. In B. Marin & E. Zólyomi (Eds.), *Women’s work and pensions: What is good, what is best? Designing gender-sensitive arrangements* (pp. 59–75). Farnham: Ashgate.
- Therborn, G. (1989). Social steering and household strategies: The macropolitics and the microsociology of welfare states. *Journal of Public Policy*, 9, 371–397.
- Tobío, C. (2007). Change and reciprocity in intergenerational relationships: The discourse of Spanish working mothers. In J. Véron, S. Pennec, & J. Légaré (Eds.), *Ages, generations and the social contract: The demographic challenges facing the welfare state* (pp. 191–207). Dordrecht: Springer.
- Uhlenberg, P. (1980). Death and the family. *Journal of Family History*, 5, 313–320.
- Uhlenberg, P. (1996). Mortality decline in the twentieth century and supply of kin over the life course. *Gerontologist*, 36, 681–685. doi:10.1093/geront/36.5.681.
- Uhlenberg, P. (2004). Historical forces shaping grandparent-grandchild relationships: Demography and beyond. In M. Silverstein & K. W. Schaie (Eds.), *Annual review of gerontology and geriatrics* (Vol. 24, pp. 77–97). New York: Springer.
- Uhlenberg, P. (2009). Children in an aging society. *Journal of Gerontology: Social Sciences*, 64B, 489–496. doi:10.1093/geronb/gbp001.
- Van Bavel, J., & De Winter, T. (2013). Becoming a grandparent and early retirement in Europe. *European Sociological Review*, 29, 1295–1308. doi:10.1093/esr/jct005.
- Van Bohemen, S. R. J. M., Van Zoonen, E. A., & Aupers, S. (2014). Negotiating gender through fun and play: Radical femininity and fantasy in the Red Hat Society.

- Journal of Contemporary Ethnography*, 43, 582–600. doi:[10.1177/0891241613505865](https://doi.org/10.1177/0891241613505865).
- Vanderbeck, R. M. (2007). Intergenerational geographies: Age relations, segregation and re-engagements. *Geography Compass*, 1(2), 200–221. doi:[10.1111/j.1749-8198.2007.00012.x](https://doi.org/10.1111/j.1749-8198.2007.00012.x).
- Vaupel, J. W. (2009). In search of time won: About the future of aging societies. In Max Planck Society for the Advancement of Science (Ed.), *Annual report 2008* (pp. 47–50). Munich: Max Planck Society.
- Vaupel, J. W. (2010). Biodemography of human ageing. *Nature*, 464, 536–542. doi:[10.1038/nature08984](https://doi.org/10.1038/nature08984).
- Viazzo, P. P. (2010). Family, kinship and welfare provision in Europe, past and present: Commonalities and divergences. *Continuity and Change*, 25, 137–159. doi:[10.1017/S0268416010000020](https://doi.org/10.1017/S0268416010000020).
- Victor, C. R. (2010). *Ageing, health and care*. Bristol: Policy Press.
- Wenger, G. C. (2009). Childlessness at the end of life: Evidence from rural Wales. *Ageing & Society*, 29, 1243–1259. doi:[10.1017/S0144686X09008381](https://doi.org/10.1017/S0144686X09008381).
- Young, F. W. (1965). *Initiation ceremonies: A cross-cultural study of status dramatization*. New York: Bobs-Merrill.

Part II

Changing Social Contexts and Life Course Patterns

Family Heterogeneity Over the Life Course

Sandra Hofferth and Frances Goldscheider

Ongoing debate in the academic study of the family focuses on the link between family change and concomitant economic, ideational, and social change. For example, even though the history of the modern U.S. focuses on the search for individual freedom and rights, many political and social groups have adhered to traditional views of the family, reinforcing patriarchal gender and intergenerational relationships (e.g., old-order Amish, Mormon groups). At the same time, we have seen an expansion of family forms, including a rapid increase in acceptance of equal treatment for, and even marriage between, same gender partners, the development of pioneering technologies for starting families (e.g., assisted reproductive technologies), and a longer term challenge to traditional family structures from changing gender roles. Increasing heterogeneity across gender and social class, plus changing views of the role of biology and even childbearing in family formation, have led to a proliferation of different family choices and hence even more potential heterogeneity in the life courses of the next generation.

Perhaps most profoundly, these changes in gender roles, in particular in the relationships between men and women as couples, are reshaping the life course. Since the 1960s, industrialized countries, including the United States, have

experienced dramatic increases in the labor force participation of women, including married mothers. When women entered the public sphere formerly dominated by men, this “first half” of the gender revolution breached the structure of the separate spheres that had characterized the gender balance since the mid-nineteenth century, when the Industrial Revolution first took the majority of men out of the agricultural household economy.

Even before the growth in female labor force participation, the life course of women was dramatically reshaped by declines in fertility and mortality, which meant that a domestic life was no longer a life-long job for them. This became particularly the case once school came to take so much of children’s time and urbanization removed so many of women’s farm-based tasks (e.g., maintaining a garden and preserving food together with caring for small animals) (Stanfors and Goldscheider 2015). Women found that they could contribute more to their family’s well-being by entering paid employment, particularly once the children began school, and increasingly by continuing in the jobs they had pursued before they had a family. This made preparation for employment (i.e., more education) increasingly important for women, and the slowing of men’s wage increases meant that men came increasingly to depend on an earning spouse. This has begun to place increased pressure to share in the domestic sphere on men, who, by joining women, will complete the second half of the gender revolution.

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The family prepares the next generation for adopting adult roles, particularly establishing their own families. The life course principle of timing informs our presentation. Experiences as children in the family of origin set the stage for later life and generational succession; thus, this chapter spends considerable time on the socialization of children and youth within the family. Second, we focus on the principle of linked lives. Family linkages may be stable and long-lasting or unstable and tenuous. Finally, we emphasize individual agency and change. Behaviors, attitudes, and beliefs are not transferred intact. Individuals are not confined to repeating the past; they are influenced not just by their families but also by the social networks, communities, and historical period in which they live. The chapter highlights key family behaviors and circumstances that can influence potential life course trajectories.

This chapter is organized around the stages of the life course: childhood and adolescence, adulthood, and old age. Within each section, to the extent research exists, we examine three key themes: (1) gender (focusing on the two halves of the gender revolution), (2) biological and social influences versus individual preference, and (3) changing norms linked to increased family heterogeneity (social class, family structure, immigrant/minority status, couples' sexual orientation). We focus on describing changing patterns, describing determinants and summarizing evidence on consequences. Throughout we will consider the fundamental principles of life course analysis: historical time and place, timing, linked lives, and human agency (Elder 1998), and in each case, we provide suggestions for pushing the research area forward.

1 Childhood and Adolescence

The changing structures of adult roles by gender are beginning to reshape children's preparation in childhood. Most dramatically, this is reflected in changes in education. However, non-school activities are changing rapidly as well, although not always in directions consistent with the ongoing changes in adult lives.

1.1 Educational Enrollment/Attainment: Convergence by Gender

The big news is that males' educational enrollment/attainment superiority has ended, and even been reversed, with young women now much more likely than young men to be enrolled in college and to have completed college degrees. In 2012, 44.5 % of women 18–24 were enrolled in degree-granting institutions compared to 37.6 % of men (Federal Interagency Forum on Child and Family Statistics 2014). This is in sharp contrast with 1970, when only 20 % of young women of that age were enrolled, compared with 32 % of young men (Federal Interagency Forum on Child and Family Statistics 2014). Men's increase was marginal, women's dramatic. More young women (11.3 %) had completed a BA or more, compared with 8.9 % of young men. This is not primarily because of differences in high school completion, although differences have emerged at this level as well. In 2012 only 9.1 % of 18–21 year olds were neither high school graduates nor enrolled in high school; this was somewhat higher for males (10.5 %) than females (7.9 %) (U.S. Census Bureau 2012). The increased education of women has implications for families through the life course both directly and through its link to increased labor force participation.

1.2 Gender Socialization

Despite the decade-long 'stall' in support for female labor force participation in the United States, which ended late in the first decade of the twenty-first century (Cotter and Hermsen 2014), a number of studies showed that men's and women's allocation of time to paid and unpaid work had become more similar (the two halves of the gender revolution), with the gender gap in the unpaid work of cooking, cleaning, and child care narrowing during the 2000–2010 decade (Bianchi and Milkie 2010). Although a substantial part of the narrowing vis-à-vis housework resulted from declines in married women's time, with regard to child care all of the narrowing resulted from increases in men's time (Bianchi and Milkie 2010).

A cross-national study of 20 countries covering the 1965–2006 period found an increase of an average of 6 h per week in employed, married men's household work and child care time (Hook 2006).

Given the trend toward gender convergence in economic and domestic roles in young adulthood, have there been major differences in socialization by gender beyond educational attainment? Lacking information about parental views on gender socialization, we document what children actually do. Because parents are making the decisions for their children, examining how children spend their time gives us a window on changes in parental values and beliefs over time. We now have two major studies of American time use in the past decade. The Panel Study of Income Dynamics Child Development Supplement (PSID-CDS) obtained information on the time use of children 6–12, and the American Time Use Survey (ATUS) obtained reports from individuals 15 and older. We use the PSID CDS for children's time; for the time of adolescents 15–19 we use the ATUS.

Studies of both children and adolescents show dramatic convergence by gender in household work, albeit to a low level. Housework time dropped significantly for girls between the early 1980s and 1997, from 4:35 to 3:38 h per week, and again between 1997 and 2003, to 3:09 h, a decline of nearly a third overall (31 %). There was a much smaller decline for boys, who recorded 2 h 52 min, 2 h 42 min, and 2 h 28 min at these three time points (Hofferth and Sandberg 2001; Hofferth 2009). Hence, by 2003 girls 6–12 spent only about a half hour more weekly time in housework than boys of the same age, compared with a difference of nearly 2 h in the early 1980s (Hofferth 2009). The continued difference between boys and girls in household work is confirmed by recent data on 15–19 year olds from the ATUS (Porterfield and Winkler 2007).

Although gender differences in socialization have been and remain large, there has been some convergence between boys and girls in one important arena. Research has shown that between 1981 and 1997 girls' participation in sports increased (Hofferth and Sandberg 2001). This was linked to the passage of Title IX

legislation, which prohibited discrimination in school sports programs. However, the two are not at parity because boys also increased their participation, but not as dramatically. Although in 2003 their participation rates were similar (57 % for girls vs. 63 % for boys), boys averaged an hour more per week than girls playing sports (4:29 vs. 3:07) (Hofferth 2009). Recent data show that boys 15–19 continue to exceed girls in time spent in sports (Porterfield and Winkler 2007). Sports is an area in which convergence between men and women could substantially alter attitudes of men towards equality of capabilities outside the household and increase men's willingness to become equal partners within in the household. Shared interest in sports might create stronger bonds between men and women. In addition, sports participation has been linked to greater post-secondary school success for boys (Glick and Hohmann-Marriott 2007; Feldman and Matjasko 2005; McNeal 1995), although it is not uniformly positive, as it has also been linked to greater alcohol use for both boys and girls (Eccles and Barber 1999).

An important major gender difference also occurs in the use of electronic media. In 2008 boys 10–18 spent 14 h per week watching television and girls spent 12. At that time boys' play time consisted more of video game (5.00 vs. 0.94 h) and computer game play (1.86 vs. 0.71 h) than girls' (Hofferth and Moon 2011). Girls have increased their time spent playing video games, but it is still much less than males. Both males and females have increased their use of the web and email, but girls are more likely to use it (38 % vs. 28 %) and spend more time in email (2.06 vs. 1.63 h per week). This, again, is an indicator of a potentially critical barrier to overcoming gender differences at home.

Finally, and of some concern, in 2003–2004 male teens 15–19 spent less time than female teens doing homework (Porterfield and Winkler 2007). Almost 64 % of boys spent fewer than 5 h per week on homework, compared with 58 % of girls. Similarly, only 17 % of boys spent more than 10 h on homework, compared with 21 % of girls. The lower amount of time boys spend in homework is likely linked to their lesser college enrollment (Feliciano and Rumbaut 2005).

The important conclusion is that even though activities such as household work have declined over time for girls, the gendered nature of their time remains strong. Boys spend less time than girls both on housework and homework, leaving them less prepared for the major work and family roles of adulthood and more prepared to spend time in sports and electronic gaming. Gender differences in activities are likely to affect family formation in the early adult life course.

1.3 Heterogeneity in Socialization by Social Class

In her ethnographic book, *Unequal Childhoods*, Annette Lareau emphasized social class differences in child rearing, with middle class families engaging in what she called concerted cultivation and lower class families engaging in what she called natural growth (Lareau 2003). She argued that middle class parents make conscious decisions to promote the growth and development of their children, through placing them in organized extracurricular activities, negotiating with institutions, and communicating verbally with the child. Children of working and lower class parents, in contrast, place them in fewer organized extracurricular activities; rather, they permit more child-initiated play, promote interaction with kin, but spend less time in verbal discussions. Parental goals are primarily to ensure safety and discipline, leaving children to develop naturally. Although Lareau's social class distinction is based upon both parental occupation and education levels, parental education appears to be primary and we use it as our indicator of class.¹

¹The major criticism of Lareau's conceptualization is that family structure and class are confounded. All of the poor families in her study were single parent families whereas all of the middle class families were two-parent families. Given the large differences in available time in two-parent and single parent families, natural growth may result more from lesser availability of parental time and resources than education/class. Research shows that parental goals and values are similar in both middle and working class families; what differ are the constraints that income and family structure place on them (Hofferth et al. 2009).

Based upon the time use literature, we see considerable differences in time use by parental education among children 15–19 enrolled in high school (Porterfield and Winkler 2007). The largest distinction is in homework: 4.3 h per week for children whose highest-educated parent did not finish high school compared with 6 h for children of parents with a BA and 9 h for children whose parent completed a professional or graduate degree. Household work goes in the opposite direction; nearly 4 h per week are spent in household work by children with a parent who did not finish high school compared with 2.6 h by children with a parent who has a professional or graduate degree. Differences in sports hours by parental education are smaller. Children of highly educated parents spend about 5 h per week playing sports, compared with 6.3 for children of parents without a high school degree. The only other major educational difference is that paid work has a curvilinear relationship with education. Children of the least educated and the most educated parents spend the least time in paid work (Porterfield and Winkler 2007). TV viewing and video game time are both lower for children of more-educated parents, who try to control excess television and game playing, than children of less educated parents (Hofferth 2010). Children of mothers who completed a college degree spent 3 fewer hours per week watching television and 2 fewer hours playing video games than children of mothers who completed high school or less (Hofferth 2010).

Some research examines differences in socialization by immigrant and native families, particularly comparing immigrant Hispanic and native Hispanic families. Children of immigrants spend more time studying, less time in activities such as sports, less time playing video games but more time watching television, and more time in household work (girls) (Hofferth and Moon 2013).

1.4 Heterogeneity in Socialization by Family Structure

Family structure, which is linked to social class, has a strong effect on children's share of housework.

Not only do children take a considerably larger share if they grow up in a mother-only family, but boys in particular share much more, especially adolescent boys, not only ‘replacing’ the normal father’s tasks (lawn work and home maintenance), but also more “female-typed” chores, including grocery shopping, cooking, housecleaning, as well as childcare, dishes, and paperwork. There are similar effects on children living in a stepparent family, but they are not as strong (Goldscheider and Waite 1991).

Mothers’ family experiences in childhood and young adulthood (childhood family structure and nonfamily living in early adulthood) have more mixed effects on their children’s involvement in household chores. Mothers who themselves grew up in a mother-only family involve their sons and daughters more in household tasks than women who grew up in traditional two-parent families, but women who experienced non-family living in early adulthood involve them less than women who did not (even controlling for college education) (Goldscheider and Waite 1991).

In sum, the results suggest that girls are still receiving more training than boys in household work, little though both may receive. Boys are more heavily involved in sports and video/computer gaming but there is little research that informs us what the influence of the focus on such activity in high school has on later family formation and family involvement or on educational and occupational success. In terms of social class differences, children of educated parents spend less time in household work and less time working for pay during the school year than children of less educated parents. They also spend less time watching television and playing video games and they spend more time in homework and traditional extracurricular activities other than sports. Finally, very little is known about the socialization of children of immigrants for later family life. What the implications of their different experiences are for boys’ and girls’ later life course is known only from piecing together disparate research findings. There is clearly room for more systematic study.

1.5 Socialization for Family Life: A Theoretical Approach

As we argue in this chapter, children’s families today are much more heterogeneous than in the past. In addition to families with two married, biological parents, children live with two unmarried biological parents, one parent and a stepparent, single parents, and other relatives such as grandparents (Hofferth et al. 2013). They may have two parents of the same gender. Thus socialization for parenthood and family life has become complicated. No longer can it be assumed that children are being reared for participation in two-sex, two-biological parent families. The experience of family structures in early childhood is likely to have long-term effects on socialization for family tasks and behaviors in adulthood. Researchers have studied long term associations for women to some extent, but few have examined long-term associations for men. Parenthood is a more heterogeneous experience for men than women; mothers tend to live with their children, but many fathers do not, and others live with stepchildren. The fact that boys raised with a stepfather are more likely to become stepfathers themselves implies socialization for different types of fathering roles (Goldscheider and Sassler 2006).

Why would there be different outcomes of growing up in different family types? Three theoretical perspectives on family process in different family types shape our understandings of these likely outcomes: social learning, social control, and instability.

Social learning theory predicts that experience in the family during childhood will influence family attitudes, expectations, and roles in adulthood. Two-parent families provide important training in the roles of men and women in families. It cannot be assumed that children who were raised in other families will learn this lesson; rather they learn messages from the types of families they experience as children. Given how important is the emotional context for learning, the learning that takes place in the home is likely very strong and very salient to children, and

hence difficult to modify. Growing up with a single parent is potentially the most isolating of the family types. Although few children spend their entire childhood with only one parent, learning partner skills may be especially difficult for boys with extended time in a single parent family unless they have role models outside the family. The proportion of children born to an unmarried mother doubled between 1980 and 2013, to 41%; much of the growth was fueled by an increase in births to cohabiting mothers, now more than half of all unmarried parent births and one-quarter of all births (Manning et al. 2014). Black mothers are still more likely to be single mothers (as was also the case in 1980), whereas White and Hispanic unmarried mothers are today more likely to be living with a partner than in the past. Researchers often include the latter with two-parent biological families, though many are unmarried stepfamilies. They differ from married biological parent families in the lower age, education, and income of the partners, and the greater fragility of their unions (Sassler 2010).

One area of increased research interest is that of the outcomes for children of growing up with same-sex parents compared with opposite sex parents. France, for example, did not allow gay and lesbian couples to adopt children, arguing that heterosexuality was an essential part of culture that was learned at home (Butler 2004). Research on children of lesbian parents has not found differences in the development of children, although children's gender and sexual behavior and preferences have not been extensively studied (Biblarz and Savci 2010). Even less research has focused on socialization and outcomes for children living with gay fathers.

The second theoretical approach argues that social control, which also varies across family types, is critical to socialization. Research has shown that, even if the family is warm, children who are not monitored do not do as well as those who are regularly monitored (Maccoby and Martin 1983). Limit-setting is an important aspect of appropriate parenting. Of course, monitoring and keeping track of children is easier when there are two parents (Forste and Jarvis 2007). Stepfamilies may be less effective as well

because of the ambiguity of the role of stepparent. Even if the parent remarries, a new stepparent usually has difficulty filling the role of the other parent, which may be why stepfathers have been shown to monitor children less than biological fathers (Hofferth and Anderson 2003). The issue of control may be one of relevance to immigrant parents, who are less proficient in the language and culture of the host country; children often serve as translators and guides to their own parents, reversing family roles (Glick 2010).

Finally, the third aspect of the family that could influence children's development of family behaviors is instability. Research suggests that the disruption of routines may be more detrimental to children's lives than the type of family (Wu and Martinson 1993). Family structure changes result in more disruption than just changes in parents; changes in parenting, neighborhood, school, and friends are also likely to occur. These changes may increase stress and lead to behaviors by children to reduce conflict and increase closeness outside the family, such as increased sexual activity, precocious adult behavior, and early departure from the parental home (Deleire and Kalil 2002; Goldscheider et al. 2014; McLanahan and Sandefur 1994; Wu and Thomson 2001).

1.5.1 Heterogeneity by Gender

Research has shown that males' responses to different family processes differ from those of females. Only a few studies have information about family processes and eventual family formation behavior for both males and females. We focus on findings from research examining the transition for both, as this permits a gender comparison.

Females are very influenced by their relationship with their mother; those growing up close to their mother did not transition to early parenthood as often as those less close. In addition, social learning plays an important role; young women who grew up with a single mother and never lived with a father tended to transition to motherhood, particularly single motherhood, sooner than those living with two parents (Hofferth and Goldscheider 2010). In this type of household, young women learn how to become a

single mother and do not learn how to negotiate with a partner. Intergenerational ties in single mother families are strong.

Males, in contrast, appear to be influenced by instability (Hofferth and Goldscheider 2010). The more family transitions experienced, the greater the chance of the young man becoming a father at a young age. This is probably because transitions are linked to changes in male father-figures with whom conflict is likely. Both closeness and monitoring are key family processes; having a close relationship and being monitored, but with some say in the rules, appears to be the ideal socialization scenario as it delays an early transition to parenthood. Closeness to the mother was most important to the type of transition to fatherhood. Men who were close to their mother growing up became residential fathers even if they were monitored strictly with no say about family rules. However, otherwise similar children who were strictly monitored but were not close to their mother were more likely to become nonresidential fathers (Hofferth and Goldscheider 2010).

1.5.2 Heterogeneity by Social Class

Parental resources are important in family formation, as their benefits accrue to children. Both women and men who grow up with better educated parents and in a higher income household delay family formation (Hofferth and Goldscheider 2010). The theory is that children will have less incentive to leave resource-rich families if they do not need to. Parents “buy” delays in family formation, permitting children more preparation time for the transition to adulthood (Haveman and Wolfe 1994; Goldscheider et al. 2014).

2 Young Adulthood and Adulthood

2.1 Transformation Due to the Gender Revolution

Women’s life course has been transformed by their growing participation in the labor force, the first half of the gender revolution. Their earnings have become central to their families’ well-being. If

once having a working wife was problematic for young men, this is no longer the case; men have come to expect a working spouse (Gerson 2010; Goldscheider and Kaufman 2006). As a result, although American young adults continue to form conjugal unions and become parents, in most cases this occurs much later in young adulthood.

2.2 Union Formation

2.2.1 Delayed Union Formation and Parent-Young Adult Coresidence

Age at first marriage has been increasing over the past 30 years; the median age at marriage for women was 25.8 in 2006–2010 compared with 21 in 1976. Similarly, the median age at marriage for men was 28.3 in 2006–2010 compared with 22.9 in 1976. In 2006–2010, 44 % of women compared with 31 % of men were married by age 25 (Copen et al. 2012).

As a result, young adults gained several years between completing school and forming a new family. Although some experienced episodes of non-family living, many returned or remained in their parental homes, increasing intergenerational coresidence (Kahn et al. 2013). Only 8.6 % of young adults aged 25–44 were living with their parents in 1980; in 2010, this was the case for 16.9 %. Further, although such intergenerational coresidence often reflected the needs of the older generation (in 1960, 53 % of Americans 45+ living with an adult child were financially dependent on them), by 2010, this was the case for only 27 % (Kahn et al. 2013). This pattern was even more marked among Black young adults than non-Blacks (Kahn et al. 2013).

Further, as marriage moves to older ages, the length of the time in which individuals have to select a partner is lengthening and the number of options for romantic relationships has expanded from dating to short-term casual sexual relationships (“hook-ups”) to “visiting” to cohabitation (Sassler 2010). This means that the process of partner selection has become more complex and heterogeneous. We do know that cohabitation has increasingly become the precursor to marriage,

with the majority of young adults in their twenties having lived with a partner (Sassler 2010). Although middle class youth increasingly delay childbearing until after marrying in their mid-twenties, a substantial minority, particularly those who are not college bound, form their families early and without marriage. Those who begin childbearing outside of a marital union are, in turn, less likely to later marry. In 2011, 36 % of White mothers, 54 % of Hispanic mothers, and 72 % of African American mothers were unmarried at their child's birth (McLanahan and Jencks 2015). This has resulted in a bimodal distribution of children's families, with White children growing up for the most part with two married parents, and Black and increasingly Hispanic children growing up in arrangements, such as cohabitation and visiting, that are less stable, with parents who are economically insecure, younger, less educated, and with potential mental health problems (Osborne and McLanahan 2007). Barriers to marriage need to be further explored. It is a widely noted conundrum that same-sex couples eagerly anticipate and celebrate marriage, whereas many of these young heterosexual couples do not see (a good) marriage as an attainable or even a beneficial goal (Edin and Kefalas 2005; Sassler and Cunningham 2008), particularly as the economic fortunes of less-educated men have tumbled and women's have risen.

Individuals choose their partners—marriages are not random events—but matching individuals is not an easy task. Given its importance and rapid change in the ways adolescents and young adults connect and establish romantic unions, it is surprising that there is not more research on the process of partnering and marital/relationship sorting. Of course, it is only recently that our large-scale surveys have begun to catalog the pre-marital relationships of youth, and document dates of cohabitation. In addition, most research has focused on adolescents and youth; given the rise in divorce and remarriage, it is surprising that few studies have examined these processes among more mature men and women (Sassler 2010).

2.2.2 Social Class Differences in Union Formation

What is striking today is the growth in educational homogeneity in mate selection. The proportion of partners whose education level is the same has increased to 55 % from a low of 45 % in 1960 (Schwartz and Mare 2005). There is similarly a decline in the proportion of partners who differ by one or two education categories. For those whose educational levels differ, there has been a sharp decline in those couples in which the husband's education exceeds that of the wife; this is a result of the previously described increase in female schooling levels. Homogamy appears to be particularly strong for the college-educated and for those with only a high school degree. Cherlin (2010) suggests that there are different marriage markets for the least educated, those with a high school degree and perhaps some college, and the college educated.

Given the increased time and attention children are spending online, communicating and gaming, it is only logical that finding a partner is now an objective of complex computerized systems and is a major business; one in ten American adults reports having used an online dating site, 38 % of single Americans who are looking for a partner have used an online dating site, and 23 % have met a spouse or long-term partner through these services (Smith and Duggan 2013). Even so, it is not a science. The strongest evidence for how difficult it is to predict a successful match is provided by the Washington Post Date Lab (Antoniades 2011). Success stories are very rare. Even though participants are chosen by what they share in experiences, preferences and attitudes, the most common complaint is that "the spark" is not there.

In fact, for most young adults, choice is quite constrained by the community they live in, which is not nearly as broad as the Date Lab area. Individuals who live in low income neighborhoods with poor schools and who do not have resources to move from them are constrained to relationships with others in those neighborhoods, who also have had poor educational opportunities

and do not know what other relationships are possible (Edin and Nelson 2013). Although online dating sites expand the range of opportunities, still there is a financial barrier to entry and such services are unlikely to accept low-income men and women.

Although a plethora of options are available for the college-educated youth, and a few ethnographic descriptions of family formation among those with a high school education or less are in print (Edin and Nelson 2013; Edin and Kefalas 2005), there is little available information about the mating and matching process among youth with some college education. In addition, how the mating process differs for young immigrants is very much unknown. It is likely that religious and community organizations serve as the mechanism for mate selection for these relatively traditional ethnic groups.

2.3 Transition to Parenthood

Although we have pointed to enormous heterogeneity in mate selection and family formation, probably the most heterogeneity lies in the context of the transition to parenthood and parenting behavior following childbearing.

2.3.1 Meaning of Parenting; Motivation for Childbearing and Later Involvement

One of the critical questions for modern families is: what is the motivation for parenthood and parental (particularly father) involvement? In the past, children were critical to the family economy. Without a source of labor on the farm or in the business, families could not survive. Even after the Industrial Revolution removed labor from the home, children continued to be socialized in ways that would continue the occupational line from father to child; whether in a family business, in a similar factory or industry, or in a similar or related profession.

Additionally, having a child was important to continue the family line or family name. In nearly all societies the family was the important unit; having children and grandchildren increased

one's stature and position in a society. Rather than contributing economically, children have to some extent become both a product of the union and a consumption item. Time with children has increased whereas another task of the household (household work) has declined over the decades (Sayer et al. 2004). The growth of intensive parenting means that bearing and rearing a child has become a major project for middle class families. Recognizing various motivations to have a child furthers our understanding of how parenting has changed and what new motivations have arisen.

Although some nations (e.g., Italy) have extremely low fertility, in the United States childbearing has hovered at replacement level, suggesting that the cultural context matters. One of the reasons for a lack of concern about fertility levels in the U.S. is that the U.S. continues to have high levels of immigration; Hispanic women, the bulk of female immigrants, had a fertility rate of 2.89 compared with the total fertility rate of 2.1, the level required to maintain a stable population (Cherlin 2010).

2.3.2 Biological Relationship and Marital Status of Children's Parents

One of the major stories regarding family change is the large shift in the structure of families rearing children from two married biological parents to a variety of other family types, particularly, families headed by unmarried mothers. This has resulted from increased out-of-wedlock childbearing; between 1960 and 2013 the proportion of babies born to unmarried mothers increased from 5 % to 41 % (Child Trends 2014). However, this increased heterogeneity is also due to a continued high probability of divorce (Cherlin 2010). Many of these families will eventually be headed by two parents, one of whom is a stepparent. In 2009, 56.7 % of children lived with two married biological parents, 3.3 % lived with an unmarried biological mother and father, and an additional 1.5 % lived with adoptive parents; 27.3 % lived with only one parent; and 4.2 % lived with no parent, including grandparents, other relatives, or non-relatives only (Kreider and Ellis 2011). Living with a biological parent and a stepparent were

7.1 % of children. A major implication of these trends is increased involvement of nonbiological mothers and fathers in parenting children.

2.3.3 Social-Normative Expectations for Nonbiological Parents

From a normative standpoint, although the relationship between husband and wife is institutionalized through marriage, the relationship of a stepparent to a stepchild is not (Cherlin 1978). However, there has been substantial research on the normative expectations for stepparents and the consensus appears to be that, in the United States, stepparents are expected not to be parents, although some financial support is expected. They are expected to be friendly and supportive of the biological parent, but not disciplinarians (Coleman et al. 2000). Research consistently shows that stepparents monitor children less than do biological parents. The expectation for stepparent involvement when the parents are unmarried is even more ambiguous than is the case for married stepparent couples. Unmarried relationships have been shown to be shorter in duration (Seltzer 2000). Another source of ambiguity is introduced by the regular involvement of the non-residential biological father of the children, which may interfere with the involvement of a stepfather (Hofferth and Anderson 2003).

Potentially the most ambiguous is the case in which the couple has both biological children and stepchildren, a blended family. Because differential treatment of children in the same family is obvious and normatively unacceptable, research clearly shows less differentiation in the treatment of biological and stepchildren in such families and fewer outcome differences (Hofferth and Anderson 2003).

Even though it makes a lot of sense that biological fathers will invest more in children than nonbiological fathers, there are well-documented cases of stepfather care for stepchildren in non-human species (Hofferth and Anderson 2003). Investing in the children of his partner (relationship or mating effort) increases the chance that she will want to have children with him. In addition, of course, the relationship between the partners is strongly linked to the quality of his

relationship with her children. The same argument applies to stepmothers and their partners' children. However, because the woman usually has the option of having her own children and often does, there may be less incentive for her to invest in the children of her partner unless there is a quid pro quo; he invests in hers as well. The proportion of stepfamilies involving a coresidential biological father and stepmother is small compared to those involving a biological mother and stepfather, and less is known about them.

It has been argued that after the relationship with the mother, men's attitudes about fathering are the most powerful psychosocial determinants of paternal involvement. Research suggests that changes in attitudes are associated with changes in fathering behavior; of course, we do not know which comes first. Changes in family structure have been occurring over the past 50 years and changes in father behavior have been similarly documented. Comparing fathering attitudes over even the short period between 1997 and 2003 indicates that fathering attitudes have become more positive over the period (Hofferth et al. 2013). Better educated fathers, those employed part-time, and those caring for a child without another caregiver had the most positive attitudes towards fathering. Positive fathering attitudes were associated with greater engagement, warmth, control, and discussion about rules with their child.

2.4 Family Processes

2.4.1 Gender Differences in Family Processes

Does the gender of children matter to family processes? Recent research suggests that a variety of parental behaviors are linked to the gender of the child. Is gender becoming less important? The following summary was drawn from a paper by Raley and Bianchi (2006), which summarizes what research tells us about gender differences in family processes. Basically, there is some evidence for a son preference among fathers. Men were more likely to marry the mother when they had a son, they worked more hours, they spent

more time with a son, men stayed married longer, and they were more likely to gain custody of the child or at least maintain contact with the custodial mother and child after divorce. Finally, fathers were more likely to invest in the college education of sons compared with daughters. The evidence from time spent with sons versus daughters suggests that this difference is declining; however, to the extent that men continue to do gender-typed activities themselves, it will not change very rapidly.

2.4.2 Social Class Differences in Family Processes

Resources always matter for the maintenance of relationships. The more resources the more benefit to be gained from the relationship. Therefore, it is important to consider the income/educational level of the couple when examining family processes. Recent research argues that relationships in middle class families emphasize the bond between partners—the husband and wife, mom and dad. The tie with the mother kept the man with the family and his children. This is the “package deal” that Townsend described (Townsend 2002). Middle class children reared in two-parent households expect to have that type of family themselves. Children who move from a nuclear family of origin are more likely to create an independent nuclear family unit of two parents and children. However, if the couple breaks up, the father’s tie with the children is often broken. A new stepfather in the family can replace some of the fathering function of the biological father, though usually not all of it.

Kathryn Edin argues that in low income families, in contrast, the link is primarily between parent and child, not between partners (Edin and Nelson 2013). The partner relationship is often brief before a child arrives; it has little time to develop. Once the relationship dissolves, the mothers move into relationships with other men and the fathers with other women. Fathers maintain their relationship with the mother of their child solely for the father-child bond. In this situation the family is the vertical or extended family; fathers have closer ties to their own parents and family of origin than to their partner and

partner’s family. A new partner to the mother of the child does not try to replace the child’s father in the child’s affections.

2.4.3 Differences by Race/Ethnicity and Immigrant Origin

The above picture reflects primarily research on African American and White families. Little is documented about the Latino family. Immigrant families have a higher birth rate and raise a higher number of children in their families. We know that Latino families tend to be headed by two married biological parents; in 2011, 73 % of children of immigrant parents were living with two parents, compared with 60 % of children of native-born American parents (Laughlin 2014). However, the fact that in 2011 more than half of Latino mothers were unmarried at birth is a cause of concern (McLanahan and Jencks 2015). Little is known about pre-birth partnering or post-birth marriages among Latino groups. Asian youth are even less studied. Today one-quarter of American children are from immigrant families and in some states the fractions are much higher. Research on how minority and immigrant children are reared to become parents and partners is needed as the population becomes less white, more minority, and more heterogeneous culturally.

2.5 Intergenerational Consequences

Family structure transitions are not random events but are highly responsive to childhood conditions and early life events and circumstances. Children growing up in the rarified atmosphere of high parental resources and education may be able to counter any instability and changes in structures. Further, higher income families are less likely to disrupt. This leaves those families with the least resources in the worst conditions upon family disruption.

Research has demonstrated the intergenerational transmission of parenting processes. A child’s positive engagement with his father contributes to the former’s successful transition to adulthood, and in turn, to greater involvement

with his own children (Hofferth et al. 2012). Improved attitudes towards fathering and increased involvement of men with their children are good signals that men's involvement will continue to increase. The only caution is that the literature also suggests that norms and models regarding father involvement are changing rapidly and that in this period it does not take a lot to either encourage or to discourage fathers from being involved. From a policy perspective, this includes workplace policies that make parental leave available and supportive employers that make it possible and acceptable to take such leave. Even today it is still often considered unacceptable for men to take leave even though it is acceptable for women (Pleck 1993).

Again, the reach of early childhood is long. Low-income parents today face a burden of potential violence and injury or death in their communities through firearms and other forms of violence. How families can better manage their lives to reduce this threat and still live relatively free lives has become an important issue. The large and increasing gap in life style across economic strata and the decreasing willingness of some well-off groups to support expenditures for the youngest generations is an increasing problem. Early childhood and school programs will need to be more and more cognizant of the variety of families represented in their schools and the needs of families throughout the life course. A recent paper called for greater attention by pediatricians to early childhood difficulties that disadvantaged children and their families face with the goal of reducing physical strains or "toxic stress" that can later become serious health impairments absent appropriate intervention (Shonkoff et al. 2012).

3 Challenges of Aging: Retirement and Sharing Housework

The decisions and experiences made across the life course accumulate to shape the later phase of the life course. As childhood activities shape those in adulthood, so both sets of activities continue to influence those later in the life course.

Although research on the effects of non-family-related experiences in childhood has begun, such as how ill health in childhood affects health and survival in old age, and how the experience of poverty in childhood has lingering effects, the cumulative effects of family patterns over the full life course is one of the greatest open challenges in the study of the life course and the family (Goldscheider 1990).

In this section, we lay out the challenges separate spheres couples face at retirement, given the great increase in joint survival among couples who remain married, and provide some evidence that the challenges might be less for couples who have shared work and family tasks. However, we have found little research on gender roles in retirement, in part because the pioneers of the increase in women's labor force participation have only just begun to retire, and few of the male pioneers in sharing household tasks have begun to retire. Research that clarifies how these challenges might differ by class, race/ethnicity, or the presence of non-biological ties, has not yet developed. Another important axis of differentiation might be couple age differences, given the structuring of retirement within the U.S. Social Security system.

3.1 Retirement and Sharing Housework in Separate Spheres Marriages: A Theoretical Approach

Women's historical specialization in the domestic sphere has had many repercussions—for them and for the men they live with. To begin with, women's specialization in homemaking, together with increased life expectancy, has created a life course trajectory for them with several distinct "segments" and hence a marriage trajectory marked by built-in radical transformations (Goldscheider 2000). The male-female relationship has become fraught throughout its length with difficult transitions, given the ideology of the separate spheres and the small families and long lives women achieved due to the demographic transition. Men and women who marry in their

20s or early 30s and have an average of two children can expect their marital relationship to survive until long after the children have grown and are actively involved in their own parental and even grandparent roles. The “empty nest” stage, which was once rarely achieved, is now the rule in marriages that survive divorce (Glick 1977).

If one were to describe the “ideal” life course stages of a traditional marriage, given low mortality and fertility, they would normally include at least four, each with a very different balance in men’s and women’s relative power and responsibility:

- both partners childless and employed, a transition for both from full-time student;
- parenthood, with women redefining themselves as childrearsers and drastically increased male financial responsibility;
- the empty nest, as women “retired” from daily parenthood and hence reduced household responsibility, while men maintain financial responsibility; and finally
- the husband’s retirement.

If one re-negotiation of power and responsibility is difficult for most relationships (consider the difficulties of renegotiating the parent-child relationship when the child becomes an adult), dealing with four transformations clearly puts significant stress on the quality and strength of the marital tie.

Further, with women primarily involved with childrearing and providing little financial contribution to the family economy, there was an even greater need in such families for men to work long hours away from the home to provide support for the children and for their wives who were raising them. The closeness and warmth developed during courtship and nurtured in the early years of marriage often withered as their separate roles as the mothers of children and the breadwinners of families separated their lives.

Finally, when it came time for him to retire, such couples were likely to have a major crisis to challenge them, since his work life was over but her remaining home tasks were not. There are four possibilities for this situation, all of which

likely cause considerable suffering for traditional couples. The first possibility is a problem for wives. Husbands often successfully invade their wives’ sphere, expecting increased domestic services and supervising their wives’ activities more directly, given greater opportunity and access to do so, leading to anger and resentment among their wives.

In the next two possibilities, wives successfully defend their separate sphere. In one, husbands enter the family on the wife’s terms—as her bumbling assistant. In the other, husbands stay “out of the kitchen” altogether. In both of these cases, the husbands were likely to suffer, since just when they are experiencing separation from their full-time employment, they become servants—or outcasts—in their own homes.

A few families might find their way to the fourth possibility, and become egalitarian after the children leave home or when husbands have fewer work hours to justify their noninvolvement in the home and its tasks. The extent of this change is rarely large, however, because the long years under a different, separate spheres regime are difficult to undo; this reaction may cause great suffering, as well. Unlike families used to sharing productive roles inside and outside the home, separate spheres relationships have little experience with re-negotiating the fundamental changes needed as the balance of work and leisure shifts. It is hardly surprising, then, that those with low levels of marital satisfaction postpone retirement (Kubicek et al. 2010).

3.2 Research on Family History and Retirement

How well does this analysis fit actual data on couples’ activities in later life? As we noted, this is an area that needs much more research. Women continue to do much more housework than men after retirement, both in the United States and other industrialized countries (Anxo et al. 2011; Gauthier and Smeeding 2003). There is some convergence, however, in part because women’s hours decline and in part because men’s hours increase. Two studies considered the effect of

gender role attitudes on this transition, but found either no effect or even counterintuitive effects (Solomon et al. 2004; Szinovacz 2000). This is surprising, as research on marital happiness has found that men aged 51–92 with more egalitarian gender role attitudes report greater marital happiness (Kaufman 2006). No racial differences were found, nor were class differences explored.

4 Challenges to Ways of Thinking About Families and Family Formation

4.1 Same Sex Couples

In 2010, an estimated 5.5 per 1,000 U.S. households (646,000) were comprised of same-sex couples (Gates and Cooke 2014). A substantial number of these households were rearing children. Data from the U.S. Census Bureau's American Community Survey indicate that about 235,700 minor children were living in same sex couple households in 2012 (Payne 2014). Of all same sex couple households, about one in five had minor children present. About half of the households had only one child. Not surprisingly, more female couple households (28 %) had minor children than male couple households (13 %). In comparison, of all family households in the U.S. in 2010, about 45 % had minor children (U.S. Census Bureau 2012). The proportion with minor children was highest among same-sex couples with the lowest education levels: 40 % of female couples and 29 % of male couples with less than a high school education, compared with 24 % and 9 % for female and male couples, respectively, with a bachelor's degree. It was also higher among Blacks (44 % and 25 % for female and male couples, respectively) than Whites (25 % and 11 %, respectively).

The number of studies of gay and lesbian couples rearing children is still small, and because of the difficulty in identifying them, still of unknown national representation. One of the leaders in disseminating information about such families is the Williams Institute (Gates and Cooke 2014).

4.2 Adoption and Assisted Reproductive Technologies

About 12 % of women 15–44 find it difficult or impossible to conceive. The proportion is small for younger women but reaches one quarter by the late 30s and early 40s (Chandra et al. 2005). The availability of adoption, assisted reproductive technology (ART), and surrogacy has improved the access of couples to childbearing and rearing.

Adoption has remained at a relatively low level. In 2002, 13 % of women reported rearing a child who was not related to them, compared with 11 % in 1995 (Chandra et al. 2005). Women with less education and lower income are more likely to be parenting a nonbiological child: 21 % of women who had completed less than high school vs. 8 % of college graduates. Similarly, 19 % of nonHispanic black women compared with 10 % of nonHispanic white and Hispanic women cared for nonbiological children.

Although the proportion of women 25–44 who used any infertility service was 19 % in 2006–2010, the proportion using ART is quite small, under 1 % (Chandra et al. 2014). About 9 % of men 25–44 reported using an infertility service.

There are basically three forms of ARTs:

- Intrauterine Insemination (IUI), in which male sperm are inserted into the female.
- In Vitro Fertilization in which the egg is fertilized by the sperm in the laboratory and the embryo placed in the mother's uterus.
- Third Party ART, including Sperm Donation, Egg Donation, and Surrogates and Gestational Carriers to carry the baby to term. All these require assistance from third parties.

In 2006–2010, more than one-third of women with current fertility problems reported using medical help to get pregnant (36 %) (Chandra et al. 2014). Among women aged 25–44 in 2006–2010 with current fertility problems, women most commonly reported using advice (29 %), infertility testing (27 %), and ovulation drugs (20 %). About 7 % reported artificial insemination, 3 % had ever undergone surgery or treatment for blocked tubes, and 3 % had ever used

ART. Among women with fertility problems there were differences in the use of infertility services by social class; 58 % of women with a bachelor's degree reported their use, compared with 33 % of women without a bachelor's degree. Married women were more likely to seek such assistance (55 %) compared with cohabiting women (21 %) and women who were neither married nor cohabiting (21 %). Similarly, seeking such assistance was more common for White than for other women: 44 % for nonHispanic Whites, 38 % for Hispanics, and 28 % for Blacks. Same-sex couples are pursuing these options to bear children (Biblarz and Savci 2010), and they may fall into the "other" category as described here. No national statistics are available for them.

Some research is available on factors associated with seeking to use these technologies to have a child, but more is needed, particularly for same-sex couples. More research is also needed on the consequences of their use for parents and for the children (Biblarz and Savci 2010).

5 Conclusions

In this chapter we have pointed out important convergences in the lives of men and women. First, we have noted that young women now surpass young men in college entry and college graduation. Second, socialization in the home as indicated by household activities has become more similar, with the household work of boys and girls converging to a low level, whereas girls' participation in sports and computing have risen, though not to the level of boys, and boys do less homework. Third, women's participation in the labor force has risen and men's has declined. American women still tend to start families earlier than men and take time off to rear young children; however, the participation of men and women outside the home in either school or work has been converging such that the difference was only 9 % in 2013 compared with 21 % in 1980. The major shift is that there is a convergence in involvement with children, with men increasing their involvement with their children and women remaining at the same high level even though

they are also participating in the work force. Much remains to be learned about these powerful changes in gender roles and relationships from childhood to old age.

A number of studies demonstrate the link between early life family structure and process, including father involvement, indicating that how they are reared influences how young adults rear their own children. Although future research into linkages between family processes and own parenting is needed, we can conclude that father involvement is likely to continue to increase because the feedback is positive. Certainly one of the most interesting new findings is that fatherhood is highly motivating for young low-income males. More needs to be done to capture this motivation and shape it into long-term relationships with children and with a positive parenting partnership with the child's mother. We do not yet know how to do this, unfortunately, as the initial studies of the Healthy Marriage Initiative (e.g., Building Strong Families) have not demonstrated overall improvements in outcomes for fathers or children from the current interventions (Wood et al. 2014). We need more tests of interventions that provide job counseling and jobs as well as family support and coparenting education. Programs need to incorporate economic and educational opportunities for young parents.

Nevertheless, although many young women now prepare through education and early employment for a sharing relationship predicated on the 'completion' of both halves of the gender revolution, structural barriers, which lead many young women (and even more young men) to prepare for a more conventional gender division of labor (male provider, woman caregiver), remain. This is particularly problematic in the United States, which provides families with no paid parental leave or subsidized, quality child care. This often requires one parent to "drop out" of the labor market, normally the mother. Unlike most other industrialized countries, the U.S. also does not tax incomes independently, so that the smaller income (typically the wife's) is taxed at a higher rate than the larger income. These barriers loom very high when children are young, when wives' incomes tend to be lowest and children's costs in

time and money tend to be highest, making it difficult to see the long-term gains in wives' earnings from continuous employment relative to the short-term costs they are facing. Further, mothers face much more of a wage penalty than other women (or men), one that is particularly large among working class women, who can least afford reliable childcare.

Given their frequent use in the U.S., we need to know more about the outcomes for children and families of assistive reproductive technologies to bear children. We also need more research on families formed by same sex couples. Such research is only in its early stages. These families permit tests of the source and maintenance of gender roles and the importance of biology.

Family formation today is different from the traditional courtship process; the use of complex statistical algorithms to identify potential matches through matchmaking sites may result in a larger set of potential partners than were available in the past; this may have advantages for young people today. We see no signs in the U.S. of reduction in demand or desire for children. In fact, immigrant parents tend to have larger families than natives; immigration has been an important source of renewal and will continue to be such. Research on the needs of immigrant families and their children should continue to grow and develop as should research on attitudes of whites who are apparently uneasy at the idea of a majority-minority nation (Ingraham 2014). The willingness of white Americans to invest in schools and services for minority children will be an important test of the inclusiveness of our great Melting Pot and a key factor in U.S. continued world competitiveness over the coming decades.

References

- Antoniades, C. B. (2011, July 28). Five years of Date Lab: Who got hitched, who got ditched and what we've learned in our quest for a spark. *Washington Post Magazine*. Retrieved from http://www.washingtonpost.com/lifestyle/magazine/five-years-of-date-lab-who-got-hitched-who-got-ditched-and-what-weve-learned-in-our-quest-for-a-spark/2011/07/05/gIQAIIUeI_story.html
- Anxo, D., Mencarini, L., Pailhe, A., Solaz, A., Tanturri, M., & Flood, L. (2011). Gender differences in time use over the life course in France, Italy, Sweden and the US. *Feminist Economics*, 179, 159–195.
- Bianchi, S., & Milkie, M. (2010). Work and family research in the first decade of the 21st century. *Journal of Marriage and Family*, 72, 705–725.
- Biblarz, T., & Savci, E. (2010). Lesbian, gay, bisexual, and transgender families. *Journal of Marriage and Family*, 72, 480–497.
- Butler, J. (2004). *Undoing gender*. New York: Routledge.
- Blossfeld, H.-P., & Hakim, C. (1997). *Between equalization and marginalization: Women working part-time in Europe and the United States of America*. Oxford: Oxford University Press.
- Chandra, A., Martinez, G., Mosher, W., Abma, J., & Jones, J. (2005). *Fertility, family planning, and reproductive health of U.S. women: Data from the 2002 National Survey of Family Growth* (Tech. Rep. No. 23(25)). Hyattsville: National Center for Health Statistics.
- Chandra, A., Copen, C., & Stephen, E. (2014). Infertility service use in the United States: Data from the National Survey of Family Growth, 1982–2010. *National Vital Statistics Report*, 73, 1–19.
- Cherlin, A. (1978). Remarriage as an incomplete institution. *American Journal of Sociology*, 84(3), 634–650.
- Cherlin, A. (2010). Demographic trends in the United States: A review of research in the 2000s. *Journal of Marriage and Family*, 72, 403–419.
- Child Trends. (2014). *Births to unmarried women*. <http://www.childtrends.org/?indicators=births-to-unmarried-women>
- Coleman, M., Ganong, L., & Fine, M. (2000). Reinvestigating remarriage: Another decade of progress. *Journal of Marriage and the Family*, 62(4), 1288–1307.
- Copen, C. E., Daniels, K., Vespa, J., & Mosher, W. D. (2012). First marriages in the United States: Data from the 2006–2010 National Survey of Family Growth. *National Health Statistics Reports*, 49, 1–22.
- Cotter, D., & Hermsen, J. (2014, July 30). *Back on track? The stall and rebound in support for women's new roles in work and politics, 1977–2012* (brief report). Retrieved October 7, 2014, from <https://contemporaryfamilies.org/gender-revolution-rebound-brief-back-on-track/>
- Deleire, T., & Kalil, A. (2002). Good things come in threes: Single-parent multigenerational family structure and adolescent adjustment. *Demography*, 39(2), 393–413.
- Eccles, J., & Barber, B. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research*, 14, 10–43.
- Edin, K., & Kefalas. (2005). *Promises I can keep: Why poor women put motherhood before marriage*. Berkeley: University of California Press.

- Edin, K., & Nelson, T. J. (2013). *Doing the best I can: Fatherhood in the inner city*. Berkeley: University of California Press.
- Elder, G. H., Jr. (1998). The life course as developmental theory. *CD, 69*, 1–12.
- Federal Interagency Forum on Child and Family Statistics. (2014). *America's young adults: Special issue, 2014*. Washington, DC: U.S. Government Printing office.
- Feldman, A., & Matjasko, J. (2005). The role of school-based extracurricular activities in adolescent development: A comprehensive review and future directions. *Review of Educational Research, 75*, 159–210.
- Feliciano, C., & Rumbaut, R. (2005). Educational and occupational expectations and outcomes among adult children of immigrants. *Ethnic and Racial Studies, 28*, 1087–1118.
- Forste, R., & Jarvis, J. (2007). “Just like his dad”: Family background and residency with children among young adult fathers. *Fathering, 5*(2), 97–110.
- Gates, G., & Cooke, A. (2014). *United States census snapshot: 2010*. Los Angeles: The Williams Institute. Retrieved from <http://williamsinstitute.law.ucla.edu/wp-content/uploads/Census2010Snapshot-US-v2.pdf?r=1>
- Gauthier, A., & Smeeding, T. (2003). Time use at older ages: Cross-national differences. *Research on Aging, 25*(2), 247–274.
- Gerson, K. (2010). *The unfinished revolution: How a new generation is reshaping family, work, and gender in America*. New York: Oxford University Press.
- Glick, P. (1977). Updating the life cycle of the family. *Journal of Marriage and the Family, 39*, 5–13.
- Glick, J. E. (2010). Connecting complex processes: A decade of research on immigrant families. *Journal of Marriage and Family, 72*, 498–515.
- Glick, J. E., & Hohmann-Marriott, B. (2007). Academic performance of young children in immigrant families: The significance of race, ethnicity, and national origins. *International Migration Review, 41*, 371–402.
- Goldscheider, F. (1990). The aging of the gender revolution. *Research on Aging, 12*, 531–545.
- Goldscheider, F. (2000). Men, children and the future of the family in the third millennium. *Futures, 32*, 527–538.
- Goldscheider, F., & Kaufman, G. (2006). Willingness to stepparent: Attitudes towards partners who already have children. *Journal of Family Issues, 27*, 1415–1436.
- Goldscheider, F., & Sassler, S. (2006). Creating stepfamilies: Integrating children into the study of union formation. *Journal of Marriage and the Family, 68*, 275–291, erratum 68 (3).
- Goldscheider, F. K., & Waite, L. J. (1991). *New families, no families*. Berkeley: University of California Press.
- Goldscheider, F., Hofferth, S. L., & Curtin, S. C. (2014). Parenthood and leaving home in young adulthood. *Population Research and Policy Review*. doi:10.1007/s11113-014-9334-9.
- Haveman, R., & Wolfe, B. (1994). *Succeeding generations: On the effects of investments in children*. New York: Russell Sage.
- Hofferth, S. L. (2009). Changes in American children's time, 1997–2003. *Electronic International Journal of Time Use Research, 61*, 26–47.
- Hofferth, S. L. (2010). Home media and children's achievement and behavior. *CD, 81*, 1598–1619.
- Hofferth, S. L., & Anderson, K. (2003). Are all dads equal? Biology vs. marriage as basis for paternal investment. *Journal of Marriage and Family, 65*, 213–232.
- Hofferth, S. L., & Goldscheider, F. (2010). Family structure and the transition to parenthood. *Demography, 47*, 415–437.
- Hofferth, S. L., & Moon, U. J. (2011). Electronic play, study, communication, and adolescent achievement and behavior, 2003–2008. *Journal of Research on Adolescence, 22*, 215–224.
- Hofferth, S. L., & Moon, U. J. (2013, August). *Childhood activities, achievement, and immigrant transitions to adulthood*. In Paper presented at Annual Meeting of the American Sociological Association.
- Hofferth, S. L., & Sandberg, J. F. (2001). Changes in American children's time, 1981–1997. In S. Hofferth & T. Owens (Eds.), *Children at the millennium: Where did we come from, where are we going?* (pp. 193–229). New York: Elsevier Science.
- Hofferth, S. L., Kinney, D., & Dunn, J. (2009). The hurried child: Myth vs. reality. In K. Matsuka & C. Christiansen (Eds.), *Life balance: Multidisciplinary theories and research* (pp. 183–206). Bethesda: AOTA Press.
- Hofferth, S. L., Pleck, J. H., & Vesely, C. K. (2012). The transmission of parenting from fathers to sons. *Parenting: Science and Practice, 12*, 282–305.
- Hofferth, S. L., Pleck, J. H., Goldscheider, F., Curtin, S., & Hrapczynski, K. (2013). Family structure and men's motivation for parenthood in the United States. In N. J. Cabrera & C. S. Tamis-LeMonda (Eds.), *Handbook of father involvement* (pp. 57–80). New York: Routledge.
- Hook, J. L. (2006). Men's unpaid work in 20 countries: 1965–2003. *American Sociological Review, 71*, 639–660.
- Ingraham, C. (2014, August 13). *Whites uneasy at idea of mostly minority U.S.* (Workblog).
- Kahn, J., Goldscheider, F., & Garcia-Manglano, J. (2013). Growing parental economic power in parent-adult child households: Coresidence and financial dependency in the United States, 1960–2010. *Demography, 50*, 1449–1475.
- Kaufman, G. (2006). Gender roles and marital happiness in later life. *Journal of Family Issues, 27*, 735–757.
- Kreider, R. M., & Ellis, R. (2011). Living arrangements of children: 2009. *Current Population Reports, P70*(126), 1–25.

- Kubicek, B., Korunka, C., Hoonakker, P., & Raymo, J. (2010). Work and family characteristics as predictors of early retirement in married men and women. *Research on Aging, 32*(4), 467–498.
- Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. Berkeley: University of California Press.
- Laughlin, L. (2014). A child's day: Living arrangements, nativity, and family transition. *Current Population Reports, P70*(139), 1–20.
- Maccoby, E., & Martin, J. (1983). Socialization in the context of the family: Parent-child interaction. In E. M. Hetherington (Ed.), *Handbook of child psychology* (Vol. IV, pp. 1–101). New York: Wiley.
- Manning, W., Brown, S., Lamidi, E., & Payne, K. (2014). *Trends in births to single and cohabiting mothers, 1980–2009* (Tech. Rep. No. FP-14-05). Bowling Green: National Center for Family and Marriage Research.
- McLanahan, S. S., & Jencks, C. (2015). Was Moynihan right? What happens to children of unmarried mothers. *Education Next, 15*(2). Retrieved from <http://educationnext.org/was-moynihan-right/>
- McLanahan, S., & Sandefur, G. (1994). *Growing up with a single parent: What hurts, what helps*. Cambridge, MA: Harvard University.
- McNeal, R. B., Jr. (1995). Extracurricular activities and high school dropouts. *Sociology of Education, 68*, 62–81.
- Osborne, C., & McLanahan, S. (2007). *Journal of Marriage and Family, 69*, 1065–1083.
- Payne, K. (2014). *Demographic profile of same-sex couple households with minor children, 2012* (Tech. Rep. No. FP-14-03). Bowling Green: National Center for Family and Marriage Research.
- Pleck, J. H. (1993). Are “family-supportive” employer policies relevant to men? In J. C. Hood (Ed.), *Men, work, and family* (pp. 217–237). Newbury Park: Sage Publications.
- Porterfield, S., & Winkler, A. (2007). Teen time use and parental education: Evidence from the CPS, MTF, and ATUS. *Monthly Laboratory Reviews, 130*, 37–56.
- Raley, S., & Bianchi, S. (2006). Sons, daughters, and family processes: Does gender of children matter? *Annual Review of Sociology, 32*, 401–421.
- Sassler, S. (2010). Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family, 72*, 557–575.
- Sassler, S., & Cunningham, A. (2008). How cohabitators view childbearing. *Journal of Marriage and Family, 52*, 3–28.
- Sayer, L. C., Bianchi, S. M., & Robinson, J. P. (2004). Are parents investing less in children? Trends in mothers' and fathers' time with children. *American Journal of Sociology, 110*, 1–43. doi:10.1086/386270.
- Schwartz, C., & Mare, R. (2005). Trends in educational assortative marriage form 1940 to 2003. *Demography, 42*, 621–646.
- Seltzer, J. A. (2000). Families formed outside of marriage. *Journal of Marriage and the Family, 62*, 1247–1268.
- Shonkoff, J., Gerner, A., & the Committee on Psychosocial aspects of Child and Family Health. (2012). The life-long effects of early childhood adversity and toxic stress. *Pediatrics, 129*, e232–e246.
- Smith, A., & Duggan, M. (2013, October 21). Online dating and relationships. Internet and American Life Project. Retrieved October 4, 2014, from <http://Pewinternet.org/reports/21013/online-dating.aspx>
- Solomon, C., Acock, A., & Walker, A. (2004). Gender ideology and investment in housework: Postretirement change. *Journal of Family Issues, 25*(2), 1550–1571.
- Stanfors, M., & Goldscheider, F. (2015). *The forest and the trees: Industrialization, demographic change, and the ongoing gender revolution in the United States and Sweden, 1870–2010* (Tech. Rep. No. SRRD_2014_18). Stockholm: Stockholm Research Reports in Demography.
- Szinovacz, M. (2000). Changes in housework after retirement: A panel analysis. *Journal of Marriage and Family, 62*, 78–92.
- Townsend, N. W. (2002). *The package deal: Marriage, work and fatherhood in men's lives*. Philadelphia: Temple University Press.
- U.S. Census Bureau. (2012). *Statistical abstract of the U.S. 2012*. Washington, DC: U.S. Government Printing Office.
- Wood, R. G., Moore, Q., Clarkwest, A., & Killewald, A. (2014). The long-term effects of building strong families: A program for unmarried parents. *Journal of Marriage and Family, 76*, 446–463.
- Wu, L. L., & Martinson, B. C. (1993). Family structure and the risk of a premarital birth. *American Sociological Review, 58*, 210–232.
- Wu, L. L., & Thomson, E. (2001). Race differences in family experience and early sexual initiation: Dynamic models of family structure and family change. *Journal of Marriage and Family, 63*, 682–696.

Educational Pathways

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1 Introduction

The educational career is a transition-rich long-term trajectory within a highly structured institutional system. On the individual level, this trajectory dictates time use, facilitates the development of cognitive, social, and work skills, connects people to interpersonal relations and social networks, and paves the way for future socioeconomic prospects. On the population level, it gauges the extent of a society's investment in its people and forecasts current and future economic productivity and social stability. At the connection of these two levels, this trajectory represents the channel by which broad social, cultural, and economic forces influence individual lives and a mechanism in the process by which societal inequality is experienced and reinforced by individual people (Kingston et al. 2003; Arum 2000). As such, education would seem well-aligned with the life course perspective, which emphasizes the dynamic and contextually embedded nature of life pathways and how they connect individual development to population processes (Elder 1998). Historically, however, life course approaches have been underutilized by educational scholars.

Fortunately, the life course perspective has been gaining ground in the field of educational

research, and the literature of life course studies on education is growing. This growth was influenced by pioneering studies like those of Karl Alexander and Doris Entwisle (1988), who developed a life course model to explain how the interpersonal, social, and institutional experiences of children during the transition into and through the early years of schooling serves as a mechanism in the intergenerational transmission of racial/ethnic and socioeconomic inequality. Now, it is being fueled by a new generation of scholars who leverage similar life course models to organize studies of academic progress and educational inequality and/or use educational issues to inform the life course perspective more generally. Such research is especially common in the sociology of education (Bozick and DeLuca 2005) and developmental psychology (Benner and Graham 2009), and it is increasingly multi-method (Crosnoe 2011). The increasing cross-pollination of life course and education thinking is, we argue, a positive development for educational research, as the life course perspective helps cohere the disparate areas and interests within that field. Many educational researchers are interested in the institutional and contextual aspects of education—the organization of schools and their internal curricula, instructional processes within classrooms, and the funding and support of school districts. Many others are focused on the developmental experiences of those within the educational system—the

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processes of learning and skill development, the interpersonal relationships that form in classrooms and schools, psychological orientations to schooling, and the perceptions of students and teachers of themselves and others (Arum 2000; Eccles et al. 1993). Because the life course perspective focuses attention on the bidirectional interplay of individual people with their contextual environments, it provides a conceptual language that allows both of these subfields of educational research to speak to each other.

This integrative value of the life course perspective in educational research is illustrated by its basic imagery. In this imagery, the life course is a tapestry of three interwoven threads within social contexts. The three threads include: (1) developmental trajectories, which tap into ongoing physical, cognitive, and socioemotional growth and maturation; (2) social convoys, which tap into continuity and change in the matrix of social relationships; and (3) social pathways, which tap into sequential movement through institutional structures and socially defined roles. As the transactions among these threads unfold, they shape and are shaped by the contextual environment, which can be conceptualized on a broad spectrum from micro-level (or proximate) ecological settings of life like families, meso-level (or intermediate) organizational settings like school systems, to macro-level (or distal) abstractions like stratification systems, the economy, and historical time. In this imagery, what happens to individual people over their daily lives, how they actively and passively interact with social structures, and what is going on in society at large come together to constitute a complex multi-level phenomenon (Crosnoe and Johnson 2011).

Following this imagery and its relevance to education in modern society, our goal is to discuss contemporary research on education in life course terms. We will not provide an exhaustive review of the literature (see our chapter in the most recent volume of *Handbook on Child Psychology* for more) but instead selectively engage with the literature to capture how education illustrates the basic components of the life course perspective and how the life course perspective illuminates educational phenomena. We do so in two stages.

First, we highlight critical educational issues in each stage of the life course and how they connect the individual and population levels. Second, we focus on specific concepts from the life course perspective and how they are evident in and informed by educational processes. Reflecting our training and the scope of our own research on education, both stages are grounded in research from the U.S., although we will bring in other countries at times to flesh out the discussion.

2 The Educational Life Course

On the individual level, the concept of the life course refers to a person's passage through a sequence of age-graded roles and contexts with associated developmental tasks. On the population level, it refers to the normative or expected ways that people make this passage. We can speak of the life course in general terms or specific to a particular domain, such as the educational life course that is defined by the accumulation of experience within and around an educational system, including prior to entry into that system, during progress through the system, and after exit from the system. This educational life course can be broken down into a few components, and we focus on three here. One is learning, which encompasses the mastery of skills and the development of knowledge bases that occur at the intersection of personal capabilities and instructional strategies (Siegler et al. 2012). A second component is achievement, which refers to external evaluations of learning (e.g., test scores, grades) and tangible curricular credentials (e.g., course credits) that bring rewards or sanctions and that open up or foreclose on future opportunities (Kelly 2008; Riegle-Crumb 2006). A third component, attainment, is a summary of persistence, both temporally (e.g., years of schooling) and in terms of status (e.g., degrees earned) (Mirowsky and Ross 2003). These components refer to the formal processes of education, or the concrete aspects of schooling most closely aligned with the official mission of modern educational systems to create a skilled workforce and informed population.

The educational life course also is formed by informal processes, including aspects of psychological adjustment and interpersonal functioning that underpin schooling. These informal components, such as engagement, comfort, and confidence, are additional components of the educational life course (Crosnoe 2011).

In this section, we cover both formal and informal components of the educational life course. In doing so, we draw on the links between the educational life course and the developmental stages that help to define the life course more generally. In other words, what are some critical educational components, major forms of stratification, and research grounded policies to reduce such stratification during childhood, adolescence, and adulthood? Of course, we recognize that these three stages of the life course are somewhat arbitrarily defined and demarcated and that the educational life course—by definition—cuts across developmental stages. Our purpose for this stage-specific discussion of educational processes, educational inequality, and educational policy is simply to more effectively organize a large literature. Again, we are highlighting a few specific examples—linking individual-level components of education to more population-relevant discussions of educational stratification and policy—as a means of illustrating the importance of a more general theoretical framework for education.

2.1 Educational Processes and Inequality in Childhood

From early childhood, children start their educational life course in earnest, including informal learning at home and in the community, participation in early child care and education programs, and their entry into the formal educational system. Their experiences during this period largely entail learning key sets of basic skills and then building on these skills in increasingly complex ways. Such experiences are primarily structured by adults within the home, in school, and in school-related programs and activities in ways that both reflect and counteract genetically heritable traits that affect intellectual capacities and

elicit socializing responses (Propper et al. 2012; Pianta et al. 2007). The importance of childhood in the educational life course is that this stage is when the foundation of long-term trajectories is built and the roots of disparities in these trajectories are laid.

Consider one key aspect of learning that unfolds across the transition into formal schooling: the development of basic mathematical skills. Even during early childhood, children differ widely in their understanding of mathematical properties and in their sense of numbers. Because these basic skills then provide the groundwork for all subsequent aspects of math learning, children who develop more early knowledge of math are in a better position to gain more math knowledge as they grow up. The process is highly cumulative, as in all academic domains, but it is particularly apparent in math. As an example, Siegler and colleagues have extensively studied children's developing ability to approximate numerical magnitudes; in other words, to estimate which of a set of numbers are closest to some specified value. This ability is typically gauged with number line tests, in which children are asked to place some number on a number line that goes from 0 to 100 but without any other numbers between these two poles shown. Where would a child place 59, close to 0, in the middle, or closer to 100? In part, the ability to properly place the 59 is simply a function of cognitive maturation. Few young children can correctly place a number like this in its correct position on the number line, but older children are able to do it more consistently. Yet, it is also a function of environmental opportunities to learn. Some children have more opportunities to learn and practice with math, and some children take more advantage of whatever opportunities are available to them. As a case in point, children from low-income families have slower development of this mathematical ability because they have less frequent learning activities with their parents at home, lower exposure to preschool enrichment, and lower-quality math instruction in school. Thus, over-time gains in a key mathematical skill are a product of the interplay of developmental trajectories (maturation, intelligence), social

convoys (teachers, parents), and social pathways (enrollment, classes). Importantly, basic math skills like those tested with the number line then powerfully predict achievement in math coursework many years later. Where a child starts in terms of initial skill levels helps to determine where they eventually end up in terms of achievement (Siegler and Lortie-Forgues 2014; Siegler et al. 2012; Siegler 2009).

Now consider how learning during the transition into formal schooling plays a role in societal inequality. The school transmission model formulated by Entwisle, Alexander, and colleagues is a good illustration. The core argument of this model, which is closely related to the discussion of mathematical learning above, is that early socioeconomic and racial/ethnic disparities accumulate into long-term disparities in educational attainment. In more detail, children from diverse segments of the population start school with small but significant differences in basic math, reading, and other academic skills due primarily to differences in their early childhood environments (e.g., home, child care, community) before they even enter their kindergarten classrooms but also to their own characteristics, behaviors, and traits that shape how they interact with these environments and what they elicit from them. These early skill disparities are then acted upon by the school system so that they compound from year to year—one child has better developed initial skills than another, and so she or he learns more during the first year of school, is selected into a more advanced learning group or class in the second year that further speeds up learning and leads to more rigorous curricula, and so on. That early skill gap eventually translates into much larger gaps in educational attainment in adulthood through such schooling-related processes as well as the summer learning effect in which youth from more advantaged backgrounds experience more educational enrichment when out of school that then further compounds the learning advantage of these youth (Alexander et al. 2014; Entwisle et al. 2005; Alexander and Entwisle 1988).

In this way, the long-term educational divergence between children that is rooted in early skill

development compounds over time due to the cumulative nature of learning and the large educational system. In the aggregate, this process leads to a more unequal population (Alexander et al. 2014; Kerckhoff 1993). This inequality enables the economic needs of society to be filled by systematically producing people to take on roles and jobs that require different skill levels and come with different rewards. It also means that some people are under-placed or over-placed in terms of the fit between the roles and jobs they take and their skill levels, which could undermine economic productivity while also being a source of societal instability (Arum 2000; Bowles and Gintis 1976). Of course, children and families do have agency to counteract this cumulative process, but the unequalizing force of the system is strong.

Unpacking and understanding this foundational role of childhood learning in educational attainment and educational inequality has been a major activity of life course scholars in education, which, in turn, has been a powerful influence on educational and social policy. It has fueled the argument—best summarized by Nobel prize-winning economist James Heckman (2006)—that interventions into educational disparities bring greater long-term returns to investment when they target early childhood rather than later stages of the life course or later levels of the educational system. If small but significant gaps in early skills are the foundation of larger inequalities in later education, then closing those initial gaps is a powerful method for reducing inequality before it is allowed to grow. This argument underlies the massive expansion of investment in early childhood education programs over the last decade, as exemplified by the implementation of publicly funded preschool in the majority of states in the U.S. by 2014 (Duncan and Magnuson 2013).

2.2 Educational Processes and Inequality in Adolescence

Into and through adolescence, young people shift into a more formalized, impersonal, and differentiated curricular environment. Within this

increasingly complex environment, cognitive and academic skills are translated into academic credentials that then become the most visible markers inside and outside of schools of the preparation and suitability of young people for future educational and occupational endeavors. During this period, early advantages and disadvantages are “activated” or defused, in part because of how young people interact with those around them and build social networks, with peers joining (and possibly even surpassing) adults as agents of influence, consultation, and support.

One key aspect of achievement that unfolds across the transition from elementary to secondary schooling involves the sequential progression of youth through college-preparatory coursework. Compared to early stages of schooling, the academic curricula of high schools in the U.S. are highly differentiated and involve more voluntary choice. Many more courses are available for enrollment, and students technically have the power to select courses (rather than being assigned), with only some courses being required. The irony is that amidst all of this choice, sequences of coursework are highly self-propelling. Once a student enrolls in a course of a certain level in 1 year, he or she is likely to follow a fairly standardized sequence of courses at that same level into which that the initial course leads. In other words, once on a specific curricular trajectory, students tend to stay on that trajectory, regardless of requirements or alternatives, because of inertia, teacher recommendations, parent expectations, skill progression, and other factors. Reflecting the changing interpersonal orientations that arise during adolescence, peers also play a major role. They model appropriate behavior, share information, and transmit values to each other, usually in tandem with parental influences but occasionally in opposition to them. Of course, young people are not passive recipients of social influence. They select themselves into social contexts, actively work with what they are given, and try to chart their own course. This agency injects variation into general patterns of inertia (Riegle-Crumb and King 2010; Adelman 2006; Stevenson et al. 1994).

As an example, a high school student enrolled in biology in ninth grade is more likely to then

transition into chemistry in tenth grade than a similar student who enrolled in life science in ninth grade, as life science is typically lower-status and less challenging than biology and, therefore, less likely to be viewed by the student and others as naturally leading into chemistry. Once in a tenth grade chemistry course, the student will be academically and socially prepared to continue into more challenging science coursework after tenth grade even if the school does not require more science coursework after two science credits have been fulfilled. A similar sequential process occurs in math (e.g., taking algebra I in ninth grade leads to more advanced math credits through high school than taking pre-algebra in ninth grade), English (e.g., enrolling in honors English in ninth grade leads to more honors and Advanced Placement English credits across the high school years than initially enrolling in regular English), and other subjects. Some of these course sequences, upon completion of high school, make students more attractive to colleges than others and enable them to be better prepared for college coursework. Taking challenging science courses and accumulating more science credits is one example of a course sequence that promotes college matriculation and success in college. Thus, where in the academic curriculum a student starts high school—which is predicated on the skills that they have developed through childhood or are merely perceived to have developed, as well as their own choice and agentic action—strongly predicts where they finish in that curriculum. The cumulative process emanating from early childhood described in the last section is propelled by a related cumulative process in adolescence (Crosnoe and Muller 2014; McFarland 2006; Morgan 2005; Schneider et al. 1999).

This individual progression through secondary school coursework—and its emanation from childhood experiences—is fundamentally implicated in socioeconomic, racial/ethnic, and other disparities in educational attainment at the population level. In a curricular system that is technically open and voluntary but that is also differentiated (i.e., many different kinds of courses and credits are available), hierarchical

(i.e., some courses and credits are more valued than others), and ambiguous (i.e., the norms for entering courses and attaining credits and what they mean for the present and especially the future are unclear), some students are able to gain a competitive edge over others simply because of their family backgrounds. Specifically, the family and community environments in which they have grown up give them access to a broad array of social resources that enable informed decision-making that closely reflects their actual educational and occupational goals. In other words, they are able to more strategically and effectively plan for what they want to achieve. Such inequality is evident in educational systems in most developed countries, but it tends to be more diffusely spread across all levels of the system in the U.S. than in many European countries, which often have more formal branch points in which students are explicitly assigned to academic or vocational tracks (Buchmann and Park 2009; Morgan 2005). Although such educational risks are experienced by individual students, they have far-reaching implications for the population, given the importance to economic, political, and social stability of ensuring that jobs and roles are filled by people with best-suited skills and that social mobility is a feasible reality.

The primary/secondary effects perspective is a framework for understanding this stratifying process. It refers to the effects of something like socioeconomic status (SES) on academic outcomes. Primary SES effects occur when prior experiences and genetically influenced capabilities related to SES create disparities in an academic outcome between high- and low-SES youth. For example, a high-SES student enrolls in ninth grade biology while a low-SES student enrolls in ninth grade life science because the former is better prepared for the more advanced class and better demonstrates the required skill level after enjoying higher-quality instruction from preschool through middle school. In this scenario, the SES difference in high school coursework is an accurate reflection of preparedness to pursue that coursework, regardless of whether the preparatory process up to that point was equitable. Secondary effects occur when dif-

ferences in informed decision-making related to SES create disparities in an academic outcome between high- and low-SES youth even when they have the same ability and preparedness. For example, a high-SES student enrolls in ninth grade biology while a low-SES student with the same academic history and skill level enrolls in ninth grade life science because the former understands why taking biology is more advantageous in the long term, because he or she has parents who push for the more challenging course and because teachers unconsciously equate socioeconomic background with skill level. Again, peers will likely play a role during adolescence, either because they directly share information and preferences for coursework or because shared coursework doubles as peer time, and some adolescents may be more or less responsive to these peer influences. This combination of primary and secondary effects captures the iterative process by which educational disparities are built over time as students transition from one level of the system to the other. Because of prior opportunities, primary effects are at work at each new level, and, because of social resources, secondary effects add to those primary effects (Jackson et al. 2007; Erikson et al. 2005; Goldthorpe 2000; Breen and Goldthorpe 1997).

Evidence of the ways in which curricular pathways in adolescence can differentiate the future prospects of young people has helped to qualify the aforementioned shift towards early intervention in efforts to combat educational inequality. Even if early skill gaps are the foundation of long-term educational disparities, closing these gaps will likely only reduce (rather than fully eliminate) disparities later in the educational career because secondary effects can mean that young people diverge even when they have the same skill level. In other words, an early intervention may balance out early childhood skill disparities, but the nature of the system will result in new disparities eventually emerging. Efforts to do something about those secondary effects, therefore, can complement early interventions by acting as “boosters” (Crosnoe and Muller 2014). Because a big part of the problem of secondary effects is the availability of aca-

demographic choices in a context in which not all people are equipped to make informed choices, many of these efforts focus on clarifying ambiguity in secondary school coursework or, even more radically, eliminating choices altogether. As one example, a wide variety of programs link adolescents whose parents did not attend college with college-educated mentors who can help them and their parents navigate the complicated academic path to college enrollment—what classes to take, when to take the SATs, how to build a compelling academic resume, how to apply for financial aid (Gandara 2002). As another example, some school districts have simplified and mandated their math/science coursework, so that all students take the same courses for the same number of years (Attewell and Domina 2008). Overall, educational research has shown how the structural characteristics of schools may do more to shape some dimensions of curricular sequences than family background and that the incentives for student behavior created by school reforms may do more to affect academic decision-making and curricular progress than individual attributes. Collectively, this research suggests that schools can be changed to improve student outcomes (McFarland 2006; Kariya and Rosenbaum 2003).

2.3 Educational Processes and Inequality in Adulthood

Although formal schooling typically ends fairly early in the life course, the importance of schooling extends across the full span of life. A major focus of research and theory on the educational life course, therefore, is on educational attainment—especially degree attainment—during young adulthood and how its consequences filter throughout adulthood and into the later years. The story is about what educational attainment brings to someone and how what it brings allows inequality to reproduce itself across generations.

To begin, degree attainment is a key aspect of educational attainment. Unlike the years of schooling that a person has reached (a common marker of educational attainment in population studies), degree attainment focuses on qualita-

tive breaks in years of schooling that are demarcated by the awarding of credentials, such as a college degree. Degrees are concrete markers of academic accomplishment that signify to others, such as potential employers and even prospective mates, perceived differences in skill, competence, and value. Even when two people have the same years of schooling, one with a degree will have an advantage over one without a degree. This importance of degree attainment is often called a “sheepskin effect,” and it is a source of debate about credentialism, or the tendency for people to be rewarded for having degrees more so than having the training and skills those degrees are supposed to signify (Attewell and Domina 2011; Hauser and Koenig 2011; Warren et al. 2008).

In recent decades, the population of young people pursuing college degrees has expanded considerably, and these young people follow diverse trajectories in this pursuit. For example, although a large portion of American youth enroll in a 4-year college after leaving high school and eventually graduate within several years, others enroll but then drop out without finishing, others go into 2-year colleges and never make it to 4-year colleges, others transfer from 2-year to 4-year colleges, and still others go back and forth between enrolling (at different levels) and dropping out. To this diversity, we can also add new forms of higher education, such as for-profit institutions and online enrollment programs (Bonnie et al. 2014; Patrick et al. *forthcoming*). The diversity in paths that young people follow to college graduation and the substantial numbers who do not make it to college and/or to college graduation is important because of the powerful role that college enrollment and graduation play in the life course. Because global economic restructuring over the last half-century has significantly reduced sectors of the labor market (e.g., manufacturing) that historically provided an ample supply of well-paying secure jobs that did not require higher education, a college degree has become more and more important to success in the labor market. Indeed, the economic returns to a college degree—such as the increase in lifetime earnings associated with obtaining a college

degree versus a high school diploma, or the earnings premium—have increased to historic levels in the last few decades. Although the costs of attaining a college degree (and associated debts) are growing, the returns to such a degree are increasing even more rapidly. As a result, a college degree is still a profitable investment in the long term despite short-term costs, especially in countries like the U.S. that do not have the kinds of apprenticeship systems supporting transitions from school to work that have been developed in some European countries like Germany (Autor 2014; Goldin and Katz 2008; Schoon and Silbereisen 2009; Fischer and Hout 2006). Importantly, the life course returns to a college degree extend well beyond income to encompass other trajectories such as health, marital stability, and civic engagement (Kingston et al. 2003; Mirowsky and Ross 2003). Thus, increasingly, college graduation is a dividing line between the haves and have-nots in the U.S. and in other industrialized societies.

Moving forward into adulthood, therefore, college degree attainment is a source of inequality. To the extent that college degree attainment is also influenced by family background and demographic factors like gender and race/ethnicity, it represents one way that advantages early in life translate into advantages later in life and, on the population level, one way that inequalities in one generation translate into inequalities in the next generation. The evidence of economic and non-economic returns to college degrees suggests that graduating from college is a ticket to a more prosperous, more stable, and healthier life, but not all youth are equally well equipped to obtain this ticket. Indeed, Whites are more likely to earn a degree than African Americans and Latino/as, and youth from affluent families are more likely to earn a degree than youth from low-income families (Federal Interagency Forum on Child and Family Statistics 2014). These disparities in college graduation, which forecast disparities in numerous life course domains in the future, are destabilizing on the societal level. They partially result from disadvantages related to socioeconomic and racial/ethnic stratification throughout childhood and adolescence that reduce enroll-

ment in college in the first place. Such disadvantages include (but are not limited to) less exposure to preschool, lower-quality K-12 schooling, the rising costs of higher education, and a lack of information about effective paths to college. Yet, disparities in college graduation are found even among those who enroll in college, suggesting that part of the problem is the higher rates of college dropout among the low-income and racial/ethnic minority students who made it to college in the first place (Bonnie et al. 2014).

A classic theoretical model of the transition into college and its relation to socioeconomic and demographic inequality is a good example of how life course insights can help shed light on an educational issue like college dropout. Tinto's (1987) model of institutional departure posits that students leave college because of a lack of academic and social integration—they are struggling academically, feel like they do not fit in socially, generally come to doubt themselves, and drift off. Because students from low-income and racial/ethnic minority families often have lower levels of academic preparation prior to college entry, enter into segregated college campuses, and are less likely to have the kinds of social and cultural capital (e.g., contacts with people who can advance their interests, understanding of valued styles of speech or dress) that bring status in college settings, they might be less academically and socially integrated at the colleges in which they enroll. Reflecting this lower degree of integration relative to other students, they are at higher risk for dropping out. Because they are more likely to drop out, they are less able to enjoy the benefits of educational attainment throughout adulthood. They would then need to possess especially high levels of agentic resources (e.g., confidence, persistence) to overcome these risks. Their vulnerability during the transition into college has inspired a number of policies and programs to promote their integration at college and to protect them from dropout, including interventions that attempt to build academic and social communities (e.g., study groups, clubs, peer counseling) for students of color and, more generally, for first generation college students (Massey et al. 2011; Steele 1997).

2.4 Summary of Educational Processes and Inequality

So far, we have highlighted one component of educational functioning, one conceptual model of inequality, and associated policy responses for each of three stages of the life course. We recognize that this selective discussion may seem piecemeal to some readers, but we also argue that, collectively, these stage-specific discussions have helped us to make a larger point. Specifically, we believe that they come together to paint a picture of individual educational trajectories that are highly cumulative and structured by major transitions in ways that exacerbate socioeconomic and racial/ethnic inequality but that also suggest critical windows of intervention (e.g., investments in early childhood education, creation of academic and social learning communities in secondary schools) for addressing these problems. Thus, the life course perspective offers tools to build a more generalized understanding of education that can then translate research into action.

3 Life Course Insights into Education

In the prior stage of this chapter, we used the stages of the life course to organize our discussion of education. In this section, we take a different strategy by using some basic concepts from the life course perspective as the organizational tool. All of the concepts have been covered or at least alluded to so far. They include life course transitions, linked lives, the tapestry of life course threads, and social context. Again, we provide specific examples of each within the domain of education that tap into different components of the educational life course of individual people, aspects of stratification at the population level, and associated policy and intervention responses. Collectively, these examples show how the life course perspective illuminates understanding of the processes of educational attainment and educational inequality and, at the same time, demonstrate how educational attainment and inequality can provide concrete exam-

ples that illustrate the theoretical meaning of these life course concepts.

3.1 Transitions and Trajectories

In the life course perspective, a transition is a change of state or setting that is embedded within a long-term trajectory. Because trajectories are often self-propagating and dictated by inertia, the changes involved in a transition have a heightened potential to disrupt compared to other periods or points along the trajectory. As a result, a transition is when a trajectory is most likely to be redirected. A negative trajectory may be turned around into a more positive direction, or a positive trajectory may be interrupted and turned negative. Both kinds of redirection are important to understanding inequality, and so transitions are likely to be critical periods in the intergenerational transmission of inequality as well as the points at which policy intervention may bring the greatest returns (Crosnoe and Johnson 2011; Schulenberg and Maggs 2002; George 1993). Transitions play an important role in the educational life course as well as in educational disparities across the life course, reflecting the staging of the educational system in the U.S. and in most developed countries. This staging is organizational, in terms of levels of schooling (e.g., elementary school, secondary school, higher education) and curricula, and it is physical, in terms of multiple classrooms within multiple buildings and campuses. Students transition through these levels and spaces as they attain education as part of a long trajectory. Such transitions, therefore, are crucial to the cumulative nature of the educational career and of educational inequality that has been such a major theme of this chapter (Benner 2011).

The transition into formal schooling and the transition from high school into college have both been discussed so far, and so we now turn to the transition from elementary school into middle school and the transition from middle school into high school. These transitions are typically disruptive to students' academic and socioemotional functioning in ways that shape future educational

trajectories. For example, the seminal work of Simmons and Blyth (1987) documented transition-related declines in both grades and self-esteem in a sample attending diverse urban middle and high schools. Yet, the degree of such disruptions is in part dependent on the trajectories that led up to that transition. During these transitions, students move into iteratively larger schools with increasingly higher-stakes academic curricula that are more competitive and more directly geared towards preparation for higher education than what they have experienced up to that point. Moreover, the act of moving from one school to another upends many relationships, both between students and teachers and among students themselves. As a result, transitioning into middle school and then into high school are times of vulnerability for young people, but that vulnerability is not the same for all students. Differences in vulnerability reflect differences in individual development (e.g., psychological maturity, cognitive capabilities, and social relations) but also group differences in position, status, and resources (Benner 2011; Langenkamp 2010; Barber and Olsen 2004).

Academic mismatches between teaching and learning are particularly problematic during the transition from elementary school into middle school. Basically, middle school organization and pedagogy are not well-matched with the developing needs of the young people that they are serving. This school transition co-occurs with the developmental transition from childhood into adolescence, which is a time of dramatic biological, cognitive, and social changes (Lerner and Galambos 1998; Simmons and Blyth 1987). Early adolescents experience a strong urge to carve out their own identities and take on more autonomy for their lives but still need to maintain strong and supportive connections with adults, but middle schools are not structured in ways to meet these developmental needs. In middle school, students typically move from class to class, so that they do not have sustained time with any one teacher, but, at the same time, their classes maintain top-down teacher-directed instruction that do not offer them many opportunities to take control of their own learning. In this new context, students often struggle emotionally

in school, which has implications for their academic pursuits. As a result of this poor stage-environment fit, early adolescents demonstrate a striking drop in academic engagement from which they never really recover (Eccles 2004; Eccles et al. 1993).

Social disruptions are particularly problematic during the transition from middle school into high school. In the post-puberty years, aspects of brain development and identity development converge so that adolescents are more socially oriented, even socially dependent, than they were in childhood or will be in adulthood. When they move between schools, their peer networks are often altered in major ways, as students from the same middle school disperse into different high schools and as students from different middle schools meet in the same high school. During this tumult, many adolescents feel lost, and, in their state of heightened social orientation, these feelings are especially discomfiting and have greater potential to filter into academic pursuits. Indeed, compared to other school transitions, depression, anxiety, loneliness, and isolation are more common during the transition into high school, all of which have implications for academic engagement and achievement (Barber and Olsen 2004; Rudolph et al. 2001; Seidman et al. 2003). Although this social disruption is often experienced negatively, it does have benefits for some students. For example, ethnographic work has revealed that some students are able to use a school transition to reinvent themselves socially, and quantitative work has demonstrated that this “fresh start” is more likely to happen when students who had academic trouble in middle school transition into a high school with few of their middle school peers (Langenkamp 2010; Kinney 1999).

Just as school transitions have the potential to alter educational trajectories of individual students, they also have the power to change educational disparities between student groups. This latter change often takes the form of an increase in the magnitude of disparities as the negative academic, social, and other experiences of school transitions are especially pronounced for students from racial/ethnic minority groups and/or those who grew up in low-income families. Their

heightened vulnerability reflects their greater vulnerability in the educational system overall. Because they are more often subject to discrimination and segregation and because of their well-documented disadvantages in school quality, students of color and/or from low-income families are less able to cope with the pressures and hardships that come with school transitions. Similarly, other students often have more social and institutional resources to ride out the short-term disruptions associated with school transitions (Benner and Graham 2009; Crosnoe 2009; Barber and Olsen 2004). In these ways, the disruptions to the educational career caused by school transitions fuel academic stratification, translating and magnifying early inequalities into future disparities. For example, analyses of nationally representative data on adolescents have revealed that the link between middle school math/science skills and high school math/science placement is weaker for low-income English language learners than for other students. They are more likely to get lost in the system as they transition from school to school, and, consequently, they accrue fewer math/science credits over time (Crosnoe 2009). This process represents a process of cumulative disadvantage, when an already disadvantaged group is more affected by some negative factor than a more advantaged group and loses ground as a result (DiPrete and Erlich 2006).

3.2 Linked Lives

One principle of the life course perspective is linked lives, which asserts that the experiences of people in the same family and network are reciprocally related. Any one person is typically connected with family members, friends, and important others, and social influences flow through these connections (Elder 1998). If Person A and Person B have a relationship, anything that happens to Person A can influence Person B through the tie between them. That influence can be active, when, for example, Person A has developed some attitude, orientation, or tendency through past experience and explicitly models it for Person B. It can also be passive, when, for

example, past experiences allow Person A to accrue knowledge, skills, and information that rub off on Person B. The relevance of linked lives to educational research reflects the interplay of individual educational trajectories and school pathways with social convoys. In other words, young people move into and through school surrounded by other people who contribute to and are affected by their educational experiences. Understanding the educational life course, therefore, means examining it as part of the series of linked lives that characterize a person's complex matrix of social relations (Crosnoe and Johnson 2011). Here, we focus on two major relationships in the social matrix that are highly educationally relevant, closely associated with specific developmental stages, and implicated in educational inequality.

First, the parent-child relationship exemplifies linked lives during childhood. Beyond issues of genetic heritability of cognitive skills and academically relevant personality traits, parents powerfully influence the academic outcomes of their children. They do so by organizing academic opportunities for them (e.g., enrolling them in preschool, selecting high-quality schools and curricula, putting them in lessons or other out-of-school activities), actively managing their learning and schooling (e.g., home literacy activities, participating in school events), emphasizing the value of schooling (e.g., expressing positive expectations), and providing home and community environments that are conducive to healthy development (e.g., maintaining a stable family life, living in a safe neighborhood) (Davis-Kean 2005; Bradley and Corwyn 2002).

Importantly, the dynamics of this relationship also allow socioeconomic disparities to magnify educational disparities. Most parents want their children to succeed academically, regardless of their SES, but higher-SES parents tend to know how to promote this academic success to translate their actions into results more than lower-SES parents. In developmental science, this role of the parent-child relationship in the stratification of educational outcomes is best represented by the family socialization model, which is grounded in Elder's (1974) study of children

coming of age during the Great Depression (Conger et al. 2010). It contends that the academic effects of family socioeconomic disadvantage on schooling are filtered through intra-family dynamics, particularly parenting practices like parental involvement in school, cognitive stimulation, and arrangement of academic activities that are more common among higher-SES parents and parenting practices like harsh discipline that are more common among lower-SES parents (Crosnoe and Cooper 2010; Mistry et al. 2004; Raver et al. 2007). In sociology, this focus on parenting is exemplified by Lareau's (2003) concerted cultivation thesis, which contends that the active parental management and involvement of higher-SES parents gives a distinct academic advantage to their children and teaches them to use the educational system for their own gains. In both cases, parents are socialized into ideal types of parenting, but more disadvantaged parents experience more constraints on their ability to enact their ideal types than more advantaged parents.

Second, the peer relationship is a primary example of linked lives during adolescence. Like people of all ages, adolescents are highly influenced by those around them. The aforementioned peculiarities of adolescent development, however, mean that they are even more easily swayed by peer influences than children or adults. Although conclusions about the magnitude of peer influence have been undermined by studies that failed to account for the bidirectional influences among peers and other threats to causal inference (e.g., selection), the general consensus is that peers model academic behavior for each other (e.g., a friend's achievement leads an adolescent to have a positive association with achievement), share academic information with each other (e.g., one friend telling the other about a new academic program or explaining why taking advanced math will help college enrollment chances), and provide academic support to each other (e.g., one friend helping the other with homework, friends encouraging other during times of stress). Of course, this influence can also go both ways, with friends socializing each other into negative academic attitudes, sharing coun-

terproductive academic views and information, and discouraging or undermining each other academically. As a result of both sets of processes, the academic profile of an adolescent typically closely mirrors the profiles of his or her friends, even when accounting for the initial tendency for adolescents to agentically form friendships with similar others (Crosnoe 2011; Sacerdote 2011; Ryan 2001).

Some of the most intense controversy in the field of educational research has centered on theoretical arguments that such peer dynamics factor into racial/ethnic disparities in achievement. For example, the oppositional culture thesis contends that African-American and Latino/a peer contexts equate academic achievement with "acting White," thereby disincentivizing achievement and leading students in these racial/ethnic groups to underperform relative to White students of similar ability levels (Ogbu 1997). Empirical support for this thesis, however, is weak, and qualitative work has shown that the evidence of academic denigration that has been found is likely not racialized at all but rather a manifestation of peer denigration of academic achievement that pervades the entire adolescent peer culture (Harris 2006; Tyson et al. 2005). Newer mixed methods research has also shown that the role of peer dynamics in racial/ethnic and other disparities is not so much about negative influences and modeling but instead a reflection of the different pools of information available to different groups of students. In other words, both White and African-American peer groups in a school may support college-going as a goal for students. Yet, because of the connection between SES and race/ethnicity and other aspects of discrimination and segregation, the former peer groups may be better able to help students construct the kinds of academic resumes that they need to go college than the latter (Crosnoe and Muller 2014).

Immigration is one demographic phenomenon in which the educational role of parent-child relations during childhood and the educational role of peer relations in adolescence come together to influence the extent of stratification in the educational system. In general, students from immigrant families experience more disad-

vantages than the general U.S. population, including higher rates of poverty, family-school language barriers, and lower levels of school quality. Because they are typically members of racial/ethnic minority groups means they also face more discrimination, in addition to the general political and social scapegoating that surrounds immigration itself (Garcia-Coll and Marks 2009; Crosnoe 2009). Given these disadvantages, children from immigrant families should be faring poorly in the American educational system, and many of them are. Yet, in general, the norm is for immigrant children to score or rate higher than their peers with native-born parents in school completion, grade point average, test scores, and other academic factors in high school, especially when their generally more disadvantaged socioeconomic circumstances are taken into account. A similar—although weaker and less consistent pattern—holds in elementary school (Hao and Woo 2012; Reardon and Galindo 2009; Pong and Hao 2007; Glick and White 2003) and has been reported in other developed countries with large immigrant populations from the developing world (Washbrook et al. 2012).

Many explanations are useful to understanding this immigrant paradox, but one of the most common concerns the strong family ties in immigrant communities and their implications for peer dynamics. Immigrant children tend to be more oriented towards adults than children raised in the U.S. by U.S.-born parents, and so they are powerfully influenced by the educational goals and aspirations that their parents have for them (and that likely contributed to immigration decisions in the first place) and less likely to associate with (or be influenced by) peers with attitudes and behaviors that are counter to what their parents value. Thus, social and emotional advantages and protections in the parent-child relationship blunt other types of disadvantages and risks, including peer risks. The longer that families remain in the U.S. and the more integrated that youth are into Americanized peer groups, however, these advantages and protections fade in power and allow the disadvantages and risks to take effect (Kao 2004).

3.3 Intertwined Trajectories

At the start of this chapter, we described the basic imagery of the life course as a tapestry of three interwoven threads: developmental trajectories, social pathways, and social convoys. This imagery from the life course perspective is relevant to the contributions of both developmentalists and demographers—two main audiences of life course research—to the field of educational research. Scholars from these disciplines have helped to expand the focus of educational research away from purely academic and institutional factors, statuses, and processes to consider the ways in which educational experiences are entangled with other life experiences (Crosnoe and Johnson 2011). Here, we discuss three examples of the connections among developmental trajectories, social pathways, and social convoys within the educational life course as a means of blurring the lines between the traditional domains of educational research and life course research—embedding education within the general life course and considering individual trajectories that aggregate into population trends. Doing so is important to understanding inequality and identifying solutions to social problems.

First, the connection between education and work represents the interplay of two social pathways—the navigation of the educational system and the navigation of the labor market, along with the sequences of roles and settings associated with both. The general view of the educational system in the U.S. is that its primary (although not sole) purpose is to prepare young people to enter the labor market and contribute to the economic productivity of the nation; however, the weaker mechanisms for coupling vocational and academic education in the U.S. compared to many European countries, like Germany, mean that many American youth may be more vulnerable during the transition to the labor market (Bonnie et al. 2014; Schoon and Silbereisen 2009). The nature of this preparatory role in the U.S. or in other developed countries, however, shifts depending on timing in the life course.

Concurrently, education and work can both support and undermine each other. For example, most adolescents work for pay at some point while they are also attending high school (Apel et al. 2007). Many view such concurrent schooling and work in positive terms, arguing that working for pay and learning to manage multiple time constraints and duties allows young people to develop responsibility, conscientiousness, and other important skills while also gaining work experience. The number of adolescents combining work and schooling has also generated some concern, fueled by studies showing that adolescent workers do worse academically than other adolescents and are more likely to engage in substance use. This research is used to characterize work as an academic distraction and an entrée into age-inappropriate groups with bad influences. Research attempting to reconcile these two sides through more rigorous longitudinal methods has generally indicated benefits (e.g., academic progress, conventional behavior) from work during the high school years unless work hours are quite intensive and/or young people who are working have low social and academic propensities to work (Lee and Staff 2007; Johnson 2004; McMorris and Uggen 2000; Mortimer 2003).

Prospectively, academic success and educational attainment in adolescence and young adulthood is one of the most important predictors of success in the labor market across adulthood. Educational experience—especially in high-quality schools—cultivates tangible work-related skills (e.g., math skills needed to be an accountant, fine arts training to be an artist), general cognitive skills that promote success in work (e.g., critical thinking, problem solving), social and cultural capital that increase attractiveness to employers and clients (e.g., knowledge of fine arts, good grammar), and it also signals to future employers and clients that a person might have other valued traits, such as persistence and conscientious, that are thought to go along with educational success. As a result, high school graduates have better labor market outcomes than high school dropouts and college graduates have better labor market outcomes than high school graduates (Bonnie et al. 2014; Fischer and Hout

2006; Mirowsky and Ross 2003; Kerckhoff 1993). Yet, even as educational attainment now predicts work success later, attempting to combine school and work now can reduce educational attainment later. Basically, juggling college coursework and a job is related to lower odds of college graduation, which is the best predictor of ultimate occupational attainment (Bernhardt et al. 2001). Again, how education and work are connected over the life course is important.

Moreover, socioeconomic differences in the types of jobs an adolescent can secure, enrollment in higher education, and the ability to postpone work to concentrate on higher education studies mean that the interplay of school and work trajectories both reflect and can reinforce socioeconomic inequality over time and across generations, which is why reducing educational disparities across diverse segments of the population is one of the widely supported mechanisms for intervening in the intergenerational transmission of inequality (Bernhardt et al. 2001; Kane 1999; Schneider and Stevenson 1999).

Second, the connection between education and health represents the interplay of a social pathway and developmental trajectory, respectively, with the navigation of the educational system shaped by and shaping physical and mental functioning and wellbeing. Although the purposes of the educational system are widely considered to include the promotion of educational success on the individual and population levels, they are not often thought to include the promotion of individual and population health. Yet, health is one of the best-documented outcomes of education. More educated people are in better health, and more educated societies are healthier (Mirowsky and Ross 2003).

One striking example is the clear link between educational attainment and mortality. Within any given society, more educated people live longer than less educated people. Moreover, societies with higher rates of educational attainment tend to be characterized by lower mortality rates. These associations tend to grow over time, both across the life course and across historical time (Miech et al. 2011; Lynch 2003). Why would educational attainment—which, with the exception of actual

health education, is not explicitly targeted at health—be associated with such a clear marker of health? Certainly, selection is part of the answer. Healthier people may be more likely to attain education (i.e., a bidirectional interplay between education and health, not just education affecting health). Furthermore, the factors that promote educational attainment might also lead to better health, such as genetically influenced cognitive skills and intelligence (Palloni 2006; Lynch 2003; Lauderdale 2001). Such selection forces, however, do not account for all of the links between education and mortality. Some causal factors are at work as well. Educational attainment comes with monetary rewards that grant access to higher-quality health care, safer living and working environments, and greater health supports (e.g., nutrition, health-related consultations). The benefits of education go well beyond money, though, to include the social, cultural, and cognitive resources that education cultivates (Lynch 2003). For example, more educated individuals tend to have broader and more diverse networks, so that they have deeper pools of social support. The critical thinking that they develop through their educational experiences (e.g., adjudicating between pros and cons, seeing life circumstances as under their own control) also allows them to make better decisions about health and health-related behaviors (Mirowsky and Ross 2003; Ross and Wu 1995).

On one hand, educational attainment is strongly and inversely related to morality and many other problematic health conditions and outcomes (e.g., depression, functional limitations, morbidity). On the other hand, educational attainment is stratified by SES, race/ethnicity, and other sociodemographic factors. Thus, it is a major source of socioeconomic and demographic disparities in health, which are such a common focus of life course research and are frequently targeted for government intervention (Palloni 2006; Williams and Collins 1995).

Third, the connection between education and family formation represents the interplay of a social pathway and a social convoy, with the navigation of the educational system related to how individuals enter into and enact family roles and how they participate in family relations. Even

less so than health, family statuses and processes are not commonly thought of as outcomes of the educational system, but indeed they are. Thus, just as family background shapes educational experiences, educational experiences shape future family life (Crosnoe and Cavanagh 2010; Cherlin 2009).

To begin with some basic family statuses, educational attainment predicts numerous aspects of marriage and partnership across adulthood. In the U.S. and many other developed countries, individuals who have graduated from college are more likely to marry than their less educated counterparts. Once married, college graduates are also more likely to stay married than others. In other words, education seems to facilitate marriage and discourage divorce (Musick et al. 2012; Schoen and Cheng 2006). Educational attainment is also closely related to fertility and associated parenting statuses and circumstances. College graduates have fewer children on average than people with less education. Even more strikingly, they are far less likely to have children outside of marriage. A majority of Americans who have not attended college now have children without being married, but less than 10 % of college graduates do (Cherlin 2009). Importantly, this interplay of educational attainment and family formation has strengthened over time, so that a child with a well-educated mother is likely to enjoy many more advantages (e.g., money, family stability) today than in the past, while a child whose mother has low education faces many more disadvantages. McLanahan (2004) has referred to this tighter coupling between maternal education and broader family advantages and disadvantages as the “diverging destinies” of American children.

Turning to basic family processes, educational attainment is also a factor in parenting behavior. We have already covered the family socialization model and the concerted cultivation thesis, both of which contend that family SES differentiates child outcomes through parenting and other family processes, but we want to stress that the literatures around these theoretical perspectives highlight parent education (and particularly maternal education) as a source of that

socioeconomic differentiation (Conger et al. 2010; Lareau 2003). Educational attainment helps parents manage their children's needs and opportunities in developmentally appropriate ways that maximize their chances for healthy development and academic success (Kalil et al. 2012). Consequently, policy efforts are increasingly taking a "two generation" approach to intervene in child health and education disparities. In such an approach, investments in children (e.g., preschool enrichment, health care) are paired with human capital investments in parents, especially mothers (e.g., general equivalency diploma classes, bilingual education, skill building and job training programs). In this way, children benefit through direct services but also indirectly through the resources that their mothers develop in parallel, resources that are in part intended to help them better act on their positive parenting values. This approach is relevant to combating socioeconomic inequality as well as other forms of stratification related to socioeconomic inequality, such as stratification by race/ethnicity and immigration (King et al. 2011; Crosnoe and Kalil 2010; Smith 1995).

Of course, as this discussion has made clear, many of the life course advantages of education help to explain the interplay of educational attainment with other threads of the life course. Education cultivates resources and skills, opens up opportunities, and empowers people to build on such resources and skills and capitalize on such opportunities. Thus, educational attainment stabilizes and supports other forms of attainment. Yet, the direction is not solely one way, as those other forms of attainment comes with advantages and disadvantages that promote or truncate educational attainment.

3.4 Contexts

To return once again to the imagery of the life course as a thread of interwoven tapestry, recall that this imagery also embeds this tapestry within social contexts. We have explained how one contribution of the life course perspective is its emphasis on the multiple levels of contexts. Here, we offer examples of different contexts of educa-

tional attainment from the micro, meso, and macro levels. These levels overlap, although studies of education often isolate them from each other (Crosnoe and Benner 2015).

First, the micro level consists of proximate ecological settings defined by smaller spaces and numbers of people. The classroom, which is embedded in a school, district, and the larger educational system, is an example of a proximate micro-level context. The classroom is the most concrete and identifiable setting in which instruction and learning occur in interaction with each other, and, as such, it is often a site of intervention in efforts to improve learning and reduce educational disparities. For example, consider the debate about whether English language learners have higher academic achievement when enrolled in classrooms in which they are taught primarily in English or when teachers use a bilingual approach. Some argue that bilingual instruction will interfere with English skill development, but others argue that mastery of the native language is a requirement for mastering English. Empirical evidence supports the latter argument. Students do better when instruction geared towards cultivating English language proficiency is integrated with content instruction in the native language, with a gradual transition towards content instruction in English as English language proficiency increases. This strategy works because English language learners do not fall behind in academic content while learning English, and it reflects the rewards of true bilingualism for cognitive and academic skills more generally (Golash-Boza 2005; Padilla and Gonzalez 2001; Yeung et al. 2000). This immigration-related phenomenon is an example of the child x instruction x context approach, which contends that children learn more readily when their teachers tailor instruction to their specific needs and talents within a generally supportive environment (Connor et al. 2009). An English language learner will be more academically successful when a teacher effectively evaluates what he or she needs both academically and in terms of language and develops a pedagogical plan to act on this evaluation, particularly if the teacher has the support of parents, other teachers, and administrators in this process.

Second, the meso level consists of larger and more impersonal organizational settings that organize and are influenced by proximate ecologies (e.g., peer groups, families) and connect them to broader social systems (e.g., stratification or political systems). The school is a good example. It houses classrooms and is in turn embedded in the broader educational system (Arum 2000). As illustrated by the lengthy and influential Coleman Report in the 1960s, schools can be characterized by a number of characteristics and processes that influence student outcomes, both academic and non-academic. To pick one example, school sector refers to whether a school is part of the taxpayer-funded public system that is overseen by local, state, and federal governments or whether it is privately supported by independent organizations. An important distinction within the general parameter of school sector is Catholic schools, other private schools, and public schools. In general, private schools outperform public schools on most indicators of student achievement, reflecting a variety of factors, including greater funding and lower student-teacher ratios (Dronkers and Robert 2008; Lubienski et al. 2009; Coleman and Hoffer 1987). This private school advantage is even more pronounced for schools run by the Catholic church, especially for children who come from poor families or who are racial/ethnic minorities (Bryk et al. 1993). Evidence for this Catholic school effect has often been attacked as spurious, the argument being that the observed success of Catholic schools is simply a function of students more likely to succeed in the first place being the ones who attend such schools rather than some instructional or curricular advantage of Catholic school education (Hallinan and Kubitschek 2012; Lee and Ready 2009). Efforts to address these concerns have revealed evidence that the Catholic school effect is at least in part real, especially for the students who are least likely to select into Catholic schools in the first place (Morgan 2001). In addition to discussions about the strong social networks and supports in Catholic schools, this causal impact is often attributed to the fact that Catholic schools have more constrained curricula, which means that a broader array of students are

exposed to challenging coursework and higher-quality instruction (Carbonaro and Covay 2010).

Third, the macro level consists of the diffuse and abstract machinery of society, the societal institutions and stratification systems that structure social life and the micro-level and meso-level contexts in which social life takes place. Perhaps the best example of a macro-level institutional context is the economy, the complex system in which goods and services are traded to balance supply and demand. The economy is the macro-level setting that defines how educational attainment is valued and what it buys people, both individually and as a population. We have already discussed how long-term changes in the economy have changed the nature of educational attainment, especially increasing the long-term returns to higher education (Goldin and Katz 2008; Fischer and Hout 2006). We can also think about how this long-term economic evolution encompasses many different shorter-term economic ups and downs. Although the long-term trend in the economy is towards higher rewards for college education, shorter-term fluctuations in the economy (e.g., recessions) have chipped away at these increasing returns. On one hand, the current economic climate shapes whether young people pursue higher education. Income effects occur when hard economic times make people eschew education in favor of work, as their pressing financial needs (and their families' needs) mean that they cannot afford to stick with education and instead need to try to bring in money. Substitution effects occur when hard economic times make people concentrate on education over work, as the bad economy shrinks the number of available jobs, which, in turn, lowers the opportunity costs of enrolling in higher education. In many countries, evidence points towards income effects as more common than substitution effects, but evidence of substitution effects (or educational warehousing) has been found in the U.S., especially among those from higher-SES backgrounds (Marteleto et al. 2012; Torche 2010; John 2009; Werum 2001; Shanahan et al. 1997; Felson and Land 1978). On the other, the current economic climate shapes what happens to those who have pursued higher education. Ample evidence from a variety

of industrialized nations indicates that young people who graduate from college during a recession have lower earnings trajectories over the next two decades than comparable students who graduate during better economic times. The weak labor market means that recession-era graduates are underplaced initially, which then deflates their upward trajectories (Oreopoulos et al. 2012; Kahn 2010). Thus, general economic trends shape motivation for and consequences of educational attainment, and specific economic events qualify this economic influence in particular ways.

Classrooms are contained within and organized by schools, and both are subject to the influence of economic forces. At the same time, what happens in classrooms shapes the academic bottom line of schools, and how schools are doing as a whole is a primary factor in economic stability and expansion. The various social contexts in which the life course unfolds, therefore, are difficult to disentangle. Even when researchers attempt to dig down into and unpack one level of context, they should do so with the recognition that it is part of a complex web of environmental influences and processes.

4 Conclusion

A point that we have repeatedly made in this chapter is that the proliferation of research at the intersection of educational studies and life course studies in recent years means that no one review can fully capture the wide breadth and depth of this integrated field and, consequently, that we have to select specific examples to tell a larger story. That story is that the educational life course is a multi-dimensional construct that, by connecting the individual and population levels, offers insight into societal inequality and informs efforts to reduce it. Put another way, what is going on inside and around a person is both an effect and cause of socioeconomic, racial/ethnic, and immigration-related inequality, and so exploring this interplay across proximal to distal levels of social life is a path towards solving social problems through evidence-based policy intervention.

Both in terms of research and policy as well as in the translation between them, the value of the life course perspective for illuminating education and educational inequality is that it tells us when and where to look as well as why we need to look when and where we do. It highlights the importance of timing; for example, advocating for interventions early in the life course supplemented by boosters later on in the life course, or pinpointing critical transition points. It also suggests that linked lives matter in fluid ways; for example, the type of linked lives that require attention may change from childhood into adolescence, and some aspects of linked lives might be more amenable to intervention than others. Finally, it suggests that the rationale for doing something about education is that it has the potential for cascading benefits; for example, improving educational outcomes may enhance health, family life, and many other barometers of a good life or a good society. Thus, the life course perspective is a guide for organizing educational research and pushing it forward, and educational research is a good exemplar of the power of the life course to promote scientifically-based knowledge about a major social issue.

As we have already noted, the integration of education and life course research is still relatively new, and so more can be done. Instilling some of the merits of life course research within educational research is one need, such as the emphasis on dynamism, contextual embeddedness, and the cross-pollination between education and many other domains. Instilling some of the merits of educational research within life course research is another, such as the value of establishing causal effects and of the two-way exchange between science and action. The two fields must keep engaging with, learning from, and teaching each other.

References

- Alexander, K. L., & Entwisle, D. R. (1988). Achievement in the first two years of school: Patterns and processes. *Monographs of the Society for Research on Child Development*, 53, 1–157.

- Alexander, K., Entwisle, D., & Olson, L. (2014). *The long shadow: Family background, disadvantaged urban youth, and the transition to adulthood*. New York: Russell Sage.
- Apel, R., Bushway, S., Brame, R., Haviland, A. M., Nagin, D. S., & Paternoster, R. (2007). Unpacking the relationship between adolescent employment and antisocial behavior: A matched samples comparison. *Criminology*, *45*, 67–97.
- Arum, R. (2000). Schools and communities: Ecological and institutional dimensions. *Annual Review of Sociology*, *26*, 395–418.
- Attewell, P., & Domina, T. (2008). Raising the bar: Curricular intensity and academic performance. *Educational Evaluation and Policy Analysis*, *30*, 51–71.
- Attewell, P., & Domina, T. (2011). Educational imposters and fake degrees. *Research in Social Stratification*, *29*, 57–69.
- Autor, D. (2014). Skills, education, and the rise of earnings inequality among the “other 99 percent”. *Science*, *344*, 843–851.
- Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research*, *19*, 3–30.
- Benner, A. D. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review*, *23*, 299–328.
- Benner, A. D., & Graham, S. (2009). The transition to high school as a developmental process among multiethnic urban youth. *Child Development*, *80*, 356–376.
- Bernhardt, A., Morris, M., Handcock, M. S., & Scott, M. A. (2001). *Divergent paths: Economic mobility in the new American labor market*. New York: Russell Sage.
- Bonnie, R. J., Stroud, C., & Breiner, H. (Eds.). (2014). *The health and well-being of young adults: A critical time*. Washington, DC: Board on Children, Youth, and Families, Institute of Medicine of the National Academies.
- Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America* (Vol. 57). New York: Basic Books.
- Bozick, R., & DeLuca, S. (2005). Better late than never? Delayed enrollment in the high school to college transition. *Social Forces*, *84*, 531–554.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*, 371–399.
- Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials towards a formal rational action theory. *Rationality and Society*, *9*(3), 275–305.
- Bryk, A. S., Lee, V. E., & Holland, P. B. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard Press.
- Buchmann, C., & Park, H. (2009). Stratification and the formation of expectations in highly-differentiated educational systems. *Research in Social Stratification and Mobility*, *27*, 245–267.
- Carbonaro, W., & Covay, E. (2010). School sector and student achievement in the era of standards based reforms. *Sociology of Education*, *83*, 160–182.
- Cherlin, A. (2009). *The marriage-go-round. The state of marriage and the family today*. New York: Simon & Schuster.
- Coleman, J. S., & Hoffer, T. (1987). *Public and private high schools: The impact of communities*. New York: Basic Books.
- Coleman, J. S., Campbell, E. G., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity*. Washington, DC: U. S. Government Printing Office.
- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and Family*, *72*, 685–704.
- Connor, C. M., Piasta, S. B., Fishman, B., Glasney, S., Schatschneider, C., Crowe, E., Underwood, P., & Morrison, F. J. (2009). Individualizing student instruction precisely: Effects of child × instruction interactions on first graders’ literacy development. *Child Development*, *80*, 77–100.
- Crosnoe, R. (2009). Family–school connections and the transitions of low-income youths and English language learners from middle school to high school. *Developmental Psychology*, *45*, 1061.
- Crosnoe, R. (2011). *Fitting in, standing out: Navigating the social challenges of high school to get an education*. New York: Cambridge.
- Crosnoe, R., & Benner, A. (2015). Children at school. In M. Bornstein & T. Leventhal (Eds.), *Handbook of child psychology and developmental science* (Ecological Settings and Processes (series editor: Richard M. Lerner), Vol. 4). New York: Wiley.
- Crosnoe, R., & Cavanagh, S. (2010). Families with children and adolescents: A review, critique, and future agenda. *Journal of Marriage and Family*, *72*, 1–18.
- Crosnoe, R., & Cooper, C. (2010). Economically disadvantaged children’s transitions into elementary school: Linking family processes, school context, and educational policy. *American Educational Research Journal*, *47*, 258–291.
- Crosnoe, R., & Johnson, M. K. (2011). Research on adolescence in the 21st century. *Annual Review of Sociology*, *37*, 439–460.
- Crosnoe, R., & Kalil, R. (2010). Educational progress and parenting among Mexican immigrant mothers of young children. *Journal of Marriage and Family*, *72*, 976–990.
- Crosnoe, R., & Muller, C. (2014). Family socioeconomic status, peers, and adolescents’ path to college. *Social Problems*, *61*, 1–23.
- Davis-Kean, P. (2005). The influence of parent education and family income on child achievement: The indirect role of parent expectations and the home environment. *Journal of Family Psychology*, *19*, 294–304.
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, *32*, 271–297.

- Dronkers, J., & Robert, P. (2008). Differences in scholastic achievement of public, private government-dependent, and private independent schools: A cross-national analysis. *Educational Policy*, 22(4), 541–577.
- Duncan, G. J., & Magnuson, K. (2013). Investing in pre-school programs. *Journal of Economic Perspectives*, 27(2), 109–132.
- Eccles, J. (2004). Schools, academic motivation, and stage-environment fit. In R. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (pp. 125–153). Hoboken: Wiley.
- Eccles, J., Midgely, C., Wigfield, A., Buchanan, C. M., Reuman, D., & MacIver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48, 90–101.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago.
- Elder, G. H. (1998). The life course as developmental theory. *Child Development*, 69, 1–12.
- Entwisle, D. R., Alexander, K. L., & Olson, L. S. (2005). First grade and educational attainment by age 22: A new story. *American Journal of Sociology*, 110, 1458–1502.
- Erikson, R., Goldthorpe, J. H., Jackson, M., Yaish, M., & Cox, D. R. (2005). On class differentials in educational attainment. *Proceedings of the National Academy of Sciences of the United States of America*, 102, 9730–9733.
- Federal Interagency Forum on Child and Family Statistics. (2014). *America's young adults: Special issue, 2014*. Washington, DC: U.S. Government Printing Office.
- Felson, M., & Land, K. (1978). Social, demographic and economic inter-relationships with educational trends in the United States, 1947–1974. In J. L. Simon (Ed.), *Research in population economics* (pp. 93–125). Greenwich: JAI Press.
- Fischer, C. S., & Hout, M. (2006). *Century of difference: How America changed in the last one hundred years*. New York: Russell Sage.
- Gandara, P. (2002). A study of high school Puente: What we have learned about preparing Latino youth for postsecondary education. *Educational Policy*, 16, 472–495.
- García Coll, C., & Marks, A. K. (2009). *Immigrant stories: Ethnicity and academics in middle childhood*. New York: Oxford University Press.
- George, L. K. (1993). Sociological perspectives on life transitions. *Annual Review of Sociology*, 19, 353–373.
- Glick, J. E., & White, M. J. (2003). The academic trajectories of immigrant youths: Analysis within and across cohorts. *Demography*, 40, 589–603.
- Golash-Boza, T. (2005). Assessing the advantages of bilingualism for the children of immigrants. *International Migration Review*, 39(39), 721–753.
- Goldin, C., & Katz, L. (2008). *The race between technology and education*. Cambridge, MA: Harvard University Press.
- Goldthorpe, J. H. (2000). *On sociology: Numbers, narratives, and the integration of research and theory*. Oxford: Oxford University Press.
- Hallinan, M., & Kubitschek, W. N. (2012). A comparison of academic achievement and adherence to the common school ideal in public and catholic schools. *Sociology of Education*, 85, 1–22.
- Hao, L., & Woo, H. S. (2012). Distinct trajectories in the transition to adulthood: Are children of immigrants advantaged? *Child Development*, 83, 1623–1639.
- Harris, A. (2006). I (don't) hate school: Revisiting 'oppositional culture' theory of blacks' resistance to schooling. *Social Forces*, 85, 797–834.
- Hauser, R. M., & Koenig, J. A. (2011). *High school dropout, graduation, and completion rates: Better data, better measures, better decisions*. Washington, DC: National Academy Press.
- Jackson, M., Erikson, R., Goldthorpe, J. H., & Yaish, M. (2007). Primary and secondary effects in class differentials in educational attainment the transition to A-level courses in England and Wales. *Acta Sociologica*, 50, 211–229.
- John, I. (2009). *Economic scarring: The long-term impacts of the recession*. Washington, DC: Economic Policy Institute.
- Johnson, M. K. (2004). Further evidence on adolescent employment and substance use: Differences by race and ethnicity. *Journal of Health and Social Behavior*, 45, 187–197.
- Kahn, L. B. (2010). The long-term labor market consequences of graduating from college in a bad economy. *Labour Economics*, 17, 303–316.
- Kalil, A., Ryan, R., & Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography*, 49, 1–23.
- Kane, T. J. (1999). *The price of admission: Rethinking how Americans pay for college*. Washington, DC: Brookings Institution.
- Kao, G. (2004). Parental influences on the educational outcomes of immigrant youth. *International Migration Review*, 38, 427–449.
- Kariya, T., & Rosenbaum, J. E. (2003). Stratified incentives and life course behaviors. In J. Mortimer & M. Shanahan (Eds.), *Handbook of the life course*. New York: Kluwer/Plenum.
- Kelly, S. (2008). What types of students' effort are rewarded with high marks? *Sociology of Education*, 81, 32–52.
- Kerckhoff, A. C. (1993). *Diverging pathways: Social structure and career deflections*. Cambridge, UK: Cambridge University Press.
- King, C., Smith, T., & Glover, R. (2011). *Investing in children and parents: Fostering dual-generation strategies in the United States*. New York: Foundation for Child Development.
- Kingston, P. W., Hubbard, R., Lapp, B., Schroeder, P., & Wilson, J. (2003). Why education matters. *Sociology of Education*, 76, 53–70.
- Kinney, D. (1999). From 'headbangers' to 'hippies': Delineating adolescents' active attempts to form an

- alternative peer culture. *New Directions for Child and Adolescent Development*, 84, 21–35.
- Langenkamp, A. G. (2010). Academic vulnerability and resilience during the transition to high school: The role of social relationships and district context. *Sociology of Education*, 83, 1–19.
- Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. Berkeley: The University of California Press.
- Lauderdale, D. (2001). Education and survival: Birth cohort, period, and age effects. *Demography*, 38, 551–561.
- Lee, V. E., & Ready, D. D. (2009). US high school curriculum: Three phases of contemporary research and reform. *Future of Children*, 19, 135–156.
- Lee, J. C., & Staff, J. (2007). When work matters: The varying impact of work intensity on high school dropout. *Sociology of Education*, 80, 158–178.
- Lerner, R., & Galambos, N. L. (1998). Adolescent development: Challenges and opportunities for research, programs, and policies. *Annual Review of Psychology*, 49, 413–446.
- Lubienski, C., Weitzel, P., & Lubienski, S. T. (2009). Is there a “consensus” on school choice and achievement? Advocacy research and the emerging political economy of knowledge production. *Educational Policy*, 23, 161–193.
- Lynch, S. (2003). Cohort and life course patterns in the relationship between education and health: A hierarchical perspective. *Demography*, 40, 309–332.
- Marteleto, L., Gelber, D., Hubert, C., & Salinas, V. (2012). Educational inequalities among Latin American adolescents: Continuities and changes over the 1980s, 1990s and 2000s. *Research in Social Stratification and Mobility*, 30, 352–375.
- Massey, D. S., Charles, C. Z., Lundy, G., & Fischer, M. J. (2011). *The source of the river: The social origins of freshmen at America’s selective colleges and universities*. Princeton: Princeton University Press.
- McFarland, D. A. (2006). Curricular flows: Trajectories, turning points, and assignment criteria in high school math careers. *Sociology of Education*, 79, 177–205.
- McLanahan, S. (2004). Children and the second demographic transition. *Demography*, 41, 607–628.
- McMorris, B. J., & Uggen, C. (2000). Alcohol and employment in the transition to adulthood. *Journal of Health and Social Behavior*, 41, 276–294.
- Miech, R., Pampel, F., Kim, J., & Rogers, R. G. (2011). The enduring association between education and mortality the role of widening and narrowing disparities. *American Sociological Review*, 76, 913–934.
- Mirowsky, J., & Ross, C. E. (2003). *Education, social status, and health*. New York: Aldine de Gruyter.
- Mistry, R., Biesanz, J. C., Taylor, L., Burchinal, M., & Cox, M. J. (2004). Family income and its relation to pre-school children’s adjustment for families in the NICHD Study of Early Child Care. *Developmental Psychology*, 40, 727–745.
- Morgan, S. L. (2001). Counterfactuals, causal effect heterogeneity, and the Catholic school effect on learning. *Sociology of Education*, 74, 341–374.
- Morgan, S. L. (2005). *On the edge of commitment: Educational attainment and race in the United States*. Stanford: Stanford University Press.
- Mortimer, J. T. (2003). *Working and growing up in America*. Cambridge: Harvard University Press.
- Musick, K., Brand, J. E., & Davis, D. (2012). Variation in the relationship between education and marriage: Marriage market mismatch? *Journal of Marriage and Family*, 74, 53–69.
- Ogbu, J. U. (1997). African American education: A cultural-ecological perspective. In H. P. McAdoo (Ed.), *Black families* (pp. 234–250). Thousand Oaks: Sage.
- Oreopoulos, P., von Wachter, T., & Heisz, A. (2012). The short-and long-term career effects of graduating in a recession. *American Economic Journal: Applied Economics*, 4, 1–29.
- Padilla, A. M., & Gonzalez, R. (2001). Academic performance of immigrant and US-born Mexican heritage students: Effects of schooling in Mexico and bilingual/English language instruction. *American Educational Research Journal*, 38, 727–742.
- Palloni, A. (2006). Reproducing Inequalities: Luck, wallets, and the enduring effects of childhood health. *Demography*, 43, 587–615.
- Patrick, M. E., Schulenberg, J. E., & O’Malley, P. M. (forthcoming). High school substance use as a predictor of college attendance, completion, and dropout: A national multicohort longitudinal study. *Youth & Society*.
- Pianta, R. C., Cox, M., & Snow, K. (2007). *School readiness and the transition to kindergarten in the era of accountability*. Baltimore: Brooks.
- Pong, S. L., & Hao, L. (2007). Neighborhood and school factors in the school performance of immigrants’ children. *International Migration Review*, 41, 206–241.
- Propper, C. B., Shanahan, M. J., Russo, R., & Mills-Koonce, W. R. (2012). Evocative gene–parenting correlations and academic performance at first grade: An exploratory study. *Development and Psychopathology*, 24, 1265–1282.
- Raver, C. C., Gershoff, E., & Aber, L. (2007). Testing equivalence of mediating models of income, parenting, and school readiness for White, Black, and Hispanic children in a national sample. *Child Development*, 78, 96–115.
- Reardon, S., & Galindo, C. (2009). The Hispanic-White achievement gap in math and reading in the elementary school grades. *American Educational Research Journal*, 46, 853–891.
- Riegle-Crumb, C. (2006). The path through math: Course sequences and academic performance at the intersection of race/ethnicity and gender. *American Journal of Education*, 113, 101–122.
- Riegle-Crumb, C., & King, B. (2010). Questioning a white male advantage in STEM: Examining dispari-

- ties in college major by gender and race/ethnicity. *Educational Researcher*, 39(9), 656–664.
- Ross, C. E., & Wu, C. L. (1995). The links between education and health. *American Sociological Review*, 60, 719–745.
- Rudolph, K. D., Lambert, S. F., Clark, A. G., & Kurlakowsky, K. D. (2001). Negotiating the transition to middle school: The role of self-regulatory processes. *Child Development*, 72, 929–946.
- Ryan, A. M. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development*, 72, 1135–1150.
- Sacerdote, B. (2011). Peer effects in education: How might they work, how big are they and how much do we know thus far? *Handbook of the Economics of Education*, 3, 249–277.
- Schneider, B., & Stevenson, D. (1999). *The ambitious generation: America's teenagers, motivated but directionless*. New Haven: Yale University Press.
- Schneider, B., Swanson, C. B., & Riegle-Crumb, C. (1999). Opportunities for learning: Course sequences and positional advantages. *Social Psychology of Education*, 2, 25–53.
- Schoen, R., & Cheng, A. (2006). Partner choice and the differential retreat from marriage. *Journal of Marriage and Family*, 68, 1–10.
- Schoon, I., & Silbereisen, R. K. (Eds.). (2009). *Transitions from school to work: Globalization, individualization, and patterns of diversity*. Cambridge, UK: Cambridge University Press.
- Schulenberg, J. E., & Maggs, J. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol*, 63, 54–70.
- Seidman, E., Lambert, L. E., Allen, L., & Aber, J. L. (2003). Urban adolescents' transition to junior high school and protective family transactions. *Journal of Early Adolescence*, 23, 166–193.
- Shanahan, M. J., Elder, G., & Miech, R. A. (1997). History and agency in men's lives: Pathways to achievement in cohort perspective. *Sociology of Education*, 70, 54–67.
- Siegler, R. S. (2009). Improving the numerical understanding of children from low-income families. *Child Development Perspectives*, 3, 118–124.
- Siegler, R. S., & Lortie-Forgues, H. (2014). An integrative theory of numerical development. *Child Development Perspectives*, 8, 144–150.
- Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science*, 23, 691–697.
- Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. Hawthorne: Aldine de Gruyter.
- Smith, S. (Ed.). (1995). *Two generation programs for families in poverty: A new intervention strategy*. Norwood: Ablex.
- Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52, 613.
- Stevenson, D. L., Schiller, K. S., & Schneider, B. (1994). Sequences of opportunities for learning. *Sociology of Education*, 67, 184–198.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.
- Torche, F. (2010). Economic crisis and inequality of educational opportunity in Latin America. *Sociology of Education*, 82, 85–110.
- Tyson, K., Darity, W., & Castellino, D. R. (2005). It's not a 'black thing': Understanding the burden of acting white and other dilemmas of high achievement. *American Sociological Review*, 70, 582–605.
- Warren, J. R., Grodsky, E., & Lee, J. C. (2008). State high school exit examinations and postsecondary labor market outcomes. *Sociology of Education*, 81, 77–107.
- Washbrook, E., Waldfogel, J., Bradbury, B., Corak, M., & Ghanghro, A. A. (2012). The development of young children of immigrants in Australia, Canada, the United Kingdom, and the United States. *Child Development*, 83, 1591–1607.
- Werum, R. (2001). Warehousing the unemployed? Federal job training programs in the depression-era south. *American Journal of Education*, 109, 228–265.
- Williams, D., & Collins, C. (1995). U.S. socioeconomic and racial differences in health: Patterns and explanations. *Annual Review of Sociology*, 21, 349–386.
- Yeung, A. S., Marsh, H. W., & Suliman, R. (2000). Can two tongues live in harmony: Analysis of the National Education Longitudinal Study of 1988 (NELS88) longitudinal data on the maintenance of home language. *American Educational Research Journal*, 37, 1001–1026.

College for All: New Institutional Conflicts in the Transition to Adulthood

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1 Introduction

Societal context is crucial for understanding how individuals move through life stages (Elder 1998). The current transition to adulthood is defined by delays experienced in post-secondary education, career exploration, marriage, and parenthood. Less obvious is the interplay between delays in post-secondary education and the transitions in the domains of work and family. Dramatically increased earnings payoffs for higher education and a prevailing emphasis on college for all have encouraged more young adults to plan higher credentials. While these new changes to the transition to adulthood and expanded education can create positive opportunities for growth and exploration, this also comes with serious costs and risks, particularly for low-income students who lack the resources for prolonged education and career exploration.

This chapter examines how community colleges shape the life course of individuals transitioning into adulthood, and whether alternative institutional structures and better informed students might reduce some of the unintended conflicts with other life domains. We focus on several conflicts. We examine *simultaneous role*

conflicts: how the student role conflicts with other roles, in particular family and work roles. We also examine *simultaneous time conflicts*: how college timetables interact with timetables for other life events associated with emerging adulthood.

Finally, we examine *sequential conflicts*: how transitions into college, within college, and after college might create conflicting expectations, difficulties, and delays in college timetables. Mortimer and Kruger (2000) contend that clear school-work connections may help shape youths' career plans and outcomes so they can anticipate and prepare for future demands. In contrast, in the U.S., "the vague connections between schooling and working, combined with the American ideology of equal, rather unlimited, and ever-available opportunity, can stimulate quite unrealistic thinking about future work roles" (Mortimer and Kruger 2000, p. 485). This analysis suggests that poorly structured transitions may create problems for youths' planning and progress and may contribute to the normative "long and winding road" described by the concept of emerging adulthood (Arnett 2000, 2004). In other words, students' life plans may be constrained or aided by their position in and trajectory through educational systems (Shanahan 2000). We conclude by suggesting that improved transition structures may reduce sequential, role and time conflicts and avoid the problems imposed by extended educational timetables.

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2 Community College Context

The vast expansion of post-secondary education has created extended higher education timelines that now characterize the transition to adulthood. In recent decades, U.S. society has made a push to give every student the opportunity to get a college degree. In fact, in a recent national cohort (ELS 2002–2012), virtually all (96 %) high school graduates plan to attend college and over 86 % enroll in college in the 8 years after high school (Rosenbaum et al. 2014; cp. Adelman 2003). This “college-for-all” policy makes colleges responsible for shaping the opportunities for social mobility of many students who have new access to attend college. Today’s labor market increasingly demands higher education credentials, making college-for-all, with a broad definition of college, an appropriate policy.

With their low tuition, convenient locations, convenient schedules, and open admissions, community colleges are a common answer to these labor market demands. Community colleges enroll nearly half of all college students, including many from underserved populations. In 2010, community college enrollment was almost as high as that of public 4-year college enrollment (NCES 2012). Many of these students pursue sub-BA credentials such as career certificates and associate’s degrees (AA), which take less time than a bachelor’s degree (BA). Since 1969, while BA degrees have doubled, certificates and AA degrees (largely offered at community colleges) have increased fourfold (NCES 2012; nd.). About 1.8 million students in 2010 completed a certificate or associate’s degree (NCES 2012). Because they serve so many youth from disadvantaged backgrounds (Rosenbaum et al. 2006), community colleges are important contexts of emerging adulthood to consider.

While critics say “college for all” is unfeasible (Murray 2008), and advocates consider it essential in the contemporary labor market (Goldin and Katz 2008), the reality is that American society has already persuaded virtually all (96 %) high school graduates to have college plans. Unfortunately, almost half (46 %) of youth who first enter community colleges do not have any

credential 8 years after high school graduation and 44 % who enter 4-year colleges with low academic achievement do not have a degree after 8 years (Rosenbaum et al. 2014). Although most high school graduates make it to college, many do not succeed, and although much research examines the academic challenges they face, reconciling the demands of college and other life demands is unresolved. We must understand how this new educational demand fits into the lives of youth who previously would not have attended college. In addition, both students and their families may have unrealistic expectations of the ways in which college will change the course of their lives.

Community colleges, like all higher education institutions, communicate expected degree timelines to students, which are based on traditional patterns created before higher education became widespread. Unfortunately, these expectations are frequently hard to meet. Completion of a degree now often takes much longer than the conventional expectation of a 4-year bachelor’s degree and a 2-year associate’s degree (Bound et al. 2009). Only 7.1 % of full-time students complete an associate’s degree in 2 years and 31.5 % of full-time students complete a bachelor’s degree in 4 years (Complete College America 2011). In fact, the “4-year BA” takes an average of almost 6 years, while a “2-year associate’s degree” takes 3–4 years. Indeed, a substantial portion of students pursuing 4-year BAs take 8 years or longer, conflicting with their initial expected timetables (Bound et al. 2009; Rosenbaum et al. 2014). This means that while students expect to finish their education early in their transition to adulthood (by age 22), in reality they may not complete their degrees until they are well into their 20s, if they complete at all.

This chapter reviews the potential consequences of these extended degree timetables in terms of the timing of other adult roles, as well as some of the transitional complications that may contribute to longer degree times. Low-income students attending 4-year schools may find that outside commitments (work and family) as well as lack of information may extend timelines beyond their expectations. We focus on the com-

munity college context because it serves many disadvantaged and non-traditional students, who might suffer more from extended degree timetables. In addition, the flexibility community colleges offer (in an effort to serve the needs of untraditional students) illustrates how poorly-structured transitions may contribute to prolonged time lines. However, many of the issues we discuss also pertain to students in 4-year colleges.

3 The Shaping of the Transition to Adulthood

The transition to adulthood has long received attention from scholars trying to understand how adolescents successfully transition into adult roles in society. Life course theory provides a paradigm that takes societal context into account when studying individuals' lives. Within this paradigm are five principles (1) life-span development, (2) agency, (3) time and place, (4) timing and (5) linked lives (Elder 1998). We will outline each briefly within the context of colleges' influence on individuals' lives.

The *principle of life span development* states that human development and aging are lifelong processes, with earlier experiences affecting later outcomes. Early educational experiences and accomplishments have life-long consequences for occupational and income attainments and adult life styles. Students' development may be influenced at any age by social contexts. The *principle of agency* highlights the active role individuals take in constructing their future trajectories through their choices and actions. The ways educational transitions are currently structured place major limits on their exercise of agency because students often lack information about options and their implications. The *principle of time and place* emphasizes that these choices and actions occur within the constraint of a particular historical time and place. The rapid expansion of community colleges in recent decades, and the challenges they pose to young people in process of transition to adulthood, well illustrates this principle. The *principle of timing*

asserts that the timing of events and experiences can affect individuals in different ways depending on when they occur in the life course. College attendance has markedly different consequences for individuals depending on whether they occur according to normative timetables, or later in the life course. Finally, individuals exist within interpersonal networks, and their life course may be influenced by other individuals' life course events, which illustrates the *principle of linked lives*. Adjustment to community college life may be importantly affected by others' expectations and support.

More recently, developmental psychologists have turned to the concept of emerging adulthood to describe a stage of life that encompasses the explorations and transitions of 18–29 year-olds, ages when individuals try out and adopt various adult roles (like spouse, parent, student, employee and head of household; Arnett 2000). A primary criticism of the concept of emerging adulthood as a developmental stage lies in questions about how this stage may be experienced by individuals from varying socioeconomic backgrounds and societal positions (Hendry and Kloep 2010; Côté 2014). In particular, we examine how youth, particularly disadvantaged youth, make choices and actions within the constraints of educational contexts, which may influence how they plan their lives and enter into the labor market.

Arnett describes emerging adults as entering and exiting adult roles at will, and suggests that post-secondary institutions are merely a possible venue for their explorations (Arnett 2000). Instead, we argue that in a historical context where college attendance is nearly universal and most young adults are exposed to college, these institutions define and influence the roles that youth adopt. Instead of being merely passive settings in which young adults explore their options and interests, we contend that post-secondary institutions may actively shape this life transition. Furthermore, how they shape this life transition may vary widely in relation to students' individual place in their life course, their linkages with family and social networks, and their previous educational experiences and attainments.

While Arnett acknowledges the job market effects of educational attainment, he portrays relatively minor and un-stressful demands from education where students have “lives structured around going to classes and doing coursework” (Arnett 2011, 2006). However, many community college students do not necessarily follow traditional school-to-family timelines and instead often marry or have children prior to graduation. Education creates demands and obligations that may compete with these other roles students adopt. This competition between roles may influence, and be influenced by, their college experience. The luxury to explore educational opportunities is especially complicated for low-income students who must manage competing roles and expectations while enrolled in college.

In contrast to Arnett, Pallas (1993) argues that schooling influences the sequencing of adult roles in other domains, particularly marriage and parenthood. Pallas envisions education as having a strong social impact on the timing, sequencing, and even disruption of various major life events. Pallas suggests that those who remain in school longer may be unable to fulfill both marriage and parenthood responsibilities and that education leads to the postponement of marriage and parenthood. In other words, men and women delay marriage and parenthood not merely because of the labor market advantages of delay, but because school enrollment leaves less time and energy for marriage and children, and less certainty about future plans. While students’ expectations may align with Pallas’ predictions, students’ actual timing for adult transitions may be untraditional.

In line with Pallas, we suggest that higher education institutions, where many students spend a large portion of the transition into adulthood, shape expectations for and timing of that transition. We argue that the community college context in particular imposes constraints that increasingly lead to conflicts with timelines of other life decisions made during this life stage. While schooling has always been in some conflict with the roles of parent, spouse and worker, extending the time spent in post-secondary institutions has prolonged these conflicts for an increasing number of students in recent years.

Although emerging adulthood *delivers the message* that extension of the timing of individuals’ trajectories through adult transitions is *penalty-free*, we point to the ways in which institutional and societal age norms related to education may create potentially difficult conflicts with timetables for other adult role demands.

Institutions can shape options and perceptions during various stages of the life course, and the transition to adulthood is no exception. Community colleges provide many low-income students with valuable opportunities for higher education, which contribute to the life course through employment opportunities and social connections. However, despite their great potential to benefit emerging adults, community colleges present other, potentially harmful consequences by delaying credential completion. Not only do delays in degree completion impact entry into adult roles, they often result in increased tuition costs, encroachment on financial aid limits, forgone wages, delayed entry into careers and increased demands on and disappointments from students’ support networks. Further, community colleges fail to offer ways to diminish these consequences or to explain how students can anticipate and deal with them. Indeed, by not announcing the frequency of such time delays, students and their family members may see delays as indicating individual failure, suggesting low ability and poor prospects.

4 Time is the Enemy: Simultaneous Conflicts in Different Life Domains

Life course theorists suggest that societal, historical, and personal contexts shape the sequencing of emerging adults’ adult roles, and they make demands and expectations that alter life choices and plans (Settersten and Hägestad 1996). The principle of timing is clearly evident in the educational realm. That is, much education literature has focused on how delays may impact education outcomes. For example, delayed entry to post-secondary education is associated with lower likelihood of degree completion (Bozick

and DeLuca 2005; Complete College America 2011). Other kinds of changes to the expected sequencing of adult roles are also associated with lower likelihood of degree completion. For example, unmarried parents enrolled in college are at greater risk of failing to complete their degree (Goldrick-Rab and Sorenson 2010). These studies are in line with the principle of timing that points to the importance of understanding how events and experiences affect individuals differently at different points during the life course. The flexibility and accessibility of community colleges provide access to education for individuals at many different stages in the life course.

Although new educational access has positive implications for opportunity, it may lead to prolonged degree timetables that may also conflict with life events outside of schooling (Settersten and Ray 2010; Furstenberg et al. 2004; Settersten and Hägestad 1996). Students who spend extended time in college may be stuck in associated life circumstances that delay self-sufficiency, reduce wages, and increase dependence on family support. While these delays can be seen as “flexibility,” expected under emerging adulthood theory, education delays may conflict with the implicit and explicit expected timetables of other institutions, especially for low-income individuals. For example, prolonged degree timetables may create delayed career entry into “adult jobs” in the primary labor market (Doeringer and Piore 1971), which may prevent young adults from getting training and advancement opportunities. These delays may also affect transitions into careers, which we will discuss later.

Life course theorists suggest that such contexts for transitioning adults may force students to contend with delays and postponements in sequencing the adoption of adult roles, including entering marriage and parenthood. Zapata-Gietl and Rosenbaum (2013) examined the hypothesis that educational timetables can conflict with expectations for the adult roles of marriage and parenthood. The authors used survey data from 1,273 students in ten community colleges (ages 18–30) to analyze how the degree plans of emerging adults related to their expectations of the tim-

ing of other adult role transitions (marriage, parenthood and transition out of their parents’ home). Using multiple regression analysis, they found that higher educational expectations were related to delayed expectations for marriage and parenthood.

The study first examined adult transition timelines without considering degree expectations. Consistent with the premise that emerging adulthood ends at 30 (implying that most have completed adulthood transitions at this age), older students’ expectations for transitions tended to converge around age 30. For example, while a childless 18 year old expected to wait 8 years (until age 26) for their first child, a childless 30 year old expected to wait only 4 years (until age 34) for their first child (Table 1). Similar patterns are evident for age of marriage, but not for moving out of parent household. This suggests that these students shared similar norms about when they personally would transition into marriage and parenting roles.

The authors predicted that student expectations for the timing of marriage and parenthood would reflect expected degree timetables. That is, students pursuing AAs should expect to marry earlier than those who planned on pursuing a BA. Multiple regression analysis showed that after controls, degree plans for BAs and AAs

Table 1 Average expected age for various life transitions

Age	Marriage	First child	Full time job	Household
18	25.89	26.72	21.46	21.79
19	25.99	27.12	22.22	22.87
20	26.66	28.3	23.02	23.28
21	26.85	28.17	23.74	24.47
22	27.19	28.64	24.4	25.23
23	27.89	29.76	25.95	26.46
24	28.8	30.04	26.32	26.88
25	29.42	30.53	27.41	27.56
26	29.58	30.48	28.75	28.75
27	30.67	32.07	30.33	29.75
28	31.89	32.42	29.75	31.62
29	32.23	33	31.11	33
30	33.59	34.33	32.25	36.5

Sample: Students attending ten community colleges, N=1,273

were strongly related to increased duration until expected marriage, parenthood, and first full-time job, although they had no impact on timetables for leaving home. In other words, students who had plans to pursue an AA or BA (as opposed to a certificate) expected to wait longer to get married, have children, or obtain their first full-time employment than students pursuing certificates (which typically take about 1 year; See Table 2). These delays suggest that community college students' expected degree timetables are related to later planned timelines for other life events, compared to students with plans for quicker education credentials. The finding that leaving home is not influenced by these longer educational timelines raise concerns about whether these added household responsibilities may require more time and financial resources than when students are living at home.

However, even if expecting an AA or BA has a strong impact compared with students planning certificates, students' expected age adjustments may not reflect the full impact of these longer degrees. While marriage and parenting timetables

are significantly longer for students with BA and AA plans than for students planning certificates, the expectations for these life events do not differ very much between those planning AA and BA degrees, and the difference is not significant. Their expectations do not seem to reflect the full degree timetables, with the BAs expecting to wait only 2 months longer than AAs to marry. This may indicate that although they recognize their education plans will extend their timetables, students feel constrained in extending their timelines further, perhaps by implicit age norms. For example, in planning age of first child, many women may feel constrained by well-publicized biological timetables. However, the findings are similar for age of marriage and age of full-time job, and similar patterns are seen for men, suggesting a more general social normative influence, not a biological influence. Students planning BAs may not want to delay these life events until after they graduate, or students may not have reconciled actual degree time with age norms for life events. Alternatively, students may be optimistic about degree timetables, either

Table 2 Regression estimates for expected duration until life transitions

	Marriage	First child	Full time job	Establishing independent household
Associates degree	0.96**	1.18**	0.67**	0.23
Bachelor's degree	1.10**	1.19**	0.99***	0.60
Certificate (omitted)	–	–	–	–
None	0.78	0.28	0.59	0.61
Black ^a	0.82*	-0.56	-0.55*	-0.12
Latino	1.00**	0.49	-0.11	0.64*
Asian or pacific islander	0.49	0.46	0.44	1.31***
Other	0.054	-0.06	-0.0075	0.28
Female	-0.98***	-0.61*	0.22	-0.36
Mother has BA	0.19	0.57	-0.023	-0.018
Explore – agree ^b	0.56	0.19	0.13	0.24
Explore – middle ^c	0.29	-0.14	0.24	0.35
Constant	4.34***	6.09***	1.77***	2.41***
N	736	658	601	657

Sample: Students attending ten community colleges, N = 1,273

^aOmitted categories are Certificate degree, White, Explore- Disagree

^bExplore – Agree = Student Agrees or strongly agrees that they want to explore career options even if their degree takes longer

^cExplore – Middle = Student indicated they were neutral about wanting to explore career options even if their degree takes longer

from lack of information about average time to degree or a belief that they will not be one of the many who take longer to graduate. Remarkably, students' mothers' education (our indicator of socioeconomic status) showed no relationship with students' expected age for adult role transitions. This suggests that students' expectations are not merely following their parents' example. Although the role of institutions, especially education, in emerging adulthood has been portrayed in contradictory ways (both inconsequential and crucial to the prolonged timing of emerging adulthood; Arnett 2011), we find that students' degree plans are, to some extent, related to their expected timetables for entering other adult roles.

Future research should examine how these expectations change as the reality of extended timetables sets in. Students demonstrate agency in choosing and following the educational trajectories they see represented by specific degrees. While the principal of agency points to the importance of these active choices on the part of students, plans sometimes fail. Research has yet to explore how unintended delays may influence the actual decisions students make about entering adult roles, what other influences such as parental expectations or peers affect their decisions, and how they balance competing influences and reach their decisions. Further, research should examine whether these possible delays in important adult life events impact emerging adults' perceptions of their life course progress and decisions as they enter adulthood.

Educational delays may have other implications. While students may adopt new college norms in extending their degree timelines, the principle of linked lives draws attention to family members who may continue to hold more traditional age norms (Settersten and Hägestad 1996). Most community college students live at home and commute, meaning that students interact with family members (either parents or spouses) on a daily basis. Indeed, research has shown that family approval affects persistence (Cabrera et al. 1992). Family support of education may go beyond mere approval and extend into additional help, such as facilitating time for studying, providing transportation to school, and offering financial support. As students approach or surpass

societal age norms for completing their formal education, however, family support faces unexpected demands; families anticipate providing this support for an institutionally defined amount of time, and may have limited resources or patience beyond that deadline. We suggest that one unforeseen consequence of delayed age timelines is that students may receive declining family support as they approach and exceed the traditional age for exiting formal education.

Our community college survey asked students about the extent to which their family supports their education goals. Although these are cross-sectional analyses, they indicate that older students perceive declining family support, with a general decline briefly suspended at ages 21–27 for females and 24–27 for males. While males show a more severe decline through age 50, females reported higher support than men until age 23, but lower support than men after age 25 (See Fig. 1). At age 30, men and women diverged again with men reporting much lower support than women through age 50. These may indicate that different age norms operate after age 30, perhaps explicitly negotiated within families. Despite being cross-sectional, these findings suggest interesting speculations, for instance, that extended time in college, which has become increasingly common (Bound et al. 2009), may lead to declining family support for college particularly after age 27. However, multivariate analyses are needed to consider other confounding influences (e.g., college grades, job and family duties, etc.). We must note that “family” may refer to family of origin or to spouse, which may operate differently. Yet traditional gender role expectations that emphasize economic contribution for males more than for females may explain the more restricted timetables for males in both kinds of “family.” However, these conjectures deserve empirical analysis.

Declining family support may in turn have deleterious effects on students' ability to persist. Pallas argues that the time spent in college can play an important role in developing plans and values in addition to providing job skills. According to the “socialization theory of schooling ... school confers knowledge about the world – for example, the labor market and the

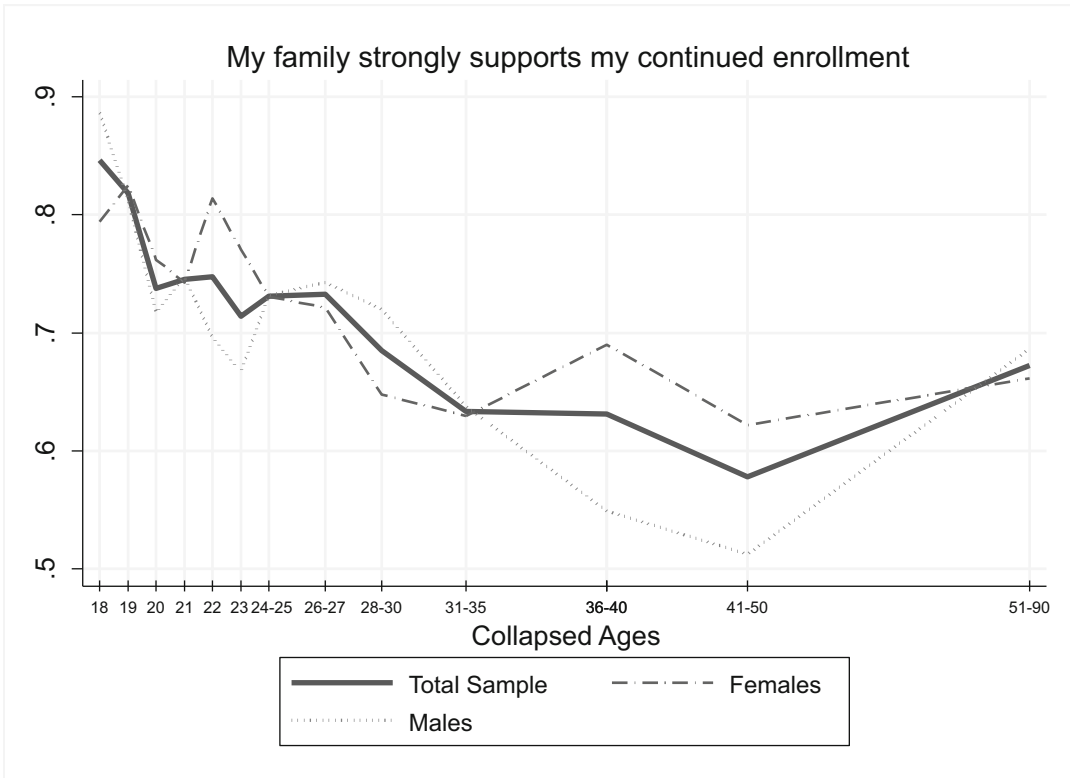


Fig. 1 Community college students’ reports of family support (Sample: students attending ten community colleges, N=1,273)

demands of specific jobs... [and] can also transform individuals’ values or preferences” (Pallas 2000). At the same time, the principle of timing emphasizes how age serves to sort individuals into positions that allow them access to different resources and challenges within institutions (Pallas 2003). That is, individuals of certain ages may make decisions that place them on educational trajectories that are more or less likely to lead to their desired results. For example, younger students with fewer responsibilities may be in a better position to take advantage of the enrichment activities or unpaid internships provided by colleges and universities, activities which have been shown to increase social integration and degree completion (Tinto 1987). In contrast, we would expect that students already married or raising children may have very different experiences in these institutions.

There is much that we do not understand about the transition to adulthood. Youth who have not completed their education are still in limbo during this stage, unable to support themselves with the meager earnings their jobs provide. In some cases, their parents may be willing to support them, if they are able (but many families are not). However, education imposes high costs, and parents may expect young adults to be financially independent immediately after graduation, even if the individual is still exploring a career, as society encourages them to do. Because of the flexibility and rapid changes of this time period, parental support is not clearly specified, and it may be subject to negotiation or abrupt changes. Ultimately, the prolonged exploration of educational opportunities may conflict with the needs and expectations of many of the new students currently enrolling in community colleges.

5 Three Problematic Transitions into Adulthood

While the prior section highlights some of the simultaneous conflicts among emerging adult roles, we now consider how *sequential conflicts* between institutions can be created. The years of emerging adulthood, ages 18–30, are usually accompanied by certain institutional transitions in the US. Transitions through educational institutions and into the labor force may be poorly aligned, so that a prior institution's preparation does not match the later institution's demands. This section examines whether poor alignment of these transitions may account for some of the turmoil and conflicts during this life stage, such as delays in adult roles or a decline in family support.

Functional sociology provides an image of society as a well-designed machine that is coordinated across time and space. Ordinarily, institutions take some responsibility for individuals, providing them with roles, status, responsibility, and direction. For example, schools are often considered responsible for preparing students to progress within the institution, and for leading to the next institution. Indeed, students expect that if they take appropriate actions during schooling, their careers will unfold as they want and expect.

When students enter college and pass their courses, they expect to acquire *credits*, which lead to a *credential*, which in turn leads to *better jobs*. In contrast, each of these stages may fail to meet those expectations if transitions are poorly aligned and unstructured. Higher education institutions may lose students at critical transition points and create conflicting expectations when students arrive at the next institution. Despite the importance of educational institutions in shaping the life course, the U.S. poorly synchronizes its many transitions through institutions (Kerckhoff and Bell 1998). American transitions through school, community colleges, and into the labor market are riddled with difficult and unclear decisions that make moving to the next level unnecessarily hard.

Community colleges have opened their doors to new kinds of students and must prepare graduates for new labor market demands. However, the

transition mechanisms designed for students who traditionally attend 4-year colleges may fail to respond to the needs of community colleges' new students. Some of these students do not have high achievement expectations or college-educated parents; they do not understand college options and do not have college savings. Additionally, with many older students and students working part time enrolling in community colleges, the age at which individuals enter and exit institutions of higher education is becoming less standardized, which makes structuring transitions particularly difficult. The increased flexibility provides new options that allow new students to enroll, but this flexibility can also pose new challenges to both individuals and institutions.

Analyzing the Educational Longitudinal Study for the class of 2004, researchers (Rosenbaum et al. 2014) find that, although some community college students have attained sub-BA credentials, almost half (46 %, see Table 3) have no credentials 8 years after high school. Some in this 46 % may still be in college, but if the sample is restricted to students who enrolled in the first 2 years after high school, which gives students at least 6 years to complete a credential, 43 % still have no certificate or degree. Similarly, although only 22 % of students who started in 4-year colleges fail to get any credential, that number doubles to 44 % for those in the bottom third of test scores who enter 4-year colleges (Ibid.). Failure to complete any credential can have severe economic and labor market consequences, making the assumption of adult roles even more difficult as individuals try to start families and head households with very small incomes.

We propose that this failure may be in part attributed to poorly designed and unstructured transitions into, though, and out of community college. We therefore examine three transitions where institutions may lose or let down students as they pursue college degrees and careers: the high school-to-college transition, the college enrollment-to-degree transition, and the college-to-work transition. These transitions in community colleges are modeled after the loosely structured transitions found in 4-year colleges.

Table 3 College attendance, college type, and credential attainment by SES and test score tertiles

		Test score ^a				SES ^b		
		All	Low test	Middle test	High test	Low SES	Middle SES	High SES
	HS diploma (on time, no GED)	8,537	2,189	2,916	3,395	2,255	2,592	3,348
	Ever attend college: 2004–2012	86 %	73 %	87 %	95 %	75 %	86 %	95 %
First college level	2 year	37 %	60 %	42 %	19 %	51 %	41 %	23 %
	4 year	59 %	30 %	55 %	80 %	42 %	55 %	76 %
Started at 2 year college	Some college	46 %	51 %	42 %	44 %	49 %	47 %	41 %
	Certificate	18 %	23 %	17 %	9 %	22 %	18 %	11 %
	Associate’s degree	16 %	15 %	18 %	16 %	16 %	16 %	14 %
	Bachelor’s degree plus	20 %	11 %	23 %	30 %	14 %	19 %	33 %
Started at 4 year college	Some college	22 %	44 %	27 %	15 %	36 %	26 %	15 %
	Certificate	5 %	12 %	7 %	4 %	7 %	6 %	4 %
	Associate’s degree	5 %	9 %	5 %	4 %	8 %	7 %	4 %
	Bachelor’s degree Plus	67 %	35 %	61 %	77 %	50 %	62 %	76 %

Source: Educational Longitudinal Survey (ELS): 2002–2012, graduating HS class of 2004

Sample: On-time high school graduates, not enrolled in a post-secondary institution in 2012

^aTest Score is the composite math and language arts standardized test score from 2002

^bSES was created by NCES through ELS, comprised of information on parents’ occupations and parents’ education

5.1 High School to College Entry

The transition between high school and college creates institutional challenges in this country, largely because of the decentralization of both high school and higher education. High schools prepare students prior to the transition, and community colleges may devise procedures that make them responsive to newly-arrived students. However, if these two consecutive institutions are not well synchronized, discontinuities arise and create potential for mistakes, failures, and extended degree timetables. High school counselors’ large caseloads (often over 400 students) and insufficient information about community colleges increase students’ difficulties in making the transition to community college.

First, there is potential for students to get “lost in transition” because high schools end their responsibility for the student at graduation, but the college may not yet have initiated its responsibility (See Sablan 2013 for a review of summer bridge programs). During the summer after high school graduation, students might not know the

steps they must take to enroll in college credit courses, which could cause serious delays in their schooling. Indeed, research finds that many high school seniors who stated in May that they would be attending college in the fall do not actually do so, perhaps because of unanticipated obstacles (Stephan and Rosenbaum 2013). Although they may ultimately overcome these difficulties, and evidence shows that many of them do (Rosenbaum et al. 2014), this delay may reduce their odds of success (Bozick and DeLuca 2011). Students who do not enroll in the fall may have had difficulties identifying procedures for testing, choosing a program, or procuring funding. These issues can even plague students who do succeed in enrollment, and a lack of know-how or college resources can prevent them from gaining traction in the new institution.

Second, placement tests are major barriers to the transition into college. Most community colleges require students to take this test upon first enrollment. The placement test determines whether they can enroll in college-level, credit-bearing English and math courses, or if they must

take a remedial sequence. Students who exhibit academic deficiencies by scoring below the selected cut level are often assigned into remedial courses, which do not count for college credit and which cover topics taught in high school. Unfortunately, most students fail this test and over 60 % of students must take remedial courses (Bailey et al. 2010; Rosenbaum et al. 2006). Although they are taking classes in college buildings and paying college tuition, students in these courses do not get college credits, so they often infer that they have not successfully made the transition into college.

This high failure rate is shocking, but where to place the blame is less clear. The usual reaction is to blame high schools, but colleges are also at fault. In many states, community colleges do not pose explicit standards, and colleges even use different tests and different cutoff points when they use the same test. It is no wonder that high school graduates are poorly prepared to meet such chaotic standards. Moreover, even when different colleges use the same test, it is very rare that high schools give the college test to their students, to notify them about their skill deficiencies. As a result, students usually remain uninformed and unable to take actions or make choices that may mitigate later delays.

Bailey and colleagues (2010) reported that most students placed in remedial courses failed to complete the remedial sequence. Indeed, if they have large achievement shortcomings in math, nearly all students (83 %) fail to complete the remedial sequence. Despite the predictable risks associated with placement in remedial coursework, students are given no warning about their poor preparation before they enter college, and they are not aware of the importance of the placement exam (Rosenbaum et al. 2006).

High schools and colleges are both responsible for this lack of student preparation with regards to the placement test. Although high schools administer many tests, few of these tests give any information about individuals' college preparation. Since colleges often have different tests and pass levels, even if high schools gave college placement tests, their test might not apply to the particular college that a student plans to attend. Although high school graduation in many

states requires a high-school exit-exam, these exit-exams require a lower level of academic achievement than college placement exams. Many seniors pass the high school exit exam, so they expect they are ready for college and are given no information to the contrary. They are then surprised when they fail the college placement exam just 3 months later. Such misalignment between educational institutions gives students reassuring but mistaken feedback, which fails to warn them that they are not prepared for college.

Unfortunately, the problem of placement tests and remedial courses is exacerbated by colleges that do not explain the true nature of these tests. Indeed, instead of using the term, "remedial," community college staff often use the vague euphemism, "developmental education," which students likely do not understand as courses that do not earn college level credits. Students are also told that they "can't fail the placement test," but no one explains that a low score can have serious consequences – delaying their credential plans by one to four semesters, costing them time and money. These well-meaning stigma-free euphemisms prevent students from understanding the transition into community college, which can lead to extended timetables and early drop-outs, sometimes even before any credits are earned.

Placement exams are not the only transition obstacle. Additional difficulties occur during the transition out of high school and into college. For example, procurement of funding, application timelines, and program selection, all must be navigated in order to successfully transition into college. Society has vastly expanded college access, but educational institutions have yet to confront the new challenges in the high school to college transition.

5.2 Credits Without Credentials

Even after they gain entry to college credit classes, students face great difficulties in actually completing credentials. Here, the barrier has shifted to college progress, where students struggle to transition from college attendance to

college graduate. Many students accrue enough credits for a degree, but do not have any credential. In a national sample of high school graduates, about 8 % had attained Associates degrees 10 years later, and another 10 % had enough credits for an AA degree but no credentials (Rosenbaum 2001).

Some students report that community college is like a Kafka-esque nightmare where they run hard but get *no traction*, where they accrue credit after credit but only get slightly closer to completing. Choosing appropriate college courses is unnecessarily complicated. Judging from student reports, navigating complex college rules for choosing courses poses cognitive challenges that stymie even the best students. Students discuss taking an unnecessarily difficult course that they fail, taking an unnecessarily easy course that does not count toward degree requirements, taking the right course offered by the wrong department, taking the night-school version when only the day-version counts, taking courses in the wrong order, or missing a required course in a rigid sequence (Rosenbaum et al. 2006). Even if students know the courses they need to take, the right course may not be offered at a time that fits their schedule, or it may be full. Credits earned can even disappear if students take too long to complete the degree, as often happens for part-time students.

The problem is both unfathomable complexity and a lack of warning, and the sheer complexity makes warnings prohibitively detailed and hard to follow. One major issue in community colleges is a dearth of counselors. While high school counselors are said to be overburdened with student-to-counselor ratios of 400:1, in community colleges, ratios frequently reach 1,500:1 (Rosenbaum et al. 2015). In the 80 h a counselor works during the 2-week registration period, if 1,500 students were to see an advisor one-on-one, counselors would have 3 min to advise each student. In those 3 min, they would need to assess students' prior record and achievement, assist in choosing a degree and career goal, determine the most appropriate program, and choose appropriate courses. In reality, not all students receive advising, although they probably should. Instead,

they end up trying to navigate this complex system of programs and courses with no help from the college, which leads to serious mistakes, wasted time, and dropouts.

Many first-generation college students who now populate community college campuses do not know how to choose realistic degrees that fit within their timetables or how to choose the right courses to meet degree requirements most efficiently. For instance, one study finds that when deciding to attend college, Latino students get helpful information from other Latino students. However, new students continue to rely on peers when they get to college even though these peers possess very little information about college requirements (Person and Rosenbaum 2006). Students have difficulties in making program choices and degree plans, because they have little information for judging how long their choices and plans will take and what those choices and plans require. The principle of agency in the life course emphasizes the role of choices in individuals' life trajectories, but their choices and actions are influenced by the availability of accurate information. When students are unable to judge the requirements and timelines for their educational plans accurately, their trajectories may be full of unexpected and undesired outcomes.

5.3 College Without Payoffs

The transition from school to work is rarely easy. Even when high schools offered vocational training, students faced difficulties transitioning into the labor force (Stone and Morgan 2012). While colleges previously provided very little job placement assistance or specific work preparation to traditional middle-class students (whose parents could help them with advice and job contacts), "college-for-all" has enrolled new students who need additional help for successfully entering the workforce. The life course trajectories of these new students are constrained, in terms of the principle of time and place, by a workforce that demands college credentials and community colleges that have limited success at conferring

credentials and rarely have systematic ways to facilitate the transition into work. Today, with high college dropout rates, many college students enter the work force without any credential.

Failure to complete a college credential has serious consequences. Although having “some college, but no credential” led to an economic payoff in the 1970s (Kane and Rouse 1995), recent research suggests this is no longer the case (Carnevale et al. 2012; Grubb 2002), and our analyses confirm that finding. Regression analysis of the earnings in 2012 of the high school graduating class of 2004 reveals that each credential (graduate degree, BA, AA, certificate) has substantial earnings payoffs compared to high school graduates, but college without credentials has none. Compared with high school graduates, bachelor degrees increased earnings by 36 %, associate degrees by 28 %, and even certificates, which take about a year, have substantial 22 % payoffs (Table 4; see also Jacobson and Mokher 2008). In terms of early earnings payoffs, students who spend time and money on school but who attain no credential or degree are essentially wasting resources. (This finding applies to youth under age 26, and may not apply to older students if they have jobs that reward a few credits and new skills.).

The same is true for students who enter 4-year colleges and fail to complete a credential. Almost one-quarter (22 %) of the students who begin in 4-year colleges have no credentials (See Table 3), and among those in the bottom third of test scores, 44 % get no credentials. Additional analyses indicate that individuals with college but no credential who began in a 4-year college will get no more payoff than those who began in a 2-year college. That is to say, 8 years after high school, on average individuals get *no payoffs* from college unless they completed a credential. Students with “some college” do not successfully transition into the labor market.

These findings indicate that students who leave college with no credential get no earnings benefit from having attended college, and would have been better off accruing work experience than having paid tuition and perhaps entered into debt. These findings converge with Vuolo et al.’s

Table 4 Regression of log income 2011 on educational attainment

	Log income 2011
Graduate degree	0.38*** (3.91)
Bachelor’s degree	0.36*** (7.98)
Associate’s degree	0.28*** (4.93)
Certificate	0.22*** (4.04)
Some college	0.05 (1.09)
High school (omitted) ^a	–
High school dropout	–0.06 (–0.75)
SES 2002 ^b	0.04 (1.79)
10th grade test score ^c	0.01*** (5.18)
Female ^d	–0.27*** (–10.57)
Black	–0.23*** (–4.28)
Hispanic	–0.03 (–0.59)
Other race	0.01 (0.30)
Constant	9.80*** (100.33)
N	3,677

Source: Educational Longitudinal Survey (ELS): 2002–2012, graduating HS class of 2004

Sample: Not enrolled in a post-secondary institution in 2012, employed full time in 2011, at least 2 years since degree completion or college attendance, if applicable

^a“high school” category includes all high school graduates, including those with a GED

^bSES was created by NCES through ELS, comprised of information on parents’ occupations and parents’ education

^cTest Score is the composite math and language arts standardized test score from 2002

^dOmitted categories are male and white

(2014a, b) findings using the Youth Development Study panel that showed that individuals with some college had less favorable outcomes than those with BA or AA degrees. Significantly, while we find that students with “some college” are not successfully transitioning into the labor

market, Vuolo and colleagues (2014b) show that their occupational outcomes are also more adversely affected by economic downturns.

We also find that while students with some college but no credentials have the same earnings as high school graduates, almost half (47 %) acquired student loans with an average debt of nearly \$16,000, about the same as those who completed a certificate (Rosenbaum et al. 2014). This lack of earnings coupled with school debt could pose serious consequences for their financial stability through the period of emerging adulthood, which may impact decisions to adopt other adult roles, particularly those requiring a living wage, such as starting a family. Indeed, students cannot escape responsibility for college loans for many years—it takes 20–25 years (depending on the program) for these debts to be forgiven. However, debt forgiveness plans only include loans obtained from the Federal government, leaving students with private loans still obligated. Student debt coupled with no earnings payoffs have long lasting impact (<https://studentaid.ed.gov/repay-loans/forgiveness-cancellation/charts>).

For students who do complete a credential, internships and practica often serve as a bridge between higher education and work. However, internships are typically unpaid, which presents an obstacle for low-income students, who cannot afford to work unpaid (Curiale 2009). While internship requirements for competitive jobs may shut some students out, practica required as part of curricula may provide valuable work experience without adding summer or post-graduate responsibilities, as internships often do. Yet these are only consistently offered in certain fields, particularly health.

The usual career services offices in public community colleges have few staff who can only help a small number of the colleges' 30,000 students (Rosenbaum et al. 2015). As a result, these offices provide small optional workshops on making an attractive resume, but they provide little practical assistance. They also post jobs on the bulletin board, but many of the posted jobs are for low-skilled work or do not align with the programs offered at the college.

Young adults entering the labor market must also contend with job changes imposed on younger workers. Having the least seniority, they are the first fired, and they are subject to high turnover. While some job changes may have pay-offs in the future, involuntary turnover can also slow the acquisition of labor market skills and experiences, which can ultimately reduce long term wages (Danziger and Ratner 2010). Consistent with the principle of linked lives, young adults' flexibility in absorbing these delays is linked to the demands, constraints, and supports their social networks are able to provide them. Students with family responsibilities or with parents who cannot provide support are particularly affected by job instability.

6 New Structures: Reducing Simultaneous and Sequential Conflicts

The difficulties we have noted in these transitions are not inevitable. Many of them can be improved by creating structured institutional procedures. Some transition difficulties are related to the complexities of community colleges and the labor market, and students' difficulty in making informed choices. By increasing structural support and guidance, these educational institutions may help students acquire the resources, information, and skills necessary for more successful transitions. Indeed, some 2-year colleges have occupational programs that use structured institutional procedures that shape programs at every stage of the process, from college enrollment through workforce entry (Rosenbaum et al. 2006). In this section, we consider what structured institutional procedures might help students make more orderly progress across transitions, improving students' knowledge, plans, and careers. In general, we highlight how structured transition procedures, timely advising, and systematic information delivery can improve transitions. We also suggest supports that may help ease conflicts for emerging adults who frequently find themselves occupying multiple roles with conflicting demands.

6.1 Institutional Procedures for the High School-to-College Transition

Structured institutional procedures can reduce many of the difficulties we have noted in the transition into college. In countries that have a national educational system, institutional procedures alert younger students to whether they are academically prepared for the next stage of education. For example, in Japanese middle schools, students take practice tests in anticipation of an exam in ninth grade that determines their high school track. These practice tests warn students about their level of preparation, leading some students to work harder and other students to lower their expectations (Kariya and Rosenbaum 1999). Unlike college students in the U.S., who do not anticipate the remedial placement test and do not review for it, Japanese students are not surprised by the high school entrance test, and have actually spent 3 years preparing for it and getting warnings about their chances of passing it. Following the Japanese example, Rosenbaum (2001: 276) proposed that instead of the many tests that give students test results with no useful information about college preparation, U.S. high schools could administer the community college remedial placement test in junior year of high school. This would inform students about whether they are prepared for this test, and allow students to prepare during the senior year of high school.

The Florida state legislature recently passed legislation to implement such a reform. Florida already had a statewide college placement exam used in all state community colleges, making it an ideal state to implement this policy. The new reform mandates that all qualified high school juniors take the exam, and students who do not meet determined “college readiness standards” must take a mandatory college preparation course in senior year. This reform is intended to tell high school juniors whether they meet the achievement level expected in the state community colleges, and it gives them an opportunity to address their skill needs (Mokher et al. 2014), thus enhancing their capacity to exercise agency.

Earlier we noted the shocking 60 % failure rate on college remedial placement tests. Here we see a reform that could warn students about their level of preparation, and can even provide instruction in high school to address their skill needs. This reform diagnoses high placement test failure rate as not the fault of high schools or colleges, but the lack of communication between the two. The Florida reform alerts students to their level of academic preparation for college on the college placement test and provides corrective instruction. In this way, improved transition structures may reduce prolonged degree timetables and thus reduce conflicts with other roles adopted during emerging adulthood.

Other institutional mechanisms can help with transition into college. Counselors are the primary high school staff responsible for advising students’ transition from high school to college, but a single counselor cannot advise all students’ choices. Additionally, high schools may create specific institutional procedures that guide this transition.

Zapata and Rosenbaum (2013) described structured advising procedures in three high schools: a suburban middle-class school which sent most students to college, an urban low-income school with poor college attendance, and another urban school serving similarly low-income students but with a new commitment to college attendance. Students need a wide variety of information and support for choosing colleges, completing applications, seeking financial aid, applying to FAFSA (to get Pell grants), and choosing a program. In the suburban high school, this study identified four structured procedures that improved the high school to college transition.

Succinct information sheets: Succinct information sheets can simplify choices. The suburban high school provided students with clear and timely information, which documented and frequently reinforced procedures for applying to financial aid and colleges. When the time came for making certain choices, the school distributed information sheets that instructed students how to make plans and take actions about topics such as selecting a college.

Systematic timetables: Systematic timetables can keep students on track. The suburban high school also created systematic procedures to provide students with reminders for the time-sensitive aspects of the college application processes such as early-decision and financial aid deadlines. Timely reminders may assist students in redirecting their goals (when financial aid limits may make shorter degrees more realistic) or adjusting their current approach.

Software: Software can inform choices and guide students' progress. The suburban high school also used college choice software to inform students about which colleges were good matches, and which were "reaches" or "safety schools" (Becker and Stephan 2011). If students fall behind in the application process, they can be notified or contacted by a school counselor or other staff.

Group advising: Group advising can improve the dissemination of important information. The suburban high school used group advising strategically, to provide students with expectations and strategies for choosing their college.

The importance of these systematic features in the suburban school is evident when contrasted with the urban school without a commitment to college enrollment. That school provided individual meetings with counselors, but very few systematic procedures, which left students overwhelmed and lacking any strategy for sifting through information. Students often lacked the basic knowledge necessary to allow them to know which questions to ask. Two meetings a year with a counselor were not sufficient to guide them through the complexities of college choice and applications. Similarly, the flexibility provided at community colleges may obscure the most direct pathways to a college degree.

In contrast, the urban school with a college commitment had recently initiated new procedures to provide systematic guidance, devised to resemble suburban school procedures (based on their own visits to suburban high schools). They differed primarily in that they also provided extensive advising on financial aid packages. They also made extra efforts to ensure

that all aspects of college were explained because students were often first-generation students and did not have resources at home. This school showed that "suburban procedures" could also be implemented in the city school context.

In the suburban school and college-focused urban school, students are supported by systematic procedures and advising that deliver information in a way that ensures students understand what to do, how to do it, and when. Such information underlies the successful exercise of agency. They do not assume that parents provide key information at home. These schools use institutional procedures to create a dependable transition from high school to college.

Of course, the best way to improve success across the transition is to eliminate the transition and merge institutions, which has been done in some small-scale reforms. Early college high schools (ECHS) do just that. ECHS are high schools that form close connections with a college and are sometimes even located on a college campus (Rosenbaum and Becker 2011). Students are prepared in the early years of high school so that by 11th grade, they are able to take at least one college course, and by 12th grade they are taking several. This structural change gives students first-hand experience in college, and seems to be effective in motivating students to meet college standards. In some schools, students complete enough college credits so they are awarded a high school diploma and an Associates degree by the end of 12th grade.

The kind of fusion created by ECHS requires levels of staffing and resources that the typical high school is unable to sustain. However, the close connections formed with colleges can allow for the kind of alignment in academic requirements that can facilitate the transition into post-secondary institutions. The transition into college can be improved by creating structured institutional procedures. Although the U.S. does not have a coordinated national educational system, institutional procedures can improve coordination and alert students about how to prepare for the next stage of education.

6.2 Institutional Procedures to Improve the Credits-Credentials Transition

Community colleges enroll many students like those in the urban high schools we studied. Many of these students do not understand college, and they cannot get their questions answered at home. Community colleges could emulate the urban high school that focused on college by devising structured institutional procedures that provide systematic information and systematic procedures to guide students through the choices they must make in college. In particular, community colleges could adapt some of the institutional procedures from high schools that we described above. Information sheets and website updates are not expensive, so community colleges can easily give students information which helps them anticipate and understand their choices about college majors or remedial coursework. Systematic timetables can keep students on track in colleges, which have many time-sensitive requirements such as financial-aid renewal, major applications (which may restrict access to needed classes), and other filing deadlines. Software can also be used to monitor students' progress in getting credits toward their major. Some 4-year colleges (Arizona State University and Austin Peay University) have devised software to notify students about which courses fit their degree goals, which courses are a good match for their prior achievements, and which will provide serious challenges. Similarly, Chicago's city colleges are using software to monitor student attendance, grades, and progress, and students are notified when they fall behind. Finally, group advising would be less expensive than individual advising, and requiring it might improve community college students' choices and college progress, instead of leaving them to fend for themselves.

More extensive institutional procedures can also be devised to improve college success for disadvantaged students. Although traditional procedures may work for traditional college students whose college-educated parents can offer advice and abundant resources, these procedures may not work well for new kinds of students

entering college today. In contrast, a study of 2-year colleges discovered some institutions which devised alternative procedures, designed to reduce the difficulties experienced by disadvantaged students and improve their college success (Rosenbaum et al. 2015). Community colleges can facilitate agency, and respond to individuals' limited information, by letting students choose their end goals, and offering them structured curriculum programs that efficiently lead to those goals as quickly as possible. In line with an approach that takes the life course into consideration, these colleges create quick successes with short-term credentials, and postpone obstacles until after students experience some college success. Course choices are structured to reduce mistakes and create efficient progress, and courses are offered back-to-back in predictable schedules and convenient locations (Rosenbaum et al. 2006). These colleges also create degree ladders with short-term interim successes along the way to ultimate degree goals, and they mandate frequent advising and continual close monitoring, so they detect problems quickly. Although these colleges have mostly disadvantaged students, their structured procedures reduce student mistakes and may increase student completion. Systematic analyses indicate that students in these colleges have greater confidence that they will make dependable progress in college, get relevant curricula, and receive job payoffs (Becker et al. 2014).

6.3 Institutional Procedures to Improve the College-Career Transition

Transitions into the workforce do not need be as difficult as they are for American students. For example, European countries use apprenticeships to provide a structured pathway from school to work (Schwartz 2014). Such apprenticeships provide clear dependable school-to-work transitions by combining education and workplace experiences in various proportions over time. Although this system has challenges, most students see these requirements as manageable and complete

the transition smoothly (Hamilton 1990). Exposing students gradually to increased demands for responsibility teaches them new capabilities. Hamilton (1990) was impressed that German 18-year-olds in apprenticeships regularly had more responsibility than Americans believe 18-year-olds can handle. Kerckhoff and Bell (1998: 153) report that “European systems have...important advantages over the US by providing multiple highly visible credentials.” Apprenticeship systems allow students to be confident of dependable labor force outcomes and improve the transition by providing clear incentives and developing student confidence in dependable labor market payoffs. Mortimer and Kruger (2000) also contend that school-work connections may affect youths’ career plans and outcomes. While Mortimer and Kruger show the virtues of “a highly structured transition” which youth can easily understand (as in Germany), the connections between schooling and working are vague in the U.S., and make plans and preparation difficult. Apprenticeship systems have their own challenges (Kupfer 2010), but they do provide an example of the kind of protections that can be extended to youth through explicit links between school and work.

Although American society has very few apprenticeships, we might ask whether American colleges could develop institutional structures that would have similar characteristics, wherein students can expect a certain payoff from making defined progress. American community colleges may facilitate such transitions by more systematically building practica into the curriculum, which may particularly help disadvantaged youth who have had less exposure to middle class occupations (Carnevale et al. 2012).

Some 2-year colleges have devised ways to provide strong support for the college-work transition at every stage of the job search process (Rosenbaum et al. 2006). In some exemplary colleges, students are informed about how to communicate their job relevant skills in a way that employers will recognize them. Schools provide students with information about job-search strategies and what kinds of jobs are good matches for their training. Some colleges have long-term con-

tacts with certain employers, and they can help students obtain good jobs in the correct field. The colleges strive to strengthen these employer contacts, and they will ask employers how last year’s graduates are doing in the job, and what new skills they should be teaching. Such strong contacts create trust, which enables the college to communicate trusted signals of students’ capabilities, which otherwise could not be conveyed. These contacts give students confidence that their college efforts will have labor market payoffs, and students are more motivated as a result (Rosenbaum et al. 2006, Chap. 9). Much like apprenticeships, these college-employer contacts create dependable pathways for the transition from college to work.

Obviously, such extensive job placement services are expensive, and most colleges cannot afford them. Yet many community college occupational faculty already have strong contacts with employers in their fields (Rosenbaum et al. 2006, p. 199). However, they do not have time to use their contacts to help many graduates because they are tied down with paperwork and administrative details. It would be relatively inexpensive to provide clerical assistance for these tasks, to free faculty time to devote to using their contacts to help their graduates’ job search. This would be an important service to graduates and to employers, and it might increase students’ confidence that college would have a payoff for them.

7 Conclusion

Many studies of the life course focus on individuals’ experiences. Although such research provides a good understanding of how individuals perceive and understand their experiences, most life course experiences are also shaped by social context. This chapter has identified some features of the social context that may constrain emerging adulthood.

We have identified some unintended negative consequences associated with the increased access and enrollment in community colleges, and we have suggested some of the specific conflicts that need to be considered and improved.

Our analyses show that students may not be fully aware of how their educational plans can influence other life domains. Ultimately, while emerging adulthood suggests that lengthening timetables are normal during this time period, students may be unaware of the extent to which their educational plans may impact their other life domains. Life course theory points to the importance of agency in individuals' lives, which is constrained by the lack of information and clarity about credentials and timelines. Future research should examine how students perceive and respond to unmet expectations for transitions into other adult roles.

College-for-all has created a distinctive historical context that simultaneously provides new opportunities and new constraints from educational demands. Unfortunately, the vast increase in college access has been undertaken in isolation, and has lacked coordination with other institutions and the demands they make on these new college students. This failure may have vast implications for creating conflicts with other life course events that are expected to occur during the transition to adulthood. For example, as students stay in college into their late 20s or beyond, they report less family support for their continuation. Students pursuing extended college timetables experience simultaneous conflicts with other life events, particularly marriage and childbirth. Prolonged timetables for completing college degrees create conflicts in other life domains. Moreover, these conflicting pressures may vary by social and cultural expectations because individual trajectories are influenced by interpersonal relationships in their linked lives.

Causality is always difficult to infer, and certainly must be considered very speculative here. Yet the studies reviewed here indicate many kinds of conflicts that are likely to influence youths' experiences, particularly the kinds of experiences associated with their transition to adulthood. If we have identified factors that have some influence, these factors may provide levers for social policy to assist youth in dealing with challenges of the transition to adulthood and minimizing unintended delays. Merely identifying potential simultaneous and sequential con-

licts can alert young adults, their parents, and educators to notice the ways social contexts create conflicts, and may suggest alternative ways to reduce these conflicts.

Clearer expectations of degree timetables would help students understand the implications of their new college opportunities, help them explain their college time commitments to family and employers, and perhaps help them discuss and negotiate changes of age norms for other life events with family members. Colleges create misleadingly upbeat age expectations that eventually hurt students who need to develop realistic expectations for degree timetables. While some students may become discouraged when they learn true degree timetables, others may reassess their plans and consider alternate, shorter degrees, such as sub-BA credentials, which yield quick interim successes, even as some students continue to pursue their BA plans. Realistic expectations about the costs (time, money, labor market experience, and family sacrifices) of new educational opportunities are especially important for low-income and first generation students who may be less likely to have the resources to ride out unexpected delays.

The payoffs to college only exist for those who complete a credential. Students who attend college but get no credentials have successfully followed society's advice to attend college, but they get no warning that "some college" is not rewarded, and no advice about how to get quick credentials. We rightly celebrate high rates of college attendance, but we ignore college dropouts, offering no advice about alternative credentials that might be easier and ignoring many of the difficulties students face after they make it into college. While reforms like the National College Advising Corps have made impressive efforts to improve college attendance, they need to consider ways to help these new college students to avoid only earning "some college" instead of a credential.

Poorly designed transitions can create failures and cause students to believe they are "low-ability" when in fact they might have great potential. Smoother transitions into college, through college, and into the workforce might decrease

the conflict felt by individuals between their roles as students and their other roles as emerging adults. The highly structured transition procedures we outline may help students avoid “some college but no credential” in addition to reducing extended timetables. These improvements may lead to fewer conflicts with other roles adopted during the transition to adulthood and help ease that transition.

While the transition to adulthood is characterized by prolonged timelines, it is possible that not all of these delays are intentional or have positive effects on individuals’ life course outcomes. We suggest that looking at education influences in the form of institutional structures is an avenue for facilitating the lives and goals of young adults.

References

- Adelman, C. (2003). *Principal indicators of student academic histories in post-secondary education, 1970–2000*. Washington, DC: US Department of Education, Institute of Education Sciences.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480.
- Arnett, J. J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties*. New York: Oxford University Press.
- Arnett, J. J. (2006). Emerging adulthood in Europe: A response to Bynner. *Journal of Youth Studies*, 9(1), 111–123.
- Arnett, J. J. (2011). Emerging adulthood(s): The cultural psychology of a new life stage. In L. A. Jensen (Ed.), *Bridging cultural and developmental approaches to psychology: New syntheses in theory, research, and policy* (pp. 255–275). New York: Oxford University Press.
- Bailey, T., Jeong, D. W., & Cho, S. W. (2010). Referral, enrollment, and completion in developmental education sequences in community colleges. *Economics of Education Review*, 29(2), 255–270.
- Becker, K. I., & Stephan, J. L. (2011). *Gatekeeping by software: 21st Century guidance counseling*. Roundtable presentation at American Sociological Association Conference, Las Vegas.
- Becker, K. I., Rosenbaum, J. R., Cepa, K., & Ahearn, C. (2014). Turning the question around: Do colleges fail to meet students’ expectations? Manuscript submitted for publication.
- Bound, J., Hershbein, B., & Long, B. T. (2009). Playing the admissions game: Reactions to increasing college competition. *Journal of Economic Perspectives*, 23(4), 119–146.
- Bozick, R., & DeLuca, S. (2005). Better late than never? Delayed enrollment in the high school to college transition. *Social Forces*, 84(1), 531–554.
- Bozick, R., & DeLuca, S. (2011). Not making the transition to college: School, work, and opportunities in the lives of American youth. *Social Science Research*, 40(4), 1249–1262.
- Cabrera, A. F., Castañeda, M. B., Nora, A., & Hengstler, D. (1992). The Convergence between two theories of college persistence. *The Journal of Higher Education*, 63(2), 143–164.
- Carnevale, A. P., Rose, J. S., & Hanson, A. (2012). *Certificates: Gateway to gainful employment and college degrees*. Washington, DC: Georgetown University Center on Education and the Workforce.
- Complete College America. (2011). *Time is the enemy*. Retrieved from www.completecollege.org/docs/Time_Is_the_Enemy.pdf
- Côté, J. E. (2014). The Dangerous myth of emerging adulthood: An evidence-based critique of a flawed developmental theory. *Applied Developmental Science*, 18(4), 177–188.
- Curiale, J. L. (2009). America’s new glass ceiling: Unpaid internships, the fair labor standards act, and the urgent need for change. *Hastings Law Journal*, 61, 1531.
- Danziger, S., & Ratner, D. (2010). Labor market outcomes and the transition to adulthood. *The Future of Children*, 20(1), 133–158.
- Doeringer, P., & Piore, M. (1971). *Internal labor markets and manpower analysis*. Lexington: Lexington Books.
- Elder, G. H. (1998). The life course as developmental theory. *Child Development*, 69(1), 1–12.
- Furstenberg, F. F., Kennedy, S., McLoyd, V. C., Rumbaut, R. G., & Settersten, R. A. (2004). Growing up is harder to do. *Contexts*, 3(3), 33–41.
- Goldin, C., & Katz, L. F. (2008). Transitions: Career and family life cycles of the educational elite. *The American Economic Review*, 2008, 363–369.
- Goldrick-Rab, S., & Sorensen, K. (2010). Unmarried parents in college. *The Future of Children*, 20, 179–203.
- Grubb, W. N. (2002). Learning and earning in the middle, part I: National studies of pre-baccalaureate education. *Economics of Education Review*, 21, 299–321.
- Hamilton, S. F. (1990). *Apprenticeship for adulthood: Preparing youth for the future*. New York: The Free Press.
- Hendry, L. B., & Kloep, M. (2010). How universal is emerging adulthood? An empirical example. *Journal of Youth Studies*, 13, 169–179.
- Jacobson, L., & Mokher, C. G. (2008). *Pathways to boosting the earnings of low-income students by increasing their educational attainment*. Report prepared for the Bill & Melinda Gates Foundation by Hudson Institute and CNA. Retrieved from <http://www.hudson.org/files/publications/Pathways%20to%20Boostin.pdf>
- Kane, T. J., & Rouse, C. E. (1995). Labor market returns to two-and four-year college. *The American Economic Review*, 85(3), 600–614.
- Kariya, T., & Rosenbaum, J. E. (1999). Bright flight: Unintended consequences of detracking policy in

- Japan. *American Journal of Education*, 107(3), 210–230.
- Kerckhoff, A. C., & Bell, L. (1998). Hidden capital: Vocational credentials and attainment in the United States. *Sociology of Education*, 71, 152–174.
- Kupfer, A. (2010). The socio-political significance of changes to the vocational education system in Germany. *British Journal of Sociology of Education*, 31(1), 85–97.
- Mokher, C. G., Jacobson, L., & Alexander, J. (2014). *Florida college and career readiness initiative: Fidelity of implementation in the first four years*. Paper presented at the Annual Conference of the American Educational Research Association: AERA, Philadelphia.
- Mortimer, J. T., & Krüger, H. (2000). Pathways from school to work in Germany and the United States. In M. T. Hallinan (Ed.), *Handbook of the sociology of education* (pp. 475–497). New York: Springer.
- Murray, C. (2008). *Real education*. New York: Crown Press.
- National Center for Educational Statistics (NCES). (2012). *Digest of educational statistics*. Washington, DC: National Center for Educational Statistics. Tables 196–197.
- Pallas, A. M. (1993). Schooling in the course of human lives: The social context of education and the transition to adulthood in industrial society. *Review of Educational Research*, 63(4), 409–447.
- Pallas, A. M. (2000). The effects of schooling on individual lives. In M. T. Hallinan (Ed.), *Handbook of the sociology of education* (pp. 499–525). New York: Springer.
- Pallas, A. M. (2003). Educational transitions, trajectories, and pathways. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 165–184). New York: Springer.
- Person, A. E., & Rosenbaum, J. E. (2006). Chain enrollment and college enclaves: Benefits and drawbacks of Latino college students' enrollment decisions. *New Directions for Community Colleges*, 2006(133), 51–60.
- Rosenbaum, J. E. (2001). *Beyond college for all: Career paths for the forgotten half*. New York: Russell Sage Foundation.
- Rosenbaum, J. E., & Becker, K. I. (2011). The early college challenge: Navigating disadvantaged students' transition to college. *American Educator*, 35(3), 14–20.
- Rosenbaum, J. E., Deil-Amen, R., & Person, A. (2006). *After admission: From college access to college success*. New York: Russell Sage Foundation Press.
- Rosenbaum, J. E., Ahearn, C., Becker K., & Rosenbaum, J. (2014). *The new forgotten half and research directions for supporting them*. Presented to the William T. Grant Foundation, New York.
- Rosenbaum, J. E., Rosenbaum, J., Stephan, J., Foran, A. E., & Schuetz, P. (2015). Beyond BA blinders: Cultural impediments to college success. My 4-year degree was the longest 8 years of my life. In O. Patterson (Ed.), *The cultural matrix: Understanding black youth*. Cambridge, MA: Harvard University Press.
- Sablan, J. R. (2013). The challenge of summer bridge programs. *American Behavioral Scientist*, 0002764213515234.
- Schwartz, R. (2014). The pursuit of pathways. *American Educator*, 38(3), 24–41.
- Settersten, R. A., & Hägestad, G. O. (1996). What's the latest? II. Cultural age deadlines for educational and work transitions. *The Gerontologist*, 36(5), 602–613.
- Settersten, R., & Ray, B. E. (2010). Not quite adults. *On the Frontier of Adulthood*, 1(1), 236.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology*, 26, 667–692.
- Stephan, J. L., & Rosenbaum, J. (2013). Can high schools reduce college enrollment gaps with a new counseling model? *Educational Evaluation and Policy Analysis*, 35(2), 200–219.
- Stone, J., & Morgan, L. (2012). *College and career ready in the 21st century*. New York: Teachers College Press.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.
- Vuolo, M., Mortimer, J. T., & Staff, J. (2014a). Adolescent precursors of pathways from school to work. *Journal of Research on Adolescence*, 24(1), 145–162.
- Vuolo, M., Mortimer, J. T., & Staff, J. (2014b). *Assessing the long-term value of college degrees in turbulent economic times*. Paper presented at the Annual Meeting of the Society for Longitudinal and Life Course Studies, Lausanne.
- Zapata-Gietl, C., & Rosenbaum, J. R. (2013). *Expecting adult roles: Emerging adults in community college contexts*. Paper Presentation at Society of Emerging Adulthood, Chicago.

Changes in Educational Inequality in Cross-National Perspective

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1 Introduction

In times of worldwide rapid educational expansion, educational opportunities of successive birth cohorts vary considerably in modern societies. Since the mid-twentieth century, all modern societies have experienced an enormous *expansion of their secondary educational school and training systems* (Boli et al. 1985; Jackson 2013). Educational reforms have been introduced that (1) reduced the importance of rigid early selection, (2) extended compulsory education, (3) expanded traditional academic tracks, (4) established more inclusive school types, (5) abolished dead-end educational pathways, and (6) created multiple new alternative routes to higher education rewarding individuals' vocational and work experiences (Benavot and Resnik 2006). Altogether, these reforms fundamentally changed the character of the old sharp divisions between academic and vocational/technical tracks in the secondary school systems (Benavot and Resnik 2006) and increased the proportion of young people who have completed at least upper secondary education (see Blossfeld and Blossfeld 2014).

Yet not only the secondary school systems have been transformed, but also the landscapes of higher education have changed in modern societies. Up into the 1970s, higher education mostly followed the completion of an academic oriented secondary school (e.g., a gymnasium, lycée, 'public,' or grammar school) and universities, colleges or institutes of technology offered academic programs for the brightest and most affluent students. In the following decades, however, not only the participation rate in higher education has been quickly rising (see Blossfeld and Blossfeld 2014), but also the heterogeneity of college students who received some kind of college degree has been growing.

Given this impressive process of educational expansion, students and their families are, however, not simply passive executors of the changes in the 'macro' structures in the educational system. Family members have agency, make decisions, and weigh the possible future costs and benefits of educational alternatives based on the family's position in the system of social inequality. The families are therefore the key units of strategic action within the structure of inequality in modern societies (Erikson and Goldthorpe 1992). The establishment of more inclusive school types, the abolition of dead-end educational pathways and the creation of multiple new routes to higher education have opened up many new options for individuals and their families to pursue their goals. Here,

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we ask the question: How has the educational attainment of men and women from families with different educational resources changed as a result of the bottom-up universalization of education in secondary school and by the changing role of elite education? In particular, we are interested to find out which educational origin groups could profit most from the additional opportunities provided by the expanding upper secondary school and tertiary education systems over time and whether there are similarities and differences among a broad array of modern societies.

Using truly equivalent educational data from the new Programme for the International Assessment of Adult Competences (PIAAC), which was collected in 24 modern countries between August 2011 and March 2012, we compare the changes in the effects of parent's education on their boys' and girls' educational opportunities across birth cohorts. We include 22 of the 24 original PIAAC countries: Austria, Belgium (Flanders), Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, South Korea, the Netherlands, Norway, Poland, the Russian Federation, the Slovak Republic, Spain, Sweden, the United Kingdom (England and Northern Ireland) and the United States (see PIAAC 2012). We did not include Cyprus and Australia in our analysis, given specific problems of data access. PIAAC allows us to conduct a highly standardized comparative analysis covering the same birth cohorts in a broad range of modern societies from the East to the West, from capitalist and (former) socialist countries, from countries with different welfare state regimes and concepts of social equality as well as different educational institutions. In other words, despite all these cultural, political, economic and structural differences among countries, have the linkages of parents' education to girls' and boys' educational opportunities changed in the same direction and with the same intensity across modern societies?

2 Conceptual Considerations and Hypotheses

2.1 Educational Attainment as a Life Course Process of Successive Educational Transitions

Given the increasing multitude of educational pathways in modern secondary and tertiary education, comparative research needs a typology to distinguish meaningful and cross-nationally equivalent educational categories (Pfeffer 2006). In each of the PIAAC societies, OECD country experts have classified respondents' diverse educational degrees based on the "International Standard Classification of Education (ISCED 1997)" (see OECD 1999). Thus, our cross-national analysis of the PIAAC data provides more comparability than other cross-national comparisons based on independently collected national surveys. The PIAAC scientific use file offers three broad highest educational attainment levels: (1) up to lower secondary education, (2) upper secondary educational attainment and (3) tertiary educational attainment.

The *lower secondary level* coincides with the end of compulsory education after grade 8 or 9 in most nations (UNESCO 2012:33). Lower secondary education may prepare students for entry into the labor market and/or for upper secondary education (OECD 1999: 33). National boundaries between lower secondary and upper secondary education are used to distinguish both levels. The completion of lower secondary education is therefore possible after 8, 9, or 10 years of schooling and at the age of 15, 16, or even 17. For example, in the United States, the ISCED classification defines lower secondary education as grades 7 through 9 and upper secondary as grades 10 through 12. Thus, a student in the United States must complete grade 9 in order to attain a lower secondary education and an upper secondary attainment level is roughly equivalent to a high school diploma.

The *upper secondary level* corresponds to the final stage of secondary education in most OECD countries. The entrance age to this level is typically 15 or 16 years. There are substantial differences in the typical duration of upper secondary programs both within and between countries, ranging from 2 to 5 years of schooling (OECD 1999:39). Upper secondary education includes completing academically oriented secondary schools such as a gymnasium, lycée, ‘public’ high school or grammar school and completing vocational schools or apprenticeship programs (e.g. in the dual system in Germany). The category upper secondary level also includes completing post-secondary non-tertiary education. For example, in Germany a skilled craftsman (‘Geselle’) can become master craftsman (‘Meister’).

A *tertiary educational level* is equivalent to graduation from a university of applied sciences, a professional college or a traditional university (OECD 1999:51). These qualifications are a requisite for gaining entry into advanced research programs and professions with high skill requirements.

The analysis of an individual’s *highest* educational attainment level, however, does not address the way persons *accumulate* formal education over the life course, namely, in a *sequence of irreversible steps* (Mare 1993: 353). Individuals and families make a sequence of decisions to continue or to drop out from the educational process. At each attainment level, one can distinguish between (1) these decisions, (2) getting admitted to the educational institutions, (3) educational participation in these institutions, and (4) graduation from these institutions. In our study, we analyze only whether individuals have successfully completed *educational attainments*. For each cohort this yields *transition probabilities from lower to higher attainment levels* that show when and at which educational level the greatest amount of dropout in the educational career occurs. Across cohorts, these stepwise transition probabilities also allow us to study in which phase of the educational career the changes in the

origin-specific opportunities have been the greatest in the process of educational expansion. Compared to earlier research on this topic (see Breen et al. 2009, 2010), we specifically aim to study the different mechanisms at work in the process of the universalization of upper secondary education and the expansion of graduation from higher education (see also Erikson and Jonsson 1996). We study the transition probabilities from *lower secondary* ($Y \geq 1$) to *upper secondary or tertiary education* ($Y \geq 2$) and from *upper secondary* ($Y \geq 2$) to *tertiary education* ($Y = 3$):

$$\Pr(Y \geq 2 | Y \geq 1) = \Pr(Y \geq 2) \quad (1)$$

$$\Pr(Y = 3 | Y \geq 2) \quad (2)$$

The first transition represents a choice between leaving the educational system with only lower secondary educational attainment and attaining an upper secondary or a tertiary level degree (unconditional probability); and the second transition consists of a choice between leaving the educational system with only upper secondary educational attainment and graduating from higher education, for those who have survived the first transition (conditional probability). Thus, educational opportunities are formed in a stepwise process over the life course and can change across birth cohorts (see Elder et al. 2004). Based on this life course approach, we are able to study not only the stepwise selection process over the life course but also the changes in opportunities across birth cohorts (see Elder et al. 2004).

2.2 Mechanisms of Social Origin

It is well known that the parent’s educational attainment has a strong impact on children’s educational success in school. Figure 1 traces the implications of a set of causal mechanisms generating the associations between parental education and children’s opportunities at successive educational transitions. Given the PIAAC data, we have to limit our empirical analysis to

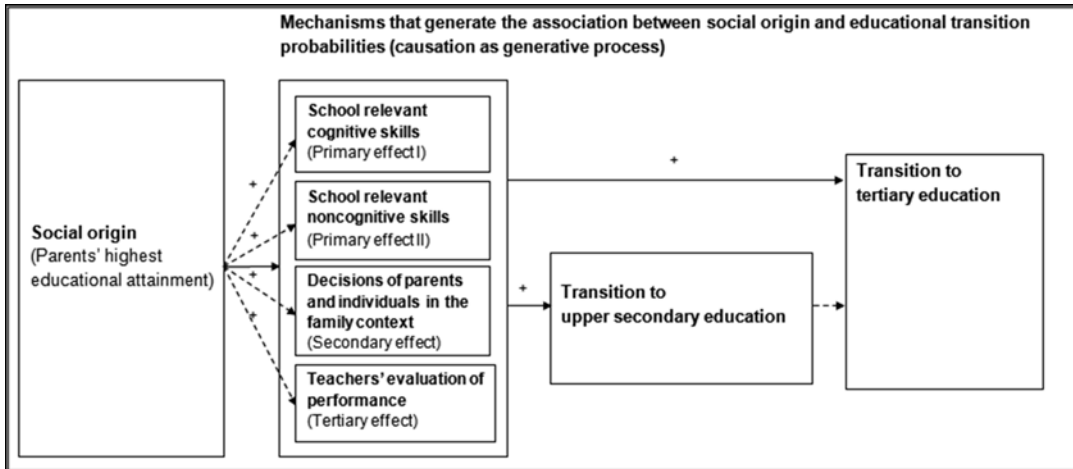


Fig. 1 Causal model of the effects of parental education on educational transitions (Source: Authors' presentation)

the *total effect* of parental education on educational transitions (shown as solid lines in Fig. 1) rather than its various indirect effects mediated by different life course processes (shown as dashed lines in Fig. 1). In our theoretical exposition, however, we develop the implications of the more differentiated model for our analysis of the *total effects* of parental education. Based on the current state of education research, we distinguish four types of indirect effects of parental education on children's success at the two educational transitions: the *primary effect I* mediated via cognitive skills, the *primary effect II* mediated via noncognitive skills, the *secondary effect* mediated via educational choices, and the *tertiary effect* mediated via teachers and schools as institutions.

Boudon (1974) called inequalities in cognitive abilities generated in a child's formative years by differences in family background the *primary effect of social origin on school success* (see primary effect I in Fig. 1). The power of *cognitive skills* in predicting educational success in school and later in adult life is well documented in the literature (Almlund et al. 2011). This *primary effect I* is strongly determined by parents' educational resources because parents are the major agents shaping primary and, to a large extent, also secondary socialization processes. Their education is assumed to have a strong influence on their everyday life interac-

tions with children, the parental nurturance of offspring, and the level of cognitive stimulation that is provided in the home environment. Better educated parents are also more able to support their children in school by parental tutoring and homework assistance (Pfeffer 2006). Shanahan et al. (2008) introduced the concept of 'environmental contingency' to refer to the configurations of such contextual factors that jointly produce an environmental effect. There is plenty of empirical evidence that all these factors generate individual differences in brain development and cognitive abilities (see Hackman et al. 2010). Since cognitive skills acquired early in life facilitate later learning (learning begets learning) and reduce the costs of acquiring further cognitive skills (Carneiro and Heckman 2005: 90), there is a tendency for family-induced inter-individual differences in cognitive achievements to be fairly stable or to even increase subsequently in the life course. Empirical results are generally in line with this argument; it is widely accepted that early experiences in the family are particularly important for the long-term trajectory of children's achievements in school and later life (see Carneiro and Heckman 2005; Weinert et al. 2011). In sum, the first theoretical assumption of our empirical analysis is that the higher the parental education level, the higher the average academic achievement of children in school and the higher the transition probabilities

from one educational level to the next in the educational system (see Fig. 1).

Success at the various educational transitions is also determined by noncognitive skills (see primary effect II in Fig. 1). In psychology, noncognitive skills refer to personality indicators, such as metacompetencies, self-concept, self-direction, self-regulation and social competences (Weinert et al. 2011). These personality traits help individuals to regulate their own learning and academic achievement. They include interest in learning, taking the initiative to learn, the knowledge about one's strengths and weaknesses in learning, the setting of realistic learning goals, the planning of learning processes, the motivation to achieve, etc. Social competencies are people's (reflexive) abilities to communicate, interact, cooperate, learn and work with one another. Social competencies are important in situations where teamwork is essential.

Educated parents do not only foster children's cognitive skills but also play an absolutely central role in the development of children's noncognitive skills by the character of their interactions with children and the organization of learning environments at home (Carneiro and Heckman 2005; Almlund et al. 2011). Parents can influence children's goals and perceptions as well as their self-concepts and opportunities through the information and experiences they provide. They can also act as role models that shape children's view of how to behave in certain situations (Schoon and Eccles 2014: 49). Children from more highly educated families will also profit from a stronger academic climate at home. Behavior genetic studies demonstrate that not only cognitive skills but also noncognitive skills are the result of complex gene-environment interactions (Johnson et al. 2011; see also Elder and Shanahan 2006). The *development of noncognitive skills is shaped by the family early in life; these skills crystallize* from childhood through early adulthood. There is empirical evidence that in this process individuals tend to increasingly select and manipulate their own environmental circumstances according to their developing personality traits (Johnson et al. 2011; Shanahan et al. 2008). Over the life course, noncognitive

skills become increasingly important as students age and are forced to make their own decisions and to regulate their own learning behavior. Thus, the second theoretical assumption of our analysis is that the higher the parental education, the more parents foster noncognitive skills supporting children's academic achievement in school and the higher the transition probabilities from one educational level to the next in the educational system (see Fig. 1).

Children's educational attainment is also strongly affected by the so-called *secondary effects of social origin* (see Boudon 1974) (see Fig. 1). The secondary effect means that, *even if we hold children's achievement (cognitive and noncognitive abilities) constant, families with higher educational resources make different educational choices* at the various educational transitions. There are several good reasons why *better educated parents are in general more inclined to push their children to the respective next educational attainment level at almost every ability level* (see Bernardi and Cebolla-Boado 2014): First, at each educational transition, families make *cost-benefit considerations* when they decide whether or not to give their children a better educational opportunity. In making this decision, their considerations are shaped by their structural positions in the system of social inequality (Breen and Goldthorpe 1997). The *(subjectively) expected costs* of higher educational transitions are higher for families with lower resources and the *utilities and (subjective) success probabilities* are lower for parents with lower resources (Boudon 1974). Typically, families with fewer resources have a *higher time preference* (which means that they value future higher educational attainment levels less) and a *higher risk aversion* (choosing an academically more challenging but economically more rewarding academic track) (Breen et al. 2014). In a recent publication, Bukodi and Goldthorpe (2012) estimated the effects of parents' class, status and education on inequalities of educational opportunities simultaneously. Although the three measures of social origin can be linked to different theoretical mechanisms by which parental resources impact family decisions, they are also

highly correlated. Thus, it is generally hard to disentangle and identify the partial effects in statistical terms. We therefore consider these origin measures as complementary rather than competing. In our analysis of the PIAAC data, we can only rely on the highest education of father and mother as social background information. We apply the dominance approach to define social origin and take the higher educational attainment level of both parents as an origin measure (Erikson 1984). In other words, we can only model part of the impact of family origin on educational opportunities and our educational origin measure will partly reflect other family resources, too. However, since the excluded background characteristics of parental class, occupational status and income are causally and temporally subsequent to parental educational attainment, one can conceive our approach as an analysis of the *total effect of parental education* (Pfeffer 2006:2).

New studies demonstrate that parental education is a relatively powerful social origin factor in the educational attainment process in modern societies (Ermisch and Francesconi 2001; Buis 2013; Bukodi and Goldthorpe 2012; Baker 2014). This is the case because economic obstacles for education, in particular for children from less advantaged families, have been strongly reduced by improving economic living conditions over the last decades (Breen et al. 2009) and by declining family size (Blake 1989). In addition, Breen et al. (2009) argue that the direct economic costs of education strongly declined through the abolition of school fees and the lengthening of compulsory school duration in modern societies. In summary, *parental education* seems to have become the *key origin factor in modern society when it comes to children's educational opportunities* (Baker 2014).

In particular, educated parents have better *knowledge about the educational system given their own experiences with more demanding educational pathways* (see Lucas 1999). In other words, they are better able to consult, guide and maneuver their children through the upper parts of the school and university system. Their knowledge about the requirements and academic demands of school institutions reduces the uncer-

tainty of educational decision making. In addition, the *status maintenance mechanism*, described by Breen and Goldthorpe (1997: 283) for social class, is an important mechanism for the intergenerational transmission of educational attainment levels. Parents want their children to attain at least the same level of education that they have achieved themselves. If children move down relative to their parents in terms of educational attainment, these *losses loom larger* (and are particularly painful for parents) *than similar gains in educational attainment* (Kahneman and Tversky 1979). Thus, differently educated parents have *varying aspiration levels* right from the beginning so that *families* do not consider children's absolute educational outcomes but *focus on the outcomes relative to their own educational degree*. Put another way, if we consider our two stage nested sequential transition model, we expect that *children from upper secondary and tertiary education backgrounds are more similar in their probabilities at the first transition* because parents at both levels want their children to obtain at least an upper secondary degree. We expect a *greater gap in aspirations and transition probabilities between families with tertiary and upper secondary education at the second transition* because parents with a tertiary degree have an even higher structural aspiration level. Of course, the increasing saturation of educational attainments from below is accompanied by a social devaluation of lower educational attainments across cohorts (see Blossfeld and Blossfeld 2014). Consequently, in the process of educational expansion we should expect an *upward drift in families' aspiration levels over time and therefore an increase in educational demand across cohorts*. In particular, when the transition from lower secondary education to upper secondary education is becoming universal, this will structurally *push children from parents with lower secondary education to increase the educational level of their children across cohorts*. However, as Blossfeld and Blossfeld (2014) have argued in an earlier paper *these particular educational gains are to some extent illusive* because the *normative minimum definitions* are changing as well at the same time across cohorts.

Finally, our theoretical model in Fig. 1 reminds us that parents' educational attainment levels are expected to have an impact on the probability of educational transitions via the evaluations of students' performance by teachers and educational institutions. There is plenty of empirical evidence that children from higher social origins – even if they have the same academic achievement levels or the same marks in school as children from less educated families (see e.g. Dollmann 2011) – get *teachers' recommendations for demanding educational institutions* more easily or have a higher probability of *admission by the next higher educational institution*. There are several reasons for this advantage of children from higher social origins (Ditton 2010): (1) Teachers in general attest that children from better educated families have more adequate noncognitive skills. Thus, as described by Bourdieu (1973), it seems that more highly educated parents equip their offspring with a better understanding of the school culture and the ability to act within it (cultural capital) as well as with the corresponding dispositions and perceptions (habitus). (2) Teachers assume that better educated parents are in general more able to provide support to their children, if necessary. So, they ascribe a higher success probability to these children's future school careers. And (3) better educated parents in general exert more pressure on teachers and educational institutions, if this should be necessary. Esser (2014) called these mechanisms the *tertiary effect of social origin* (see Fig. 1). Thus, the fourth theoretical assumption of our empirical analysis is that the higher the education of parents, the more favorable are the evaluations of children's performances by teachers and educational institutions and the higher the transition probabilities from one educational level to the next.

The four supposed indirect effects of parental education on the educational transition probabilities in our theoretical model in Fig. 1 all have a positive sign and are complementary. Thus, from this perspective, it is theoretically plausible to estimate a model of the *total effect* of parental education on the transition probabilities, summarizing the various positive indirect effects of parent's education. Of course, it would be interesting

to identify each of the four partial indirect effects of parental education directly, but this is not possible with the PIAAC data. To do this, prospective measures of abilities or retrospectively collected school marks for a long series of successive birth cohorts in a broad array of modern societies would be necessary. Such data are not available today.

2.3 Competing Theories About Changes in Origin-Specific Educational Opportunities Across Cohorts

There are several competing theories about changes in the inequality of educational opportunity that occur in the process of educational expansion. First, there is the *modernization theory*, positing that educational expansion will lead to a general *decline in the inequality of educational opportunities among all groups across cohorts* (cf. for example Lenski 1966; Treiman 1970). According to this theory the educational system mainly expands in response to the functional requirements of modern societies. In the modernization process, all parents are increasingly better informed by mass media about the educational opportunities of their children so that the secondary effect of social origin is declining. In addition, as the educational selection procedures become more rational and less ascriptive, the tertiary effect of social origin declines. Educational opportunities are therefore increasingly dependent only on students' achievements (primary effect of social origin). However, even the primary effect is likely to decline in the modernization process if educational policy increasingly invests in early childhood intervention programs, all-day schools etc.

A competing hypothesis is put forward by the *cultural reproduction theorists* (see Bowles and Gintis 1976; Bourdieu 1973; Collins 1971). They claim that educational certificates help to legitimize social inequality in modern societies. A major function of educational credentials is to exclude members of lower social origins from attractive positions in the labor market.

Reproduction theorists, however, recognize an inherent conflict between the selection and socialization functions of education. The role of educational institutions is to integrate children from lower social origins and ethnic minorities into the dominant value system of the society (see also Meyer et al. 1977). Educational expansion in upper secondary school is consistent with the rising demands of disadvantaged groups for more education. In other words, in the process of educational expansion from below, not only the attainment of primary but also lower and upper secondary schooling will become universal and increasingly independent of social background (Shavit and Blossfeld 1993). In this process, the better educated families are always forerunners and the less educated families are latecomers across cohorts. At the same time, the privileged groups want to maintain their advantages in the upper reaches of social inequality. Hence, they preserve their privileges in the attainment of higher education. This is possible because of the persistence of primary, secondary and tertiary effects of social background across cohorts (see Fig. 1). Thus, we expect that in the process of expansion of tertiary education the increasing educational demands of children from more highly educated families should always be greater than the increasing educational demands of children from less well educated families.

Raftery and Hout (1993) suggested an elaboration of the reproduction theory regarding educational transitions. Their *Maximally Maintained Inequality* (MMI) hypothesis states that the *effect of educational origin on making an educational transition declines across birth cohorts only when the privileged groups are more or less saturated at a transition*. According to Hout (2006:239) the saturation threshold is reached, if "...the proportion of successful students from privileged backgrounds exceeded 80 percent." Put in another way, educational expansion only leads to an increase of educational opportunities for children from lower educational backgrounds (the latecomers), if children from higher educational backgrounds (the forerunners) have a transition probability of at least 80 %.

This 80 % threshold is quite arbitrary and hard to justify, since the inequality of educational opportunity might also decline under less extreme conditions. Based on a *ceiling effect*, increases in transition probabilities exponentially decline across cohorts. That is, as the transition probability for a social group increases, there is less room for additional gains. This means that the gains in the transition probabilities for children from more highly educated families, who are the forerunners, might be smaller than the gains for children from less well educated families, who are the latecomers. As a result, the inequality of educational opportunities declines before the saturation levels of the more privileged groups are reached.

For the (*former*) *socialist countries* in Europe specific changes in the inequality of educational opportunities have been observed. For example, Simkus and Andorka (1982) reported for Hungary and Gerber and Hout (1995) for Soviet Russia that the effect of social origin on access to university increased with the establishment of new elites in the period of state socialism. There is evidence that the effect of social origin on educational attainment rose in formerly socialist Russia, Hungary, Romania and the Slovak Republic during the period of transition from socialism to capitalism (Gerber 2000; Iannelli 2003). It is assumed that the steeply rising competition among social groups in the transition from a socialist society, committed to social equality, to a market society will lead to rising inequality of educational opportunity. In our empirical analysis, we will test whether these former socialist societies follow a specific path in the development of origin-specific educational opportunities.

2.4 Changing Gender Mechanisms Across Cohorts

The basic mechanisms through which parental education influences the educational opportunities of children at various educational transitions can be assumed to be at work for both men and women (see Fig. 1). However, theory

and empirical research suggest that there are also important differences in the educational opportunities of men and women by birth cohort and social origin. In particular, in most modern societies women of all social origins have achieved striking gains relative to men in education across cohorts. Various theories have been offered to explain this dramatic change (see DiPrete and Buchmann 2013; Becker 2014; Schoon and Eccles 2014). In the following, we will discuss gender-specific mechanisms focusing on the four main theoretical dimensions of school success shown in Fig. 1: (1) cognitive skills, (2) noncognitive skills, (3) evaluation of student educational performance by teachers and institutions, and (4) educational decisions of parents and individuals.

With regard to cognitive skills, large-scale assessments, such as TIMSS (Trends in International Mathematics and Science Study), PIRLS (Progress in International Reading Literacy Study) and PISA (Programme for International Student Assessment), suggest that women compared to men have an edge in reading and some weaknesses in mathematics and science. However, there is no strong trend in gender-specific “academic abilities” that could possibly explain the striking gains of women in the educational arena in modern societies during the last decades (DiPrete and Buchmann 2013). In terms of noncognitive skills, there seem to be at least three good reasons for girls’ greater school success (DiPrete and Buchmann 2013:101–112): (1) girls on average have an advantage relative to boys in terms of social behavior in school: they show higher rates of conformity to the school culture and they have lower rates of disruptiveness, aggression, antisocial behavior or attention disorders. (2) Girls on average work harder in school and invest greater efforts in doing their homework. And (3) girls on average express a stronger interest in and enjoyment of school. Given these gender differences in noncognitive skills, it is not surprising that girls are better able to turn their small cognitive ability edge at the beginning of school into higher levels of cognitive growth during the school career (Matthew effect).

Girls’ more school-adequate noncognitive skills also have a strong impact on the evaluation of student performance by teachers. Empirical studies demonstrate that girls typically get better grades in their courses in school relative to their performance level on standardized tests (DiPrete and Buchmann 2013). In tracking systems such as the German one, where the recommendation of teachers is often a necessary prerequisite for the transition to upper secondary school, it has been shown that boys need higher academic skills than girls to receive a recommendation for the gymnasium (Bos et al. 2007). Thus, teachers’ evaluations of students’ performance favor women’s higher success rates at educational transitions.

These stylized empirical facts suggest the conclusion that girls always have performed better in school than boys (DiPrete and Buchmann 2013). Girls’ better cognitive skills, their more school-adequate noncognitive skills, and their advantage in receiving better grades for the same performance in school, are very important factors underlying the catch-up of females relative to males in most modern societies and even the reversal of the gender gap in some countries. However, they do not explain this dramatic historical change in gender-specific educational participation. For example, these advantages cannot explain why young women born in the 1950s or 1960s did not attain higher educational attainment levels than their male contemporaries in most modern societies. It is reasonable to assume that these women were often barred from going to upper secondary schools or university colleges. Thus, a declining educational gender gap and perhaps its reversal in modern societies hinges on an additional theoretical explanation.

Educational expansion occurred during a historical period when gender roles in modern societies were culturally transformed and when discrimination against women was declining (DiPrete and Buchmann 2013). One of the most important structural developments in contemporary societies has been the *change in women’s life course patterns* (rising employment, declining fertility, and the changing use of time) and – at the same time – the *relative stability of men’s*

roles in the life course (even if there has been a slight change in the provider role). This change has had a profound impact on the *educational decisions of parents*. In the 1960s and 1970s, families in modern societies were still characterized by a ‘male breadwinner’-‘female homemaker’ model and (marital) unions were comparatively stable. At that time, girls’ education was less important than boys’ in terms of families’ intergenerational status reproduction (Goldthorpe 1983). This was the time “...when gender inequality in education meant female disadvantage” (DiPrete and Buchmann 2013: 1). With increasing women’s labor force participation (see Blossfeld and Hakim 1997), however, modern countries are experiencing a fundamental shift from a male breadwinner society towards a dual earner society (Blossfeld and Drobnič 2001). In dual earner societies, the status of a family is not only determined by the economic position of the husband but by the occupational positions of both (marital or non-marital) partners. Women’s rising gainful employment in gender-segregated labor markets of modern service societies (see, for example, Steinmetz 2013) means that each younger cohort of women can seek employment in skilled service and administrative jobs as well as in the semi-professions and professions. In these types of jobs, formal education is a particularly important requisite for occupational access. In other words, across birth cohorts, the value of women’s educational investments in early life has sharply increased and parents’ rising investments in girls’ educational attainments can be viewed as a highly adaptive family strategy in modern societies. These higher educational investments also make women less vulnerable with regard to union instabilities. In comparison, men’s adult roles as breadwinners have not changed so much in modern life courses. After entering the labor market, they are still expected to work full-time until retirement. Based on the upgrading of skills in the labor market, men’s educational attainment has also become more important across cohorts. Thus, both women’s and men’s demand for education is rising. However, based on the high level of occupational gender-segregation in modern labor markets

(Steinmetz 2013), a considerable proportion of men still seeks employment in blue-collar jobs and technical occupations, where secondary qualifications in terms of vocational training are often quite sufficient. Thus, for many males the incentive to attain higher formal education seems to be smaller than for women. In summary, we expect that the female advantages in academic performance in school, together with the changing incentives of parents to give their daughters a better education, have increased women’s rate of educational attainment beyond the rate of their male counterparts across cohorts. In other words, women are increasingly expected to catch up with men or even outperform men at higher levels of educational attainment.

In addition, we expect that the rate at which this change happens is different for women from different educational origins. Since better educated parents always tended to hold more gender-egalitarian attitudes and values and for a long time tended to make sure that their sons and daughters received similar educational opportunities, we expect that the differences between men and women with better educated parents are smaller than for less well educated families among the older birth cohorts (e.g. at the beginning of the observation window of our study). In other words, *better-educated families have been forerunners in terms of modern gender-role orientations and educational participation* in modern societies and *lesser-educated families are latecomers* in this respect. Given the constraints of the ceiling effect in the educational transitions discussed above, we therefore expect that in the process of educational expansion women from less well educated families profit more in terms of their educational success and catch up with men from the same educational origin in successive cohorts.

3 Data and Methods

Using truly equivalent educational data from the PIAAC study, we conduct a cross-national comparison of changes in the effects of parental education on educational opportunity of men and

women during the process of educational expansion. PIAAC focuses on further education in adult lives and collects cross-sectional information on education as well as key cognitive and noncognitive workplace-related skills. The PIAAC data set was conducted by the Organisation for Economic Co-operation and Development (OECD) and collected in most countries between August 2011 and March 2012. It includes adults between 16 and 65 years old from 24 countries. We restrict our analysis to 22 countries since data access for Cyprus and Australia was limited due to political difficulties and data protection restrictions. We include in our analysis the following countries: Austria (AT), Belgium (Flanders) (BE), Canada (CA), the Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Ireland (IE), Italy (IT), Japan (JP), the Republic of South Korea (KR), the Netherlands (NL), Norway (NO), Poland (PL), the Russian Federation (RU), the Slovak Republic (SK), Spain (ES), Sweden (SE), the United Kingdom (England and Northern Ireland) (UK), and the United States (US). For a more detailed description of the PIAAC study design and the data set we refer the reader to Kirsch and Thorn (2013).

PIAAC provides comparable information on the highest educational levels of the respondents and their parents. As described earlier, PIAAC was specifically designed to establish conceptual equivalence in the classification of educational attainment levels across countries. The data in the scientific use file were coded according to the “International Standard Classification of Education (ISCED 1997)” (OECD 1999). The randomly selected total sample of adults in the 22 countries analyzed here includes 152,514 individuals. We restrict our subsample to 100,998 individuals aged 30–65 to make sure that respondents have already completed their highest level of education.

We used logistic regression to estimate the sequential transition model specified in our theoretical section (see Buis 2011; Rohwer 2014) and estimated the models separately for each country. The following explanatory variables and their

interaction effects are included in our maximum likelihood estimations:

- *Parental education* We applied the so-called dominance approach (see Erikson 1984) and assigned the highest educational level of the parents to the origin family as a whole. We include dummy variables indicating the highest educational level of the family: ‘lower secondary,’ ‘upper secondary,’ and ‘tertiary (ref.)’ education.
- *Cohort trend variable* We include a trend variable for the seven birth cohorts and assign the following values: ‘1’ for cohort 1947–1952, ‘2’ for cohort 1953–1957, ‘3’ for cohort 1958–1962, ‘4’ for cohort 1963–1967, ‘5’ for cohort 1968–1972, ‘6’ for cohort 1973–1977 and ‘7’ for cohort 1978–1982. We tested this trend variable in all models against the full set of birth cohort dummy variables and found that the trend variable excellently represents the monotonic changes across cohorts in all countries. Thus we are using the more parsimonious specification.
- *Gender* We include a dummy variable for gender (‘1’ indicating females and ‘0’ indicating males (ref.)).
- *Migration background* In order to control for migration background we use two dummy variables indicating that ‘one parent is a migrant’ or ‘both parents are migrants. Natives are the reference category.
- *Birth cohort * Parental education interactions* We included interactions between the cohort trend variable and dummy variables for parental education.
- *Birth cohort * Gender interactions.* We include interactions between the cohort trend variable and the gender dummy variable.
- *Parental education * Gender interactions* We include interactions for the gender dummy variable and the dummy variables for parental education.

Since PIAAC applied a complex multistage stratified cluster sampling design, we used the PIAAC sampling weights in our Stata estimation procedures for each of the 22 countries.

In particular, we applied the Jackknife Repeated Replication (JRR) and Balanced Repeated Replication (BRR) methods to estimate the sampling variance (see Heeringa et al. 2010).

Based on our logistic probability models, we compute for each country and for each of the *two transitions separate predicted probability plots* (with their confidence bands) for the *native born men and women* from families with the three different education levels across the seven birth cohorts (Hanmer and Kalkan 2013).

4 Results

4.1 The Overall Educational Expansion Dynamics in the 22 Countries

To set the context for our comparative analysis of the changes in origin- and gender-specific educational inequalities, we briefly describe the overall educational expansion in the 22 countries. Table 1 compiles the *overall expansion intensities at the transitions* from lower secondary education to upper secondary completion and from upper secondary education to tertiary graduation between the birth cohorts 1947–1952 and 1978–1982 in the 22 countries. The overall change in the probability of making the first or second transition is classified as follows: a drop by more than 10 percentage points is defined as ‘--’; a drop by less than 10 percentage points is classified as ‘-’; no change is classified as ‘0’; an increase by less than 10 percentage points is classified as ‘+’; and an increase of more than 10 percentage points is classified as ‘++’.

There are two countries, the United States of America and the Netherlands, which stand out in their dynamics of expansion in the observation window. The United States has a constant transition probability at the first transition (from lower secondary to upper secondary education) and shows only a moderate further increase of the probability at the second transition (from upper secondary education to tertiary graduation). Here it is important to note that in comparative terms the United States has been a forerunner in the

expansion of secondary education. This country has a long tradition of universal public education. Based on the introduction of the comprehensive high school, enrollment in secondary schools already steeply increased from 7 % in 1890 to 80 % in the 1960s (Benavot and Resnik 2006). Thus, regarding the first transition, the United States was already fairly saturated at the upper secondary education level at the beginning of the observation window (birth cohort 1947–1952). The Netherlands strongly expanded the transition probability at the first transition but did not increase the transition probability at the second one. In Austria, the Netherlands, Italy and Norway the upper secondary level expanded more strongly than the tertiary level. The opposite happened in the Czech Republic, Poland and Russia. Here the tertiary level expanded more strongly than the upper secondary level. It is remarkable that these three countries are former socialist countries. At the time of the transition from socialism to capitalism in the early 1990s, the educational systems of former socialist countries were characterized by a broad inclusion of students in upper secondary school and a comparatively small tertiary educational sector. Thus, the pathway to tertiary education was strongly restricted by the socialist states. Since the fall of

Table 1 Comparison of the overall changes in the transition probabilities at the first and second transition by country (birth cohorts 1947–1952 and 1978–1982 compared)

		Change at the transition from upper secondary to tertiary education				
		--	-	0	+	++
Change at the transition from lower to upper secondary education	--					
	-					
	0				US	
	+				EE, DE	CZ, PL, RU
	++			NL	AT, NO, IT	BE, CA, DK, FI, FR, IE, JP, KR, SK, ES, SE, UK

Source: Authors’ analysis

the Iron Curtain, these so-called transition countries have been catching up with other modern societies by expanding their higher education sector in particular.

In summary, the overall picture in the 22 countries is one of impressive educational expansion at both the first and the second educational transitions within the observation window (see Table 1). Modern countries typically have universalized their educational systems step by step from the bottom to the top and turned their tertiary educational systems into institutions of mass education.

4.2 Changes in Origin- and Gender-Specific Educational Opportunities

The question now arises as to what extent men and women from different educational backgrounds benefited from the rising educational opportunities in the 22 countries. In order to answer this question, we have estimated logistic regression models for the first and second transitions for each of the 22 countries. The plots of the predicted transition probabilities to upper secondary and tertiary education across the seven birth cohorts for men and women from the three educational origin families (lower secondary, upper secondary and tertiary education) and all 22 countries is voluminous. These plots are available from the authors by request. However, the countries can easily be grouped according to their patterns of change in educational inequality over time. Given the limited space for this contribution, we only *describe in detail the development of educational inequalities based on the predicted probabilities* in three countries.

First, the basic pattern of development of educational inequalities is very similar in the United States (US), Germany (DE), and Slovakia (SK). All three countries have in common that for more than 30 years: (1) they constantly excluded a substantial proportion of children from families with lower secondary education from a successful transition to upper secondary education; and, at the same time, (2) they have experienced an

increase in the inequalities of educational opportunities in the transition from upper secondary to tertiary education (which in all three countries constitutes a historical period in which the overall transition probability has been rising). As a representative example for these three countries, we describe the inequality trends for the United States in more detail.

Figure 2 shows how the predicted transition probabilities to upper secondary and tertiary education changed for successive birth cohorts by parental education and gender in the United States. For the transition to upper secondary education the transition probabilities for the different educational origin groups and for men and women are fairly stable across cohorts (see the two plots on the left panel of Fig. 2 for men and women). Children from parents with upper secondary and tertiary education have been completely saturated at this transition and did not differ significantly within the observation window. In other words, for these two types of origin families we do not really find children with less than upper secondary education anymore. This is in agreement with the expectation from the status maintenance hypothesis that children from parents with upper secondary and tertiary education are similar in their probabilities at the first transition because parents of both families want their children to obtain at least an upper secondary degree. In addition, the status maintenance hypothesis (Breen and Goldthorpe 1997) suggests a greater gap in transition probabilities between children from these two better educated families and the children from parents with lower secondary education at the first transition because parents with lower secondary education have a much lower structural aspiration level. And indeed, there is a big and significant gap between the children from lower secondary education families and the other two groups with better educated parents. It is however surprising that there has been a high degree of stability in the transition probability (of about 80 %) for children from parents with lower secondary education for such a long time. Since the proportion of parents with only lower secondary education in our data set has been declining from about 30 %

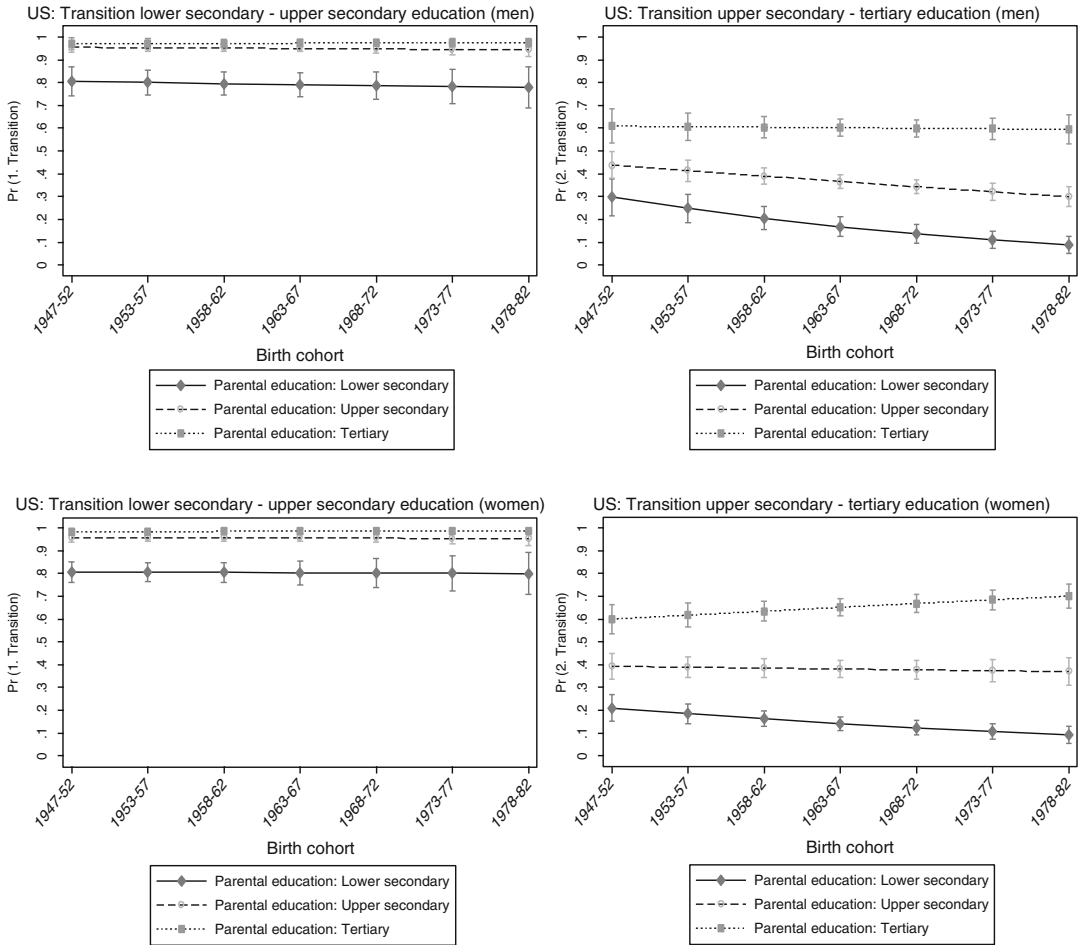


Fig. 2 Predicted transition probabilities (with 95 % confidence intervals) to upper secondary and tertiary education for successive cohorts in the United States (US) (Source: Authors’ calculation)

(in cohort 1947–1952) to about 14 % (in cohort 1978–1982), this means that a proportion of about 4–6 % of children of each birth cohort have been excluded in the United States. Of course, this is only a small percentage. However, this exclusion is consequential for these children’s later life course in a country where the returns to educational attainment have been rising over time (DiPrete and Buchman 2013:7).

If we move to the second transition (from upper secondary to tertiary education) in the United States (see the two plots on the right panel of Fig. 2 for men and women), it is obvious that the inequality between the educational opportunities of children from different origin groups is diverging across cohorts. In particular, children

from parents with tertiary education could benefit from the moderate overall educational expansion of higher education in the United States, while the children from families with lower and upper secondary education clearly lose out at this second transition to tertiary graduation when competing with children from tertiary educated families. To a large extent this lower graduation rate might be due to the greater college dropout probability of youth from lower social backgrounds. The gains in graduation from college are stronger for women than for men, so that women from families with tertiary education are clearly the winners with respect to educational expansion in the United States. The rising educational inequalities in higher education in the

process of educational expansion is consistent with the cultural reproduction theory (Bowles and Gintis 1976; Bourdieu 1973; Collins 1971) and the MMI hypothesis (Raftery and Hout 1993), which claim that privileged families preserve or even expand their privileges in the attainment of higher educational degrees – at least as long as they are not yet saturated.

In summary, we find that during the last 30 years in the United States inequalities in higher education have increased. These trends coincide with the more general American experience of rising societal inequalities during the last decades – in particular, the decline in the minimum wage and rapidly rising wage inequality (Katz and Autor 1999: 1547). The societal model in the United States that minimizes the role of the state, individualizes risks and promotes market solutions (Esping-Andersen 1999: 75), in order to provide for each citizen opportunities according to achievement regardless of social origin, seems to have been gradually undermined by strong internal and global competitive forces since the 1980s (Katz and Autor 1999; DiPrete et al. 2006).

Second, a contrasting development of educational inequalities can be observed in Italy (IT), Sweden (SE), the United Kingdom (UK) and the countries of the former Communist bloc in Central and Eastern Europe, such as the Czech Republic (CZ), Poland (PL), and Estonia (EE). In these six countries, educational inequalities are strongly decreasing at the first transition and significantly increasing at the second one. As a representative example for the pattern of change in these six countries, we describe in detail the pattern in Poland (see Fig. 3).

The two plots in the left panel of Fig. 3 show the changes for Poland in the transition probabilities to upper secondary education for children from different educational origins, separated for males and females. Again, the children from families with upper secondary and tertiary education have been fairly saturated at the first transition since the beginning of the observation window, supporting again the status maintenance hypothesis (Breen and Goldthorpe 1997). However, in contrast to the United States, we now see that the

gap between these two more privileged origin groups and the children from families with lower secondary education has been strongly decreasing across cohorts. This pattern is in agreement with the MMI hypothesis (Raftery and Hout 1993) that children from lesser educated families can particularly profit from educational expansion, if the children from the better educated families are already saturated at the respective transition. It also confirms the cultural reproduction theory (Bowles and Gintis 1976; Bourdieu 1973; Collins 1971), which recognizes that an important role of educational institutions is to integrate children from lower social origins into the dominant value system of the society. And finally, it supports the claim of the modernization theory that in the process of educational expansion there is a general decline in the inequality of educational opportunities among all groups because selection and evaluation procedures become more rational and less ascriptive. In other words, in these six countries children from families with lower secondary education are less and less likely to be excluded from the process of educational expansion and can remarkably improve their educational opportunities at the first educational hurdle.

However, if we next inspect the second transition from secondary to tertiary education in Poland (see the two plots on the right panel of Fig. 3 for men and women), it becomes apparent that there is at the same time a trend towards rising inequality, too. In particular, children from parents with tertiary education profited most from the overall educational expansion of higher education, while the opportunities of children from families with lower secondary education have been quite stable across cohorts, so that they lose out in relative terms over time. Again, this trend is clearly stronger for women than for men, so that women from families with tertiary education gradually catch up and then eventually surpass the males. As mentioned above, trends in educational inequalities in Poland are representative of the trends in educational inequality for the other two countries from the former Communist bloc in Central and Eastern Europe, the Czech Republic and Estonia, as well as for Western

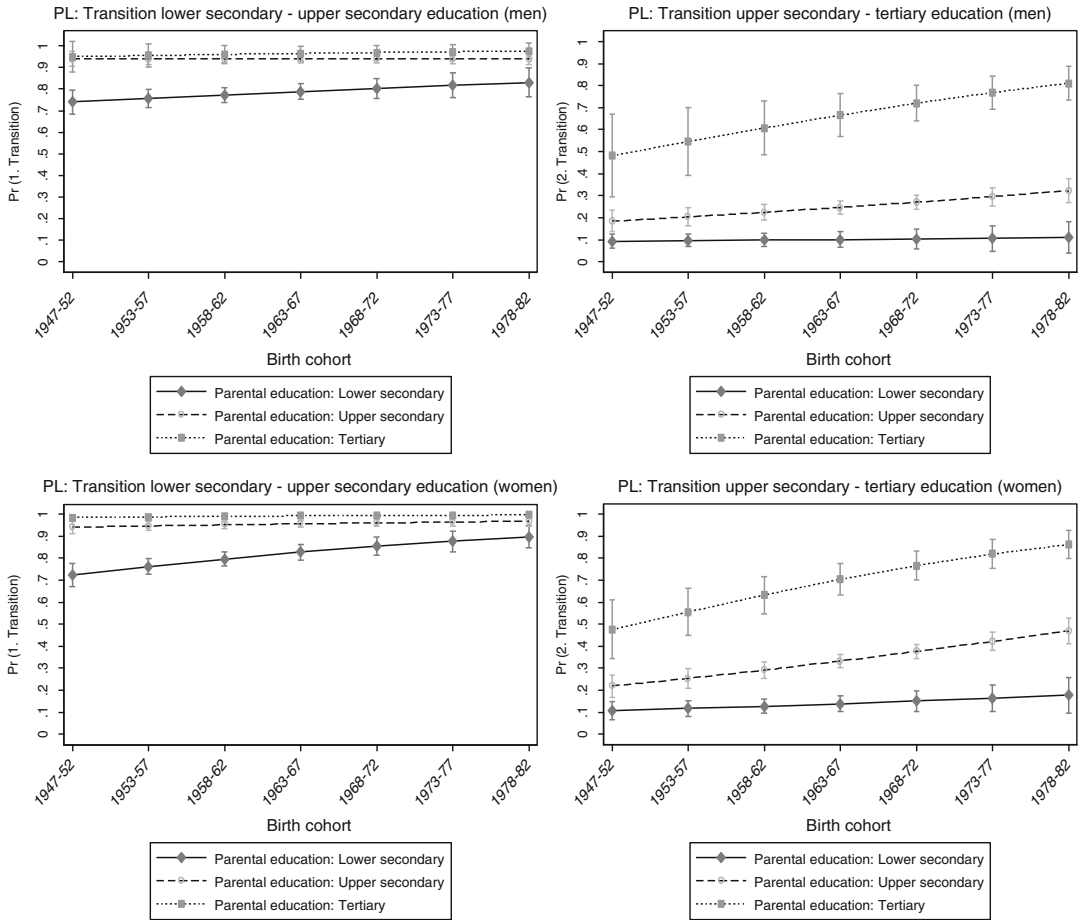


Fig. 3 Predicted transition probabilities (with 95 % confidence intervals) to upper secondary and tertiary education for successive cohorts in Poland (PL) (Source: Authors' calculation)

European capitalist countries like Italy, Sweden, and the United Kingdom. Thus, the pattern in these six countries provides support for the hypothesis that privileged families preserve or even increase their advantages in the attainment of higher educational qualifications. These advantages stem partly from their higher academic performance and better noncognitive skills (primary effects I and II) and partly from their families' and teacher's educational decision making (the secondary and tertiary effects; see Fig. 1). Our result here is in agreement with cultural reproduction theory (Bowles and Gintis 1976; Bourdieu 1973; Collins 1971) and the MMI hypothesis (Raftery and Hout 1993). The factor that presumably creates similarity among these

quite different societies in the process of educational expansion is the rising competition among families and individuals with different educational resources. Families try to do the best for their children. However, they have different locations in the structure of inequality and differential access to resources in order to achieve their goals as described in our theoretical model (see Fig. 1). The PIAAC data suggest that not only the three capitalist countries, such as Italy, Sweden and the United Kingdom, are confronted with an increase in the competition of families in the transition to higher education in the last three decades, but that this is especially true for the countries of the former Communist bloc in Central and Eastern Europe (Cummings 2003). After the fall of the

Iron Curtain, former socialist countries such as the Czech Republic, Poland and Estonia have not only strongly expanded their tertiary educational systems (see Table 1), but they have increased the competition even more among origin families in the transition from socialism to capitalism. The result of this rising general competition seems to be that even in a context of massive educational expansion of tertiary education, the effect of social origin on higher education has been rising in former socialist countries (see also Gerber 2000; Iannelli 2003; Mateju et al. 2003).

Third, there are 13 countries (Austria (AT), Belgium (Flanders) (BE), France (FR), Canada (CA), Denmark (DK), Finland (FI), Ireland (IE), Japan (JP), the Republic of South Korea (KR), the Netherlands (NL), Norway (NO), the Russian Federation (RU) and Spain (ES)) that manifest clear patterns of declining educational inequalities at both educational transitions. Of course, the strength of these declines differs for the first and second transition as well as over the 13 countries. As a rule, the decline in educational inequalities has been stronger for women than for men at both transitions so that the gender gaps decline and even tend to reverse in some of the countries. Hence, women are again the winners in an era of educational expansion. In order to contrast the changes in educational inequalities in these 13 countries as much as possible with the changes in the United States and Poland, we select the Republic of South Korea (KR). South Korea has not only drastically expanded its overall participation in upper secondary school and tertiary education in the observation window, but experienced also an impressive decline in educational inequalities at the first and the second transition.

The two plots on the left panel of Fig. 4 show separately for South Korean men and women from different educational origins the changes in the transition probabilities to upper secondary education (first transition). It is immediately clear that South Korea is a latecomer in the process of educational expansion. Thus, there has been lots of room to expand upwards. Hence, in our observation window the three educational origin groups started out from a comparatively low level of enrollment in upper secondary

school. However, in terms of growth of students who have attained at least upper secondary education, South Korea has experienced an outstanding expansion in recent decades (see also Park 2009). Today, only very few South Korean young people enter the labor market after completing 'junior high school' or 'middle school.' Instead, the overwhelming majority of 'middle school' graduates enters high (i.e. upper secondary) schools. South Korea's academic high schools are in general much less socially differentiated (Park 2010). This is because South Korea introduced an 'Equalization Policy' in 1974. Based on this policy, students in public and private schools are randomly assigned to academic high schools in their districts by a lottery (Park 2010). Figure 4 shows that children from all three educational origin families strongly increased their transition probabilities in the observation window; this is true in particular for women, who started from a lower level of enrollment in birth cohort 1947–1952. In Fig. 4, the differences in educational opportunities among women and men from different educational origins therefore strongly converge and eventually completely disappear at the end of the observation window (birth cohort 1978–1982). Contrary to the MMI hypothesis (Raftery and Hout 1993), Fig. 4 reveals that disadvantaged children from families with lower secondary education could significantly increase their educational opportunities in a period when the children from higher educated families were not yet saturated. Such a catch-up pattern for children from parents with lower secondary school can also be observed for Ireland (IE), the Netherlands (NL) and Spain (ES). These findings clearly contradict the MMI theory. They are, however, in agreement with the ceiling effect hypothesis that predicts declining inequality of educational opportunity, if the probabilities of the higher educational origin groups are below the saturation level and when the probabilities of lower educational groups are still particularly small. Thus massive educational expansion can indeed reduce inequality of educational opportunity far before the saturation level for the more privileged groups is reached.

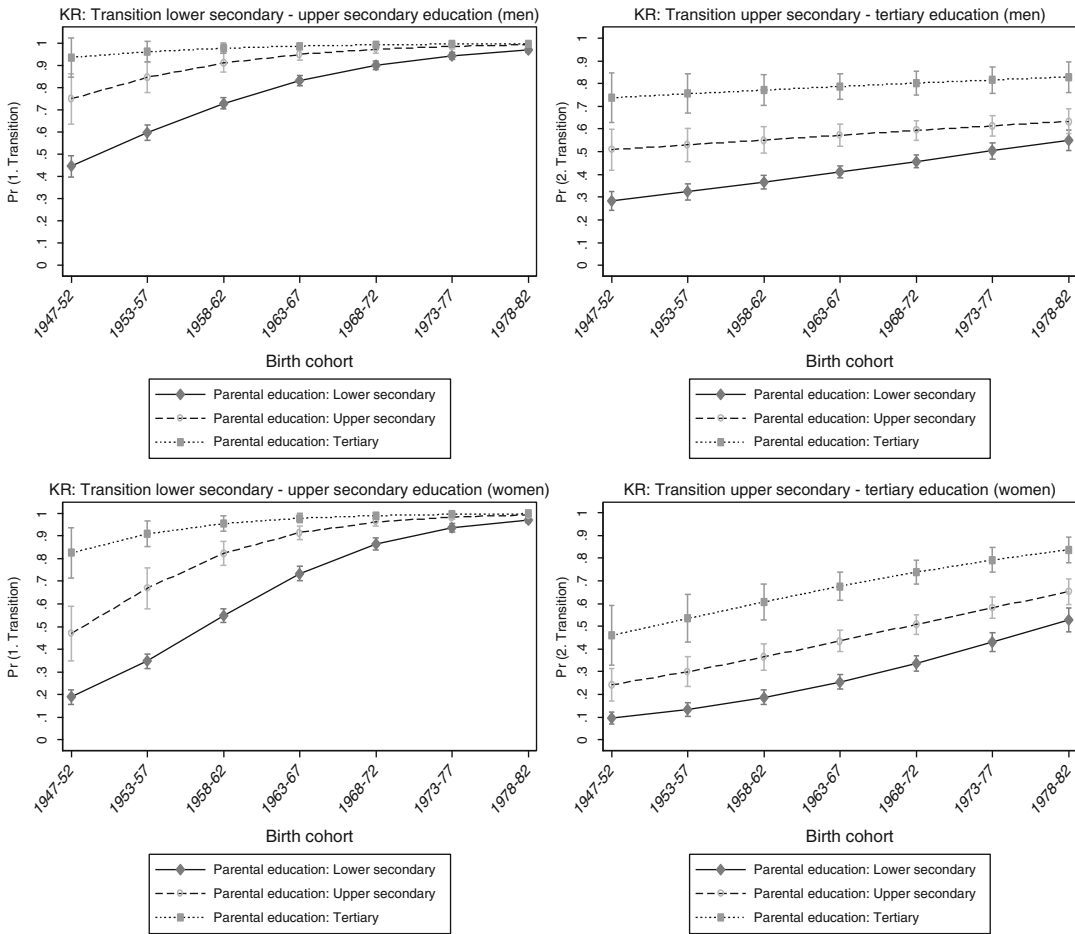


Fig. 4 Predicted transition probabilities (with 95 % confidence intervals) to upper secondary and tertiary education for successive cohorts in the Republic of South Korea (KR) (Source: Authors’ calculation)

In the two plots on the right panel of Fig. 4, the changes in educational inequalities for the second transition (from secondary to tertiary education) for South Korean men and women are shown. Clearly, there are great differences between the three educational origin groups. Thus, children from more highly educated families have always had an advantage in completing tertiary education. In South Korea there is severe competition on the entrance exam for university (Jang and Kim 2004). In this competition, children from families with tertiary education who have not only higher cognitive and noncognitive skills but also more favorable resources at home are therefore more successful than children from parents with upper secondary or lower secondary education.

The expansion of the tertiary educational sector in South Korea took place mainly in the 1960s, 1980s and 1990s. In addition, legislation in 1995 facilitated the creation of many new universities (Grubb and Lazerson 2009). Based on these reforms, all educational origin groups could profit from the massive and quick expansion of tertiary education in South Korea; and children from families with lower secondary education could catch up in this process. As a result, educational inequalities in the transition to tertiary educational attainment could be effectively reduced.

The patterns of change in educational inequality in South Korea (and in the other 12 countries listed above) contradict the expectations from cultural reproduction theory (Bowles and Gintis

1976; Bourdieu 1973; Collins 1971) and the MMI hypothesis (Raftery and Hout 1993). They rather support the modernization theory, positing that educational expansion will lead to a general decline in the inequality of educational opportunities among all educational origin groups (cf. for example Lenski 1966; Treiman 1970). It is difficult to detect a common mechanism among these 13 diverse countries that could explain the pattern of declining educational inequality. Only for some of these countries an explanation appears quite obvious: In South Korea, Japan, Spain, Finland, France, and Ireland the expansions in the upper secondary and tertiary educational system have been particularly massive and fast. Hence, it seems that a very strong educational expansion in a short historical period made it possible to open up new opportunities for children from parents with lower secondary education in the competition among families with different resources. Countries such as South Korea, Japan and Finland are in addition good examples of societies that successfully combine a high average level of academic performance in the large-scale assessments (such as PIRLS and PISA) with a high level of equity in educational opportunities for all social groups (OECD 2013).

5 Summary and Conclusion

In the process of educational expansion and reforms the old sharp divisions between academic and vocational/technical tracks in the secondary school systems of modern societies have greatly declined and the proportion of young people who have completed at least upper secondary education has impressively risen. Also the enrollment in higher education has quickly grown in all modern countries and turned their tertiary educational systems into institutions of mass education. Using truly comparative data from the PIAAC study, we analyzed how the educational attainment of men and women from families with different educational backgrounds has changed by the bottom-up universalization of education in secondary school and by the declining role of elite education in modern tertiary edu-

cation. In particular, we sought to understand which of the educational origin groups could profit most from the additional opportunities provided by expanding upper secondary and tertiary education over time and how these changes differed among a broad array of modern societies.

We adopted a life course perspective in order to get a better understanding of the processual nature of educational attainment in the life courses of successive cohorts (Mare 1981). Young people accumulate formal schooling over the life course in a sequence of irreversible steps and individuals and families make consecutive decisions to continue or to drop out. We looked at two important successive transitions in the educational career of children: the transition from lower secondary educational attainment to upper secondary educational attainment and from upper secondary educational attainment to tertiary graduation.

Based on our analysis of the first educational transition to upper secondary educational attainment, we can summarize the evidence as follows: (1) Children from families with tertiary education were already saturated at the beginning of the observation window (birth cohort 1947–1952). These families are therefore clearly the forerunners in the process of expansion of the first transition in all countries. Thus, even if these families have a high level of educational demand, they structurally could not further increase their transition probabilities to upper secondary school in the observation window. (2) In most of the 22 countries under study, men from families with upper secondary education were already fairly saturated at the first educational transition at the beginning of the observation window (birth cohort 1947–1952). In comparison, women from these families somewhat lagged behind in several countries in the oldest cohort. This was in particular the case in South Korea, the Netherlands, Spain, Austria, Ireland, and Italy. However, these women profited strongly from the expansion of the first transition and caught up with their male counterparts within the observation window. Among the youngest cohorts, men and women from families with upper secondary education were fairly saturated. (3) In almost all countries

(the exceptions are the United States, Germany and Slovakia) there have been impressive gains for children from lower secondary education which reduced the inequality of educational attainment drastically. The United States (with its inclusive high school system), Germany (with its inclusive vocational training system) and most of the former socialist countries (with their inclusive equality programs in secondary schools), had already comparatively high transition probabilities for children from parents with lower secondary education among the oldest cohort. In the past, these countries clearly were the forerunners at the first transition. But then they did not expand much further within the observation window and somehow left children from lower secondary education behind. However, in the great majority of countries there have been gains for children from disadvantaged families. These gains have been particularly strong for women in the observation window, so that these women could close the gender gap at the lower end of the inequality pyramid. (4) At the end of the observation window (for cohort 1978–1982), in most countries the transition to upper secondary education was saturated for all origin groups. The exceptions are Spain, Italy, Ireland and the United Kingdom where the transition probabilities for children from parents with lower secondary education were still below Hout's 80 % level among the youngest cohort (born 1978–1982). In a modern world where upper secondary education has become the minimum standard among the younger generation, this lack of education for children from disadvantaged families is likely to be associated with high unemployment, low career and income opportunities and a high likelihood of poverty in the later life course. These children clearly have been left behind by these modern states.

Our empirical findings for the first educational transition suggest the following four theoretical conclusions: (1) In most countries there has been a strong decline in educational inequality across cohorts. Since this decline took place in a context where children from more privileged families have been fairly saturated, this empirical evidence supports not only the modernization

hypothesis and the cultural reproduction theory but also the MMI hypothesis. However, the MMI hypothesis was not fully confirmed because in some countries men and women from lower secondary education backgrounds could catch up even within a context where the more educated families had not yet been saturated. Thus, empirical evidence generally is more in agreement with the ceiling effect hypothesis than with the MMI hypothesis. The ceiling effect hypothesis posits that inequality of educational opportunity might even decline, when the probabilities for the lower educational groups are particularly small and when the probabilities of the higher educational groups are below the saturation level. (2) Women from families with lower and upper secondary education could not only catch up relative to their male counterparts from the same educational origin level but also with regard to children from more privileged families. Hence, one can conclude that women from lower educational origins are the big winners in the expansion of the first educational transition in almost all countries. These gains of women from families with lower secondary education occurred in a historical period when gender roles in modern societies have been culturally transformed and discrimination against women has been declining (DiPrete and Buchmann 2013). With rising women's labor force participation, societies are experiencing a shift from male breadwinner to dual earner families (Blossfeld and Drobnič 2001). Women increasingly seek employment in skilled service and administrative jobs. Thus, parents invest more in their daughter's education. (3) With the universalization of upper secondary education, however, the social value of upper secondary attainment is also changing. Reaching at least upper secondary education has become a widely shared and common experience for most young people today. When upper secondary education is becoming nearly universal among the younger generations, it becomes a kind of necessary condition for every young individual. Reaching upper secondary educational attainment is nothing special anymore. The few who do not (or are not able) to make the transition to this new minimum educational attainment level are, of course,

becoming increasingly disadvantaged and left behind outsiders. In other words, the impressive educational gains of men and women from lower secondary education at the transition to upper secondary education carry an elusive flavour. In comparison to their parents they have clearly achieved a nominally higher educational attainment. But in the process of universalization of education from below there has also been a decline in the social value of this educational attainment level over time. With regard to the younger generations, the relative gain across cohorts seems to disappear. (4) From a life course perspective the substantial reduction in origin-specific educational inequalities in reaching the upper secondary educational level can lead to more equality in the attainment of higher education. But this only occurs if the transition to tertiary education does not become more unequal with regard to social origin.

Our empirical findings for the second transition to tertiary educational attainment can be summarized as follows: (1) In all countries men and women from parents with tertiary education had again the highest starting probabilities among the three different origin groups in the oldest cohort (1947–1952). The children from these families did not only have the best opportunities to complete upper secondary education but, if they had attained upper secondary education, they also had the greatest chances to graduate from higher education. Put in another way, the very favorable transition probabilities of both transitions multiply for them over the educational career and produce the highest proportion of tertiary graduates among all families. The success of children from tertiary families is partly based on their higher academic performance and more school appropriate noncognitive skills and partly on the specific educational choices of these students and their parents. (2) The changes in transition probabilities from upper secondary educational attainment to tertiary graduation have not been uniform across the 22 countries. We observe both strongly increasing and decreasing educational inequalities between children from different educational origins across cohorts. (3) In nine countries (the United States, the

United Kingdom, Germany, Italy, Sweden, and the countries of the former Communist bloc in Central and Eastern Europe such as the Czech Republic, Slovakia, Poland, and Estonia) the opportunities to graduate successfully from higher education for children from lower secondary education families have become worse. In three of these nine countries (the United States, Germany and Slovakia), the children from these families had quite unchanged opportunities to reach an upper secondary educational attainment. The additional decline of chances at the second transition means that these children from disadvantaged families in these three countries are clearly the losers in the process of educational expansion. In the other six countries (Poland, the Czech Republic, Estonia, Italy, Sweden, and the United Kingdom) children from lower secondary education increased their chances at the first transition but lost opportunities to graduate from tertiary education, if they had successfully completed upper secondary education. Thus, the gains in the probabilities at the first transition were at least partly counteracted at the second transition. This result is of course not consistent with the expectations of modernization theory but rather supports cultural reproduction theory. In general, the countries with increasing educational inequalities at the second transition are those societies that experienced a strongly increasing market competition among status and income groups in society. This is particularly true for the liberal economies in times of globalization (Blossfeld et al. 2005), such as the United States, the United Kingdom, and the former socialist countries, which strongly liberalized their economies after the breakdown of the Iron Curtain (the Czech Republic, Slovakia, Poland, and Estonia). From a theoretical point of view, the development in Sweden is most interesting. In the past this society was often characterized as a country with a particularly high level of social and gender equality in educational attainment (Erikson and Jonsson 1996). However, in the last two decades, Sweden also moved away from the strict social democratic model by introducing policies of liberalization, deregulation and privatization. In particular, in the educational system

private schools were introduced and the responsibility for education was shifted from the central state to the community level. These reforms seem to have turned around the long trend towards more educational equality. (4) For the remaining 13 countries the transition probabilities for children from parents with lower secondary education increased relative to the other origin groups in the transition to tertiary graduation. These countries are the Republic of South Korea, Japan, Finland, Norway, Denmark, Austria, Belgium (Flanders), the Netherlands, the Russian Federation, France, Ireland, Belgium, Canada and Spain. In most of these countries there has indeed been a substantial reduction of educational inequalities because the declining inequalities at the first and second transitions add up over the life course. Rising educational opportunities for children from lower educational origins are obviously possible. Thus, the question is, What explains these declining educational inequalities? It seems that the massive expansion of higher education in a short historical period has been an important factor. In addition, special educational policy measures, supporting particularly disadvantaged children, are important. They seem to have been quite effective in reducing educational inequalities in several countries.

6 Further Research Needs for Cross-National Comparisons

Our analysis shows that the highly standardized cross-national PIAAC data can provide new insights into the relationships between educational expansion and changes in inequalities of educational opportunity across very diverse modern societies. However, the PIAAC data also have severe limitations. The most important drawback is that they offer only a snapshot of the students' educational position in a long career at one point in time. For example, based on the cross-sectional character of the PIAAC study, we were forced to use individuals' highest educational attainment in order to reconstruct their major educational transitions over the life course. An educational

career, however, consists of a sequence of participations in often age-graded and institutionally structured educational contexts. Future cross-national educational research initiatives should therefore collect detailed longitudinal data on the movement of individuals through the educational systems of a greater number of modern societies. Cross-national longitudinal data would also offer the ability to nest individual educational trajectories and educational transitions within changing institutional and historical contexts. Cross-national research would also profit from better data on the long-term relationships between parents and children and how these relationships influence the educational careers of children, adolescents, and adults over the life course in different countries. Finally, our theoretical model in Fig. 1 suggested that we have to go a step further in collecting longitudinal data on (1) the informal and formal learning environments in the family and within the various institutional settings, (2) the development of cognitive and noncognitive competences and (3) the educational decision-making processes over the life course. Longitudinal data would shed light on how different competencies are acquired over the life span, how they interact over time and across educational stages, and in which way they may contribute to individual and group-specific life course outcomes. This would allow us to identify and compare the four types of indirect effects of parental education on children's educational attainment (see Fig. 1). In sum, standardized cross-national panel data are essential for identifying trajectories of growth and development over the life course in modern societies and for understanding the causal relationships between competence development, educational decision making and educational participation.

References

- Almlund, M., Duckworth, A. L., Heckmann, J. J., & Kautz, T. (2011). *Personality psychology and economics. Discussion Paper No. 5500*. Bonn: IZA.
- Baker, D. (2014). *The schooled society. The educational transformation of global culture*. Stanford: Stanford University Press.

- Becker, R. (2014). Reversal of gender differences in educational attainment – Historical analysis of the west German case. *Educational Research*, 56, 184–201.
- Benavot, A., & Resnik, J. (2006). Lessons from the past: A comparative socio-historical analysis of primary and secondary education. In A. Benavot, J. Resnik, & J. Corrales (Eds.), *Global educational expansion historical legacies and political obstacles* (pp. 1–89). Cambridge (MA): American Academy of Arts and Sciences.
- Bernardi, F., & Cebolla-Boado, H. (2014). Previous school results and social background: Compensation and imperfect information in educational transitions. *European Sociological Review*, 30, 207–217.
- Blake, J. (1989). *Family size and achievement*. Los Angeles: University of California Press.
- Blossfeld, P., & Blossfeld, G. (2014). *Educational expansion from below. The logic of educational expansion in modern societies*. (Unpublished paper, work in progress).
- Blossfeld, H.-P., & Hakim, C. (1997). *Between equalization and marginalization : women working part-time in Europe and the United States of America*. Oxford: Oxford University Press.
- Blossfeld, H.-P., & Dobnič, S. (2001). *Careers of couples in contemporary societies. A cross-national comparison of the transition from male breadwinner to dual-earner families*. Oxford: University Press.
- Blossfeld, H.-P., Mills, M., Klijzing, E., & Kurz, K. (2005). *Globalization, uncertainty and youth in society*. London: Routledge.
- Boli, J., Ramirez, F., & Meyer, J. (1985). Explaining the origins and expansion of mass education. *Comparative Education Review*, 29, 145–170.
- Bos, W., Hornberg, S., Arnold, K.-H., Faust, G., Fried, L., Lankes, E.-M., Schwiippert, K., & Valtin, R. (2007). *IGLU 2006. Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich*. Münster: Waxmann.
- Boudon, R. (1974). *Education, opportunity, and social inquiry. Changing prospects in Western society*. New York: Wiley.
- Bourdieu, P. (1973). Kulturelle Reproduktion und soziale Reproduktion. In P. Bourdieu (Ed.), *Grundlagen einer Theorie der symbolischen Gewalt* (pp. 88–137). Frankfurt am Main: Suhrkamp.
- Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America* (Vol. 57). New York: Basic Books.
- Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society*, 9, 275–305.
- Breen, R., Luijckx, R., Müller, W., & Pollak, R. (2009). Nonpersistent inequality in educational attainment. Evidence from eight European countries. *American Journal of Sociology*, 5, 1475–1521.
- Breen, R., Luijckx, R., Müller, W., & Pollak, R. (2010). Long-term trends in educational inequality in Europe: Class inequalities and gender differences. *European Sociological Review*, 26, 31–48.
- Breen, R., van de Werfhorst, H. G., & Meier Jæger, M. (2014). Deciding under doubt: A theory of risk aversion, time discounting preferences, and educational decision-making. *European Sociological Review*, 30, 258–270.
- Buis, M. L. (2011). The consequences of unobserved heterogeneity in a sequential logit model. *Research in Social Stratification and Mobility*, 29, 247–262.
- Buis, M. L. (2013). The composition of family background: The influence of the economic and cultural resources of both parents on the offspring's educational attainment in the Netherlands between 1939 and 1991. *European Sociological Review*, 29, 593–602.
- Bukodi, E., & Goldthorpe, J. H. (2012). Decomposing 'social origins': The effects of parents' class, status, and education on the educational attainment of their children. *European Sociological Review*, 28, 1–16.
- Carneiro, P., & Heckman, J. J. (2005). Human capital policy. In J. J. Heckman & A. B. Krueger (Eds.), *Inequality in America. What role for human capital policies?* (pp. 77–239). Cambridge: MIT Press.
- Collins, R. (1971). Functional and conflict theories of educational stratification. *American Sociological Review*, 36, 1002–1019.
- Cummings, W. (2003). *The institutions of education: A comparative study of educational development in six core nations*. Oxford: Symposium Books.
- DiPrete, T., & Buchmann, C. (2013). *The rise of women: The growing gender gap in education and what it means for American schools*. New York: Russell Sage.
- DiPrete, T., Goux, D., Maurin, E., & Quesnel-Vallee, A. (2006). Work and pay in flexible and regulated labor markets: A generalized perspective on institutional evolution and inequality trends in Europe and the U.S. *Research in Social Stratification and Mobility*, 24, 311–332.
- Ditton, H. (2010). Schullaufbahnen und soziale Herkunft – eine Frage von Leistung oder Diskriminierung? In S. Aufenanger, F. Hamburger, L. Ludwig, & R. Tippelt (Eds.), *Bildung in der Demokratie* (pp. 79–99). Opladen: Barbara Budrich.
- Dollmann, J. (2011). Verbindliche und unverbindliche Grundschulempfehlungen und soziale Ungleichheiten am ersten Bildungsübergang. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 63, 595–621.
- Elder, G. H., & Shanahan, M. J. (2006). The life course and human development. In R. E. Lerner & W. Damon (Eds.), *The handbook of child psychology. Theoretical models of human development* (pp. 665–715). New York: Wiley.
- Elder, G. H., Johnson, K. M., & Crosnoe, R. (2004). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer.
- Erikson, R. (1984). Social class of men, women and families. *Sociology*, 18, 500–514.
- Erikson, R., & Goldthorpe, J. H. (1992). *The constant flux: A study of class mobility in industrial societies*. Oxford: Clarendon Press.
- Erikson, R., & Jonsson, J. O. (1996). *Can education be equalized? The Swedish case in comparative perspective*. Boulder: Westview Press.

- Ermisch, J., & Francesconi, M. (2001). Family matters: Impacts of family background on educational attainments. *Economica*, 68, 137–156.
- Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. Oxford: Oxford University Press.
- Esser, H. (2014). *Bildungssysteme und ethnische Bildungsungleichheiten*. Unpublished manuscript. Mannheim Centre for European Social Research. Mannheim University.
- Gerber, T. P. (2000). Educational stratification in contemporary Russia: Stability and change in the face of economic and institutional crisis. *Sociology of Education*, 73, 219–246.
- Gerber, T. P., & Hout, M. (1995). Educational stratification in Russia during the Soviet period. *American Journal of Sociology*, 3, 611–660.
- Goldthorpe, J. H. (1983). Women and class analysis: In defence of the conventional view. *Sociology*, 17, 465–488.
- Grubb, W. N., & Lazerson, M. (2009). *The education gospel*. Cambridge: Harvard University Press.
- Hackman, D. A., Farah, M. J., & Meaney, M. J. (2010). Socioeconomic status and the brain: Mechanistic insights from human and animal research. *Nature Reviews/Neuroscience*, 11, 651–659.
- Hanmer, M. J., & Kalkan, K. O. (2013). Behind the curve: Clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models. *American Journal of Political Science*, 57, 263–277.
- Hearinga, S. G., West, B. T., & Berglund, P. A. (2010). *Applied survey data analysis*. Boca Raton: Chapman & Hall/CRC Press.
- Hout, M. (2006). Maximally maintained inequality and essentially maintained inequality: Cross-national comparisons. *Sociological Theory and Methods*, 21, 253–278.
- Iannelli, C. (2003). Parental education and young people's educational and labour market outcomes: A comparison across Europe. In I. Kogan & W. Müller (Eds.), *School-to-work transitions in Europe: Analyses of the EU LFS 2000 ad hoc module*. Mannheim: Mannheimer Zentrum für Europäische Sozialforschung.
- Jackson, M. (2013). Introduction. How is inequality of educational opportunity generated? The case for primary and secondary effects. In M. Jackson (Ed.), *Determined to succeed? Performance versus choice in educational attainment* (pp. 1–33). Stanford: Stanford University Press.
- Jang, S., & Kim, N. (2004). Transition from high school to higher education and work in Korea, from the competency-based education perspective. *International Journal of Educational Development*, 24, 691–703.
- Johnson, W., Penke, L., & Spinath, F. (2011). Heritability in the era of molecular genetics. Some thoughts for understanding genetic influences on behavioural traits. *European Journal of Personality*, 25, 254–266.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291.
- Katz, L. F., & Autor, D. H. (1999). Changes in the wage structure and earnings inequality. In O. Aschenfelter & D. Card (Eds.), *Handbook of labor economics* (pp. 1463–1555). Amsterdam: North Holland.
- Kirsch, I., & Thorn, W. (2013). *Technical report of the survey of adult skills (PIAAC)*. http://www.oecd.org/site/piaac/_Technical%20Report_17OCT13.pdf
- Lenski, G. E. (1966). *Power and privilege: A theory of social stratification*. Chapel Hill: UNC Press Books.
- Lucas, S. R. (1999). *Tracking inequality. Stratification and mobility in American high schools*. New York: Teachers College Press.
- Mare, R. D. (1981). Trends in schooling: Demography, performance, and organization. *Annals of the American Academy of Political and Social Science*, 435, 96–122.
- Mare, R. (1993). Educational stratification on observed and unobserved components of family background. In Y. Shavit & H.-P. Blossfeld (Eds.), *Persistent inequality* (pp. 351–376). Boulder: Westview Press.
- Mateju, P., Rehakova, B., & Simonova, N. (2003). *Transition to university under communism and after its demise. The role of socio-economic background in the transition between secondary and tertiary education in the Czech Republic 1948–1998* (pp. 301–324). Prague: Institute of Sociology, Academy of Science of the Czech Republic.
- Meyer, J. W., Ramirez, F. O., Rubinson, R., & Boli-Bennett, J. (1977). The world educational revolution, 1950–1970. *Sociology of Education*, 50, 242–258.
- OECD. (1999). *Classifying educational programmes. Manual for ISCED-97 implementation in OECD countries*. Paris: OECD.
- Park, H. (2009). Inequality of educational opportunity in Korea by gender, socio-economic background, and family structure. *The International Journal of Human Rights*, 11, 179–197.
- Park, H. (2010). Japanese and Korean high schools and students in comparative perspective. In J. Dronkers (Ed.), *Quality and inequality of education. Cross-national perspectives* (pp. 255–273). Berlin: Springer Verlag.
- Pfeffer, F. (2006). *The institutional context of educational attainment. Intergenerational educational mobility in comparative perspective*. Presented at the ECSR Prague Conference September 2006.
- Raftery, A. E., & Hout, M. (1993). Maximally maintained inequality: Expansion, reform, and opportunity in Irish education, 1921–1975. *Sociology of Education*, 1, 41–62.
- Rohwer, G. (2014). *A defence of the sequential transition model*. (Paper is in progress).
- Schoon, I., & Eccles, J. S. (2014). *Gender differences in aspiration and attainment: A life course perspective*. Cambridge: Cambridge University Press.
- Shanahan, M. J., Vaisey, S., Erickson, L. D., & Smolen, A. (2008). Environmental contingencies and genetic pro-

- pensities: Social capital, educational continuation, and dopamine receptor gene DRD2. *American Journal of Sociology*, 114, 260–286.
- Shavit, Y., & Blossfeld, H.-P. (1993). *Persistent inequality. Changing educational attainment in thirteen countries*. Boulder: Westview Press.
- Simkus, A., & Andorka, R. (1982). Educational attainment in Hungary. *American Sociological Review*, 47, 740–751.
- Steinmetz, S. (2013). *The contextual challenges of occupational sex segregation. Deciphering cross-national differences in Europe*. Wiesbaden: VS Verlag.
- Treiman, D. J. (1970). Industrialization and social stratification. *Sociological Inquiry*, 40(2), 207–234.
- UNESCO. (2012). *International standard classification of education*. UNESCO Institute for Statistics: Montreal. <http://www.uis.unesco.org/Education/Documents/isc2011-en.pdf>
- Weinert, S., Artelt, C., Prenzel, M., Senkbeil, M. Ehmke, T., & Carstensen, C. H. (2011). Development of competences across the life span. In H.-P. Blossfeld, J.-G. Roßbach, & J. von Maurice (Eds.), *Education as a lifelong process*. *Zeitschrift für Erziehungswissenschaft*, 14, 67–86.

Work Over the Gendered Life Course

Phyllis Moen

1 Introduction

The concept of “work” is tied to purposive activity, although the term most often refers to gainful (paid) rather than unpaid labor, such as informal family care work or volunteer work for communities or non-profit organizations. Paid work is the principal activity of most “prime age” adults (ages 25–55) in advanced economies, institutionalized with the industrial revolution and its corollary emphasis on wage employment as distinct from self/family employment in agriculture or small businesses, and distinct as well from the informal family care work taking place within households. (Throughout the chapter, therefore, I use “work” to refer to paid work, unless otherwise designated.)

1.1 Work and the Life Course

The social and temporal organization of work replete with the rhythms, clocks and calendars of work days, work weeks, work years, and work lives (including entries and retirement exits) have been fundamental to the shaping of the conventional mid-twentieth century lock-step life

course. This takes the form of first, years of preparation (education), then continuous paid employment throughout adulthood, then the “golden years” of leisure in retirement (see Kohli 1986a, b, 2007; Kohli and Meyer 1986; Kohli et al. 1991; Moen and Roehling 2005).

Work by at least one household member is crucial to supporting individuals and families. But working for the same or several organizations and in the same or several occupations throughout the life course not only provides a source of income (livelihood), it is also key to status, skill development, daily routines, information acquisition, and social relations. There is a subjective side as well; work shapes identities, values, a sense of mastery, and current as well as future expectations. In these many ways work shapes individual and family life quality as well as life chances at all ages and life stages (Elder 1994; Glavin 2013; Hitlin and Elder 2007b; Jahoda 1982; Kohn and Schooler 1983; Schooler et al. 1999; Warren et al. 2002). For example, work has consistently been related to both mental and physical health. To be sure, healthy people are most apt to work, but work itself promotes health and well-being (Berkman et al. 2014; Bird and Rieker 2008; Blustein 2008; Bosma et al. 1998; Carr 1997; Karasek and Theorell 1990; Landsbergis et al. 1992; Mirowsky and Ross 1989; Pavalko et al. 1993).

Work is also tied to economic safety nets. Unlike European social welfare state provisions,

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in the U.S., employing organizations have traditionally been a major source of social welfare, providing (until recently) most health insurance, pensions, and saving plans. Moreover, job tenure (seniority) has historically provided (again, until recently, and only for white-collar and unionized blue-collar workers) a measure of job and economic security accumulating with tenure and translating into retirement security.

There is considerable variety and inequality in the nature of work and its rewards and costs. Employment opportunities, the risks of unemployment, entrance into certain occupations, toxic work environments, job conditions, resources, and power are institutionalized and stratified in the labor market by policies and traditions tied to educational background, job tenure, and status as well as by (often hidden) stereotypes and discrimination. Taken together, these policies, traditions and biases serve to foster and reproduce disparities by social class, race, nativity, gender, and age. There are opportunities for job mobility for some; but both advantages and disadvantages tied to work trajectories tend to cumulate over the life course (Dannefer 2003; Ferraro and Shippee 2009).

1.2 Work as a Master Life Course Status

Paid work is thus a master status, providing a framework for organizing and integrating literally every aspect of social existence across the life course – for youth on the precipice of the labor market, adults simultaneously building families and careers, and older adults on the edge of retirement (Barley 1989; Beck 1992; Csikszentmihalyi 1990; Hall 2004; Heinz 2003; Hughes 1958; Moen 2003b; Moen and Roehling 2005). The long arm of the job touches both working and non-working adults and retirees, their partners, their aging parents, their children and grandchildren. This is the case not only for individual and family lives, but also for the various institutions, organizations and activities within communities and the broader society. For instance, the rhythms of both traffic and televi-

sion scheduling reflect the work day, and community activities are arranged around work weeks, weekends, and national “holidays” from work.

Employment is clearly the path to economic independence, self-esteem, meaning, and security, the fundamental public ecology in which the adult life course plays out. But jobs remain gendered, even though they are no longer officially advertised as “for men” or “for women.” Educators, employers, media, and even parents commonly steer young women (and young men) toward some jobs rather than others, contributing to the ongoing gendering of occupations (Fernandez and Sosa 2005). Ridgeway and Correll (2004) describe how small biasing effects such as these accumulate over careers and lifetimes to result in substantially different employment experiences and rewards for men and women who may have started out with similar social backgrounds.

Both work and the work force have been transformed in remarkable ways. The traditional social contract rewarding the lock-step of continuous full-time employment with job and retirement security has disappeared, unlikely to return. Workers are now more apt to be female, minority, or older than ever in history. Still, rigid work-time norms, policies, and practices (such as completing education by the 20s or earlier, 9- to 5, 5-day work weeks, hierarchical “top-down” authority structures, retirement at 65) designed for white-collar and unionized blue-collar jobs in the 1950s (think “Mad Men”) haven’t changed. The fact is, there is a fundamental *mismatch* between the social organization of education, paid work and retirement (institutionalized in the middle of the twentieth century) and twenty-first century workforce and economic realities. Adding to this mismatch are outdated gendered traditions and expectations regarding paid work and family care work (such as who is responsible for breadwinning or family care) that are at odds with increasingly strong societal norms (and policies) endorsing women’s employment and gender equality (Blair-Loy 2003; Gerson 2010; Moen 1992; Moen and Roehling 2005; Orrange 2007; Reynolds and Aletraris 2010).

Thus contemporary work and occupational careers illustrate a key challenge of our times – the need for corporate and public policies promoting innovative organizational structures and cultures that better fit with twenty-first century realities of a changing economy (including the dismantling of traditional social protections), a changing workforce (of women as well as men, more older workers), and changing gender and occupational values (including beliefs that all adults in the household should work, that family and work environments should be egalitarian, and young workers not always buying into traditional norms and expectations). What are the emerging contours of twenty-first century work, a twenty-first century life course?

The remainder of this chapter views work through a life course lens highlighting key life course themes: that *historical context* matters, that *time and timing* are fundamental to aligning individual biographies with macro-level institutions, the *dynamics of social change*, and the importance of the *constrained agency* of individuals, organizations, public policy makers and scholars in reshaping the social and temporal aspects of work. It further addresses processes inhibiting work redesign and concludes with hidden assumptions constraining both research and policy innovations.

2 Historical Context: Work as an Institution

How did we get here? To a place where institutions feel out of date, no longer fitting with today's intense job demands, chronic job insecurity, uncertain career paths, families without full-time homemakers, and transitions into and out of the work force that take years, not days? A life course approach to the study of work necessarily starts with an historical vantage point (Elder and George [forthcoming](#)). The development of corporations following the industrial revolution set the stage for wage labor, as well as the breadwinner/homemaker family form (for those who could afford it). After the Second World War and the return of troops to the civilian labor force (and

married women war workers to domesticity), a career mystique developed based on middle-class white-collar and unionized blue-collar men's occupational trajectories and possibilities (Moen and Roehling [2005](#)). It portrayed continuous, full-time (or more) hard work and commitment throughout most of adulthood as *the* path to success and happiness. The booming Post-World War II economy creating skilled blue-collar and professional white-collar jobs laid the groundwork for the social construction of standardized "good" and "bad" work. Good work was for those who could follow the career mystique, that is, jobs providing high wages, security with seniority, health care, pensions, sick leave, vacations and other benefits (Kalleberg [2011, 2012](#)). Bad work consisted of more marginal engagements – part or full time work – often intermittent – with little security and few such benefits or supports (Kalleberg [2000](#)). The institutional clocks and calendars associated with good work and orderly career paths became key organizers of everyday experiences and of the life course as an institution. But note that this was based on a white, middle-class and unionized working-class male template of work.

Consider the ways jobs were allocated by whether or not one was male or female (or pregnant), or how workers were allocated social security credits, both of which disadvantaged women. Until the late 1960s, job want ads in newspapers specified the gender of the employee, with clerical and secretarial positions specifically seeking women (Pedrianna [2004](#)). Teachers in some school districts in the 1960s and 1970s could not continue to teach if pregnant. Before 1978 one could not receive a year's Social Security credit except by remaining in the workforce continuously throughout the year, something problematic for women moving in and out of paid work for caregiving or other reasons (Institute for Women's Policy Research [2005a, b](#)). These policies began to be revised in tandem with both the women's movement and the corollary unprecedented influx of married women into the workforce (Moen and Roehling [2005](#)).

The career mystique paradigm was never a reality for most minorities, women, or the poorly

educated, but it became the widely accepted vision of the ways work and career pathways *should* be organized. This false myth traditionalizing rigid clocks (9–5, Monday’s through Friday’s) and calendars (full-time job entry as a marker of the transition into adulthood, continuous work throughout adulthood; retirement at 62 or 65 as a marker of old age) occurred in tandem with and was only possible because of another myth, the feminine mystique (Friedan 1963), freeing (male) workers to focus full time on their jobs because someone else – their wives – were persuaded that their sense of fulfillment came from full-time (and unpaid) care work – for their children, their houses, their husbands, their communities.

A life course approach thus underscores the significance of *social time*, the socially constructed and institutionalized entry and exit portals into and out of roles (such as labor market participation) and relationships (such as marriage and caregiving). The life course regime of paid work and career paths institutionalized in the middle of the twentieth century provided (for many men at least) a lock-step template shaping much of the workforce’s biographical experiences, despite the fact that war and economic downturns generated some sharp dislocations. Institutionalizing age-graded labor market entry and exit time tables, occupational ladders, qualifications for advancement, pensions, and government supports (such as Unemployment Insurance, Social Security, and educational loans) created what most consider the “normal” life course. But this life course regime marginalized those out of step with its specifications, those who couldn’t get the educational credentials, job interviews, or promotions to jobs with career tracks, as well as the absence of supports for integrating work and family care obligations.

The women’s movement in the 1970s pushed to effectively replace the feminine mystique with the career mystique – with women seeking men’s jobs, men’s career paths, and men’s financial and other rewards. Though few men or women could actually attain it, the false myth (heavy career commitment as the only path to life quality) became legitimated as “the way things are,” and “the way things should be” – for women as well

as men at all points along the life course. This made life difficult for working women with family responsibilities and for women, immigrants and minorities in “bad” jobs, exacerbating gender as well as other inequalities (Budig and England 2001; Correll et al. 2007; Gangl and Ziefle 2009; Staff and Mortimer 2012). For even professional women, the reality has become some sort of career mystique *plus* (the “plus” being women’s conventional family responsibilities).

In tandem with the career mystique, the political climate of neoliberalism (Acker 2006; Davis 2009; Sennett 1998) over the last several decades has prioritized paid work over all other activities, as can be seen in the U.S. in welfare reform legislation passed in 1996 (Personal Responsibility and Work Opportunity Reconciliation Act) and incentives (delays in eligibility for full Social Security benefits, higher benefits for those working until age 70) encouraging older workers to extend their years of labor force participation.

3 Time and Timing

A second key life course theme has to do with the time and timing of events, related always to age. Life course scholars have sensitized researchers to the multiple meanings of age (Brückner and Mayer 2005; Hagestad and Neugarten 1985; Riley et al. 1994; Settersten and Hagestad 1996a, b; Settersten and Mayer 1997). Age is more than biological time. It is also about *social time*, such as the patterning of *transitions and trajectories*, the development of *timing norms* and the concept of *cohort* tied to historical context, as well as the cultural and structural clockwork of work. Especially consequential is the fact that with bureaucratization, work came to be about time rather than piece work, hours “at work” rather than accomplishments.

3.1 Scheduling Social Time: Doing Age and Gender

The concept of “social time” captures the temporal routines, regulations, and rules that define the universe of options available for individuals to

shape their life courses (e.g., Heinz and Marshall 2003; Kohli 1986b, 2007; Levy and Widmer 2013; Marshall et al. 2001; Moen 2003a; Moen and Spencer 2006; Mortimer et al. 2015; Shanahan 2000; Shanahan et al. 1997) and incorporates gender as well as age expectations. Institutionalized social time clocks define traditional age-graded pathways to and through paid work. Age is thus an important determinant of people's institutionalized *social roles*, independent of their capacities and preferences, and is reflected in what Riley (1987) refers to as the *age stratification system*. Other meanings of age have to do with the patterning of *transitions and trajectories*, the development of *timing norms* and the concept of *cohort* tied to historical context.

Just as there are multiple meanings of age, so too, are there multiple meanings of gender. "Gender" (or "sex") quite obviously refers to the biological differences between men and women, but it is equally an ascribed status affecting life chances and possibilities. There is also a *gender stratification system*, sometimes formal but often informal biases allocating some social positions and opportunities to men and others to women throughout the adult course (Bem 1994; Folbre 2001; Moen 2001, 2003a; Moen and Chermack 2005; Moen and Spencer 2006; Risman 1998; West and Zimmerman 1987; Williams 2000; Williams and Dempsey 2014). Note that race and class are also important statuses intersecting with age and gender to shape the gendered adult course (Acker 2006; McCall 2001; Schulz and Mullings 2006).

Gender and age are not simply markers; rather, they play out as biological, social and historical forces. This matters because the work scripts people follow depend on the *combination* of their age and gender. In fact, age and gender constitute the backbone of key socialization and allocation regimes around paid work (Esping-Andersen 2009; Moen 2013), creating distinctive sets of challenges and limiting the strategic choices and adaptations of women and men as they move to and through adulthood. For example, hiring managers are looking for young adults for entry-level positions, not someone in their 40s or 50s. What is key is that both age and gender are *intersecting statuses*, setting work expectations, options, and resources throughout the adult years.

Age and aging serve to widen, rather than narrow gender differences and inequalities (Moen 2001; Moen and Spencer 2006). For example, contemporary young people in high school and college often wear similar styles of clothing, earn similar (low) wages in retail or service jobs, and take similar classes. It is only as they enter and move through adult roles – especially as employees, spouses, and parents – that women's and men's experiences and resources tend to markedly diverge (Aronson and Mortimer 2013; Ashby and Schoon 2010). Both advantages and disadvantages cumulate over the life course, widening inequalities within as well as across gender divides.

3.2 Timing, Transitions and Trajectories

Part of the time and timing life course theme relates to the cultural and structural aspects of the timing, transitions and trajectories of work and career paths. Rather than think of "career" as moving up in seniority or climbing an occupational ladder, I use the term to capture the dynamic choices and progression of individuals along various role pathways. People follow a range of careers: educational careers, health careers, family careers, leisure careers, work careers.

Following the lock-step path of good jobs or else the more checkered path of bad jobs is shaped by prior educational training as well as certification, skills, and family background *along with* discrimination by race, gender, and social class (Macmillan and Eliason 2003). Good jobs offer more than earnings or job security; they also provide workers with more autonomy and control. "Timing" also underscores the differences in men's and women's experiences of employment. For example, men tend to have longer tenure in organizations and occupations than women. And women typically work fewer hours per week than their male colleagues. Thus a gendered life course perspective highlights gender as a key contingency affecting the nature of work and career paths over life biographies – and their consequences.

Women's lives typically underscore the embeddedness of work careers in family careers and vice versa, the impossibility of isolating one from the other in any artificial divide (Blossfeld and Drobnič 2002; Blossfeld and Hofmeister 2008; Damaske 2011; Hobson 2014; Sweet 2014). This has been true of men's lives as well, but was less obvious in earlier times. Recall that white middle-class and unionized blue-collar men in the middle of the last century moved up occupational or seniority ladders, achieving income, status, and job security precisely because they had wives who took care of the home front, leaving them unencumbered, able to focus almost entirely on their jobs throughout their "prime" working years.

Today most workers are married to other workers, are singles or single parents, and/or have children, parents or other aging relatives who require care. Few men or women have homemaking support, either paid or unpaid (although many husbands still benefit from their working wives doing most of the domestic work). What some young people increasingly have, however, is parental support as they move into the workforce (Mortimer 2011; Mortimer and Fischer *forthcoming*; Mortimer et al. 2010; Swartz 2009; Swartz et al. 2011).

The life course perspective (Elder and George *forthcoming*; Elder et al. 2003; Mortimer and Shanahan 2003) holds that work transitions (such as getting or changing jobs, voluntarily leaving the work force, being laid off or retiring) always occur in the context of ongoing trajectories. Understanding the patterning of employment through the life course may be important for understanding both the resources available and the meaning of paid work, with men and women typically following (or being allocated into) very different patterns. For example, women following intermittent career paths, moving in and out of the workforce, in and out of part time work in response to shifting family care obligations, find it easier to get off occupational or organizational tracks than to get back on (Han and Moen 1999a, b, 2002; Hobson 2014; Malenfant et al. 2007; Stone 2007).

3.3 Timing Norms

There are other forms of timing as well. Consider commonsense notions about the "right" time for doing things. Culturally-grounded norms and policies shape expectations and beliefs about the "right" age to be in school, to be in the labor force, to move up occupational ladders, to start a family, or to retire from a career (Hagestad and Neugarten 1985; Neugarten et al. 1965). This reflects the institutionalized aspects of work, in terms of expectations and rules around the time, timing, and duration of jobs (work days, work weeks, work years as well as entries and exits at different ages and life stages; see Kelly and Moen 2007; Moen and Chesley 2008; Settersten and Hagestad 1996a, b). Work entries or exits experienced as "off-time" (i.e. earlier or later than is socially prescribed) may be perceived as more stressful or disruptive than work transitions that are normatively "on-time" (George 2003).

For example, workers in their 50s who are unexpectedly laid off or forced into early retirement due to corporate restructuring may very well experience these "off-time" transitions as disruptive and psychologically stressful. And the duration of experiences (such as time unemployed, time out of the workforce, tenure within an organization, or cumulative stress) can shape future opportunities as well as health and well-being (George 2003, 2014; Pearlin et al. 2005; Schieman et al. 2002).

Another example: men traditionally have been expected to be the family breadwinners, with all the possibilities, power, and pressures associated with it. Women are now expected to both hold down jobs *and* provide care for infirm and disabled family members as well as for dependent children. These differing options and imperatives play out in distinctive trajectories and turning points that shape disparities in men's and women's occupational careers, resource accumulations, and retirement paths (Blossfeld and Drobnič 2002; Blossfeld and Hofmeister 2008; George 1993; Moen and Flood 2013; Moen and Roehling 2005; Staff and Mortimer 2012).

3.4 Cohort

Age at a given point in time is also an indicator of *birth-cohort* membership and, thus, of life experiences shared with others born in the same historical context (Riley 1987; Riley et al. 1994; Ryder 1965). People of the same cohort live through the same historical times and are often socialized in similar ways, experiencing the same events, using the same technologies, and living through the same economies, climates, and policy as they move through the life course. The result is often greater differences across than within cohorts in beliefs and values related to work, gender and adult pathways. For example, young workers today are far less likely to want more job responsibility and more hours on the job compared to young workers in the early 1990s (Matos and Galinsky 2012) and fewer say that work is central to their lives (Settersten and Ray 2010). Members of the aging Boomer cohort (born after World War II, from 1946 through 1964), Generation X (born 1965–1974), and Millennials (1975–2000) have different beliefs about women’s and men’s roles. Note that family members, neighbors, friends, and coworkers of different ages are also members of different cohorts, socialized differently and viewing their lives – past, present and future – from vastly different vantage points.

What gives each cohort its distinctiveness are the shared events and experiences of people who are roughly the same age when major historical events occur. For Americans moving into adulthood in the early 1960s, a defining moment was when John F. Kennedy died. For those not yet born, Kennedy’s death is the stuff of history books and documentary films. For most Americans who were adults or adolescents at the turn of this century, *the* transformative experience of their lives occurred on September 11, 2001 when planes flew into the World Trade Center and the Pentagon.

There are other ways that *when* people are born, which birth cohort they belong to, has enormous implications for the course of their work

years. Men in certain cohorts have gone to war while their younger or older brothers (in different cohorts) watched these same wars on newsreels or television. And the cohort of young women today is the first participating actively in military roles previously allocated only to men. It is also the first cohort where young women have more education than young men.

Cohort differences are especially evident in societal expectations and gender norms around paid work and unpaid family work. Recall, the career mystique myth crystallized in tandem with the *feminine mystique* (Friedan 1963), a belief in the 1950s and early 1960s that women were socialized to (and should) be exclusively wives and mothers, finding total fulfillment in full-time domesticity. The problem was that many working-class and poor women couldn’t afford to be out of the workforce, often moving in and out of marginal jobs, and middle-class women in college were learning different lessons about using their skills in the world of work. Friedan’s book (1963) tapped a nerve, revealing many homemakers longing for a different kind of engagement and, in doing so, (re) launched the women’s movement in the 1960s and 1970s.

People in different cohorts have different attitudes about work, career paths, and gender (Schuman and Rieger 1992), as well as different options, depending on whether they are women or men, and whether they have a college education. Consider the different experiences of the parents of the baby-boom cohort (young adults in the 1940s and 1950s) versus the boomers themselves (young adults in the 1970s and 1980s) versus young adults today. Note that what is taken-for-granted at one point in history (such as men as the exclusive family breadwinners in the 1950s) changes. Today, dual-earner households are very much the expected norm, and growing numbers of women earn more than their husbands. Also new: the transition from school to work has lengthened and become more complex for young people today, often involving a series of unrelated jobs and periods of unemployment (Blossfeld and Drobnič 2002; Mortimer et al.

2015; Vuolo et al. 2012; Mortimer and Moen [this volume](#)).

The boomers (born 1946–1964) grew up along with the women’s movement, which, in combination with an expanding economy, resulted in a tremendous growth in women’s educational attainment and labor-force participation (Moen [forthcoming](#)). Boomers were the first cohort to experience the mismatch between traditional career paths and the growing numbers of women in the workforce. Recall this mismatch reflects the changing nature of the labor force. Although there are some exceptions (husbands whose wives are not working and vice versa), today’s workforce consists mainly of (1) men whose partners are also in the labor force, (2) women whose partners are also in the labor force, and (3) men and women without partners but with family obligations and/or non-work interests. Still, formal and informal caregiving remains “women’s” work (Folbre 2001, 2012). This includes many boomer grandmothers who are both working and caring for their grandchildren (Harrington Meyer 2014).

Life course scholars (Elder 1996; Moen 2003a; Settersten and Mayer 1997) emphasize the *life stage principle*; this means that the timing of historical events in people’s lives – such as the delaying of full Social Security benefits, new communication technologies, or economic downturns (like the Great Recession felt most strongly in 2008–2010) – impacts some cohorts more than others, given their ages. The life stage principle states that the effects of the same historical change is often different for individuals of different ages (different cohorts) and career and life course stages, as well as those differing in their social class backgrounds (Elder 1996, 1998; Johnson et al. 2012; Moen 2003a, b; Mortimer et al. 2010).

4 The Dynamics of Social Change

Contemporary employers and employees find themselves on a moving platform of multi-layered historical, social, and economic changes. Consider first the changes in workforce and retirement demographics (more women, more

immigrants, more older workers, more retirees – along with greater life expectancy). And there is economic globalization (reducing social protections and individualizing risks of job loss and economic insecurity) as well as high velocity changes in communications and information technologies contributing to blurring boundaries between work and non-work times and spaces. Another change: prolonged periods of education and dependency in early adulthood (including changes in the odds and timing of obtaining reasonably secure employment, as well as increases in cohabitation, delays in marriage and parenting, the rise in later life divorce and the growth in complex families). The confluence of these forces are upending conventional life course norms, including linear career paths and conventional one-way retirements (Blossfeld et al. 2008; Heinz 2003; Johnson et al. 2012; Moen and Flood 2013; Warner et al. 2010). Medical advances promoting health and longevity, the aging of the large boomer cohort, declines in the pool (and options) of young job entrants, less physically demanding work, the weakening of unions, and the dismantling of traditional pensions and protections for older workers and retirees – all are part of this moving platform of change (Cahill et al. 2005; Fullerton and Wallace 2007; Johnson et al. 2011; Kalleberg 2009, 2011; Mortimer et al. 2014; Ogums 2012; Sargent et al. 2013). It is not surprising that the nature of the work life course of most people no longer fits the lock-step ideal. Fundamental to understanding work in the twenty-first century are changes in the nature of both work and the work force.

4.1 The Changing Nature of Work

Work in the early twenty-first century has changed in a variety of remarkable ways. This is the consequence of a precarious and polarized global labor market that is producing concerns over productivity and competitiveness along with an unsettled economic climate, technological advances, the long-standing shift to a service economy, and the dismantling of social protections as part of a neoliberal agenda emphasizing the self-regulation of markets and the

individualization of risks (Davis 2009; Glavin 2013; Johnson et al. 2012; Kalleberg 2009, 2011; Silva 2013; Sweet and Meiskins 2013; Vuolo et al. 2012). The rise of a contingent workforce along with “downsizing” and the restructuring of job ladders mean that, for many workers, the traditional (secure) organizational career is rapidly becoming obsolete. Lock-step career path templates are thus increasingly irrelevant for contemporary workers. Despite the disappearance of the standard employment contract (Stone and Arthurs 2013), many rigid labor market laws, regulations, policies, and practices remain in place, continuing to provide mid-twentieth century scaffolding shaping (and constraining) twenty-first century clocks, calendars, and rhythms of work. These rigidities around the expected clockworks of work and who has control over their jobs and their time also promulgate inequalities in work conditions and resources over the life course.

Characteristics of jobs, career paths, and the working environment are extremely consequential for the developing individual and tend to differ by gender (Moen and Chermack 2005). Considerable theoretical progress and empirical evidence link high demands on the job and low levels of job latitude with heightened feelings of strain (Elsass and Viega 1997; Karasek and Theorell 1990) leading to poor health outcomes such as cardiovascular disease and elevated blood pressure. But men are more apt than women to typically occupy jobs with good health benefits, those with both high demands and high control (Bosma et al. 1998; Cheng et al. 2000; de Jonge et al. 2000; Dwyer and Ganster 1991; Hemingway and Marmot 1998; Kristensen 1995, 1996; Landsbergis et al. 1992; Schnall et al. 1994). Moreover, Marshall et al. (1997) find evidence suggesting that the demand-control model may be more applicable to employees in manufacturing sector jobs (typically men) than to those in service jobs (typically women). They find that, for employees in the service sector, job control does not moderate job demands, while the intrinsic rewards associated with serving others tend to benefit service employees' health.

Recent natural experiments and field trials show the importance of employees' control over their time, along with having supervisors who are

supportive of their personal lives, in reducing work-family conflict and increasing actual and perceived schedule control (Kelly et al. 2011, 2014), health and health behaviors (Fan and Qian 2015; Moen et al. 2011b, 2015) parents' perceived time adequacy (Hill et al. 2013), and turnover (Moen et al. 2011a, 2014). Such research designs are important for capturing the changing nature of work environments and suggest potential future directions – greater flexibility and control over time, for example. However, employers' labor market flexibility – the ability to reduce their work force at will or offshore jobs to other countries – remains a key component of contemporary work.

4.2 The Changing Workforce

Medical advances promoting health and longevity, the aging of the large Boomer cohort, increasing immigration, different fertility rates, and women's increased labor force participation are transforming the demography of the workforce. In fact, the twenty-first century workforce in North America and Europe is characterized by a large number of women (almost equally divided between women and men in the U.S.); growing numbers of two-earner, single, or single-parent employees; increasing numbers of minorities and immigrants; and an aging workforce (as boomers move through their 50s, 60s, and 70s). The mismatch between this heterogeneous workforce (increasingly with non-work obligations, values, and interests) and the lock-step expectation of continuous full-time employment is another example of structural lag (Moen 1994; Riley et al. 1994) or *institutional inertia* (Moen forthcoming), in that calcified rules, regulations, cultural norms, policies, and practices about work time, career paths, and retirement are changing at a glacial pace.

As a case in point, increases in life expectancy and decreases in fertility in Europe and North America are transforming the age distribution of the labor pool. The work force is continuing to age as boomers grow older, smaller cohorts move into work, and young people spend more time in school. The proportion of workers ages 16–24 in

the U.S. was 16.9 % in 1992, falling to 13.7 % in 2012 and projected to be 11.3 % by 2022. By contrast, workers 55 and older constituted only 11.9 % of the U.S. workforce in 1992; by 2012, fully 20.9 % of workers in the U.S. were 55 or older, projected to be over one in four (25.6 %) by 2022 (Toossi 2013). While the retirement transition came to be normatively defined in terms of timing and legitimacy, setting retirement apart from unemployment as a later-life work exit that can be planned for, anticipated, and positively defined (Graebner 1980; Moen 2012), comparatively few boomers plan for their retirement, and many would prefer a longer transition, with the possibility of reduced hours spent on one's career job and the possibility of reemployment following retirement from that job (Moen et al. 2005).

5 Redesigning Work and the Gendered Life Course

Attention to three institutionalized *processes* is central to understanding and developing innovations to reduce the mismatch between outdated twentieth century policies and traditions around the social and temporal organization of work and twenty-first century workforce, technological, and economic realities. These processes also reproduce gender, race and class inequalities by advantaging some early in the career course and disadvantaging others, with long-term consequences. These dynamic, interrelated processes of *socialization*, *allocation*, and *strategic selection* set the clocks and calendars of work and sort men and women into different labor markets, different occupations, different trajectories, and disparate resources, risks, and rewards.

5.1 Socialization

Liao and Cai (1995) define socialization as, “the process whereby individuals learn and maintain the morals and values of a society (see also Kramer 2011). Socialization teaches each new

generation, directly and indirectly by example, what is expected for workers of each gender at different ages and life stages and from different socioeconomic backgrounds (see Settersten and Owens 2002; Settersten and Ray 2010). Socialization processes thus foster gendered work identities as well as different preferences, expectations, values and motivations for women and men at different ages and from the same or different backgrounds (Preves and Mortimer 2013).

To understand behavior at any one life stage requires knowledge of prior processes of socialization. Heinz, for instance, describes young people's “biographical action orientation” (Heinz 1999, 2002a, b) that serves as a guide to behavior as they move into and through adulthood. As an example of the cumulative processes of early decisions, young women are less apt to take calculus in high school, a choice (reflecting earlier gender socialization) that has enormous implications in terms of their subsequent majors in college. This choice to opt out of high school calculus considerably reduces the odds that women will move into careers in engineering or the natural sciences, given that these occupations require training in mathematics, widely seen as a valued but male-typed task (Ceci and Williams 2010; Nosek et al. 2002).

Early socialization plays out throughout adulthood. In a 4-year (2000–2003) Norwegian study of an entering cohort of undergraduate students in varying professions, Daehlen (2005) found preferences for work to be deeply rooted in a person's early socialization, acquired well before the choice of a higher educational program and sustained through such programs. This study offers evidence that gendered preferences are formed well before the transition to adulthood.

But socialization processes are ongoing throughout the life course, continuing to shape adult beliefs, values and expectations (Mortimer and Simmons 1978; Preves and Mortimer 2013). Daehlen (2005) found that job values change with education, more or less in the same direction for male and female students (see also Johnson 2001). Goodwin and O'Connor (2005) reanalyzed data from interviews of young men (who

were ages 16–18 in 1962), following up with 94 re-interviews in 2001, finding that the career paths of the respondents they located were extremely gendered. Almost all the men had found jobs through male relatives, they all stressed making money as important, and reported that years ago the Youth Employment Office had steered them into traditionally male jobs.

Socialization processes change with changes in the larger opportunity structure of work, but remain shaped by existing outdated institutionalized templates. Thus, the cohort of women coming of age in the 1970s and 1980s rejected the feminine mystique, only to learn and embrace the *career* mystique instead. The women's movement became an important socializing force encouraging women to want and even demand "men's" jobs, "men's" career aspirations, and "men's" salaries and occupational achievements – as the path to gender equality. But the career mystique – that a lifetime of working hard always pays off in occupational and economic security and success – was a false myth, never accessible to most workers. And it was predicated on having *someone else* – a wife – to take care of all the details of daily living. Accordingly, feminists began to call for men to do their "fair share" of the unpaid family care work, only later recognizing that the structure and culture of paid work made doing so difficult for all workers, regardless of gender (England 2005; Hobson 2014; Kimmel 2008; Moen and Roehling 2005).

The feminine mystique is gone, although women are still socialized and allocated to the nation's care work for children and youth, communities, the disabled, and the older frail and infirm (Folbre 2001, 2012). The career mystique remains dominant in American culture, the epitome of independent adulthood, the accepted path of optimal adult development leading to success, fulfillment, and gender equality (Moen and Roehling 2005), even though young people are finding it hard to land secure jobs (Mortimer and Fischer forthcoming; Orrange 2007), midlife adults are stressed managing work and family roles (Sweet 2014) and older workers with long tenure are seeing their job and economic security

evaporate (Lippmann 2008). The result? Role conflicts, strains, time pressures and overloads for employees in demanding jobs and/or high occupational aspirations who also have family or personal goals, needs, and obligations (Damaske 2011; Hobson 2014; Moen et al. 2015; Stone 2007; Sweet 2014).

Contemporary twenty-first century cohorts of young workers – men and women – are being socialized to simultaneously both embrace and question the career mystique. Recall that socialization involves learning from observations. Many young people can no longer "see" the payoffs of following the lock-step career mystique path in light of corporate downsizing, mergers, and outsourcing, as well as the strains they observe in the lives of their parents' generation. Their beliefs about adulthood, gender equality and the path to success are often inconsistent, ambivalent, and vague (Moen and Orrange 2002; Mortimer and Fischer forthcoming; Mortimer et al. 2015; Orrange 2007).

Socialization is also subject to changes over the life course of an individual and their changing social networks (Liao and Cai 1995). For example, consider the transition to parenthood with the birth of a child. Becoming a parent cannot be understood separately from the taken-for-granted norms and scripts that define what it means to be a working mother or father. Mothers are (still) expected to do most of the child care and fathers are (still) expected to do most of the breadwinning, even though both are likely to be in the workforce (Hochschild 1997; Singley and Hynes 2005).

Adult opportunities still follow informal gender norms and expectations even though they are no longer formally regulated. Consider, as a case in point, educational socialization. On the surface, educational policies are gender-neutral. But Goodwin and O'Connor (2005) find that "schools reinforce different cultural values, dominant masculinity types, vocational preferences, and, via the curriculum, link types of knowledge and skills with masculinities and femininities" (p. 453). This accentuates men's traditional expectations and values about male adulthood as years of breadwinning and continuous, full-time

hard work (see also Moen and Roehling 2005; Orrange 2007; Townsend 2002).

As a result of both formal and informal learning (socialization), gender and age are, literally, in our heads, as “scripts” guiding behavior and expectations of self and others (Fenstermaker and West 2002). We develop age- and gender-related work and family stereotypes and values by hearing, seeing, and using polarizing language, categories, expectations, and assessments as short-hand heuristics and habits (Moen and Spencer 2006; Ridgeway and Smith-Lovin 1999; West and Zimmerman 1987). Consider, for example, the ways gender permeates how we think about and refer to work roles (e.g., about nurses, “where is she?” and physicians, “is he in yet?”), and divisions of labor (e.g., “driving trucks is a man’s job”). Gender and age as ways of categorizing and dividing behavior and beliefs, risks and resources combine to shape work roles and relationships in ways that seem “natural” (i.e., second nature). Beliefs about men’s greater status and competence implicitly shape the expectations of both men and women about their own competence and performance compared to others, independently of their actual underlying abilities (Ridgeway and Correll 2004).

5.2 Allocation

Second are *allocation* processes: the structural arrangements and power differences in groups, organizations and societies that open up some occupational possibilities for men or for women, while closing others through processes of gender (combined with race, ethnic, and age) stereotyping and discrimination (Acker 1992, 2006; Moen and Spencer 2006; Ridgeway and Correll 2004; Risman 1998; Williams 2000). Just as there are convoys of relationships (*social convoys* – see Kahn and Antonucci 1980) over the life course, so too are there convoys of rules, risks, and regulations (*institutional convoys*) that shape the distinctive work experiences of women and men. Institutional convoys give social relationships structure and meaning, even as they constrain options around education, work, family and

retirement (Moen 2013). These convoys promote and perpetuate disparities by social location (that is, by gender, age, social class, marital status, immigrant status, race and ethnicity). Social and institutional convoys also constitute sources of on-going socialization processes: they transmit to the next generation taken-for-granted norms and expectations about how adulthood should unfold – such as the incidence, timing, durations and trajectories of education, work career, and retirement paths.

Why is there still inequality – economic, political, social and interpersonal – between working women and men? Gender stratification is fundamentally about disparities by gender in economic power (Andersen 2005, 2009; Blumberg 1984; Blair-Loy 2009; Esping-Andersen 2009). Serguino (2007) argues that socialization forces in the form of gender ideology, norms and stereotypes reinforce material inequality between women and men thereby reinforcing the gender stratification (allocation) system.

These allocation processes – institutional arrangements that stratify women and men by their gender – are even more important than socialization processes. Kohn and Schooler (1983) define stratification as the hierarchical distribution of power, privilege, and prestige. Groups and organizations of all types allocate roles, risks, resources and relationships – along with power – based on a range of factors. The allocation of power, privilege and prestige in society and in organizations depends on one’s social background, race and ethnicity, educational achievement, and occupational level, of course, but also on the combination of age and gender (See Andersen 2005, 2009; Hobson 2014; Kimmel 2008; Kramer 2011; McCall 2001; Rothman 1979).

The difference between gender socialization and allocation is this: Gender socialization is about *learning gender*, fostering differences in women’s and men’s beliefs, values, and identities. Gender allocation is about *dividing by gender*, stratifying positions, power and material resources by whether one is male or female. These are two systematic ways that roles, resources and rewards are distributed,

perpetuating gender inequality. This takes place in large part because labor market and business rules, routines, and regulations serve to structure the adult course in gendered ways.

The notion of “career” implies an organizational ladder to be climbed, but it also stands for institutionalized life paths involving a series of choice processes (Sweet and Moen 2012). As Barley (1989; p. 49) points out, the career concept can be used as a “lens for peering at larger social processes known as institutions.” Consider, for example, the implicit contracts between employers and employees and between family members regarding divisions of labor (at home and at work), job security, and job progression. All of these “contracts” color individuals’ views of their experiences both at home and at work, affecting their habits, choices, and strategies of action (Bourdieu 1984; Swidler 1986).

What many contemporary workers are experiencing is the dissolution of these contracts, with no clear-cut alternatives replacing them. The challenge is to develop more flexible institutions, a range of legitimated paths through work and the adulthood, opening up opportunities to customize education, work and career paths across the life course.

5.3 Strategic Selections

Third are *strategic selections*: women and men choose to enter or exit the labor market or particular occupations and not others at different points in their lives (Moen and Chermack 2005; Moen and Chesley 2008; Moen and Wethington 1992). But these are constrained choices (Bird and Rieker 2008; England 2005; Esping-Andersen 2009; Hobson 2014; Kimmel 2008; Moen 2013). Individuals learn the institutionalized nature of work and the life course through socialization and allocation processes. Then they act accordingly.

Thus, existing institutionalized arrangements shape decision making by providing individual women and men at different life stages with “available lists of reasons, motives, and aspirations” for decision-making (Meyer 1986, p. 205),

such as expectations regarding education, parenthood, employment, and retirement (see also Altucher and Williams 2003; Brines and Joyner 1999; Carr 1997; Chesley and Moen 2006; Clausen 1995; Cooney and Mortimer 1999; Freund 1997; Gerson 1985; Han and Moen 1999a, b; Moen et al. 2005, 2006; Pixley and Moen 2003; Wethington et al. 2003).

The “career” concept is useful for understanding both paid and unpaid work over the life course, since it incorporates a range of ideas from different perspectives, including transitions and trajectories, individuals and organizations, and subjective identities as well as objective paths. It is also a useful frame for linking the strategic selections by individuals and families with large-scale institutionalized (and sometimes changing) policies, practices, and norms in work organization and society.

Today, especially in light of increasing longevity, technological advances, shifting gender values, a changing workforce, and a globalized economy, much of the existing infrastructure around work and the life course is now obsolete. In light of this moving platform of social change, how can workers plan for their uncertain futures? Take the case of younger workers trying to launch their careers, mid-life workers worried about layoffs as well as struggling to manage multiple obligations, or older workers considering leaving their career jobs or the workforce altogether. Millennials, genXers and boomers are finding themselves in a world vastly different from that experienced by their parents at their same ages (Carr and Manning 2010; Hochschild 2012; Moen 2003a, b; Mortimer and Fischer *forthcoming*).

For instance, contemporary older workers confront more risk and uncertainty related to both when they retire from their career jobs and when they exit the labor market altogether. Many older workers are developing their expectations about retirement with the backdrop of corporate downsizing and increasing job and economic insecurity (Moen 2012; Moen et al. 2010; Moen et al. *Forthcoming*; Sweet and Moen 2012). In 2014, the average age of complete retirement from the labor force among U.S. workers was

around age 62. Exiting their career jobs often occurs even earlier, meaning that contemporary workers can expect to spend a significant portion of their life course in encore adulthood (see Moen and Flood 2013; Mortimer and Moen [this volume](#)), thinking about or trying to fashion second chapters or “encore” careers in paid or unpaid work. Unlike previous generations, for whom retirement exits were fixed according to public and private policies, contemporary workers are exercising considerable discretion in the timing of their exits from career jobs (or else are laid off or finding themselves encouraged to take early buyouts). By contrast, for their parents (mostly fathers) the retirement transition was not so much an uncertain or risky event as it was a normative and routinized inevitability.

Women and men live distinctive work lives because they develop different preferences (Becker 1981; Hakim 2004) as a result of bringing different expectations and values (socialization) to each fork in the occupational life course. Moreover, each fork in the occupational life course is stratified by gendered and age-graded cultures and biases allocating women and men to different opportunities, risks, and constraints (allocation). Even whether or not adults perceive that there is in fact a “fork in the road” (decision point) sometimes depends on their gender. Choosing which occupational path or transition to take (strategic selections) is guided by both socialization and allocation processes that persist across the life course through ongoing social relationships and institutionalized work, educational, organizational, and occupational regimes (England 2005; Moen 2013; Person et al. 2005) that promote or reduce a sense of agency (Hitlin and Elder 2007a, b; Hobson 2014).

Large-scale transformations render existing scripts (learned through socialization and allocation processes) out of date, opening up new or closing down opportunities to women and/or men. Wars, economic dislocations, technological innovations, and social movements, for example, can transform educational, job, career, age, and gender strategies, as can changes in social policies and regulatory practices (Elder 1974; Moen and Roehling 2005; Mortimer and Fischer [forth-](#)

[coming](#); Schneider and Stevenson 1999; Settersten et al. 2001; Shanahan 2000; Vuolo et al. 2013).

The twenty-first century is just such a time of social transformation. Demographic, cultural, economic, and technological changes are rewriting the nature of work, education/career/retirement paths and the gendered life course. Still, the fundamental mismatch between outdated scripts and new realities perpetuates gender as well as class/ race/ethnic and age inequalities. Needed are a wider pool of institutionalized options and protections from the risks of employment and economic insecurity for workers of all ages and life stages.

6 Conclusions: Advancing Scholarship and Policy

Work and careers are what Pearlin (1988; p. 259) describes as “durable arrangements” that serve to “organize experience over time.” In turn, it is precisely this organized experience that “is the basis for how we see the world around us, how we think about it and act toward it.” Americans in particular equate success and productivity with paid work. And, as noted throughout, society and the economy in all developed nations are ordered around full-time jobs, full-time workers, and continuous careers, as are organizations, communities, and families. These rigid structures and cultures offer few options, even as work intensification and job insecurity ratchet up uncertainty (Burchell et al. 2002; Smith 2001; Uchitelle 2007).

Historical trends, along with other demographic, social and technological transformations, call for new definitions, clocks, and calendars of work and career paths and new structures promoting productive engagement at all life-course stages. Recall the concept of career is most typically defined as a series of positions, an orderly and hierarchical progression up an occupational status ladder. Individuals experiencing uneven or downward pathways are seen as deviant, less committed to their jobs, and reaping fewer economic or psychic rewards (Kalleberg

2011; Wilensky 1961). But this formulation contains a number of hidden assumptions – about the nature of the life course, jobs, and social relations. These interrelated assumptions constrain both innovative scholarship and innovations in work redesign and alternative career paths.

6.1 Assumption 1: The Primacy of Paid Work as Key to Identity and Fulfillment

Americans in particular equate “success” with occupational status and career mobility in the form of rising occupational prestige and high incomes. Employment is not only a central role in American society, it is virtually isomorphic with contemporary notions of productivity and achievement. For men, success has been about climbing occupational ladders, accruing along the way money, power, and prestige. In the past, for women, success was cast as marrying a man with these resources (Clausen and Gilens 1990). Both work and the workforce have changed, and yet achievement and productivity continue to be characterized in terms of occupational trajectories. This characterization renders *unpaid* work – at home, in the community – discounted, literally, in national economic indexes (e.g., the unemployment rate, the gross national product) and in self-assessments (e.g., I am only a housewife; I am just a volunteer).

One important contribution of the social sciences is in clarifying the relationships between structured experience and self-concepts (e.g. Gecas 2003; Mortimer et al. 2015). Going to college, getting a job, marrying, having a child, serving in the military, being laid off, retiring – all change identities – how people see themselves, and how others see them. There is insufficient scholarship on how work exits and entrances as well as their duration, timing, and expectedness shape self-concepts and feelings of mastery or control for those at different life stages.

The Matthew Effect, the idea that the rich get richer and the poor get poorer, which is the basis for the cumulative advantage/disadvantage the-

ory (Dannefer 2003; Ferraro and Shippee 2009), is about existing disparities that cumulate over time. But there are also age-based disparities that accompany growing older, even for those previously advantaged. This is a result of past institutionalization of later adulthood as a distinctive stage of the life course, separated from “prime” adulthood through images, meanings and values (culture) and social organization (structure) that serve to create and sustain social group distinctions (see as “senior,” “the aged,” “pensioners,” “retirees,” the “young-old,” the “old-old.”

Whether the age-boundaries around these groupings are becoming more blurred, and whether they are more or less blurred for individuals differentially located in the social structure (such as by gender, class, race and ethnicity) are important theoretical and empirical questions for future scholarship. Whether later adulthood is being further divided into “encore adulthood” and “old age” stages of the life course is also a key topic for investigation (see Mortimer and Moen [this volume](#)). The answers may well turn on labor market, income support, and residential policies, as well as the health and disability statuses and family circumstances of individuals within particular subgroups of the population.

To understand individuals and organizational behavior requires investigation of institutional contexts that not only define appropriate behavior but also provide explanations or accounts of that behavior (Friedland and Alford 1991; Sewell 1992). Sometimes there is loose coupling or decoupling (deliberate disconnects) between means and goals (Boxenbaum and Jonsson 2008).

Attention to meaning and values is also crucial to the study of work and occupational transitions, in order to understand age-graded behavior (such as workforce exits) as voluntary or involuntary, expected or unexpected. Thus a retirement exit can be a passage to (well-deserved) leisure, the unwanted result of downsizing, or a desired second chance, a transition to a new career.

For most adults, paid work is a major, if not the principal, source of purposive activity, social relations, independence, identity, and self-respect. The role of worker is the way that we become integrated and acknowledged as adult

members of the larger community. But this ignores the importance – and valuing – of family and personal experiences and civic engagement. It is also based on a mid-twentieth century model of work, fashioned for those without personal and family needs, goals, and obligations and no longer has the primacy it once had (Matos and Galinsky 2012).

Understanding paid work requires attention to the meaning, measurement, and management of *time* over the life course of individuals, families, and organizations. Sensitivity to timing underscores the need to locate work lives in institutional and organizational as well as historical and biographical contexts, accentuating age, cohort, period, and gender differences and disparities, but also within-gender, within age, within cohort, and within-period inequalities between those in low-wage and high-wage work (as well as through the exclusion of some from employment).

6.2 Assumption 2: The Male Experience as Template

The use of the career concept is heavily biased toward the experience of men, not women (Bem 1994). Thus, “career” commonly refers to moving through a series of (related) jobs over the life course, the typical experience of men in the second half of the last century. Men’s work can be subdivided into organizational careers – moving up internal ladders within a corporation – and occupational careers – moving up internal ladders within professions. But when women are the focus, the career concept is typically constrained to a more narrow definition, referring to their remaining in, or moving in and out of, the labor force in tandem with shafting family care obligations.

But from the 1970s on, people have earned their living in a workforce comprised of both men and women. Yet we continue to hold men and women to a male career trajectory, a path that, in reality, is increasingly available to ever fewer men or women. Thus far, the gender revolution has focused on rendering men’s career

paths open to women, with the (male) career mystique the taken-for-granted model. Women use it to gauge their own experiences, as do their colleagues and bosses. But this model does not fit unless women relinquish their traditional family responsibilities as nurturers and caregivers on the domestic front. Increasingly, the model does not fit men’s experiences either (Gerson 2010). Men have been able to follow the conventional career model precisely because (1) they did not shoulder much of the family care work responsibilities, and (2) the employer-employee contract provided internal labor markets and avenues for occupational mobility.

The potential significance of one’s career course for subsequent life quality was first examined by Wilensky in the 1950s. In his classic study, Wilensky (1961) investigated the “orderliness” of men’s careers, defining “disorderly” careers as having a series of functionally and hierarchically unrelated jobs for at least four fifths of their work history. He found that men who had orderly careers were more likely (1) to have strong attachments to their communities and greater participation in community activities, (2) to integrate work and non-work roles more, and (3) to maintain friendships over longer periods of time, as compared to men with disorderly careers. Since social integration has been shown to be related to later-life health and well-being (Moen et al. 1989, 1992) having had a disorderly work career may also be negatively related to retirement quality.

Unfortunately, Wilensky, as well as other scholars who have examined employment history and well-being (e.g., Pavalko et al. 1993), focused exclusively on men’s career trajectories. But in point of fact, women are more apt to have disorderly careers than are men. Given the primacy of their traditional family roles, women’s career patterns are often characterized as “erratic,” “uneven,” or “chaotic,” with marriage and children often obstacles or at least interruptions in their employment histories, and changes in family responsibilities often requiring women to move in and out of the labor force and in and out of part-time work (Moen 1985). Men’s traditional roles as breadwinners has meant that career

interruptions have been far less common for them. Thus, despite changes in women's labor force participation in the second half of the twentieth century, men's employment histories continue to look more orderly than women's.

In the 1970s, Spillerman (1977) described the construction of typologies based on empirical regularities in actual career lines (see also Kanter 1977). We need empirical accounts of contemporary twenty-first century career paths – men's and women's, as well as the joint paths of husbands and wives. The need for new career typologies empirically derived and grounded in community, family, organizational and societal contexts, is becoming increasingly self-evident (Hobson 2014).

6.3 Assumption 3: The Inevitability of the Lock-Step Life Course

A regime of twentieth century social and organizational policies and practices have created, reinforced and perpetuated different life courses for men and women. First were efforts to institutionalize life into segments predicated on middle-class men's experiences. In fact, the very notion that adulthood consists of distinctive and identifiable paths is a product of primarily mid-twentieth century policies and practices developing in Europe and America around the institutions of education, employment, and retirement (see Hobson 2014; Kohli 1986a, b; Marshall et al. 2001; Meyer 1986; Moen 2013; Shanahan et al. 2002). Recall that in the middle of the twentieth century, educational, employment, and pension legislation and regulation forged a *lock-step life course*, consisting of first full-time public education as preparation for adult roles, then an adulthood of continuous, full-time employment, followed by full-time leisure during the "golden years" of retirement. This adult path of continuous, full-time, year-round employment, bracketed by schooling at one end and retirement (or death) at the other, became institutionalized and taken for granted (Moen 2012, 2013; Moen and Roehling 2005). In the U.S., government policies – Social Security, Unemployment Insurance, Medicare, disability regulations, the

Fair Labor Standards Act – all took as a "given" both the lock-step path of (men's) continuous, full-time employment and the breadwinner-homemaker gender divide. These policies, together with regulations guiding business practices, constitute an *age-graded* regime giving structure to the life course: the shared understandings and taken-for-granted rules, roles, relationships, resources and risks associated with adulthood at different ages and life stages. Education, employment and retirement have served (together with marriage and parenting) to structure virtually all aspects of the adult life course, with retirement frequently a marker of old age. And yet this lock-step sequence of education, employment, and retirement is obsolete, a cultural relic of a society that no longer exists.

What is required by scholars and leaders is a thoughtful reappraisal of existing life patterns and examination of alternatives to the existing lock step. This could lead to a reconfiguration of the life course in ways that create more employment and educational options and more variety for both men and women in youth, early adulthood, midlife, and encore adulthood. A key question for policy and research is: How do we respond to institutional inertia? How can we change the clocks and calendars of work and the lock step life course to better fit the realities of today's – and tomorrow's – workforces, families, and economies?

6.4 Assumption 4: The Individual as Focal Point

Workers are typically thought of as individuals without family responsibilities or constraints, much less other interests or values, and their careers are similarly defined as reflecting the individual's mobility patterns. But family and personal considerations and values increasingly intrude on the work weeks and career paths of both men and women, as do considerations and resources associated with a spouse's career, children's schooling, and aging parents' needs as well as those of coworkers and supervisors. This

conforms to the life course notion of linked lives, suggesting the importance of couples or households or work teams as appropriate units of analysis or else key contexts in investigating and understanding work over the life course.

And yet existing rhythms, clocks and calendars of work and occupational careers remain based on the presumption that employees have no family responsibilities, and often that workers are not embedded in work groups and social networks. But social relationships matter, even though this is less blatant than in the 1950s when organizations frequently interviewed the wives of job candidates to ensure that they too were dedicated to their husband's upward career mobility. As Liljeström et al. (1978, p. 105) pointed out, "When industrialization separated homes from workplaces the men's contacts with children were diminished. Childhood ended up in 'women's territory.' The child formed more and more the core of 'meaning' in the married woman's life.... No wonder, then that the mother came to be chained to a pedestal of indispensability.... Each parent developed a specialty: the one became a Mother, the other a Breadwinner." Middle-class breadwinners had someone at home to do the domestic work of the household as well as the emotional work of family relationships. But absent hiring out the nurturing of family relationships (Hochschild 2012), it is hard for contemporary workers – men or women – to manage the competing pressures for time, energy, commitment, and attention between work and family. As boomers move through their 50s, 60s, and 70s the care of aging parents and other relatives, including ailing spouses, will only accentuate the disjuncture between the reality of their work lives and their own (as well as others') expectations.

Middle-class families in the 1950s, 1960s, and 1970s could afford one career to a family. Breadwinners who did well in their careers did well for their families (Becker 1981; Newman 1993). For contemporary workers to attain or maintain their desired standard of living most frequently requires two incomes.

Contemporary gender inequalities are in large part the result of the fact that jobs remain struc-

tured for breadwinners with homemakers, even though neither men nor women are apt to have such back up. Family goals and obligations continue to shape women's lives even though most are entrenched in the workforce (Carr 1997; Garey 1999; Gerson 2010; Han and Moen 1999a, b, 2002; Ridgeway and Correll 2004). When couples have children, therefore, it is women's wages and career progression that suffers (Correll et al. 2007; Staff and Mortimer 2012). Thus the social organization of the life course typically produces diverging pathways for men and women (Crompton 1999; Hobson 2014; Moen and Roehling 2005) fostering work-family conflicts and strains for women and their families (see Kelly et al. 2008). The life course as an institution allocating roles and resources over time is also replete with informal norms, including those held by work teams and social networks, that shape women's and men's cognitive assessments, their "ambitions, stock-taking, and self-image at various times during their lives" (Krüger and Baldus 1999 p. 356; see also Altucher and Williams 2003; Becker and Moen 1999; Blossfeld and Huinik 1991; Moen and Orrange 2002; Townsend 2002).

Contemporary strategies for dealing with the time crunch frequently involve women cutting back hours on the job and, often, career prospects. But the larger issue of integrating work life with home life is occurring in an economic climate of reduced opportunity for mobility for both men and women, at a time when the male template for success fits ever fewer workers, regardless of gender. Key topics for future research: How can the values of individual achievement and success be reconciled with familistic values? Can organizational career patterns accommodate to the shifting personal needs, goals, and interests of workers over the life course? Are there sustainable and flexible career paths and coworker relationships that promote life quality, organizational effectiveness and gender equality?

The temporal organization of jobs and career paths institutionalized in public and corporate policies and practices limits employee control

and flexibility in arranging their daily schedules, as well as their control and flexibility over arranging their career paths and achieving within couple gender equality. Moreover, wider options in the young adult and encore adult years (see Mortimer and Moen [this volume](#)) are difficult if not impossible without the development of greater career and schedule flexibilities in the clockworks of workdays, workweeks, work years, and work lives (Kelly and Moen [2007](#)). Needed are work redesigns that provide workers with greater flexibility and control over their time (Kelly et al. [2011, 2014](#); Kossek et al. [2014](#); Moen et al. [2011a](#)). Without such fundamental work redesign, the only way to gender equality seems to be for young and middle-aged women and men alike to function as if they have no obligations outside of their jobs and for older workers to make special arrangements with their employers for shifting gears or else fashion their own second chapters.

6.5 What's Next?

There are two ways to change the gender and age stratification systems as well as the structural lag around work and career paths, from the top down and from the bottom up. Some argue that you have to first change beliefs, norms and stereotypes and then concrete changes will appear (such as equitable income). Others suggest that changing gender- and age-graded systems and structures leads to corresponding changes in gender and age stereotypes, beliefs and norms (Hobson [2014](#); Moen [2013](#); Serguino [2007](#)). In reality both are needed, but institutional inertia suggests the importance of building more flexible institutions that are more relevant to the changing nature of work and the workforce.

DiMaggio and Powell ([1991](#)) point to the way institutional arrangements channel social choices. Organizational and occupational ladders provide a common understanding of social mobility and an identifiable pattern of progression through the work course. But this common understanding

represents a set of practices and policies that no longer fit with the realities of a changing economy, changing gender roles, blurred lines between education, work and retirement, and cohorts of educated, introspective boomers, genXers, and millennials. Many of these coexisting members of contemporary cohorts value their personal and family lives and flexible yet meaningful work more than occupational achievement, yet they are uncertain as to how to fit the pieces of their lives together in an unsettled global climate that individualizes the risks of employment and economic insecurity. Required are new institutional arrangements for more flexible and sustainable work and occupational careers for those with personal or family interests, goals, and obligations.

Employers, policy makers, thought leaders, scholars, and individuals have yet to achieve consensus as to what the nature of twenty-first century work, careers, education, and retirement will be, or how to restructure the education-work, work-family, or work-retirement interfaces. Yet current assumptions and practices seem increasingly outmoded and inappropriate. The absence of consensus about new ways to work, learn, and retire means that workers continue to confront structural lags in the shape and structure of the life course. The mismatch between outdated rules and updated but ambiguous realities is producing a sense of *ambivalence* about current and future ways of working (see also Bourdieu [1984](#); Lüscher and Pillemer [1998](#); Mortimer et al. [2015](#); Orange [2007](#); Sutor and Pillemer [1994](#)).

The research and policy challenge is to rewrite the scripts of the ideal worker and “good” jobs that reflect today’s, not yesterday’s realities (Hobson [2014](#); Williams [2000](#); Williams and Dempsey [2014](#)). Both scholars and organizational as well as public policy makers need to rethink and fashion flexible and sustainable alternative clockworks, calendars, and pathways of work that take into account heightened insecurity and the new individualization of risk, the heterogeneous workforce, and the evolving and variegated twenty-first century life course.

References

- Acker, J. (1992). Gendered institutions: From sex role to gendered institutions. *Contemporary Sociology*, 21, 565–569.
- Acker, J. (2006). Inequality regimes: Gender, class, and race in organizations. *Gender & Society*, 20(4), 441–464.
- Altucher, K., & Williams, L. B. (2003). Family clocks: Timing parenthood. In P. Moen (Ed.), *It's about time: Couples and careers* (pp. 49–59). Ithaca: Cornell University Press.
- Andersen, M. L. (2005). Thinking about women: A quarter century's view. *Gender & Society*, 19(4), 437–455.
- Andersen, M. L. (2009). *Thinking about women: Sociological perspectives on sex and gender* (8th ed.). Boston: Allyn & Bacon.
- Aronson, P., & Mortimer, J. T. (2013). Subjective preferences versus objective realities: Voices of full-and part-time employed mothers. In P. N. Claster & S. L. Blair (Eds.), *Visions of the 21st century family: Transforming structures and identities* (pp. 185–211). Bingley: Emerald Group Publishing.
- Ashby, J. S., & Schoon, I. (2010). Career success: The role of teenage career aspirations, ambition value and gender in predicting adult social status and earnings. *Journal of Vocational Behavior*, 77, 350–360.
- Barley, S. R. (1989). Careers, identities, and institutions: The legacy of the Chicago School of Sociology. In M. B. Arthur, D. T. Hall, & B. S. Lawrence (Eds.), *Handbook of career theory* (pp. 41–65). New York: Cambridge University Press.
- Beck, U. (1992). *Risk society*. Newbury Park: Sage.
- Becker, G. S. (1981). *A treatise on the family*. Cambridge, MA: Harvard University Press.
- Becker, P. E., & Moen, P. (1999). Scaling back: Dual-earner couples' work-family strategies. *Journal of Marriage and the Family*, 61(4), 995–1007.
- Becker, H. S., & Straus, A. L. (1956). Careers, personality, and adult socialization. *American Journal of Sociology*, LXII(3), 253–263.
- Bem, S. L. (1994). *The lenses of gender: Transforming the debate on sexual inequality*. New Haven: Yale University Press.
- Berkman, L. F., Kawachi, I., & Glymour, M. M. (2014). *Social epidemiology*. New York: Oxford University Press.
- Bird, C. E., & Rieker, P. P. (2008). *Gender and health: The effects of constrained choices and social policies*. New York: Cambridge University Press.
- Blair-Loy, M. (2003). *Competing devotions: Career and family among women executives*. Cambridge, MA: Harvard University Press.
- Blair-Loy, M. (2009). Work without end? Scheduling flexibility and work-to-family conflict among stockbrokers. *Work and Occupations*, 36, 279–317.
- Blossfeld, H. P., & Drobníč, S. (2002). *Careers of couples in contemporary societies: From male breadwinner to dual earner families* (pp. 201–231). Oxford: Oxford University Press.
- Blossfeld, H. P., & Hofmeister, H. (2008). *Globalization, uncertainty and women's careers: An international comparison*. Cheltenham: Edward Elgar.
- Blossfeld, H. P., & Huinik, J. (1991). Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation. *American Journal of Sociology*, 97, 143–168.
- Blossfeld, H. P., Buchholz, S., Bukodi, E., & Kurz, K. (2008). *Young workers, globalization and the labor market*. London: Edward Elgar.
- Blumberg, R. L. (1984). A general theory of gender stratification. *Sociological Theory*, 2, 23–101.
- Blustein, D. L. (2008). The role of work in psychological health and well-being: A conceptual, historical, and policy perspective. *American Psychologist*, 63, 228–240.
- Bosma, H., Stansfield, S. A., & Marmot, M. G. (1998). Job control, personal characteristics, and heart disease. *Journal of Occupational Health Psychology*, 3, 402–409.
- Bourdieu, P. (1984). *Distinction*. Cambridge: Harvard University.
- Boxenbaum, E., & Jonsson, S. (2008). Isomorphism, diffusion and decoupling. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin (Eds.), *Sage handbook of organizational institutionalism* (pp. 78–98). London: Sage.
- Brines, J., & Joyner, K. (1999). The ties that bind, principles of cohesion in cohabitation and marriage. *American Sociological Review*, 64(3), 333–355.
- Brückner, H., & Mayer, K. U. (2005). De-standardization of the life course: What it might mean? And if it means anything, whether it actually took place? *Advances in Life Course Research*, 9, 27–53.
- Budig, M. J., & England, P. (2001). The wage penalty for motherhood. *American Sociological Review*, 66, 204–225.
- Burchell, B., Ladipo, D., & Wilkinson, F. (2002). *Job insecurity and work intensification*. New York: Routledge.
- Cahill, K. E., Giandrea, M. D., & Quinn, J. F. (2005). *Are traditional retirements a thing of the past?: New evidence on retirement patterns and bridge jobs*. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics.
- Carr, D. (1997). The fulfillment of career dreams at midlife: Does it matter for women's mental health? *Journal of Health and Social Behavior*, 38, 331–344.
- Carr, D. C., & Manning, L. K. (2010). A new paradigm for qualitative research in the United States: The era of the third age. *Qualitative Sociology Review*, VI(1), 16–33.
- Ceci, S. J., & Williams, W. M. (2010). *The mathematics of sex: How biology and society conspire to limit talented women and girls*. New York: Oxford University Press.
- Cheng, Y., Kawachi, I., Coakley, E. H., Schwartz, J., & Colditz, G. (2000). Association between psychosocial work characteristics and health functioning in

- American women: Prospective study. *British Medical Journal*, 320(7247), 1432–1436.
- Chesley, N., & Moen, P. (2006). When workers care: Dual-earner couples' caregiving strategies, benefit use, and psychological well-being. *American Behavioral Scientist*, 49(9), 1248–1269.
- Clausen, J. (1995). Gender, contexts, and turning points in adults' lives. In P. Moen, G. H. Elder Jr., & K. Lüscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 365–392). Washington, DC: American Psychological Association.
- Clausen, J. A., & Gilens, M. I. (1990). Personality and labor force participation across the life course: A longitudinal study of women's careers. *Sociological Forum*, 5, 595–618.
- Cooney, T. M., & Mortimer, J. T. (1999). Family structure differences in the time of leaving home: Exploring mediating factors. *Journal of Research on Adolescence*, 9(4), 367–376.
- Correll, S. J., Benard, S., & Paik, I. (2007). Getting a job: Is there a motherhood penalty? *American Journal of Sociology*, 112(5), 1297–1338.
- Crompton, R. (1999). *Restructuring gender relations and employment: The decline of the male breadwinner*. Oxford: Oxford University Press.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper Collins Publishers.
- Daehlen, M. (2005). Change in job values during education. *Journal of Education and Work*, 18(4), 385–400.
- Damaske, S. (2011). *For the family? How class and gender shape women's work*. New York: Oxford University Press.
- Dannefer, D. (2003). Cumulative advantage/disadvantage and the life course: Cross-fertilizing age and social science theory. *Journal of Gerontology*, 58(6), 327–337.
- Davis, G. F. (2009). *Managed by the markets: How finance re-shaped America*. Oxford: Oxford University Press.
- de Jonge, J., Bosma, H., Peter, R., & Siegrist, J. (2000). Job strain, effort-reward imbalance and employee well-being: A large-scale cross-sectional study. *Social Science & Medicine*, 50(9), 1317–1327.
- DiMaggio, P. J., & Powell, W. W. (1991). Introduction. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.
- Dwyer, D. J., & Ganster, D. C. (1991). The effects of job demands and control on employee attendance and satisfaction. *Journal of Organizational Behavior*, 12(7), 595–608.
- Elder, G. H., Jr. (1974). *Children of the great depression*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1994). Time, human agency, and social change: Perspectives on the life course. *Social Psychology Quarterly*, 57, 4–15.
- Elder, G. H., Jr. (1996). Human lives in changing societies: Life course and developmental insights. In R. B. Cairns, G. H. Elder Jr., & E. J. Costello (Eds.), *Developmental science* (pp. 31–62). New York: Cambridge University Press.
- Elder, G. H., Jr. (1998). The life course as development theory. *Child Development*, 69(1), 1–12.
- Elder, G. H., Jr., & George, L. (forthcoming). Age, cohort, and the life course. In M. J. Shanahan, J. T. Mortimer, & M. K. Johnson (Eds.), *Handbook of the life course*. New York: Springer.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer Academic/Plenum Publishers.
- Elsass, P. M., & Veiga, J. F. (1997). Job control and job strain: A test of three models. *Journal of Occupational Health Psychology*, 2(3), 195–211.
- England, P. (2005). Gender inequality in labor markets: The role of motherhood and segregation. *Social Politics*, 12, 264–268.
- Esping-Andersen, G. (2009). *The incomplete revolution: Adapting to women's new roles*. Cambridge: Polity Press.
- Fan, W., & Qian, Y. (2015). Long-term health and socioeconomic consequences of early-life exposure to the 1959–1961 Chinese famine. *Social Science Research*, 49, 53–69.
- Fenstermaker, S., & West, C. (2002). *Doing gender, doing different: Inequality, power, and institutional change*. New York: Routledge.
- Fernandez, R. M., & Sosa, M. L. (2005). Gendering the job: Networks and recruitment at a call center. *American Journal of Sociology*, 111(3), 859–904.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49(3), 333–343.
- Folbre, N. (2001). *The invisible heart: Economics and family values*. New York: New Press.
- Folbre, N. (2012). *For love and money: Care provision in the U.S.* New York: Russell Sage.
- Freund, A. M. (1997). Individuating age salience: A psychological perspective on the salience of age in the life course. *Human Development*, 40, 287–292.
- Friedan, B. (1963). *The feminine mystique*. New York: Bantam Doubleday Dell.
- Friedland, R., & Alford, R. A. (1991). Bringing society back in: Symbols, practices, and institutional contradictions. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232–263). Chicago: University of Chicago Press.
- Fullerton, A. S., & Wallace, M. (2007). Traversing the flexible turn: U.S. workers' perceptions of job security, 1977–2002. *Social Science Research*, 35(1), 201–221.
- Gangl, M., & Ziefle, A. (2009). Motherhood, labor force behavior and women's careers: An empirical assessment of the wage penalty for motherhood in Britain,

- Germany and the United States. *Demography*, 46(2), 341–369.
- Garey, A. I. (1999). *Weaving work and motherhood*. Philadelphia: Temple University Press.
- Gecas, V. (2003). Self-agency and the life course. In J. T. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 369–388). New York: Kluwer Academic/Plenum Publishers.
- George, L. K. (1993). Sociological perspectives on life transitions. *Annual Review of Sociology*, 19, 353–373.
- George, L. K. (2003). Life course research: Achievements and potential. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 671–680). New York: Kluwer Academic/Plenum Publishers.
- George, L. K. (2014). Taking time seriously: A call to action in mental health research. *Journal of Health and Social Behavior*, 55(3), 251–264.
- Gerson, K. (1985). *Hard choices: How women decide about work, career, and motherhood*. Berkeley: University of California Press.
- Gerson, K. (2010). *The unfinished revolution: How a new generation is reshaping family, work, and gender in America*. New York: Oxford University Press.
- Glavin, P. (2013). The impact of job insecurity and job degradation on the sense of personal control. *Work and Occupations*, 40, 115–142.
- Goodwin, J., & O'Connor, H. (2005). Engineer, mechanic or carpenter? Boys' transitions to work in the 1960s. *Journal of Education and Work*, 18(4), 451–471.
- Graebner, W. (1980). *A history of retirement*. New Haven: Yale University Press.
- Hagestad, G. O., & Neugarten, B. L. (1985). Age and the life course. In R. H. Binstock & E. Shanas (Eds.), *Handbook of aging and the social sciences* (pp. 35–61). New York: Van Nostrand Reinhold.
- Hakim, C. (2004). *Key issues in women's work: Female diversity and the polarization of women's employment*. London: TheGlassHouse.
- Hall, D. T. (2004). The protean career: A quarter-century journey. *Journal of Vocational Behavior*, 53, 1–13.
- Han, S. K., & Moen, P. (1999a). Work and family over time: A life course approach. *The Annals of the American Academy of Political and Social Sciences*, 562, 98–110.
- Han, S. K., & Moen, P. (1999b). Clocking out: Temporal patterning of retirement. *American Journal of Sociology*, 105, 191–236.
- Han, S. K., & Moen, P. (2002). Coupled careers: Pathways through work and marriage in the United States. In H. Blossfeld & S. Drobnič (Eds.), *Careers of couples in contemporary societies: From male breadwinner to dual earner families* (pp. 201–231). Oxford: Oxford University Press.
- Harrington Meyer, M. (2014). *Grandmas at work: Juggling families and jobs*. New York: New York University Press.
- Heinz, W. R. (1999). *From education to work: Cross-national perspectives*. New York: Cambridge University Press.
- Heinz, W. R. (2002a). Transitional discontinuities and the biographical shaping of early work careers. *Journal of Vocational Behavior*, 60, 220–240.
- Heinz, W. R. (2002b). Self-socialization and post-transitional society. *Advances in Life Course Research*, 7, 41–64.
- Heinz, W. R. (2003). From work trajectories to negotiated careers: The contingent work life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 185–204). New York: Kluwer Academic/Plenum Publishers.
- Heinz, W. R., & Marshall, V. W. (2003). *Social dynamics of the life course: Transitions, institutions, and inter-relations*. Weinheim: Deutscher Studien Verlag.
- Hemingway, H., & Marmot, M. (1998). Psychosocial factors in the primary and secondary prevention of coronary heart disease: A systematic review. In S. Yusuf, J. Cairns, J. Camm, E. Fallen, & B. Gersch (Eds.), *Evidence based cardiology* (pp. 269–285). London: BMJ Publishing Group.
- Hill, R., Tranby, E., Kelly, E. L., & Moen, P. (2013). Relieving the time squeeze? Effects of a white-collar workplace change on parents. *Journal of Marriage and Family*, 75, 1014–1029.
- Hitlin, S., & Elder, G. H., Jr. (2007a). Agency: An empirical model of an abstract concept. *Advances in Life Course Research*, 11, 33–67.
- Hitlin, S., & Elder, G. H., Jr. (2007b). Time, self, and the curiously abstract concept of agency. *Sociological Theory*, 25, 170–191.
- Hobson, B. (2014). *Worklife balance: The agency and capabilities gap*. New York: Oxford University Press.
- Hochschild, A. R. (1997). *The time bind: When work becomes home and home becomes work*. New York: Metropolitan Books.
- Hochschild, A. R. (2012). *The outsourced self: Intimate life in market times*. New York: Henry Holt and Company, LLC.
- Hughes, E. C. (1958). *Men and their work*. Glencoe: Free Press.
- Institute for Women's Policy research. (2005a, June). *Women and social security: Benefit types and eligibility* (IWPR Publication No. D463). Washington, DC.
- Institute for Women's Policy research. (2005b, August). *The gender wage ratio: Women's and men's earnings* (IWPR Publication No. C350). Washington, DC.
- Jahoda, M. (1982). *Employment and unemployment: A social-psychological analysis*. Cambridge: Cambridge University Press.
- Johnson, M. K. (2001). Changes in job values during the transition to adulthood. *Work and Occupations*, 28, 351–354.
- Johnson, R. W., Mermin, G. B., & Resseger, M. (2011). Job demands and work ability at older ages. *Journal of Aging & Social Policy*, 23(2), 101–118.
- Johnson, M. K., Sage, R. A., & Mortimer, J. T. (2012). Work values, early career difficulties, and the U.S. economic recession. *Social Psychology Quarterly*, 75(3), 242–267.

- Kahn, R. L., & Antonucci, T. C. (1980). Convoys over the life course: Attachment, roles, and social support. In P. B. Baltes & O. C. Brim (Eds.), *Life-span, development, and behavior* (pp. 254–283). New York: Academic.
- Kalleberg, A. L. (2000). Nonstandard employment relations: Part-time, temporary, and contract work. *Annual Review of Sociology*, 26, 341–365.
- Kalleberg, A. L. (2009). Precarious work, insecure workers: Employment relations in transition. *American Sociological Review*, 74(1), 1–22.
- Kalleberg, A. L. (2011). *Good jobs, bad jobs: The rise of polarized and precarious employment systems in the United States, 1970s–2000s*. New York: Russell Sage.
- Kalleberg, A. L. (2012). Job quality and precarious work: Clarifications, controversies, and challenges. *Work and Occupations*, 39(4), 427–448.
- Kanter, R. M. (1977). *Work and family in the United States: A critical review and agenda for research and policy*. New York: Russell Sage.
- Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity and the reconstruction of working life*. New York: Basic Books.
- Kelly, E., & Moen, P. (2007). Rethinking the clockwork of work: Why schedule control may pay off at home and at work. *Advances in Developing Human Resources*, 9(4), 487–506.
- Kelly, E. L., Kossek, E. E., Hammer, L., Durham, M., Bray, J., Chermack, K., & Murphy, L. (2008). Getting there from here: Research on the effects of work-family initiatives on work-family conflict and business outcomes. *Academy of Management Annals*, 2(1), 305–340.
- Kelly, E. L., Moen, P., & Tranby, E. (2011). Changing workplaces to reduce work-family conflict: Schedule control in a white-collar organization. *American Sociological Review*, 76(2), 265–290.
- Kelly, E. L., Moen, P., Fan, W., Oakes, J. M., Okechukwu, C., Davis, K. D., Hammer, L., Kossek, E., King, R. B., Hanson, G., Mierzwa, F., & Casper, L. (2014). Changing work and work-family conflict in an information technology workplace: Evidence from a group-randomized trial. *American Sociological Review*, 79(3), 485–516.
- Kimmel, M. S. (2008). *The gendered society*. New York: Oxford University Press.
- Kohli, M. (1986a). The world we forget: A historical review of the life course. In V. W. Marshall (Ed.), *Later life: The social psychology of aging* (pp. 271–303). Beverly Hills: Sage.
- Kohli, M. (1986b). Social organization and subjective construction of the life course. In A. B. Sørensen, F. E. Weinert, & L. R. Sherrod (Eds.), *Human development and the life course: Multidisciplinary perspectives* (pp. 271–292). Hillsdale: Erlbaum.
- Kohli, M. (2007). The institutionalization of the life course: Looking back to look ahead. *Research in Human Development*, 4, 253–271.
- Kohli, M., & Meyer, J. W. (1986). Social structure and social construction of the life stages. *Human Development*, 29, 145–149.
- Kohli, M., Rein, M., Guillemand, A.-M., & van Gunsteren, H. (1991). *Time for retirement: Comparative studies of early exit from the labor force*. Cambridge: Cambridge University Press.
- Kohn, M. L., & Schooler, C. (1983). *Work and personality: An inquiry into the impact of social stratification*. Norwood: Ablex.
- Kossek, E. E., Hammer, L. B., Kelly, E. L., & Moen, P. (2014). Designing work, family & health organizational change initiatives. *Organizational Dynamics*, 43(1), 53–63.
- Kramer, L. (2011). *The sociology of gender: A brief introduction* (2nd ed.). New York: Oxford University Press.
- Kristensen, T. S. (1995). The demand-control-support model: Methodological challenges for future research. *Stress Medicine*, 11, 17–26.
- Kristensen, T. S. (1996). Job stress and cardiovascular disease: A theoretic critical review. *Journal of Occupational Health Psychology*, 1, 246–260.
- Krüger, H., & Baldus, B. (1999). Work, gender and the life course: Social construction and individual experience. *Canadian Journal of Sociology*, 24(3), 355–379.
- Landsbergis, P. A., Schnall, P. L., Dietz, D., Friedman, R., & Pickering, T. (1992). The patterning of psychological attributes and distress by job strain and social support in a sample of working men. *Journal of Behavioral Medicine*, 15(4), 379–405.
- Levy, R., & Widmer, E. (2013). *Gendered life courses between individualization and standardization. A European approach applied to Switzerland*. Wien: Lit Verlag.
- Liao, T. F., & Cai, Y. (1995). Socialization, life situations, and gender-role attitudes regarding the family among white American women. *Sociological Perspectives*, 38(2), 241–260.
- Liljeström, R., Svensson, G. L., & Mellström, G. F. (1978). *Roles in transition: Report of an investigation made for the advisory council on equality between men and women*. Stockholm: Liber Forlag.
- Lippmann, S. (2008). Rethinking risk in the new economy: Age and cohort effects on unemployment and re-employment. *Human Relations*, 61(9), 1259–1292.
- Lüscher, K., & Pillemer, K. (1998). Intergenerational ambivalence: A new approach to the study of parent-child relations in later life. *Journal of Marriage and the Family*, 60, 413–425.
- Macmillan, R., & Eliason, S. R. (2003). Characterizing the life course as role configurations and pathways: A latent structure approach. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 529–554). New York: Kluwer Academic/Plenum Publishers.
- Malenfant, R., LaRue, A., & Venzina, M. (2007). Intermittent work and well-being: One foot in the

- door, one foot out. *Current Sociology*, 55(6), 814–835.
- Marshall, N. L., Barnett, R. C., & Sayer, A. (1997). The changing workforce, job stress and psychological distress. *Journal of Occupational Health Psychology*, 2, 99–107.
- Marshall, V. W., Heinz, W., Krüger, H., & Verma, A. (2001). *Restructuring work and the life course*. Toronto: University of Toronto Press.
- Matos, K., & Galinsky, E. (2012). *National study of employers*. New York: Families and Work Institute.
- McCall, L. (2001). *Complex inequality: Gender, class, and race in the new economy*. New York: Routledge.
- Meyer, J. W. (1986). The institutionalization of the life course and its effects on the self. In F. E. Weinert & L. R. Sherrod (Eds.), *Human development and the life course: Multidisciplinary perspectives* (pp. 119–216). Hillsdale: Erlbaum.
- Mirowsky, J., & Ross, C. E. (1989). *Social causes of psychological distress*. New York: Aldine de Gruyter.
- Moen, P. (1985). Continuities and discontinuities in women's labor force participation. In G. H. Elder Jr. (Ed.), *Life course dynamics: 1960s to 1980s* (pp. 113–155). Ithaca: Cornell University Press.
- Moen, P. (1992). *Women's two roles: A contemporary dilemma*. Westport: Greenwood.
- Moen, P. (1994). Women, work and family: A sociological perspective on changing roles. In M. W. Riley, R. L. Kahn, & A. Foner (Eds.), *Age and structural lag: The mismatch between people's lives and opportunities in work, family, and leisure*. New York: Wiley.
- Moen, P. (2001). The gendered life course. In L. George & R. H. Binstock (Eds.), *Handbook of aging and the social sciences* (pp. 179–196). San Diego: Academic.
- Moen, P. (2003a). Midcourse: Navigating retirement and a new life stage. In J. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 269–291). New York: Kluwer Academic/Plenum Publishers.
- Moen, P. (2003b). *It's about time: Couples and careers*. Ithaca: Cornell University Press.
- Moen, P. (2012). Retirement dilemmas and decisions. In J. Hedge & W. Borman (Eds.), *The Oxford handbook of work and aging* (pp. 549–569). New York: Oxford University Press.
- Moen, P. (2013). Constrained choices: The shifting institutional contexts of aging and the life course. In L. Waite (Ed.), *Perspectives on the future of the sociology of aging* (pp. 175–216). Washington, DC: National Research Council.
- Moen, P. (forthcoming). *Encore Adulthood: Boomers on the Edge of Risk, Renewal, and Purpose*. New York: Oxford University Press.
- Moen, P., & Chermack, K. (2005). Gender disparities in health: Strategic selection, careers, and cycles of control. *Journal of Gerontology*, 60B, 99–108.
- Moen, P., & Chesley, N. (2008). Toxic job ecologies, lagging time convoys, and work-family conflict: Can families (re)gain control and life course "fit"? In D. S. Lero, K. Korabik, & D. L. Whitehead (Eds.), *Handbook of work family integration: Research, theory, and best practices* (pp. 95–118). New York: Elsevier.
- Moen, P., & Flood, S. (2013). Limited engagements? Women's and men's work/volunteer time in the encore life course stage. *Social Problems*, 60(2), 206–233.
- Moen, P., & Orrange, R. (2002). Careers and lives: Socialization, structural lag, and gendered ambivalence. *Advances in Life Course Research*, 7, 231–260.
- Moen, P., & Roehling, P. (2005). *The career mystique: Cracks in the American dream*. Boulder: Rowman & Littlefield.
- Moen, P., & Spencer, D. (2006). Converging divergences in age, gender, health, and well-being: Strategic selection in the third age. In R. Binstock & L. George (Eds.), *Handbook of aging and the social sciences* (pp. 127–144). Burlington: Elsevier Academic Press.
- Moen, P., & Wethington, E. (1992). The concept of family adaptive strategies. *Annual Review of Sociology*, 18, 233–251.
- Moen, P., Dempster-McClain, D., & Williams, R. M., Jr. (1989). Social integration and longevity: An event history analysis of women's roles and resilience. *American Sociological Review*, 54, 635–647.
- Moen, P., Dempster-McClain, D., & Williams, R. M., Jr. (1992). Successful aging: A life course perspective on women's roles and health. *American Journal of Sociology*, 97, 1612–1638.
- Moen, P., Sweet, S., & Swisher, R. (2005). Embedded career clocks: The case of retirement planning. *Advances in Life Course Research*, 9, 237–265.
- Moen, P., Huang, Q., Plassmann, V., & Dentinger, E. (2006). Deciding the future: Do dual-earner couples plan together for retirement? *American Behavioral Scientist*, 49(9), 1–22.
- Moen, P., Sweet, S., & Hill, R. (2010). Risk, resilience, and life-course fit: Older couples' encores following job loss. In P. S. Fry & C. L. M. Keyes (Eds.), *New frontiers in resilient aging* (pp. 283–309). New York: Cambridge University Press.
- Moen, P., Kelly, E. L., & Hill, R. (2011a). Does enhancing work-time control and flexibility reduce turnover? A naturally-occurring experiment. *Social Problems*, 58(1), 69–98.
- Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011b). Changing work, changing health: Can real work-time flexibility promote health behaviors and well-being? *Journal of Health and Social Behavior*, 52, 404–429.
- Moen, P., Kaduk, A., Kossek, E. E., Hammer, L., Buxton, O. M., O'Donnell, E., Almeida, D., Fox, L., Tranby, E., Oaks, J. M., & Casper, L. (2015). Is work-family conflict a multi-level stressor linking job conditions to mental health? Evidence from the work, family and health network. *Research in the Sociology of Work*, 26: 177-217.
- Moen, P., Kelly, E. L., Fan, W., Lee, S-R., Almeida, D., Kossek, E. E., & Buxton, O. (Forthcoming). Does a flexibility/support organizational initiative improve high tech employees' subjective wellbeing? Evidence

- from the Work, Family, and Health Network. *American Sociological Review*.
- Moen, P., Kelly, E. L., Oakes, J. M., Lee, S.-R., Bray, J., Almeida, D. M., Hammer, L., Hurtado, D., & Buxton, O. (2014, August). *Can a flexibility/support initiative reduce turnover? Results from the work, family and health study*. Presentation at the Annual Meeting of the American Sociological Association, held in San Francisco.
- Mortimer, J. T. (2011). Transition to adulthood, parental support, and early adult well-being: Recent findings from the Youth Development Study. In A. Booth, S. Brown, N. Lansdale, W. Manning, & S. McHale (Eds.), *Early adulthood in a family context* (pp. 27–34). New York: Springer.
- Mortimer, J. T., & Fischer, L. (Forthcoming). Career beginnings American style: Agency and floundering in subjective perspective. In T. T. Swartz, D. Hartmann, & R. Rumbaut (Eds.), *Crossings to adulthood: How young Americans understand and navigate their lives*. Leiden: Brill Publishers.
- Mortimer, J. T., & Moen, P. (this volume). The changing social construction of age: Precarious identity and enactment of “early” and “encore” stages of adulthood. In M. Shanahan, J. T. Mortimer & M. K. Johnson (Eds.), *The handbook of the life course* (Vol. 2). New York: Springer.
- Mortimer, J. T., & Shanahan, M. J. (2003). *Handbook of the life course*. New York: Kluwer/Plenum Publishers.
- Mortimer, J., & Simmons, R. G. (1978). Adult socialization. *Annual Review Sociology*, 4, 421–454.
- Mortimer, J. T., Kim, M. & Swartz, T. T. (2010). *Unemployment, parental help, and self efficacy during the transition to adulthood*. Paper presented at the IUSSP Seminar on Intergenerational Ties and Transitions to Adulthood, sponsored by Bocconi University, the MacArthur Network on Transitions to Adulthood, and the IUSSP Scientific Panel on Transitions to Adulthood in Developed Countries. Milan, 8–9 Nov 2010.
- Mortimer, J. T., Vuolo, M., & Staff, J. (2014). Agentic pathways toward fulfillment in work. In A. C. Keller, R. Samuel, M. M. Bergman, & N. K. Semmer (Eds.), *Psychological, educational, and sociological perspectives on success and well-being in career development* (pp. 99–126). New York: Springer.
- Mortimer, J. T., Lam, J., & Lee, S.-R. (2015). Transformation, erosion, or disparity in work identity? Challenges during the contemporary transition to adulthood. In K. McLean & M. Syed (Eds.), *Oxford handbook of identity development* (pp. 319–336). New York: Oxford University Press.
- Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology*, 70, 710–717.
- Newman, K. S. (1993). *Declining fortunes: The withering of the American dream*. New York: Basic Books.
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Math = male, me = female, therefore math ≠ me. *Journal of Personality and Social Psychology*, 83, 44–59.
- Ogums, R. U. (2012). Living and working in retirement, a new paradigm in the U.S. exploring retirees attitudes and beliefs toward working. *Journal of Economic & Social Studies (JECOSS)*, 2(1), 21–50.
- Orrange, R. M. (2007). *Work, family, and leisure: Uncertainty in a risk society*. Boulder: Rowman & Littlefield.
- Pavalko, E. K., Elder, G. H., Jr., & Clipp, E. C. (1993). Worklives and longevity: Insights from a life course perspective. *Journal of Health and Social Behavior*, 34(4), 363–380.
- Pearlin, L. (1988). Social structure and social values: The regulation of structural effects. In H. J. O’Gorman (Ed.), *Surveying social life* (pp. 252–264). Middletown: Wesleyan University.
- Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, 46, 205–219.
- Pedrianna, N. (2004). Help wanted NOW: Legal opportunities, the women’s movement, and the battle over sex-segregated job advertisements. *Social Problems*, 51, 182–201.
- Person, A. E., Rosenbaum, J. E., & Deil-Amen, R. (2005). Colleges, careers, and the institutional structure of the transition to adulthood. *Advances in Life Course Research*, 9, 125–149.
- Pixley, J. E., & Moen, P. (2003). Prioritizing careers. In P. Moen (Ed.), *It’s about time: Couples and careers* (pp. 183–200). Ithaca: Cornell University Press.
- Preves, S., & Mortimer, J. T. (2013). Socialization for primary, intimate, and work relationships in the adult life course. In J. DeLamater (Ed.), *Handbook of social psychology* (2nd ed., pp. 151–190). New York: Springer.
- Reynolds, J., & Aletraris, L. (2010). Mostly mismatched with a chance of settling: Tracking work hour mismatches in the United States. *Work and Occupations*, 37(4), 471–511.
- Ridgeway, C. L., & Correll, S. J. (2004). Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. *Gender & Society*, 18(4), 510–531.
- Ridgeway, C. L., & Smith-Lovin, L. (1999). The gender system and interaction. *Annual Review of Sociology*, 25, 191–216.
- Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review*, 52(1), 1–14.
- Riley, M. W., Kahn, R. L., & Foner, A. (1994). *Age and structural lag: The mismatch between people’s lives and opportunities in work, family, and leisure*. New York: Wiley.
- Risman, B. J. (1998). *Gender vertigo: American families in transition*. New Haven: Yale University Press.
- Rothman, R. A. (1979). Occupational roles: Power and negotiation in the division of labor. *The Sociological Quarterly*, 20, 495–515.

- Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review*, 30(6), 843–861.
- Sargent, L. D., Lee, M. D., Martin, B., & Zikic, J. (2013). Reinventing retirement: New pathways, new arrangements, new meanings. *Human Relations*, 66(1), 3–21.
- Schieman, S., Van Gundy, K., & Taylor, J. (2002). The relationship between age and depressive symptoms: A test of competing explanatory and suppression influences. *Journal of Aging and Health*, 14, 260–285.
- Schnall, P. L., Landsbergis, P. A., & Baker, D. (1994). Job strain and cardiovascular disease. *Annual Review of Public Health*, 15, 381–411.
- Schneider, B., & Stevenson, D. (1999). *The ambitious generation: America's teenagers, motivated but directionless*. New Haven: Yale University Press.
- Schooler, C., Mulatu, M. S., & Oates, G. (1999). The continuing effects of substantively complex work on the intellectual function of older workers. *Psychology and Aging*, 14, 483–506.
- Schulz, A. S., & Mullings, L. (2006). *Gender, race, class and health: Intersectional approaches*. San Francisco: Jossey-Bass.
- Schuman, H., & Rieger, C. (1992). Historical analogies, generational effects, and attitudes toward war. *American Sociological Review*, 57, 315–325.
- Sennett, R. (1998). *The corrosion of character: Personal consequences of work in the new capitalism*. New York: Norton.
- Serguino, S. (2007). Plus Ça change? Evidence on global trends in gender norms and stereotypes. *Feminist Economics*, 13(2), 1–18.
- Settersten, R. A., Jr., & Hagestad, G. O. (1996a). What's the latest? Cultural age deadlines for educational and work transitions. *The Gerontologist*, 36(2), 178–188.
- Settersten, R. A., Jr., & Hagestad, G. O. (1996b). What's the latest? II. Cultural age deadlines for educational and work transitions. *The Gerontologist*, 36(5), 602–613.
- Settersten, R. A., Jr., & Mayer, K. U. (1997). The measurement of age, age structuring, and the life course. *Annual Review of Sociology*, 23, 233–261.
- Settersten, R. A., Jr., & Owens, T. (2002). *New frontiers in socialization*. London: Elsevier.
- Settersten, R. A., Jr., & Ray, B. (2010). *Not quite adults: Why 20-somethings are choosing a slower path to adulthood and why it's good for everyone*. New York: Bantam/Random House.
- Settersten, R. A., Jr., Furstenberg, F. F., Jr., & Rumbaut, R. G. (2001). *On the frontier of adulthood: Theory, research and public policy*. Chicago: University of Chicago Press.
- Sewell, W. H., Jr. (1992). A theory of structure: Duality, agency, and transformations. *American Journal of Sociology*, 98, 1–29.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology*, 25, 667–692.
- Shanahan, M. J., Elder, G. H., Jr., & Miech, R. A. (1997). History and agency in men's lives: Pathways to achievement in cohort perspective. *Sociology of Education*, 70, 54–67.
- Shanahan, M. J., Mortimer, J. T., & Krüger, H. (2002). Adolescence and adult work in the twenty-first century. *Journal of Research on Adolescence*, 12, 99–120.
- Silva, J. M. (2013). *Coming up short: Working-class adulthood in an age of uncertainty*. New York: Oxford University Press.
- Singley, S. G., & Hynes, K. (2005). Transitions to parenthood: Work-family policies, gender, and the couple context. *Gender & Society*, 19(3), 378–397.
- Smith, V. (2001). *Crossing the great divide: Worker risk and opportunity in the new economy*. Ithaca: Cornell University/ILR Press.
- Spillerman, S. (1977). Careers, labor market structure, and socioeconomic attainment. *American Journal of Sociology*, 83, 551–593.
- Staff, J., & Mortimer, J. T. (2012). Explaining the motherhood wage penalty. *Demography*, 49, 1–21.
- Stone, P. (2007). *Opting out? Why women really quit careers and head home*. Berkeley: University of California Press.
- Stone, K., & Arthurs, H. (2013). *Rethinking workplace regulation: Beyond the standard contract of employment*. New York: Russell Sage Foundation Publications.
- Suitor, J., & Pillemer, K. (1994). Family caregiving and marital satisfaction. *Journal of Marriage and the Family*, 56, 681–690.
- Swartz, T. T. (2009). Intergenerational family relations in adulthood: Patterns, variations, and implications in the contemporary United States. *Annual Review of Sociology*, 35, 191–212.
- Swartz, T. T., Uno, M., Mortimer, J. T., Kim, M., & O'Brien, K. B. (2011). Safety nets and scaffolds: Parental support in the transition to adulthood. *Journal of Marriage and Family*, 73, 414–429.
- Sweet, S. (2014). *The work-family interface: An introduction*. Thousand Oaks: Sage.
- Sweet, S., & Meiksins, P. (2013). *Changing contours of work: Jobs and opportunities in the new economy* (2nd ed.). Thousand Oaks: Pine Forge Press.
- Sweet, S., & Moen, P. (2012). Dual earners preparing for job loss: Agency, linked lives, and resilience. *Work and Occupations*, 39(1), 35–70.
- Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociological Review*, 51, 273–286.
- Toossi, M. (2013). Labor force projections to 2022: The labor force participation rate continues to fall. *Monthly Labor Review* (Dec): 1–28.
- Townsend, N. W. (2002). *The package deal: Marriage, work, and fatherhood in men's lives*. Philadelphia: Temple University Press.
- Uchitelle, L. (2007). *The disposable American: Layoffs and their consequences*. New York: Vintage Books.

- Vuolo, M., Staff, J., & Mortimer, J. T. (2012). Weathering the great recession: Psychological and behavioral trajectories in the transition from school to work. *Developmental Psychology, 48*, 1759–1773.
- Vuolo, M., Mortimer, J. T., & Staff, J. (2013). Adolescent precursors of pathways from school to work. *Journal of Research on Adolescence, 24*(1), 145–162.
- Warner, D. F., Hayward, M. D., & Hardy, M. A. (2010). The retirement life course in America at the dawn of the twenty-first century. *Population Research and Policy Review, 29*(6), 893–919.
- Warren, J. R., Hauser, R. M., & Sheridan, J. T. (2002). Occupational stratification across the life course: Evidence from the Wisconsin Longitudinal Study. *American Sociological Review, 67*, 432–455.
- West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & Society, 1*(2), 125–151.
- Wethington, E., Pixley, J. E., & Kavey, A. (2003). Turning points in work careers. In P. Moen (Ed.), *It's about time: Couples and careers* (pp. 168–182). Ithaca: Cornell University Press.
- Wilensky, H. (1961). Orderly careers and social participation. *American Sociological Review, 26*, 521–539.
- Williams, J. C. (2000). *Unbending gender: Why family and work conflict and what to do about it*. Oxford: Oxford University Press.
- Williams, J. C., & Dempsey, R. (2014). *What works for women at work: Four patterns working women need to know*. New York: New York University Press.

Military Service in Lives: Where Do We Go From Here?

Andrew S. London and Janet M. Wilmoth

1 Introduction

The military is a complex, dynamic, and potentially transformative early life-course institution (Bennett and McDonald 2013; Kelty and Segal 2013) about which we know less than we should. It is increasingly recognized that military service is a somewhat “hidden” or “missing” variable in the literature on the life course and aging (Spiro et al. 1997). In the lead article to a special issue of *Research on Aging* on Military Service, the Life Course, and Aging, which he guest-edited, Richard A. Settersten, Jr. (2006: 12) writes: “Most scholarship on aging is based on cohorts born early in the 20th century, and these cohorts have had significant experience with war. Wartime experiences may therefore be critical but largely hidden variables underlying current scientific knowledge about aging.” We concur with this claim, although we contend that military service, more generally, has been understudied as an early-adulthood institutional influence on the life course and aging (Wilmoth and London 2013).

During the 34-year period from January 1980 through December 2013, the five *Gerontology*

Society of America (GSA)-sponsored journals (*The Journals of Gerontology: Series A*, *The Journals of Gerontology: Series B*, *The Gerontologist*, *The Journal of Gerontology*, *Public Policy & Aging Report*), *Research on Aging*, and *Journal of Aging and Health* published a total of 101 military-related articles, or three per year, on average (Wilmoth and London forthcoming). Perhaps marking a turning point in the field, the nine articles published in the peak year—2006—include the introduction and six research articles that were published in Settersten’s special issue of *Research on Aging*. However, the vast majority of the military-related publications in these seven journals during this time period were based on cross-sectional research designs and non-representative samples, and focused exclusively on veterans or Veterans Administration health care facilities and programs that serve older veterans. Although these studies address important, policy-relevant questions, the degree to which prior service in the armed forces affects variation in long-term life-course outcomes remains virtually unexamined because almost none of these studies directly compares veterans to non-veterans over time in well-specified models.

The sample of articles noted above clearly does not constitute or represent the body of research published on military service and the life course. In fact, there is a rapidly emerging body of quantitative, longitudinal and qualitative

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research on military service in lives that builds upon strong foundations laid over several decades (Wilmoth and London 2013; see also, Camacho and Atwood 2007; Card 1983; Carlson and Andress 2009; Hogan 1981; London *forthcoming*; London and Wilmoth 2008; MacLean and Elder 2007; Mettler 2005; Modell and Haggerty 1991; Wilmoth and London *forthcoming*). Some of the earliest foundations were laid by Glen H. Elder, Jr. (Elder 1986, 1987). As he made seminal conceptual contributions to the development of the life-course perspective, he and a group of colleagues also elaborated a set of studies that empirically demonstrated the importance of examining military service in lives (Clipp and Elder 1996; Dechter and Elder 2004; Elder 1986, 1987; Elder and Bailey 1988; Elder and Clipp 1988a, b, 1989; Elder et al. 1991, 1994, 1997, 2010; Pavalko and Elder 1990). Elder's influence extended beyond his own direct scholarly contributions to the field to the training and support of scholars from various disciplines who have pursued their own investigations of military service and the life course (Gade and Ruise 2013). He remains a stalwart and engaged advocate for studying military service in lives (Elder 2013).

One can imagine approaching a discussion of military service and the life course in various ways. One might think about the military life course as encompassing three periods—pre-service, active-duty, and veteran—and focus on describing experiences within and across these stages exclusively among people who serve. One might extend that framework to think about the ways that those who serve are similar to and different from age-similar peers. One might focus on life-course stages, such as childhood and adolescence, the transition to adulthood, midlife, retirement, and old age, and consider how trajectories through, and outcomes within, each stage are associated with military service. One might focus on the principles of the life course—lifelong development, location in time and place, timing and sequencing, human agency, and linked lives (Elder and Johnson 2002; Elder et al. 2003; Giele and Elder 1998; Settersten 2003; Mortimer and Shanahan 2003)—in relation to military service.

Our intent in this chapter is to layer, weave, and integrate each of these approaches, with a focus on life-course stages as the primary scaffolding for organizing our arguments, reviews of evidence, methodological challenges, and gaps in the literature, and discussions of directions for the future. Unless otherwise stated, our focus is on the U.S. military. By adopting this approach, we can frame a focused set of issues that are germane to a specific stage of the life course. Then, with those issues in mind, we can review exemplary conceptual and empirical research, pay attention to historical variations, draw attention to principles of the life course that are particularly salient, and describe processes that are related to entrance into the military, military service experiences, and exit from the military, as well as the consequences of military service for those who served and those whose lives are linked to them.

Military service could have an effect on virtually everything life-course researchers study, but data constraints limit what we know. We address this issue most directly toward the end of the chapter. Moreover, because it is a “hidden” or “missing” variable in most domains of investigation—with notable exceptions in some, as the chapter aims to describe—there are many questions that are relatively unexplored. Identifying causal relationships remains a daunting challenge in most domains of investigation. In this chapter, our review of such questions, knowledge, methodological challenges, and gaps in knowledge will by necessity be selective and relatively broad; cited sources provide more detailed, critical reviews of theory and evidence related to specific domains of investigation, and point to gaps in the literature. There is a need for additional theoretical delineation of the characteristics of military service that matter and empirical investigation of the mechanisms through which military service shapes the life course. Some of the best life-course research links theory and methodologically rigorous empirical investigation to provide compelling evidence of the how and why military service matters. Such studies contribute to our understanding of military service in lives, as well as the role of social institutions in shaping the life course more generally.

2 Life-Course Perspectives on Military Service

Each of the five commonly recognized principles of the life-course perspective—life-long development, location in time and place, timing and sequencing, human agency, and linked lives (Elder and Johnson 2002; Elder et al. 2003; Giele and Elder 1998; Settersten 2003; Mortimer and Shanahan 2003)—is germane to understanding the consequences of military service in lives. Human development and aging must be understood as processes that unfold over time. What happens earlier conditions what happens in subsequent life stages; goal-setting for an imagined, desired future might also do the same. The principle of life-long development highlights the critical importance of having comprehensive data on military service experiences, as well as longitudinal data that enable researchers to address selection and disentangle aging from period and cohort effects. Change is fundamental to this principle of the life course, and can be seen in studies of the consequences of military service that draw on long-term longitudinal data.

The principle of location in time and place emphasizes how lives are contextualized by historical period and specific geographies. It points to the need to consider cohort differences (Wilmoth and London *forthcoming*), as well as where service happens and how service affects mobility and (re)settlement patterns (Bailey 2011, 2013). Active-duty military personnel move more frequently than civilians, and they move longer distances when they relocate. They are also disproportionately recruited from southern and rural parts of the country. The military is a complex system of inter-related places, and, like all places, these sites are socially organized and have cultures that vary over time. Wars happen in particular theaters of operation, but are geographically dispersed such that not all service members who are active-duty during a war are exposed to combat. The historical period of service also matters, as the circumstances of service (e.g., length of overseas duty, environmental exposures, ratio of wounded to died), and military policies (e.g., stringency of screening policies,

activation of Reserve and National Guard components, inclusion of women, minorities, and gays and lesbians) change over time. Because of data constraints, one of the great challenges of life-course research on military service is specifying the ways in which service in particular times and places affects specific outcomes.

The principle of human agency directs attention to the role that individuals play in their own lives as they actively choose among various opportunities and deal with the constraints that they encounter as they age in time and place. Because choices are structured by historical and social circumstances, as well as personality, individuals with apparently similar social locations may make very different choices. Although the military is often considered a “total institution” (Burland and Lundquist 2013) that strips a substantial amount of agency from individuals while they are on active-duty and can produce identity conflict during the transition to civilian life (Smith and True 2014), individuals always act upon their circumstances. The choices service members make, including the initial choice many make to volunteer for service, re-enlistment decisions, seeking entrance into a military academy, or choosing a military career, can have significant consequences over the life course for them and for those whose lives are linked to them. How military service affects post-service choices and actions is also a critical issue. The relatively high rate of suicide among veterans, as well as active-duty personnel, underscores this point (LeardMann et al. 2013).

The principle of timing and sequencing focuses on when events and transitions occur in relation to age and other events and transitions. In the literature on military service and the life course, this principle has received the most attention in relation to the transition to adulthood because the active-duty period is generally initiated and ended in early adulthood. Questions related to the timing and sequencing of service in individual lives, and how military service influences the acquisition of marital, parenting, educational, and occupational roles have received the lion’s share of attention in the literature. The consequences of transitions, including their

disruptiveness to already established life-course trajectories, depend in part on whether they are expected or unexpected, as well as if they are considered “on-time” or “off-time.” Culturally based, age-graded norms allow for some planning and determine whether a transition is deemed to be on-time or off-time. Off-time transitions do not coincide with the expected timetable and are often, but not always, associated with negative consequences.

The principle of linked lives focuses attention on the importance of social relationships and the interdependence of lives. The intergenerational transmission of military service within families is one topic that has received considerable attention in the literature, with the U.S. Department of Defense estimating that 57 % of active-duty troops serving in 2011 were the children of current or former active-duty or Reserve service members (Human Resources Strategic Assessment Program 2011). Addressing how participation in the military, whether for a short time or a 20-year career, affects service members’ parents, spouses, and children is a critically important issue that warrants substantially more attention than it has received.

3 Military Service in Lives: A Conceptual Model

The military is a particular kind of institution that reflects that social context in which it is organized (Kelty and Segal 2013; Segal and Segal 2004). In the United States, the armed forces include the Army, Navy, Air Force, Marine Corps, and Coast Guard. These branches are organized hierarchically by rank, with a clearly specified and enforced chain of command and fine-grained distinctions drawn, respectively, within the enlisted and officer ranks. Reserve and National Guard components are variably connected to, but distinct from, the various branches of the armed forces. Individuals serving full-time in one of the five branches of the armed forces are considered active-duty service members; veteran status is conferred upon those who served on

active duty and received a better-than-dishonorable discharge. While there is opportunity for advancement in the armed forces, especially among those pursuing military careers, each rank initially selects individuals with particular characteristics and provides them with access to different types of assignments, risks, and rewards. Military occupational specialties vary by branch and rank, and provide different kinds of education and training, which variably translate into the civilian labor market (Kleykamp 2013). Exposure to combat is not a prerequisite for either active-duty or veteran status, or benefits eligibility, although specific benefits are available to veterans who served in specific wars or experienced a service-connected disability (Wilmoth and London 2011; Wilmoth et al. 2015a). The availability of specific veterans’ benefits varies by historical period, duration of service, rank, and disability status, and the take-up of benefits varies across the life course (Bennett and McDonald 2013; Street and Hoffman 2013; Wilmoth and London 2011). Family members may also receive benefits as a result of a spouse or parent’s active-duty service or service-related death.

The military is a potentially transformative institution that tends to engage young people, often for a relatively short period of time. For most of U.S. history, less than 1 % of the population served in the armed forces at any given time, with the exception of brief periods when the country was at war (see Figure 1 in Segal and Segal 2004). Cumulatively, as of September 2014, it is estimated that there were almost 22 million veterans living in the U.S., of whom about 75 % served during wartime (National Center for Veteran Statistics and Analysis 2014). Based on data from the 2009 to 2013 American Community Survey, veterans represent about 9 % of the civilian population aged 18 and above (U.S. Census Bureau 2015). Many more individuals live their lives linked to those who have served, which underscores the prevalence of military service experiences. Although the size of the active-duty force has declined over the course of the late-twentieth and early-twenty-first centuries

(see Figure 1.1 in Wilmoth and London 2013), in 2011, 1,411,424 Americans were on active duty in the armed forces (Department of Defense 2012). Women comprised 14.5 % of active-duty personnel. The largest share served in the Army (561,437), followed by the Air Force (328,821), Navy (320,141), Marine Corps (201,026), and Coast Guard (42,011). Overall, the ratio of enlisted personnel to officers was 4.9–1. The average ages of enlisted personnel and officers were 27.4 and 34.7 years, respectively.

Serving in the military variably offers young adults an array of risks and benefits, and the effects of military service may be mixed and countervailing. For any particular life-course outcome, the extent to which military service is beneficial or has negative consequences—if it has any consequences at all—depends on the particularities of historical circumstance, the prevailing organization and policies of the armed forces, individual characteristics, service experiences, and access to benefits. We advocate using a cumulative exposure model of the life course for studying military service in lives (see Figure 1.2 in Wilmoth and London 2013). Specifically, we propose that exposure to the military in a particular historical period by individuals with particular characteristics influences processes of cumulative inequality that produce variation in outcomes over the life course. Early-life characteristics and circumstances shape exposure to military service, and military service can mediate, moderate, or have no influence on the associations between such factors and later-life outcomes. Additionally, participation in the military has the potential to directly (re)shape mid- and later-life educational, occupational, wealth accumulation, marriage/family, civic engagement, and health trajectories and outcomes. Whether and how military service affects the life course is individually, socially, and historically contingent, rather than automatic, and can best be evaluated by comparing those with military service histories to those without them, controlling for selection and taking into account the heterogeneity in military service experiences to the extent possible. The timing and sequencing of

military service in relation to other life course transitions and events matters (Elder 1986, 1987; Hogan 1981). Moreover, as Teachman (2013: 282–283) notes: “the effects of military service may not be proportionate across the life course... military service may produce results that vary according to stage in the life course...What may appear to be a null effect of military service at one point in the life course may be very different at earlier or later points in time.” Overall, this conceptual model of the life-course consequences of military service suggests that it is important to examine the potential effects of military service during different stages of the life course.

4 Childhood and Adolescence

Life-course and military researchers who address childhood and adolescence—the pre-military period of the life course—have paid particular attention to identifying early life-course factors that encourage or discourage voluntary military service. This body of research on selection into military service addresses intergenerational issues, as well as economic and non-economic influences on entry into the military (Teachman and Tedrow 2014). Other questions that are germane to life-course researchers with interests in children and youth pertain to the linked-lives aspect of the life-course perspective. In part motivated by the past decade of war and recognition that an estimated two million children of active-duty personnel have variably been subjected to the exigencies of parental war-related deployment, deployment-related stress, and combat-related injury and death (Cozza et al. 2013), researchers are increasingly investigating how exposure to the military early in life shapes child development. A recent issue of *The Future of Children* (Cozza and Lerner 2013) on Military Children and Families epitomizes this trend, and serves as an excellent starting point for researchers with such interests. Whether, how, and why such children’s childhood, adolescent, and adult life-course trajectories and outcomes will differ from those of children who have not had similar

experiences is an important question for future research. Data collection must begin now and be sustained over time in order to rigorously address the questions life-course researchers will likely ask about these children in the future. Finally, Burland and Lundquist (2013) have recently argued that children in veteran families may also retain variable and complex relationships to the military that are largely unexplored in life-course research.

4.1 Selection into the Military

From 1941 to 1973, American men were subject to a draft, and during World War II, the Korean War, and the Vietnam War, many men were in fact conscripted into service (Flynn 1993). For example, about 10 of the 16 million men who served during World War II were conscripted (Segal and Segal 2004). It is worth noting, however, that even while the draft was active, many men and all women who served in the U.S. military did so voluntarily (Card 1983; Segal and Segal 2004). With the end of the Vietnam-era draft and the advent of the All-Volunteer Force in 1973, all individuals who have entered the military have done so voluntarily.

In the context of a draft, or in national contexts where military service is a compulsory duty of citizenship (e.g., Denmark, Israel, Singapore), selective influences on service and subsequent life-course trajectories and outcomes are less pronounced, although they may still be present depending on the stringency of screening processes. In such contexts, non-service may have both material and symbolic consequences. In contexts where service is voluntary, understanding variation in who serves is important for helping guide military personnel policy, recruitment, and planning (Bachman et al. 2000; National Research Council 2006; Sackett and Mavor 2003). In the U.S., ensuring an adequate number of active-duty personnel has been a particular policy concern in the era of the All-Volunteer Force. The rapid decline in the number of individuals born to at least one veteran—from 40 % in 1970 to 8 % in 2000—is a particular concern

given the substantial intergenerational influence on military service that has operated in the past (see Figure 3.16 in Sackett and Mavor 2003). But, understanding selective influences on service is also important for assessing the distribution of the risks that wartime service entails (Gimbel and Booth 1996), determining the racial and socioeconomic status equity of draft-era conscription, and obtaining adequate control of selection in life-course research (Wolf et al. 2013). In the absence of near-universal participation or random assignment to military service, which is closely approximated in the context of a draft lottery, accounting for voluntary selection into military service is especially challenging, yet critically important, for determining the extent to which observed associations represent causal relationships (Wolf et al. 2013).

Demographic characteristics, such as age, race/ethnicity, nativity status, gender, and sexual orientation have variably constrained entry into the military, as well as military service experiences and access to benefits, in various historical periods (Brown 2013; Campbell 2013; Kelty and Segal 2013; Lutz 2013). Historically, however, rates of participation in the military over 50 % were observed among each single-year cohort of men born between 1915 and 1935, with the rate topping 70 % among men in the 1919–1927 birth cohorts (Hogan 1981). Such high levels of participation were achieved through a mix of conscription and voluntary enlistment. Interestingly, in the context of the Vietnam-era draft, and perhaps the World War II-era draft as well, the distinction between voluntary and compelled service blurred. As documented by Card (1983), the extent to which men felt coerced into serving varied among those who were drafted and those who were not, as well as by socioeconomic and human capital characteristics. For example, approximately the same percentages of men with higher- and lower-than-average academic aptitude, respectively, indicated that they were drafted but served willingly (21.6 % and 28.2 %) or were drafted and served unwillingly (2.1 % and 2.0 %). However, a significantly lower percentage of men with higher-than-average academic aptitude enlisted willingly (40.4 % versus 56.4 %), while a

significantly higher percentage enlisted unwillingly (i.e., to avoid the draft) (25.9 % versus 8.2%). In the contemporary U.S. context, individuals can no longer be compelled to serve by the state; however, they may feel compelled to some degree by other factors, such as family expectation, lack of alternate opportunity, or the need to escape abuse within the family. The extent to which these kinds of felt social pressures contextualize what on the surface are voluntary enlistment decisions, the experience of serving in the military, or post-service outcomes has received little attention in the literature.

In the current All-Volunteer Force era, individuals must volunteer for service. This constitutes a first-stage selection process. However, the desire to enter the armed forces voluntarily in this or any other era does not necessarily translate into entry because the military is a highly selective institution that screens and excludes individuals deemed unqualified for service. The characteristics that disqualify an individual from service vary across historical periods and contexts, such as periods of war and peace, but have included physical and mental health problems, obesity, disability, low IQ, lack of a high school diploma or equivalent, heavy drug use, and having a felony conviction (National Research Council 2006). Just on the basis of the pre-induction physical exam, from 1950 to 1971, rates of rejection were always over 30 %, but mostly at or over 40 %, and varied substantially from year to year (Wolf et al. 2013). The life-course consequences of rejection from the military for those who desired, and perhaps expected or were expected, to serve is also a topic that has received little attention in the literature.

A substantial body of research documents that a broad range of factors can influence voluntary decisions about enlistment (Elder et al. 2010; Fligstein 1980; Johnson and Kaplan 1991; National Research Council 2006; Sackett and Mavor 2003; Teachman et al. 1993a, b). As discussed by Teachman and Tedrow (2014), these include economic factors, such as relatively low family socioeconomic status, constrained opportunity in the labor market, or the desire to obtain training or higher education through access to GI

Bill benefits, as well as non-economic factors, such as having a parent or other family member who previously served in the military, living near a military base, being patriotic, having a thirst for adventure, or needing to belong. While there are many factors that shape entrance into the military, as is the case with disqualifying conditions, the factors that lead an individual to volunteer in one historical period may be different from those that influence voluntary entry in another.

Given that the factors that influence entrance into military service change over time, and selection into military service is an issue of high policy relevance in the era of the All-Volunteer Force, there is a need for continued, expanded data collection, theoretical development, and research into early-life influences on military service. For researchers, being able to account for early-life factors that influence entry into the military, combat assignments during service, and post-service outcomes of interest is critical for determining the causal effects of military service.

In a recent article, Teachman and Tedrow (2014: 46–47) write that “our understanding of the factors that lead young men and women to choose military service in the all-volunteer era remains skeletal,” and that there “is no commonly accepted model for military enlistment.” In this article, they focus on delinquency, and deftly theorize and empirically demonstrate a nonlinear relationship between delinquency and military service. Youth who demonstrate some propensity toward delinquent behavior are positively selected into the military because it provides a legitimate institutional context for the transition to adulthood. The military offers delinquent youth a range of perceived benefits, such as adventure, comradery, income, an exit from the circumstances that contribute to delinquent and criminal behavior, and an opportunity for a fresh start. Some may be encouraged to enter the military by family members, counselors, or social or juvenile justice workers, which may contribute to a positive association between delinquency and service; such potential influences raise questions about the extent to which some delinquent youth feel coerced into service. Their analysis of data

from the 1997 National Longitudinal Survey of Youth demonstrates that lower levels of delinquency increased the likelihood of serving in the military, while higher levels of delinquency and criminality discouraged entrance, possibly because the military deemed such individuals to be morally unfit for service.

Due to cohort replacement, the veterans who served during World War II and the Korean War are aging out of the population at present, while those who served during the Vietnam War are entering the retirement and post-retirement age ranges (Wilmoth and London [forthcoming](#)). As such, Vietnam-era veterans and their contemporaries will be of increasing interest to life-course scholars who study older adults (London [forthcoming](#)). Given this and the fact that few long-term studies that include Vietnam-era veterans have included the prospective measurement of pre-service characteristics that might have influenced voluntary entrance into the military, it is instructive to note that some research from the Vietnam era suggests that those who did serve may have been more similar than dissimilar to those who did not serve.

Josefina Card (1983) drew on extensive, pre-service, baseline Project Talent data, which were collected when the men she studied were 14 or 15 years old, to identify factors that differentiated those who served from those who did not. She also distinguished service members who did not serve in the Vietnam theater of operations (i.e., non-Vietnam veterans) from those who did serve in Vietnam and were, therefore, potentially exposed to combat (i.e., Vietnam veterans). Comparing those who did not serve to non-Vietnam veterans and Vietnam veterans, respectively, she found no statistically significant differences by: race; size of town in which the individual grew up; religion; scores on eight different cognitive tests; self-ratings of study habits and skills; education plans; high school course and grades; 9 out of 10 personality characteristics (except calmness); 7 out of 11 high school experiences (except amount of guidance received elsewhere, amount of extracurricular reading, variety of extracurricular activities, and degree of participation in extracurricular activities); and 10 of 17 vocational interests (except biological

science/medicine, public service, literary/linguistic, social service, business management, computation, and labor). Compared to those who did not serve, Card (1983) reported that those who served were found to: be less calm; receive less guidance outside of high school; participate less in extracurricular activities; and be less interested in all of the vocations for which significant differences emerged. Although men from upper-class backgrounds were significantly less likely to have served than men from other socioeconomic class backgrounds, and lower-class and Black men were more likely to serve in the Army and Marine Corps where combat exposure was more common, her findings led Card (1983: 24) to conclude: “The groups of veterans and non-veterans are not as different from one another as popular belief might suggest. Not one of the group averages lies more than 0.2 standard deviations away from the overall class average.” To some extent, she concluded, the draft helped level the playing field. However, it is likely that military screening and the differential rejection of both draftees and enlistees was also a factor. For example, with respect to race, countervailing forces may have worked to equalize participation. Blacks were more likely than whites to be drafted because they were less able to obtain deferments, but they were four times more likely to be rejected because they failed pre-induction physical and mental health exams.

While unobserved heterogeneity related to selection into military service, as well as mortality selection (Wolf et al. 2013), will remain issues in life-course research that focuses on older Vietnam-era veterans, Card’s (1983) results provide some of the most comprehensive evidence regarding what might and might not matter with respect to selection into the military during the Vietnam War era. This should help guide interpretive efforts in future research.

4.2 Children and Youth in Military Families

Although questions related to selection into military service have received the lion’s share of attention in the literature related to the pre-service

period of the life course, another issue that warrants mention in relation to the contemporary historical circumstances of children and youth, and future life-course studies, pertains to the experiences of military children. Increasingly, the post-9/11 military is comprised of active-duty service members with families; of the two million who have served in the active-duty military since 9/11, nearly 45 % had children (Cozza et al. 2013). In 2011, the ratio of spouses and children to active-duty service members was 1.4–1 (Clever and Segal 2013). Overall, in 2011, there were 1.2 million children of active-duty personnel, and another 743,736 children in the families of Reserve and National Guard members.

While they may share some experiences with so-called “military brats” from earlier eras, who were fewer and often raised overseas during peacetime (Ender 1996, 2002; Wertsch 1991), it is likely that the experiences of this generation of military children will be different in many ways. As described in detail in a recent issue of *The Future of Children* on Military Children and Families (Cozza and Lerner 2013), children in military families face a particular set of circumstances that have the potential to impact developmental trajectories and outcomes. Post-9/11 military service has been particularly consequential for service members, their spouses, and children because it has occurred during the wars in Iraq and Afghanistan. Military parents and children during this period faced lengthy, and often multiple, deployments with concomitant deployment-related separation and substantial deployment-related stress. While military families and children exhibit substantial resilience, and military programs aim to assist families during the deployment of a member, there is evidence of negative consequences for children. Among military children, longer parental deployments were associated with increased problems in school, in the family, and with peers (Chandra et al. 2010; Lester et al. 2010). Whether such problems persist and represent seeds of longer-term problematic trajectories and outcomes, represent relatively transient difficulties in challenging circumstances, or generate stress-related growth that benefits these children later in

life are questions that lend themselves well to future investigation. Similar questions should be asked specifically in relation to the large number of Reservists who were mobilized as part of the recent war efforts and their children. Reserve families are less accustomed to deployment. Some research suggests that all members of activated Reserve families experience “boundary ambiguity,” which is a state in which family members are inconsistent in their reports of who is in or out of the family and who is performing what roles within the family (Faber et al. 2008). Such ambiguity, if prolonged, may have significant consequences for children.

It is beyond the scope of this chapter to provide an extensive review of the findings contained in the recently published issue of *The Future of Children* (Cozza and Lerner 2013) and related literature. However, we believe it is important for life-course researchers with interests in children and youth, and how experiences in childhood shape adult life-course trajectories and outcomes, to recognize these contemporary circumstances. The research community needs to think carefully about the kinds of data that will be necessary to investigate whether and how military-related childhoods affect lives as they unfold over time (Chandra and London 2013; Teachman 2013). A failure to act now risks leaving the contemporary experiences of a large number of military children hidden in future life-course research.

4.3 Children and Youth in Veteran Families

A third and final issue that is pertinent to life-course researchers with interests in the military and children and youth pertains to children in veteran families. As noted recently by Burland and Lundquist (2013: 172): “The literature on military and family focuses almost exclusively on current families in the military, not on veteran families, whereas the existing veteran life-course literature is focused mostly on individuals, not on families.” Veteran families are those in which at least one member served on active-duty in the armed forces. Some, but not all children in

veteran families were military children. Sometimes, family formation begins after the period of active-duty service ends, such that children of veterans never directly experience the military institution directly. However, they may experience it indirectly, as a result of the effects of military service on their parent or parents, on family life, and in relation to the material resources to which they have access. In the context of providing a comprehensive review of the literature on veteran families, Burland and Lundquist (2013) argue that the military often maintains complex ties to veteran families long after the service member's active-duty service has ended. These ties may operate through GI Bill benefits for education or home loan guarantees. In the context of service-connected disability or the death of a service member, the ties between the military and the veteran family may actually be intensified as pensions are paid out over the long-term. The extent to which these complex and variable ties to the military continue to shape the lives of children and youth whose lives are linked to veterans are important questions that to date remain understudied.

5 The Transition to Adulthood

Life-course scholars have demonstrated that the pathways taken during the demographically dense period of young adulthood (Rindfuss 1991) can leave an indelible mark on the course of human lives (Shanahan 2000). Military service is a salient pathway to adulthood for many young Americans (Bennett and McDonald 2013; Kelty et al. 2010; Kelty and Segal 2013). Of the 1,411,424 active-duty personnel in 2011, 13.3 % were 25 years old or younger and another 22.5 % were 26–30 years old (Department of Defense 2012). Considering only enlisted personnel, 49.3 % were 25 years old or younger.

Most active-duty service begins and ends during the stage of the life course often identified as the transition to adulthood. For the 1940, 1945, 1950, 1955, 1960, and 1965 single-year birth cohorts, less than 5 % of men remained on active duty by age 30 years (Figure 13.2 in Wolf et al.

2013). While age at entry and exit from the military define duration of service, they also mark transitions out of and into civilian adulthood. Prior to service or in its absence, civilian status signifies non-veteran; after service, civilian status signifies veteran. Since the military is one of the largest single employers of young men, and increasingly young women, the period of active-duty service coincides with, and to a certain degree constitutes, the transition to adulthood for many Americans. Given extensive heterogeneity in military service experiences and outcomes, as well as the transformative potential of the military as a quasi-total institution, veteran status can signify an enormous range of personal circumstances in early adulthood. While conditioned by period-specific and dynamic economic, labor market, social, political, and familial factors, mid- and later-life effects of military service are emergent in or anchored to active-duty service in early adulthood. For example, combat-related injuries, accidents, or military sexual trauma that occur during the active-duty, young-adult period of the life course point to direct mechanisms by which military service can negatively impact young lives (MacLean 2013). On the positive side, education and training in the military can in some circumstances transfer and provide a competitive edge in the civilian labor market (Kleykamp 2013).

How military service affects the transition to adulthood, and thereby, subsequent life-course trajectories and outcomes, has been the subject of a substantial amount of theoretical consideration and empirical investigation (Wilmoth and London 2013). Yet, there is a need for additional specification and testing of the mechanisms by which serving in the military service has effects on particular outcomes. Some of the most influential research on military service and the transition to adulthood has focused on discontinuities in the life course—turning points and life course disruption, and on how military service may benefit individuals from disadvantaged backgrounds (Bennett and McDonald 2013; Browning et al. 1973; Elder 1986, 1987; Hogan 1981; Kelty et al. 2010; Sampson and Laub 1996). Other research focuses on the timing and sequencing of life-course

transitions into marital, parenting, and occupational roles in relation to military service. Recent work takes up military service in relation to the emergent “new” transition to adulthood paradigm (Berlin et al. 2010; Settersten and Ray 2010), which we believe is a useful framework for guiding future research on the transition to adulthood.

5.1 Military Service and Discontinuities in the Life Course

The potential for military service to produce discontinuities in the life course has been a long-term focus in the literature. Early theorizing focused on the potential for the military to benefit individuals from disadvantaged backgrounds. One conceptual model—commonly referenced as the military-as-turning-point hypothesis—suggests that the military “knives off” negative early-life influences and provides a “bridging environment” in which service members can obtain resources that reset their life course in beneficial ways (Browning et al. 1973; Lopreato and Poston 1977). Settersten and Ray (2010: 35) write that the military is: “designed to shape the futures of young adults by providing a setting in which they can successfully live, work, and learn. By coupling expectations and demands with guidance, mentoring, and other resources, military service helps young adults acquire skills and fosters a sense of competence...it also provides a bridge from school to higher education or the labor force by providing tuition credits, loan forgiveness, financial stipends, access to jobs, or health insurance and other benefits.” While such benefits and “bridging” functions are not automatic, and military service during war time (and to a lesser extent peace time) carries a substantial risk of injury (MacLean 2013) that can produce a negative turning point in the life course, there is evidence that military service may be particularly advantageous for individuals from disadvantaged backgrounds. For example, Sampson and Laub (1996: 364) conclude: “Military service in the World War II era provided American men from economically disadvantaged backgrounds with

an unprecedented opportunity to better their lives though on-the-job training and further education” (see also Laub and Sampson 2003). Mettler (2005) has made similar arguments.

Glen H. Elder’s (1986, 1987) early theorizing about how military service could produce discontinuities in the life course focused attention on age at entry into military service, and the relation of military service to psychosocial maturation and the timing of other life-course transitions. By focusing on early versus late entry into the military, he further elaborated the military-as-turning-point hypothesis and a corollary life-course-disruption hypothesis. Focusing on service during World War II, Elder (1987) argued that early entry constituted a social and psychological moratorium that delayed the transition to adulthood. By delaying the assumption of marital, parenting, and civilian occupational roles, individual service members could maximize their utilization of service benefits and the resources made available by the institution. Early entrants were likely the most disadvantaged, who had fewer alternatives and were, perhaps, proactively seeking a route out of difficult early-life circumstances. Such individuals were most likely to benefit from the health and educational benefits available to them through military service. In contrast, relatively late age at entry into the military had the potential to disrupt established marital, parenting, and occupational trajectories. Later entrants likely came from more-advantaged socioeconomic backgrounds, and were more likely to have completed their educations, be married, have children, and have launched their careers prior to entering the military. As a result, military service later in the transition to adulthood could disrupt established life-course patterns. Moreover, late entrants would likely have less motivation and opportunity to take advantage of the educational benefits available to veterans. Thus, through various mechanisms, the gains that would accrue to more-disadvantaged, earlier entrants might not materialize to the same degree or with the same effects in their lives, and they might actually be disadvantaged due to service-connected injury or the disruption that serving engendered in their family and work lives.

Empirical examination of these theoretical propositions yielded substantial support. Elder (1986) reported that those who entered military service at younger ages did in fact come from more-disadvantaged family backgrounds, had poorer grades, and reported lower feelings of self-adequacy. However, relative to non-veterans, they were able to achieve equal occupational outcomes, to have more stable marriages, and to experience larger gains in psychological strength through mid-life. The positive turning point they experienced was in part due to their later transition to adult roles and responsibilities. This interpretation is consistent with the beliefs of the majority of early entrants, who were much more likely than later entrants to report retrospectively that their lives had followed a different and more rewarding course as a result of their military service (Elder 1987). In addition to the corollary evidence regarding late entry that is reported by Elder (1986, 1987), other studies provide direct evidence in support of the life-course-disruption hypothesis. For example, Elder et al. (1994) report, based on data from the relatively advantaged men in the Stanford-Terman longitudinal study who experienced World War II, that each year that entrance into military service was delayed reduced the economic and job benefits associated with military service, and increased the risk of life-course disruption and related costs. Moreover, partly as a result of the work-life disadvantages they experienced, late-mobilized men were at greatest risk of negative physical health trajectories over the life course. London and Wilmoth (2006) also examined the turning-point and life-course-disruption hypotheses in their study of the influence of race and early-life socioeconomic status disadvantage on men's later-life mortality. Based on analyses of data from men in the Health and Retirement Study (HRS) and the Study of Assets and Health Dynamics among the Oldest-Old (AHEAD), which include a nationally-representative sample of cohorts who experienced World War II, the Korean War, and the Vietnam War, they found little evidence that military service or early age at

entry was beneficial; most of the evidence was consistent with life course disruption and continuity of disadvantage interpretations.

Emerging research pays attention to other mechanisms by which military service can produce discontinuities in the early-adult life course. Miech et al. (2013) theorized that the stringent antidrug policies that the military successfully instituted in the mid-1980s, and expanded and refined subsequently, could substantially reduce illicit drug use, even among those who used drugs prior to entering the military. Knowledge of when the policies were instituted and what they entailed allowed for the design of a natural experiment to evaluate the impact of military service on illegal drug use in young adulthood. These investigators conducted an age-period-cohort analysis of data from the 1985, 1988, and 1990–2010 National Survey of Drug Use and Health in order to examine the impact of military service on long-term trends in hallucinogen use. Results were consistent with the hypothesis that a mandatory anti-drug policy enforced within the context of a powerful total institution can lead to a life-long reduction in hallucinogen use. Among birth cohorts who were young adults immediately before the implementation of the antidrug policies, the odds of past-year hallucinogen use were twice as high for veterans than for nonveterans over the life course. This difference disappeared among birth cohorts that passed through young adulthood after the antidrug policies were implemented even though veterans had significantly higher overall rates of illegal drug use in adolescence. Further analysis indicated that, after the drug-testing policies were implemented, veterans had significantly lower prevalence of past-year hallucinogen use than nonveterans among the subgroup who reported a history of illegal drug use before age 18 years. These trends were not explained by trends in recruits' tendencies to use illegal drugs prior to entry into the military, although it is conceivable that knowledge of the military's drug policy dampened pre-service drug use among those who aspire to enter the military. Overall, the results of this study point to a specific

mechanism by which service in the armed forces produced a turning point that led to a lasting, life-long behavior change.

5.2 Timing and Sequencing in the Transition to Adulthood

The timing and sequencing of life-course transitions and events is a central concern in life-course studies generally (Elder and Johnson 2002; Elder et al. 2003; Giele and Elder 1998; Settersten 2003; Shanahan 2000). Concerns about timing and sequencing are embedded within the military-as-turning-point and life-course-disruption hypotheses that were discussed in the previous section. Questions related to how military service affects the timing and sequencing of transitions and events in the early-adult life course was a central focus of Hogan's (1981) book *Transitions and Social Change: The Early Lives of American Men*. In this book, he used data from the Occupational Changes in a Generation II survey, which was conducted in conjunction with the March 1973 demographic supplement to the Current Population Survey. Men from early- to mid-twentieth century birth cohorts, between the ages of 20 and 65 years were included. These are cohorts in which participation in the military was particularly high.

Hogan (1981) documented various effects of military service on timing and sequencing. For example, with respect to the timing of school completion in relation to military service, he notes that men from lower socioeconomic status backgrounds are less likely to attend college, and, if they complete college, they take longer and more variable amounts of time to do so. The GI Bill allowed many veterans, and some veterans from lower socioeconomic backgrounds, to delay entry into the labor force and attend college (Bound and Turner 2002; Stanley 2003). This accentuated inter-cohort variation. As Hogan (1981: 212) writes in relation to the availability of GI Bill education benefits: "It created a group of military-experienced birth cohorts among whom schooling was completed relatively late, at widely varying ages, and many persons married

and/or began their first full-time jobs while enrolled in school. To the extent that the veterans attending college under GI Bill benefits were from poor socioeconomic backgrounds, inter-cohort changes in transition behavior was assured."

Hogan (1981) also discusses how military service affected marriage patterns. Faced with sudden, sometimes unexpected, induction into the armed services during the draft, some men chose to marry at once, while others postponed marriage until after they completed their wartime service. Unmarried men who took up GI Bill education benefits after their service was completed would have to wait a long time to marry if they waited until after they completed school and found a first full-time civilian job. Thus, many veterans married "on-time," but prior to completing school or beginning work. Hogan (1981: 214) notes: "For most men, therefore, military service represented an obstacle to the smooth completion of the transition from adolescent to adulthood."

In addition to Hogan's (1981) early, seminal work on the topic of how military service shaped inter-cohort variation in timing and sequencing in the transition to adulthood, other studies have investigated the effects of military service on the timing and sequencing of role acquisition in early-adulthood. Much, but not all, of this work focuses on marriage and childbearing. For example, Card (1983) found that Vietnam-era veterans finished school, got married, and became fathers at significantly older ages than their non-veteran classmates. Call and Teachman (1996) examined marital stability in relation to the timing of first marriage and Vietnam-era military service (i.e., before, during, or after service). They found that Vietnam combat and non-combat veterans married at the same rate as non-veterans, and marriages contracted before or during service were not negatively impacted with respect to marital stability. However, marriages contracted after service experienced increased stability. Focusing on those serving during the All-Volunteer Force era, Lundquist (2004) reported that marriage was more common and occurred earlier in the lives of military personnel than in the lives of civilians, while Lundquist and Smith (2005) reported that military personnel also started childbearing

earlier. Teachman (2007a) examined the effect of military service and race on the timing of a first marriage, and found that military service increased the likelihood of marriage for both whites and blacks. After taking selectivity, income, and economic stability into account, observed effects were particularly strong for black men. Usdansky et al. (2009) used data from the Fragile Families and Child Well-Being Study and found that military service prior to a non-marital birth significantly increased the odds of marriage within 5 years for blacks only.

Although there is some research that addresses timing and sequencing issues in relation to military service, the research in this area is thin and many gaps in the research remain. As Burland and Lundquist (2013: 173–174) note in relation to the life-course-disruption hypothesis and the timing of family formation: “By implication, it may also be that families created after service are more positively benefited than families that form before or during service. This family formation timing comparison has scarcely been studied and is something that merits further research.” Beyond marriage and childbearing, many other questions about the timing and sequencing of transitions and events in the young-adult life course warrant additional attention. Consistent with the life-course principle of life-long development and the cumulative inequality perspective, the patterning of events in early-adulthood is likely to be an important determinant of what comes next.

5.3 The “New” Transition to Adulthood

The “new” transition to adulthood generally entails a lengthening of the time it takes for youth to leave home, complete school, enter the workforce, marry, and have children, as well as substantial variability in the sequencing of the various transitions that occur during this demographically-dense period of the life course (Berlin et al. 2010; Settersten and Ray 2010). In their contribution to an issue of *The Future of Children* on Transition to Adulthood, Kelty et al.

(2010) argue that military service during the era of the All-Volunteer Force is one of many pathways to adulthood, rather than a delay or a detour in the process of transitioning to adulthood (see also, Kelty and Segal 2013; Bennett and McDonald 2013). Kelty et al. (2010: 181) further argue that serving in the military results in transitions to adulthood that are “more stable and orderly” than is the case among those who have not served in the military. While it is beyond the scope of this chapter to delve substantially into the emergent evidence regarding the changes in the transition to adulthood that constitute the new paradigm, we believe that the “new” transition to adulthood paradigm frames a set of important issues that can and should be taken up in relation to military service. For example, building on Hogan’s (1981) work, it would be interesting to know whether and for whom the wars in Iraq and Afghanistan, in conjunction with the Great Recession of 2008, have complicated the stability and orderliness of transitions to adulthood among recent cohorts of veterans.

6 Middle Age and Later Life

Life-course researchers often focus on the mid- and later-life consequences of military service via the lens of veteran status since most individuals who serve have rejoined the civilian population by age 30 (Wolf et al. 2013) and sampling frames for household-based surveys often exclude active-duty military personnel. The consequences of early-adult military service on veterans’ mid- and later-life outcomes may be positive or negative, and transient, long-lasting, or permanent. Not all will be apparent in young adulthood; some may emerge in later life for the first time or as a recurrence. Although a substantial body of research on the consequences of military service exists (Wilmoth and London 2013), determining the causal influence of military service on a range mid- and later-life outcomes has been hampered by: the lack of long-term, comparative, longitudinal data; inadequate control of selection into military service; and insufficient measurement of the timing of military

service in relation to other life course events. The absence of data on the heterogeneity of military service experiences is also a critical issue. Some long-term studies are based on a relatively narrow range of birth cohorts, which contributes to uncertainty about the generalizability of findings. Other studies, such as those that use the HRS, are only able to observe individuals who survive to midlife, which raises a concern about mortality selection (i.e., left censoring) (Wolf et al. 2013).

Despite these limitations, extant research provides some insight into the long-term, potentially causal effects of military service on lives. Contributors to a recent edited volume entitled *Life-Course Perspectives on Military Service* (Wilmoth and London 2013) provide comprehensive reviews of what we know about the mid- and later-life consequences of military service for labor market outcomes among veterans and military spouses (Kleykamp 2013); family relationships (Burland and Lundquist 2013); spatial mobility (Bailey 2013); health (MacLean 2013); and later-life health and financial security (Street and Hoffman 2013). A review of the findings from those chapters is beyond the scope of this chapter. Here, we focus critical attention on a range of issues that are germane to understanding the long-term consequences of military service, and provide selected, illustrative examples from the literature that point to potential directions for future research.

6.1 Identifying Causal Effects

In the literature on military service and the life course, identifying causal effects has been a persistent challenge. Some researchers have used experimental audit studies to examine the impact of veteran status on employment (Kleykamp 2009, 2013) and experimental vignette studies to examine the influence of veteran status on public attitudes (MacLean and Kleykamp 2014). While the World War II- and Vietnam-era draft lotteries, and other variables, have been used to instrument military service (Angrist 1990, 1993; Angrist and Chen 2011; Angrist and Krueger 1994), instrumental variable methods have only been applied

successfully to a narrow range of birth cohorts and selected outcomes—primarily education and earnings. Although combat-exposed veterans demonstrate considerable resiliency over the course of their lives (Aldwin et al. 1994; Ardelt et al. 2010; Elder and Clipp 1989), combat exposure has been a particular focus of attention because it signifies the sacrifice soldiers make and it clearly reflects an observable causal effect of early-adulthood military service. Combat exposure can have life-long consequences for disability (Elder et al. 1997; MacLean 2010, 2013), physical and mental health problems (Elder et al. 2009; Vogt et al. 2004), inadequate sleep (London et al. 2014), and mortality (Bedard and Deschênes 2006; Dobkin and Shabani 2009; Elder et al. 2009), and it may also affect many other health-related processes and outcomes that unfold over the life course.

For example, in her study *Lives after Vietnam*, Card (1983) collected data that allowed her to describe the extensive combat-related experiences of Vietnam veterans (i.e., those who actually served in Vietnam and were potentially exposed to combat), and how those varied by branch, race, socioeconomic background, and academic aptitude. She was also able to draw on the extensive pre-service baseline data collected by Project Talent in order to control admirably for selection into the military. Among Vietnam veterans, those who served in the Army and Marine Corps were significantly more likely to have combat experiences than those who served in the Navy, Air Force, and Coast Guard. Specifically, they were more likely to: receive fire from the enemy (91.9 % versus 65.4 %); fire own weapon at enemy (68.8 % versus 34.7 %); kill enemy (45.7 % versus 20.8 %); see someone get killed (68.9 % versus 47.9 %); see enemy wounded (70.2 % versus 37.9 %); see American wounded (88.6 % versus 67.1 %); see enemy dead (77.3 % versus 38.9 %); see American dead (77.6 % versus 59.9 %); and be in a combat situation where survival was in jeopardy (74.0 % versus 45.3 %). Non-whites and men with lower-than-average socioeconomic backgrounds were more likely to serve in the Army and Marine Corps than the other branches, although there

were no significant race or socioeconomic status differences in the specific combat experiences that were reported by Vietnam veterans. However, Vietnam veterans with low academic aptitude were more likely than those with high academic aptitude to see American wounded, see enemy and American dead, and be in a combat situation where survival was in jeopardy.

Partly as a result of these experiences, veterans at the first follow-up had significantly more symptoms of post-traumatic stress disorder (PTSD)—nightmares, loss of control over behavior, emotional numbing, withdrawal, hyper-alertness, anxiety, depression—than non-Vietnam veterans (i.e., those who served but not in the Vietnam theater of operations) and non-veterans. They also had higher conviction rates for misdemeanors and felonies, and lower life satisfaction in general. However, demonstrating change over time and life-long development, at age 36, their ratings of various aspects of their lives—“relationship with wife or girlfriend, having and raising children, occupation or job, financial security and material well-being, health, relationship with other relatives, relationship with friends, intellectual development, personal understanding and awareness, socializing and entertaining, and recreational activities—were consistently higher than similar ratings taken just 7 years prior. While this was true of their classmates’ ratings too, the increases reported by the Vietnam veterans tended to be greater than those reported by their classmates” (Card 1983: 149). Whether and how these men’s lives continued to change through mid- and later life is unknown as there has not been a broad-scale long-term follow-up of the Project Talent sample to date.

6.2 Dynamic Outcomes

The negative and positive outcomes of military service are dynamic and can change over the life course. However, the long-term data sets that life-course researchers have available for analysis often do not contain an adequate number of points of observation to track trajectories of stability and change with age. Sometimes, negative

outcomes dissipate, as suggested above, while at other times they emerge in specific contexts or at particular points in the life course. In some circumstances, military service has positive effects that emerge and dissipate over time.

For example, Whyman et al. (2011) recently focused on peacetime service in order to document whether non-war military service may have beneficial effects on health and well-being through midlife. They used data from the National Longitudinal Survey of Youth and reported that men who served on active duty but did not see combat were less likely to experience depressive symptoms than non-veterans and men who served in the Reserves. To help establish a causal relationship, the Reserves were chosen as the comparison group because they share many unobserved characteristics with veterans, but have not served on active duty. Results also indicated that this beneficial effect of non-combat military service dissipated after discharge. Their analysis provides an important counterpoint to the prevailing emphasis in the social science literature and media on the negative mental health consequences of military service, and also suggests that the mental health consequences of military service can change over the life course.

Even if negative, positive, or neutral consequences of military service are evident at one point in the life course, it does not necessarily mean that the same will be the case at other points in the life course. For example, one of the contributors to the special issue of *Research on Aging on Military Service, Aging, and the Life Course* that Richard A. Settersten, Jr. edited focused on late-onset stress symptomatology among aging combat veterans (Davison et al. 2006). London et al. (2012) used data from the HRS to estimate growth curve models of men’s depressive symptom trajectories in later life by veteran status. Net of a broad range of other factors, they found that veterans had significantly fewer depressive symptoms than non-veterans around retirement age. Moreover, they found evidence of a positive turning point; military service offset the effect of early-life socioeconomic disadvantage on men’s later-life depressive symptoms. Only non-veterans from socioeconomically disadvantaged

backgrounds had elevated depressive symptoms in later life. The depressive symptoms trajectories of the other three groups—advantaged non-veterans and veterans, respectively, and disadvantaged veterans—were significantly lower and remarkably similar around the mean age (66.2 years), although all groups converged at the oldest ages.

6.3 Inter- and Intra-Cohort Variation

Secondary data analysts depend on large-scale data collection efforts to support their research agendas. Generally, they take what they can get in terms of measured outcomes and the birth cohorts that are represented in the data sets they use. Researchers who are interested in studying the same processes among different cohorts to determine if the effect of military service has changed must try to align different data sets, which introduces an element of uncertainty rooted in indirect comparisons. Nevertheless, the admirable research program elaborated by Jay Teachman and Lucky Tedrow over the last decade provides important insights into influences of military service on education, income, and marriage/family outcomes across cohorts (Teachman 2004, 2005, 2007a, b; Teachman and Tedrow 2004, 2007, 2008).

Some data sets do allow for direct inter- and intra-cohort comparison of dynamic outcomes. For example, two recent studies that focus on military service in relation to body mass index (BMI) are illustrative. In the era of the All-Volunteer Force, Teachman and Tedrow (2013) argue that eating and exercise patterns are more in balance during the active-duty period than they are during the more-sedentary veteran period. Eating habits established while in the military, when physical activity and caloric demands are relatively high, carryover into civilian life, but activity levels and exercise habits do not carry over to the same extent. As a result, during the transition to civilian life, veterans gain weight and then carry that weight with them as they age. From this perspective, the military is a protective

environment to the extent that it encourages physical activity during and after the period of active duty, but is a risk environment to the extent that it encourages eating habits that can lead to weight gain. Results from well-specified models support the conclusion that military service is associated with higher BMI.

Recent research using data from the HRS examined inter-cohort variation in men's later-life BMI trajectories and came to a similar conclusion (Wilmoth et al. [forthcoming](#)). Without any controls in the models, veterans exhibit lower BMI, on average, than non-veterans. However, with controls for birth cohort, early-life characteristics that occur prior to military service, potentially mediating mid- to late-life characteristics, and methodological controls for proxy report, attrition, and death during the study period, the effect of veteran status was found to be small, marginally significant, and positive (i.e., veterans were heavier than non-veterans). Overall, the results demonstrated the large effect of the secular trend in increased weight across the population—younger cohorts were substantially heavier than older cohorts regardless of their veteran status—and a substantively small but consistent, positive intra-cohort effect of veteran status.

There also appears to be intra-cohort variation in mid- to later-life health on the basis of veteran status. Wilmoth et al. (2010) used data from the 1992–2006 waves of the HRS to estimate growth curve models that examined differences in health trajectories between non-veterans and veterans, veterans with and without wartime service, and war service veterans who served during World War II, Korea, Vietnam, and multiple wars. They focused on men's health conditions, activities of daily living limitations, and self-rated health. Veterans had better health at the mean age of 66.2 years, but experienced greater age-related changes in health than non-veterans. Similarly, men who served during wartime had better health at the mean age, but more age-related changes in health than men who did not serve during wartime. Among war veterans, Vietnam veterans were in poorer health than veterans of World War II, the Korean War, and multiple wars at the mean

age, but they experienced less substantial age-related health changes than men who served during those earlier wars.

6.4 Timing and Sequencing in the Life Course

Data on timing and sequencing of life course events with respect to military service are often not collected systematically, which makes it impossible to isolate the long-term effects of military service in relation to other events during young adulthood. When such data on timing and sequencing are available, they can help explain the sources of variation in observed mid- and later-life outcomes. For example, with respect to timing in the life course, the relatively earlier age at marriage and childbearing among veterans may increase the odds of divorce and shape patterns of remarriage over the life course (Adler-Baeder et al. 2006; Lundquist and Xu 2014). With respect to sequencing, Hogan (1981) found that veterans of World War II, the Korean War, and the Cold War did not experience the mid-career earnings deficits that are usually associated with marrying before school completion. However, men who served in the armed forces during the Vietnam War and completed college after marriage did experience the socioeconomic attainment deficits that are usually associated with a non-normative transition to adulthood. These mid-life socioeconomic attainment outcomes are important because they lay the foundation for financial security in later-life and retirement (Street and Hoffman 2013), while also shaping the capacity for intergenerational transfers to children and, sometimes, aging parents.

In order to break new ground with an under-analyzed outcome and establish foundations for future investigation, life-course researchers sometimes proceed with studies that only allow for the theoretical description of the processes before, during, or after military service that may produce an observable association. For example, London et al. (2013) examined the association between veteran status and ever having an extramarital relationship among ever-married men and

women. Drawing on the life-course perspective, they theorized that the likelihood of engaging in extramarital relationships might be increased by: factors that select individuals into military service; the opportunities that deployment-related separations present; the male-dominated culture of the military; the sex industries that thrive around overseas bases and in the locations where deployed service members take rest and relaxation; and, possibly, the post-service careers chosen by veterans, if they disproportionately increase business-related travel and separation from a spouse. Using data from the National Health and Social Life Study (NHSLs), they found that 32 % of veterans had engaged in an extramarital relationship, which was about twice the rate of non-veterans. Multivariate analyses indicated that veterans, particularly male veterans, were significantly more likely than non-veterans to ever engage in an extramarital relationship, and that both veteran status and having had an extramarital relationship increased the odds of ever experiencing divorce.

Using the same pre-service, active-duty, post-service life-course theoretical framework, in a subsequent study, London and Wilmoth (2015) used data from three national surveys to investigate variation in men's participation in commercial sexual relationships by veteran status. Taken together, the samples included men who turned 18 years old between 1922 and 2010 and thus served in the military from the early part of the twentieth century through the early part of the twenty-first century. They found that male veterans were significantly more likely than non-veterans to report ever paying for sex, with rates across the three sub-studies ranging from 10.9 to 14.6 % among non-veterans and from 25.3 to 33.9 % among veterans. In multivariate models that controlled for demographic and early-life factors to the extent possible with available data, the odds of ever paying for sex were 2.25–3.10 times higher among veterans than among non-veterans. In a supplemental analysis using data from the General Social Survey (GSS), longer duration of service was associated with an increased odds of ever paying for sex. While the data they had available did not allow them to

determine the timing of the commercial sexual relations in the men's lives or in relation to military service, or demonstrate a causal relationship between serving in the military and ever paying for sex, the strength and consistency of the findings provided compelling evidence of an association that they deemed worthy of further theorizing and empirical investigation.

6.5 Linked Lives

Adequate data to examine how military service affects the lives of those who are linked to veterans as they age—grandparents, parents, siblings, spouses, and children—are generally not available in single-respondent surveys, and are under-analyzed when they are available. The literature on military service has paid some attention to spouses' outcomes. For example, military spouses are often conceptualized as “tied migrants” because active-duty service entails substantial mobility—relocations every 3–4 years (Bailey 2011, 2013). Frequent moves decrease military spouses' attachment to the labor force (Kleykamp 2013), which can reduce opportunity costs for childbearing. The increased mobility-decreased labor force attachment-increased fertility nexus among military wives has been examined to some extent in the literature (Gill et al. 1994; Gill and Haurin 1998). This is arguably a causal sequence that is driven by the tempo of service-related moves to which service members and their families are subjected. The military places substantial demands on woman as wives and mothers, particularly officer's wives (Harrell 2000, 2001; Lundquist and Xu 2014). Given the very large cohorts of older men who served in the military, most of whom were married, how linkage to men who serve affected military spouses' lives and women's aging is a topic that warrants considerably more attention among life-course scholars than it has received. To date, few studies consider the long-term consequences for spouses' later-life outcomes.

Serving in the military is risky, and many individuals are harmed as a result of serving their country (MacLean 2010, 2013). Service-

connected disability has important implications for injured service members' lives, but also for the individuals whose lives are linked to them. Sometimes, service-connected injuries generate short-term demands for family care; at other times, caregiving demands may extend over the long-term, with substantial consequences for caregivers' careers and well-being. It is noteworthy that recent evidence indicates that households that include disabled service members are at significantly greater risk of poverty and material hardship, which affect all household members (Heflin et al. 2012; London et al. 2011; Wilmoth et al. 2015b).

7 Conclusion

In their *Annual Review of Sociology* essay from over two decades ago, Modell and Haggerty (1991: 205) wrote that studies of military service and the life course aim “to connect the micro- and macro-levels of analysis, thus connecting the soldier's story to that of his [*or her*] changing society.” In setting the agenda for future life-course studies of military service, Teachman (2013: 275) recently wrote: “Research on military service has a long and rich history. Indeed, the roots of quantitative Sociology can be traced to research sponsored by the military during World War II... Yet despite this research heritage, fifty years after the publication of *The American Soldier*, we know surprisingly little about the ways military service is linked to the lives of the men and women who have served their country.”

In our view, military service is an emerging variable in life-course studies. A small group of life-course researchers have pursued programs of research over many decades, and several younger scholars, many of whom are referenced in this chapter, are poised to do so. Others have made singular, or less sustained but none-the-less important, contributions to the field. There is much to be gained by continued investigation. The recent, longest-ever, post-9/11 wars in Iraq and Afghanistan have generated a groundswell of interest and attention in the research community, the media, and the public. Many special issues of

journals that focus on military service in some way that is relevant for life-course researchers have recently been published or are forthcoming (e.g., *The Future of Children*, *Substance Use & Misuse*, *The Gerontologist*, *The Journal of Gerontological Social Work*). There is renewed energy in the field, and much to be gained by the careful theoretical specification and empirical testing of the mechanisms by which participation in the military produces effects on the life course.

In order to maximize the potential for studying the military service in lives, new and enhanced data collection will likely be necessary (Chandra and London 2013; Teachman 2013). It is critical that these data collections take into account the previously mentioned methodological challenges that hamper our current understanding of the long-term consequences of military service. In particular, we need nationally representative data that: measures selection into military service and specific military service experiences in order to identify the causal aspects of service that initiate enduring life-course effects; considers a range of positive and negative life course outcomes to reveal the heterogeneous effects of military service within and between cohorts; collects data at regular intervals throughout mid- to late-life to track the trajectory of emerging and dissipating effects; contains information on the timing of events to clarify how military service relates to other life course events like completion of education, union formation and dissolution, childbearing, and emergence of health conditions; and links the data of primary respondents to significant others, such as parents, spouses, children, and grandchildren, to understand how the effects of military service reverberate through lives. Addressing these methodological concerns will enable researchers to understand the enduring effects of military service and to pursue core and emerging substantive topics within life-course studies, such as many that have been mentioned throughout this chapter. Future research might also examine variation on the basis of gender, race/ethnicity, and sexual identity; gene-environment interactions and the extent to which military service is a risky or protective early-life environment for individuals with specific genetic

susceptibilities; and international, comparative research questions that focus on how different state policies structure the life course in relation to military service.

The time to tackle these methodological challenges and pursue these substantive topics is now, as aging veteran cohorts from World War II and the Korean War, who are currently over the age of 75, are replaced by the retirement-aged Vietnam War cohort, the middle-aged Gulf War cohort, and the young-adult aged post-9/11 cohort that served in Iraq and Afghanistan. In some respects, we have missed the opportunity to fully elucidate the mechanisms by which military service affects lives based on the experiences of the cohorts who served in the military during the middle of the twentieth century. New data collection on these cohorts could still yield important insights if it carefully attends to the previously discussed methodological issues. But, the most promising research is on the All-Volunteer Force-era cohorts because they can be prospectively tracked through middle age and later-life. Building on existing studies and pursuing new data collection with these younger cohorts can lay a foundation that will lead to better understanding of the long-term impact of military service on lives.

References

- Adler-Baeder, F., Pittman, J. F., & Taylor, L. (2006). The prevalence of marital transitions in military families. *Journal of Divorce and Remarriage*, *44*(1–2), 91–106.
- Aldwin, C. M., Levenson, M. R., & Spiro, A. (1994). Vulnerability and resilience to combat exposure: Can stress have lifelong effects? *Psychology and Aging*, *9*(1), 34–44.
- Angrist, J. D. (1990). Lifetime earnings and the Vietnam era draft lottery—Evidence from Social Security administrative records. *American Economic Review*, *80*(3), 313–336.
- Angrist, J. D. (1993). The effect of veterans benefits on education and earnings. *Industrial & Labor Relations Review*, *46*(4), 637–652.
- Angrist, J. D., & Chen, S. H. (2011). Schooling and the Vietnam-era GI Bill: Evidence from the draft lottery. *American Economic Journal: Applied Economics*, *3*, 96–118.
- Angrist, J. D., & Krueger, A. B. (1994). Why do World War II veterans earn more than nonveterans. *Journal of Labor Economics*, *12*(1), 74–97.

- Ardelt, M., Landes, S. D., & Vaillant, G. E. (2010). The long-term effects of World War II combat exposure on later life well-being moderated by generativity. *Research in Human Development, 7*(3), 202–220.
- Bachman, J. G., Segal, D. R., Freedman-Doan, P., & O'Malley, P. M. (2000). Who chooses military service? Correlates of propensity and enlistment in the US armed forces. *Military Psychology, 12*(1), 1–30.
- Bailey, A. K. (2011). Race, place and veteran status: Migration among black and white men, 1940–2000. *Population Research and Policy Review, 30*(5), 701–728.
- Bailey, A. K. (2013). Military employment and spatial mobility across the life course. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 185–199). New York: Routledge.
- Bedard, K., & Deschênes, O. (2006). The long-term impact of military service on health: Evidence from World War II and Korean War veterans. *American Economic Review, 96*(1), 176–194.
- Bennett, P. R., & McDonald, K. B. (2013). Military service as a pathway to early socioeconomic achievement for disadvantaged groups. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 119–143). New York: Routledge.
- Berlin, G., Furstenberg, F. F., Jr., & Waters, M. C. (2010). Introducing the issue. *The Future of Children, 20*(1), 3–18.
- Bound, J., & Turner, S. (2002). Going to war and going to college: Did World War II and the G.I. Bill increase educational attainment for returning veterans? *Journal of Labor Economics, 20*(4), 784–815.
- Brown, M. T. (2013). Military service and lesbian, gay, bisexual, and transgender lives. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 97–118). New York: Routledge.
- Browning, H. L., Lopreato, S. C., & Poston, D. L. (1973). Income and veteran status – Variations among Mexican Americans, blacks and anglos. *American Sociological Review, 38*(1), 74–85.
- Burland, D., & Lundquist, J. H. (2013). The best years of our lives: Military service and family relationships—A life-course perspective. In J. M. Wilmoth & A. S. London (Eds.), *Life course perspectives on military service* (pp. 165–184). New York: Routledge.
- Call, V. R. A., & Teachman, J. D. (1996). Life-course timing and sequencing of marriage and military service and their effects on marital stability. *Journal of Marriage and the Family, 58*(1), 219–226.
- Camacho, P. R., & Atwood, P. L. (2007). A review of the literature on veterans published in *Armed Forces & Society, 1974–2006*. *Armed Forces & Society, 33*(3), 351–381.
- Campbell, D. (2013). Women's lives in wartime: The American Civil War and World War II. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 48–67). New York: Routledge.
- Card, J. J. (1983). *Lives after Vietnam: The personal impact of military service*. Lexington: Lexington Books.
- Carlson, E., & Andress, J. (2009). Military service by twentieth-century generations of American men. *Armed Forces & Society, 35*(2), 385–400.
- Chandra, A., & London, A. S. (2013). Unlocking insights about military children and families. *The Future of Children, 23*(2), 187–198.
- Chandra, A., Lara-Cinisomo, S., Jaycox, L. H., Tanielian, T., Han, B., Burns, R. M., & Ruder, T. (2010). *Views from the homefront: The experiences of youth and spouses from military families*. Santa Monica: RAND Corporation. http://www.rand.org/content/dam/rand/pubs/technical_reports/2011/RAND_TR913.pdf
- Clever, M., & Segal, D. R. (2013). The demographics of military children and families. *The Future of Children, 23*(2), 13–39.
- Clipp, E. C., & Elder, G. H., Jr. (1996). The aging veteran of World War II: Psychiatric and life course insights. In P. E. Rusking & J. A. Talbott (Eds.), *Aging and post-traumatic stress disorder* (pp. 19–51). Washington, DC: American Psychiatric Press.
- Cozza, S. J., & Lerner, R. M. (2013). Military children and families: Introducing the issue. *The Future of Children, 23*(2), 3–11.
- Cozza, S. J., Haskins, R., & Lerner, R. M. (2013). Keeping the promise: Maintaining the health of military families and children. *The Future of Children Policy Brief*. http://futureofchildren.org/futureofchildren/publications/docs/23_02_PolicyBrief.pdf
- Davison, E. H., Pless, A. P., Gugliucci, M. R., King, L. A., King, D. W., Salgado, D. M., Spiro, A., & Bachrach, P. (2006). Late-life emergence of early-life trauma—The phenomenon of late-onset stress symptomatology among aging combat veterans. *Research on Aging, 28*(1), 84–114.
- Dechter, A. R., & Elder, G. H., Jr. (2004). World War II mobilization in men's work lives: Continuity or disruption for the middle class? *American Journal of Sociology, 110*(3), 761–793.
- Department of Defense. (2012). *2011 Demographics: A profile of the military community*. Washington: Office of the Deputy Under Secretary of Defense. http://www.militaryonesource.mil/12038/MOS/Reports/2011_Demographics_Report.pdf
- Dobkin, C., & Shabani, R. (2009). The health effects of military service: Evidence from the Vietnam draft. *Economic Inquiry, 47*(1), 69–80.
- Elder, G. H., Jr. (1986). Military times and turning points in men's lives. *Developmental Psychology, 22*(2), 233–245.
- Elder, G. H., Jr. (1987). War mobilization and the life course: A cohort of World War II veterans. *Sociological Forum, 2*(3), 449–472.
- Elder, G. H., Jr. (2013). Foreword. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. xix–xxiii). New York: Routledge.

- Elder, G. H., Jr., & Bailey, S. L. (1988). The timing of military service in men's lives. In J. Aldous & D. M. Klein (Eds.), *Social stress and family development* (pp. 157–174). New York: Guilford.
- Elder, G. H., Jr., & Clipp, E. C. (1988a). Wartime losses and social bonding – Influences across 40 years in men's lives. *Psychiatry Interpersonal and Biological Processes*, 51(2), 177–198.
- Elder, G. H., Jr., & Clipp, E. C. (1988b). War experiences and social ties: Influences across 40 years in men's lives. In M. W. Riley (Ed.), *Social change and the life course* (Social structures and human lives, Vol. 1, pp. 306–327). Beverly Hills: Sage Publications.
- Elder, G. H., Jr., & Clipp, E. C. (1989). Combat experience and emotional health – Impairment and resilience in later life. *Journal of Personality*, 57(2), 311–341.
- Elder, G. H., Jr., & Johnson, M. K. (2002). Perspectives on human development in context. In C. von Hofsten & L. Bergman (Eds.), *Psychology at the turn of the millennium* (Social, developmental, and clinical perspectives, Vol. 2, pp. 153–175). East Sussex: Psychology Press Ltd.
- Elder, G. H., Jr., Gimbel, C., & Ivie, R. L. (1991). Turning points in life: The case of military service and war. *Military Psychology*, 3(4), 215–231.
- Elder, G. H., Jr., Shanahan, M. J., & Clipp, E. C. (1994). When war comes to men's lives: Life-course patterns in family, work, and health. *Psychology and Aging*, 9(1), 5–16.
- Elder, G. H., Jr., Shanahan, M. J., & Clipp, E. C. (1997). Linking combat and physical health: The legacy of World War II in men's lives. *American Journal of Psychiatry*, 154(3), 330–336.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer Academic/Plenum.
- Elder, G. H., Clipp, E. C., Brown, J. S., Martin, L. R., & Friedman, H. W. (2009). The lifelong mortality risks of World War II experiences. *Research on Aging*, 31(4), 391–412.
- Elder, G. H., Jr., Wang, L., Spence, N. J., Adkins, D. E., & Brown, T. H. (2010). Pathways to the all-volunteer military. *Social Science Quarterly*, 9(2), 455–475.
- Ender, M. G. (1996). Growing up in the military. In C. D. Smith (Ed.), *Strangers at home: Essays on the effects of living overseas and coming home to a strange land* (pp. 125–150). Bayside: Aletheia Publications.
- Ender, M. G. (2002). *Military brats and other global nomads: Growing up in organization families*. Westport: Praeger.
- Faber, A. J., Willerton, E., Clymer, S. R., MacDermid, S. M., & Weiss, H. M. (2008). Ambiguous absence, ambiguous presence: A qualitative study of military reserve families in wartime. *Journal of Family Psychology*, 22(2), 222–230.
- Fligstein, N. D. (1980). Who served in the military, 1940–73. *Armed Forces & Society*, 6(2), 297–312.
- Flynn, G. Q. (1993). *The draft 1940–1973*. Lawrence: University Press of Kansas.
- Gade, P. A., & Ruise, B. (2013). United States military services' sponsorship of life-course research: Past, present, and future. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 243–253). New York: Routledge.
- Giele, J. Z., & Elder, G. H., Jr. (1998). *Methods of life course research: Qualitative and quantitative approaches*. Thousand Oaks: Sage Publications.
- Gill, H. L., & Haurin, D. R. (1998). Wherever he may go: How wives affect their husband's career decisions. *Social Science Research*, 27(3), 264–279.
- Gill, H. L., Haurin, D. R., & Phillips, J. (1994). Mobility and fertility in the military. *Social Science Quarterly*, 75, 340–353.
- Gimbel, C., & Booth, A. (1996). Who fought in Vietnam? *Social Forces*, 74(4), 1137–1157.
- Harrell, M. C. (2000). *Invisible women: Junior enlisted Army wives*. Santa Monica: RAND.
- Harrell, M. C. (2001). Army officers' spouses: Have the white gloves been mothballed? *Armed Forces & Society*, 29(1), 55–75.
- Heflin, C., London, A. S., & Wilmoth, J. M. (2012). Veteran status and material hardship: The moderating influence of disability. *Social Service Review*, 86(1), 119–142.
- Hogan, D. P. (1981). *Transitions and social change: The early lives of American man*. New York: Academic.
- Human Resources Strategic Assessment Program. (2011). *Status of forces survey of active duty members: Leading indicators*. Arlington: Defense Manpower Data Center.
- Johnson, R. J., & Kaplan, H. B. (1991). Psychosocial predictors of enlistment in the all-voluntary armed forces: A life-event-history analysis. *Youth and Society*, 22(3), 291–317.
- Kelty, R., & Segal, D. R. (2013). The military as a transforming influence: Integration into or isolation from normal adult roles? In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 19–47). New York: Routledge.
- Kelty, R., Kleykamp, M. A., & Segal, D. R. (2010). The military and the transition to adulthood. *Future of Children*, 20(1), 181–207.
- Kleykamp, M. (2009). A great place to start? The effect of prior military service on hiring. *Armed Forces & Society*, 35(2), 266–285.
- Kleykamp, M. (2013). Labor market outcomes among veterans and military spouses. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 144–164). New York: Routledge.
- Laub, J. H., & Sampson, R. J. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge, MA: Harvard University Press.
- LeardMann, C. A., Powell, T. M., Smith, T. C., Bell, M. R., Smith, B., Boyko, E. J., Tomoko, I. H., Gackstetter, G. D., Ghamsary, M., & Hoge, C. W. (2013). Risk factors associated with suicide in current

- and former US military personnel. *Journal of the American Medical Association*, 310(5), 496–506.
- Lester, P., Mogil, C., Saltzman, C., Woodward, K., Nash, W., Leskin, G., Bursch, B., Green, S., Pynoos, R., & Beardslee, W. (2010). Families overcoming under stress: Implementing family-centered prevention for military families facing wartime deployments and combat operational stress. *Military Medicine*, 176(1), 19–25.
- London, A. S., & Wilmoth, J. M. (2006). Military service and (dis)continuity in the life course – Evidence on disadvantage and mortality from the Health and Retirement Study and the Study of Assets and Health Dynamics among the Oldest-Old. *Research on Aging*, 28(1), 135–159.
- London, A. S., & Wilmoth, J. M. (2008). Military service. In D. Carr, R. Crosnoe, M. E. Hughes, & A. Pienta (Eds.), *Encyclopedia of the life course and human development* (pp. 292–299). Farmington Hills: Gale.
- London, A. S., & Wilmoth, J. M. (2015). Veteran status and paid sex among American men: Findings from three national surveys. *Archives of Sexual Behavior*, 44(4), 997–1009.
- London, A. S., Heflin, C. M., & Wilmoth, J. M. (2011). Work-related disability, veteran status, and poverty: Implications for family well-being. *Journal of Poverty*, 15, 330–349.
- London, A. S., Brown, M. T., & Wilmoth, J. M. (2012). *Long-term consequences and turning points: Veteran status and men's later-life depression*. Presented at the 107th annual meeting of the American Sociological Association, Denver, 17–20 August.
- London, A. S., Allen, E., & Wilmoth, J. M. (2013). Veteran status, extramarital sex, and divorce: Findings from the 1992 National Health and Social Life Survey. *Journal of Family Issues*, 34(11), 1452–1473.
- London, A. S., Burgard, S. A., & Wilmoth, J. M. (2014). The influence of veteran status, psychiatric diagnosis, and traumatic brain injury on inadequate sleep. *Journal of Sociology & Social Welfare*, XLI(4), 49–67.
- Lopreato, S. C., & Poston, D. L. (1977). Differences in earnings and earnings ability between black veterans and non-veterans in the United States. *Social Science Quarterly*, 57(4), 750–766.
- Lundquist, J. H. (2004). When race makes no difference: Marriage and the military. *Social Forces*, 83(2), 731–757.
- Lundquist, J. H., & Smith, H. L. (2005). Family formation among women in the US Military: Evidence from the NLSY. *Journal of Marriage and Family*, 67(1), 1–13.
- Lundquist, J. H., & Xu, Z. (2014). Reinstitutionalizing the family: Lifecourse policy and marriage in the military. *Journal of Marriage and Family*, 76(5), 1063–1081.
- Lutz, A. C. (2013). Race-ethnicity and immigration in the U.S. military. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 68–96). New York: Routledge.
- MacLean, A. (2010). The things they carry: Combat, disability, and unemployment among U.S. men. *American Sociological Review*, 75(4), 563–585.
- MacLean, A. (2013). A matter of life and death: Military service and health. In J. M. Wilmoth & A. S. London (Eds.), *Life course perspectives on military service* (pp. 200–220). New York: Routledge.
- MacLean, A., & Elder, G. H., Jr. (2007). Military service in the life course. *Annual Review of Sociology*, 33, 175–196.
- MacLean, A., & Kleykamp, M. (2014). Coming home: Attitudes toward U.S. veterans returning from Iraq. *Social Problems*, 61(2), 131–154.
- Mettler, S. (2005). *Soldiers to citizens: The G.I. Bill and the making of the greatest generation*. New York: Oxford University Press.
- Miech, R. A., London, A. S., Wilmoth, J. M., & Koester, S. (2013). The effects of the military's antidrug policies over the life course: The case of past-year hallucinogen use. *Substance Use & Misuse*, 48, 837–853.
- Modell, J., & Haggerty, T. (1991). The social impact of war. *Annual Review of Sociology*, 17, 205–224.
- Mortimer, J. T., & Shanahan, M. J. (2003). *Handbook of the life course*. New York: Kluwer Academic/Plenum Publishers.
- National Center for Veterans Analysis and Statistics. (2014). Office of the Actuary, Veteran Population Projections Model (VetPop2014), Table 2 L. http://www.va.gov/vetdata/Veteran_Population.asp
- National Research Council. (2006). *Assessing fitness for military enlistment: Physical, medical, and mental health standards*. Washington, DC: National Academies Press.
- Pavalko, E. K., & Elder, G. H., Jr. (1990). World War II and divorce: A life-course perspective. *American Journal of Sociology*, 95(5), 1213–1234.
- Rindfuss, R. (1991). The young adult years: Diversity, structural change, and fertility. *Demography*, 28(4), 493–512.
- Sackett, P., & Mavor, A. (2003). *Attitudes, aptitudes, and aspirations of American youth: Implications for military recruitment*. Washington, DC: National Academies Press.
- Sampson, R. J., & Laub, J. H. (1996). Socioeconomic achievement in the life course of disadvantaged men: Military service as a turning point, circa 1940–1965. *American Sociological Review*, 61(3), 347–367.
- Segal, D. R., & Segal, M. W. (2004). America's military population. *Population Bulletin*, 59(4), 1–40.
- Settersten, R. A., Jr. (2003). *Invitation to the life course: Toward new understandings of later life*. Amityville: Baywood.
- Settersten, R. A., Jr. (2006). When nations call: How wartime military service matters for the life course and aging. *Research on Aging*, 28(1), 12–36.
- Settersten, R. A., Jr., & Ray, B. (2010). What's going on with young people today? The long and twisting path to adulthood. *The Future of Children*, 20(1), 19–41.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology*, 26, 667–692.

- Smith, R. T., & True, G. (2014). Warring identities: Identity conflict and the mental distress of American veterans of the wars in Iraq and Afghanistan. *Society and Mental Health, 4*(2), 147–161.
- Spiro, A., Schnurr, P. P., & Aldwin, C. M. (1997). A life-span perspective on the effects of military service. *Journal of Geriatric Psychiatry, 30*(1), 91–128.
- Stanley, M. (2003). College education and the midcentury GI Bills. *Quarterly Journal of Economics, 118*(2), 671–708.
- Street, D., & Hoffman, J. (2013). Military service, social policy, and later-life financial and health security. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 221–242). New York: Routledge.
- Teachman, J. D. (2004). Military service during the Vietnam era: Were there consequences for subsequent civilian earnings? *Social Forces, 83*(2), 709–730.
- Teachman, J. D. (2005). Military service in the Vietnam era and educational attainment. *Sociology of Education, 78*(1), 50–68.
- Teachman, J. D. (2007a). Race, military service, and marital timing: Evidence from the NLSY-79. *Demography, 44*(2), 389–404.
- Teachman, J. D. (2007b). Military service and educational attainment in the all-volunteer era. *Sociology of Education, 80*(4), 359–374.
- Teachman, J. D. (2013). Setting an agenda for future research on military service and the life course. In J. M. Wilmoth & A. S. London (Eds.), *Life course perspectives on military service* (pp. 254–274). New York: Routledge.
- Teachman, J. D., & Tedrow, L. M. (2004). Wages, earnings, and occupational status: Did World War II veterans receive a premium? *Social Science Research, 33*(4), 581–605.
- Teachman, J. D., & Tedrow, L. M. (2008). Divorce, race, and military service: More than equal pay and equal opportunity. *Journal of Marriage and Family, 70*(4), 1030–1044.
- Teachman, J., & Tedrow, L. (2013). Veteran status and body weight: A longitudinal fixed-effects approach. *Population Research and Policy Review, 32*(2), 199–220.
- Teachman, J. D., & Tedrow, L. M. (2014). Delinquent behavior, the transition to adulthood, and the likelihood of military enlistment. *Social Science Research, 45*, 46–55.
- Teachman, J. D., Call, V. R. A., & Segal, M. W. (1993a). Family, work, and school influences on the decision to enter the military. *Journal of Family Issues, 14*(2), 291–313.
- Teachman, J. D., Call, V. R. A., & Segal, M. W. (1993b). The selectivity of military enlistment. *Journal of Political & Military Sociology, 21*(2), 287–309.
- U.S. Census Bureau. (2015). <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>
- Urdansky, M. L., London, A. S., & Wilmoth, J. M. (2009). Veteran status, race-ethnicity, and marriage among fragile families. *Journal of Marriage and Family, 71*(3), 768–786.
- Vogt, D. S., King, D. W., King, L. A., Savarese, V. W., & Suvak, M. K. (2004). War-zone exposure and long-term general life adjustment among Vietnam veterans: Findings from two perspectives. *Journal of Applied Social Psychology, 34*(9), 1797–1824.
- Wertsch, M. E. (1991). *Military brats: Legacies of childhood inside the fortress*. New York: Harmony Books.
- Whyman, M., Lemmon, M., & Teachman, J. (2011). Non-combat military service in the United States and its effects on depressive symptoms among men. *Social Science Research, 40*, 695–703.
- Wilmoth, J. M., & London, A. S. (2011). Aging veterans: Needs and provisions. In J. L. Angel & R. Settersten (Eds.), *Handbook of the sociology of aging* (pp. 445–461). New York: Springer.
- Wilmoth, J. M., & London, A. S. (2013). *Life-course perspectives on military service*. New York: Routledge.
- Wilmoth, J. M., & London, A. S. (forthcoming). The influence of military service on aging. In K. F. Ferraro, L. K. George, & D. Carr (Eds.), *Handbook of aging and the social sciences (8th edition)*. New York: Springer.
- Wilmoth, J. M., London, A. S., & Parker, W. M. (2010). Military service and men's health trajectories in later life. *Journal of Gerontology: Social Science, 56*(6), 744–755.
- Wilmoth, J. M., London, A. S., & Heflin, C. M. (2015a). The use of VA disability compensation and Social Security disability insurance among working-aged veterans. *Disability and Health Journal, 8*(3), 388–396.
- Wilmoth, J. M., London, A. S., & Heflin, C. M. (2015b). Economic well-being among older adult households: Variation by veteran and disability status. *Journal of Gerontological Social Work, 58*(4), 399–419.
- Wilmoth, J. M., London, A. S., & Himes, C. L. (forthcoming). Inter-cohort variation in the consequences of U.S. military service on men's body mass index trajectories in mid- to late-life. In C. Burton-Jeangros, S. Cullati, A. Sacker, & D. Blane (Eds.), *A life course perspective on health trajectories and transitions*. London: Springer.
- Wolf, D. A., Wing, C., & Lopoo, L. M. (2013). Methodological problems in determining the consequences of military service. In J. M. Wilmoth & A. S. London (Eds.), *Life-course perspectives on military service* (pp. 254–274). New York: Routledge.

Criminal Justice and the Life Course

Sara Wakefield and Robert Apel

1 Introduction

Few institutions in the United States have undergone such radical change as the criminal justice system over the last four decades—changes that brought it to the fore as an institution powerfully structuring the lives of those who come into contact with it. We focus our analysis on the United States for two reasons. First, historical developments in the United States have transformed the criminal justice system and, especially, the prison from an institution that few experience to one that has profound influences on the life course. Second, because a central premise of life-course theory is to link the institutional and historical context to the unfolding of individual lives, it is virtually impossible to do justice to the perspective *without* focusing the discussion on a specific place and time. We do, however, compare developments in the United States with other nations throughout. We take advantage of the conceptual tools of life-course analysis in order to integrate much of what we know from existing research about the criminal justice system and its consequences. Elder (1998) defines four key principles of the life-course perspective—context, timing,

interdependency, and agency—and we use these to structure the remainder of the review.

2 Context: History, Demography, and the Prison Environment

Context refers to the idea that “the life course of individuals is embedded in and shaped by the historical times and places they experience over their lifetime” (Elder 1998: 3). With respect to the criminal justice system, there are three major contexts that must be considered: historical, sociodemographic, and geographic. A fourth contextual facet that cannot be overlooked is the prison environment itself.

2.1 Historical Context

Since the early 1970s, the American criminal justice system has grown in size, scope, and influence. These shifts were historically unprecedented in scale and, importantly, largely unanticipated by criminologists. Writing in the 1970s, for example, prominent criminologists Alfred Blumstein and Jacqueline Cohen (1973) marveled at the remarkable stability of punishment between 1930 and 1970. At the time of their writing, the prison incarceration rate in the United States had achieved an apparent steady state of

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about 110 per 100,000, and only rarely strayed outside of the interval 100–120 per 100,000. This stability persisted through the crime rate increases of the 1960s, compelling them to propose a “conservation theory” whereby the threshold response to criminal behavior routinely adapts to maintain a constant level of punishment. An analysis of state imprisonment rates provided further evidence of this homeostasis (Blumstein and Moitra 1979). However, as if to mock this conservation theory, in the 1970s policymakers began laying the foundation for the “grand social experiment” (Frost and Clear 2009) that is now commonly referred to as mass incarceration.

Sociologist David Garland is usually credited with coining the phrase “mass imprisonment” and highlights two primary characteristics of the practice: (1) a rate of incarceration that is far beyond any historical or comparative standard (Garland 2001b: 5) and (2) incarceration rates that result in “the systematic incarceration of whole groups in the population” (Garland 2001b: 6). Figures 1, 2, 3, and 4 demonstrate just how much has changed with respect to crime and criminal justice since the 1970s in the United States (Federal Bureau of Investigation 1960–2012; Sourcebook of Criminal Justice Statistics 2014). As Garland’s characterization suggests and Fig. 1 displays, the imprisonment rate has grown steadily, whether or not the crime rate is moving upward or downward.

While most observers refer to mass incarceration as a national trend, there is substantial variation in the practice across states. Figure 2 compares incarceration rates across states in 2013. Some states, like Maine or Minnesota, never dabbled in the mass incarceration of its population while others, most notably in the South, have maintained the highest mass incarceration rates since beginning the practice in the late 1970s. Still others, best exemplified in California and Florida, were initial leaders in the high reliance on incarceration as a response to crime but have since scaled back because of crushing budget deficits, bloated prison populations, or, in the case of California, a federal court order to reduce their populations because of inhumane conditions.

Still, while there is substantial cross-state variation, the mass incarceration of large proportions of the population is unique to the United States in comparison to the rest of the world. Figure 3 compares incarceration rates in the United States relative to others across the globe, showing a rate in the United States that is 5–10 times the norm internationally.¹ Moreover, while the United States knows no peer in its rate of incarceration, the countries that come closest have little else in common with the United States and are typically characterized by repressive or unstable regimes (for example, Russia, Cuba, and Rwanda). Countries that more closely approximate the United States on other metrics (social, political, or economic) have also increased their use of incarceration—for example, the UK, Denmark, or the Netherlands—but no other Western democracy approaches the sheer scale of imprisonment evident in the United States over the last four decades. Unsurprisingly, the American prison boom coincided with massive expansion in spending on the criminal justice system overall, including police, courts, and corrections (see Fig. 4).

The punitive turn is generally explained through a confluence of factors including the emergence of law-and-order politics and the politicization of crime in the 1970s and 1980s (Beckett 1997; Garland 2001a; Jacobs and Helms 1996), economic realignment (Western 2006), and increasingly deterministic and punitive sentencing policies (National Research Council 2014; Simon 2007). Examples of such practices include mandatory minimum sentencing regimes (that require a prison term be served), so-called “three strikes and you’re out” laws (that dramatically lengthen prison sentences for recidivists), and the expansion of legal, civil, and social liabilities that accompany a felony conviction (that entrench former inmates in a “criminal” class) (Olivares et al. 1996; Shannon et al. 2014; Wakefield and Uggen 2010).

¹Note that Fig. 1 depicts imprisonment rates (incarceration in prisons) while Fig. 3 compares incarceration rates (incarceration rates in prisons *and* jails) hence the difference in overall rates across the figures.

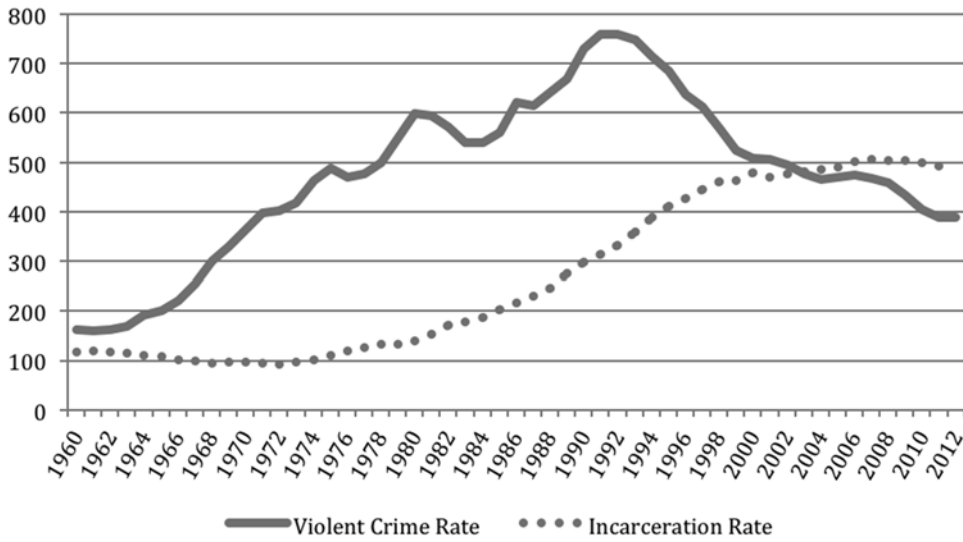


Fig. 1 U.S. Violent Crime Rate and Incarceration Rate per 100,000 (1960–2012)

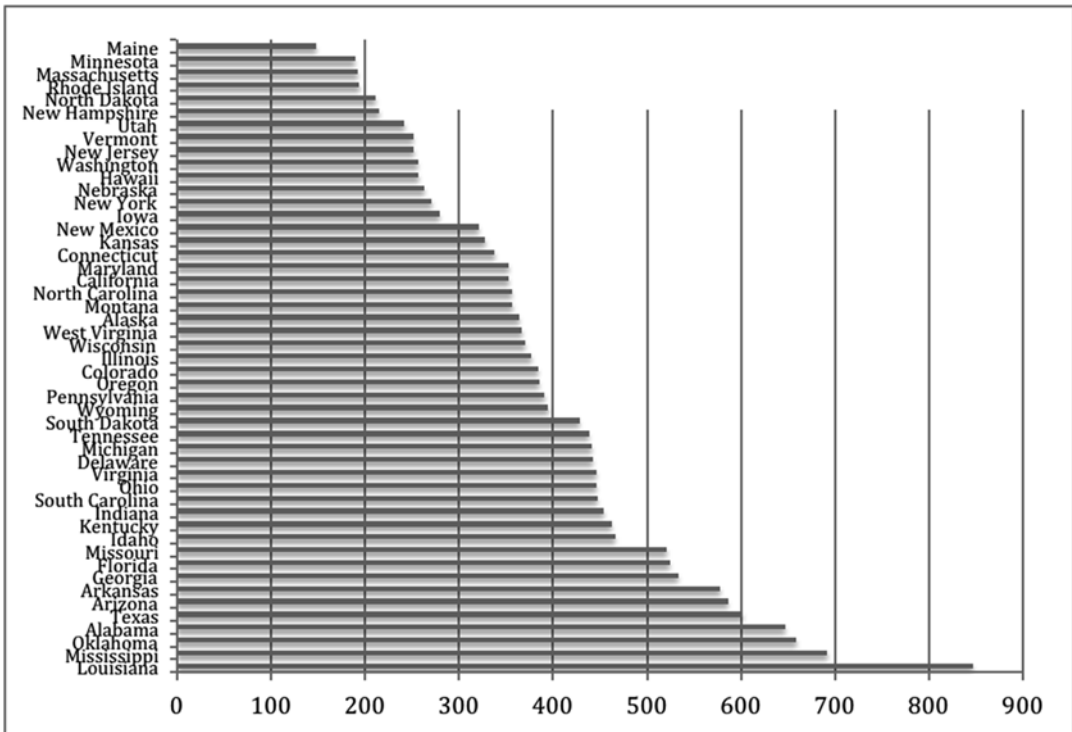


Fig. 2 Incarceration Rate per 100,000, by U.S. State (2013)

For our purposes of examining the effects of shifts in crime and punishment on the life course, trends in crime and punishment suggest that cohorts who came of age during the mass

incarceration era experienced rapidly increasing levels of formal criminal punishment and surveillance and widely varying levels of exposure to crime. The average young adult in the United

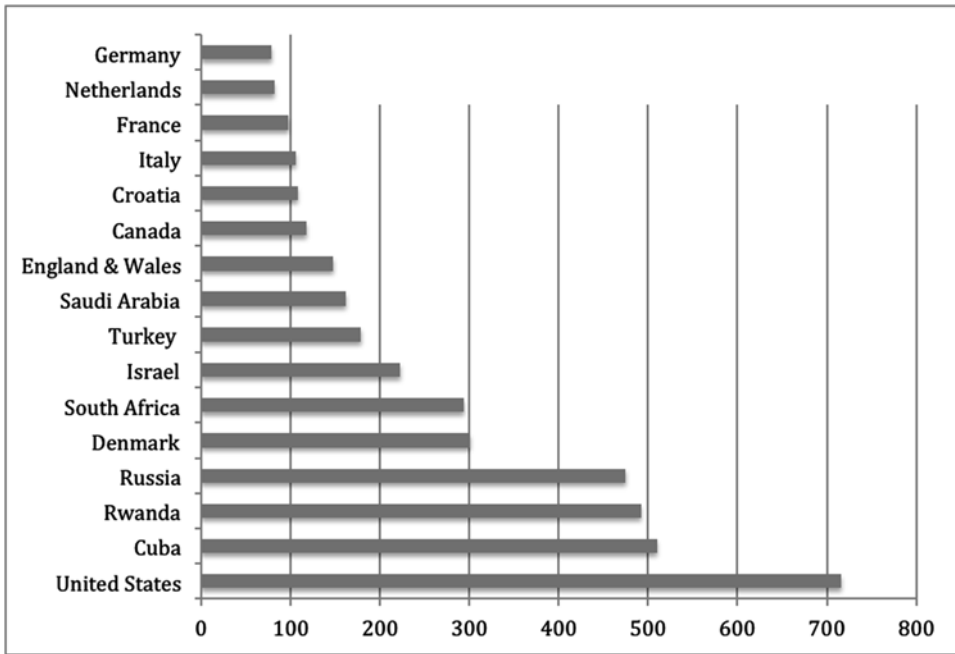


Fig. 3 Incarceration Rate per 100,000, by Country (2013)

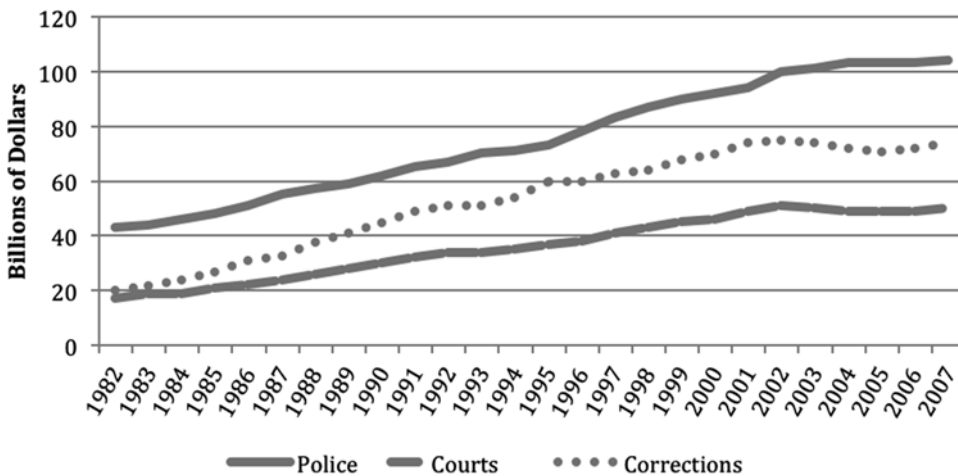


Fig. 4 Criminal Justice System Expenditures in the United States, 1982–2007

States today now has the novel historical experience of living in a low-crime society with the highest rates of criminal punishment in the world. In contrast, among the most disadvantaged and socially marginalized, crime, police surveillance, and criminal punishment are common experiences. It is to this group that we now turn.

2.2 Sociodemographic Context

Recall that Garland’s “mass incarceration” criteria include both high (relative to a historical or comparative norm) and demographically concentrated rates of incarceration. The graphs in the preceding section show how far out of any

historical or comparative mean the United States is with respect to its reliance on the prison. Yet mass incarceration is consequential for our understanding of the life course as much because of Garland's second criterion as the first. Incarceration in the United States is increasingly defined as the mass imprisonment of marginalized men—mostly Black and Hispanic men with very little education and very poor job prospects. Contact with the criminal justice system is thus driven by the intersection of group memberships defined by race (Black and Hispanic), sex (male), socioeconomic status (poorly educated, unemployed or low-wage workers), and neighborhood (highly concentrated disadvantage).

As with the causes of the prison boom, the causes of such stark racial disparities in the prison population are a point of significant debate among scholars—ranging from narratives of largely unintended consequences of race-neutral policies (Neal and Rick 2014) to mass incarceration as racial subjugation by another name (Alexander 2010). Indeed, others view the prison boom as “extrapenological,” or unrelated to crime rates, but instead driven by the same racialized forces that resulted in slavery or Jim Crow segregation (Wacquant 2000, 2001). Several studies do suggest that the proportion of sentencing disparities explained by racial differences in arrest has declined since the dawn of the prison boom (Baumer 2013) and racial disproportionality is surely the most striking feature of the modern criminal justice system in the United States (Wakefield and Uggen 2010). This debate is not yet settled, however—we would argue that although racial disparities are evident in all stages of the justice system, the causal mechanisms that produce them are not clear.

While race gaps in criminal involvement exist, they do not neatly explain race gaps in who ends up in prison (National Research Council 2014; but see Neal and Rick 2014). Black-white gaps in arrest and incarceration are more disparate with respect to drug crimes, yet numerous self-report studies show that Whites report comparable or higher levels of substance use relative to Blacks (Bachman et al. 1991; Beckett et al. 2006; National Research Council 2014). Race gaps and

cohort shifts in the likelihood of arrest and incarceration provide another salient example. A recent study found that about 30 % of Black males had been arrested at least once by age 18 and almost half (49 %) had been arrested at least once by the age of 23; the corresponding arrest risk for White males was 22 % and 28 % respectively (Brame et al. 2014). The race gap in cumulative risk of incarceration by age 30 for men who came of age during the prison boom is much larger—about 26.8 % of all Black males had been incarcerated compared to 5.4 % for White males. Among cohorts born 30 years earlier, prior to the prison boom, the comparable risks are 14.7 % (Black) and 3.8 % (White) (Western and Pettit 2010: 11). Similarly large race gaps in the risk of experiencing the incarceration of a parent are evident as well—raising the possibility of an intergenerational transmission of inequality that occurs via contact with the criminal justice system, criminal conviction, and prison experience (Pettit et al. 2009; Wakefield and Wildeman 2013; Wildeman 2009).

The race-sex-class nexus is the most striking characteristic of the modern prison population, but other characteristics define the group as well. The expansion of the criminal justice system in the United States has also increased the rate of women serving time—from about 5 per 100,000 in 1970 to 65 per 100,000 in 2013—and prisons are also characterized by an aging population with significant mental and physical health problems (Beck and Maruschak 2001; Bureau of Justice Statistics 2007; Myers and Wakefield 2014; National Commission on Correctional Health Care 2002). Indeed, spending time in the nation's prisons and, especially, jails are a common experience for those with severe mental illness (National Commission on Correctional Health Care 2002; Teplin 1984).

2.3 Geographic Context

Contact with the criminal justice system tends to be concentrated geographically as well—several studies show that a large proportion of inmates come from a relatively small number of neigh-

borhoods (Clear 2007; Gonnerman 2004; Sampson and Loeffler 2010). The spatial concentration of criminal justice experience is partially explained by developments in law enforcement that resulted in the concentrated surveillance of whole groups and neighborhoods. Serious criminal behavior is highly spatially concentrated, as is the law enforcement response to it (see Smith 1986). The very existence of the “crime hot spot” in the modern criminological lexicon reflects the non-random distribution of crime along with other indicators of physical and social disorder (see Sherman et al. 1989). Wilson and Kelling’s (1982) metaphor of a broken window to characterize the relationship between disorder and serious predatory crime became the dominant rationale for enforcement of public order violations (so-called “incivilities”). Consequently, many urban police departments have embraced the aggressive use of field interrogations of suspicious persons—especially the so-called “stop-and-frisk” or *Terry* stop (*Terry v. Ohio*, 392 U.S. 1 [1968]). Whatever its law enforcement benefits, however, it has been heavily criticized on the basis that it harasses poor and minority residents while having questionable impact on crime and disorder (Gelman et al. 2007; Goffman 2014; Tyler 2006; but see Zimring 2012).

We noted in the historical section of our essay that even at such high levels of incarceration, the average person in the United States has little contact with the criminal justice system and simply benefits from coming of age during a period with very little crime. Moreover, many scholars of the ‘collateral consequences’ of the prison boom, for example, routinely describe them as ‘hidden,’ ‘invisible,’ (e.g., Manza and Uggen 2006; Pettit 2012; Western and Beckett 1999) or otherwise opaque to the general public—the growth in incarceration and overwhelming reach of law enforcement has only recently become a source of public discussion and debate. The demographic and spatial concentration of crime, law enforcement attention, and prison experience is perhaps one explanation for the relative lack of public discussion of the deleterious consequences of the prison boom until very recently.

2.4 The Prison as Context

Finally, the relevance of context for life-course analysis leads to the additional realization that the prison or jail environment is a potentially salient context in its own right. The effects of ‘doing time,’ prison culture, and living in a ‘total’ institution was a source of sociological and criminological attention long before the rapid increase in the incarceration rate (E. Goffman 1961; Irwin 1970; Jacobs 1977; Sykes 1958/2007). Classic studies of institutionalization and prison culture generally pre-date the prison boom in the United States—with relatively few exceptions (e.g., Irwin 2005; Kruttschnitt and Gartner 2005; Skarbeck 2014) sociologists and criminologists increasingly turned their attention to life after prison in the form of collateral consequences research (see Wakefield and Uggen 2010 for a review) or focused on the control and maintenance of growing inmate populations (e.g., DiIulio 1987; Steiner and Wooldredge 2009) during the prison boom. That the prison environment as a consequential context for later life outcomes received less research attention during the height of the prison boom represents a large gap in the literature (see Kreager et al. 2015; Simon 2000 for further discussion).

There are reasons to think that the prison context is important for understanding life-course outcomes, whatever the rate of incarceration, but this question surely takes on more relevance as the prison population grows larger. Incarceration could promote the accumulation of a perverse form of knowledge known as “criminal capital.” Criminal capital is the accumulation of skills and knowledge that, while useful in the criminal underworld and in prison, are of little practical utility in more conventional settings (Hagan 1993). The most obvious way that correctional institutions could provide criminal capital is through peer influence. Inmates might become more deeply embedded in crime because they spend time in the company of fellow captives who strengthen their orientation to unlawful behavior. For example, Bayer et al. (2009) reported higher recidivism probabilities among juveniles who were exposed to other youthful

offenders remanded to the same Florida correctional facility, and who had committed the same type of offense. In other words, they found reinforcing effects of inmate peers on those offenses in which youth had prior experience, but no such reinforcing effects on offenses in which youth had no prior experience.

Criminal behavior might also be maintained through prison socialization, or what has been called “prisonization” or “institutionalization” (Clemmer 1940; Goffman 1961; Sykes 1958/2007). Adaptations to the habits and customs that prevail in correctional institutions may not be easily shed upon release and could therefore create problems of adjustment in conventional society. Correctional institutions are tightly controlled environments wherein inmates are stripped of their identities and cut off from social supports. Like Brooks Hatlen in *The Shawshank Redemption*—the elderly prison librarian who was paroled after serving 50 years in prison but who took his own life shortly after release—some returning ex-prisoners might experience psychological difficulty making the transition back into the free world after a lengthy prison sentence. Alternatively, in prisons that house the most dangerous offenders (e.g., maximum security prisons), James Jacobs (1977) suggests that socialization into a violent code of conduct could worsen recidivism risks.

It is not immediately obvious, however, that the incarceration experience is altogether negative for inmates, as the foregoing discussion about criminal capital and prison socialization might suggest. Although the rehabilitative ideal was never truly realized even in its supposed heyday of the 1970s (Phelps 2011), there is compelling evidence that some common prison-based programs lower the recidivism of participants. For example, in a meta-analysis of prison-based programs, Wilson et al. (2000) concluded that programs which provide adult basic education and post-secondary education produce consistent reductions in recidivism, as well as improvement in post-release employment. Furthermore, these and other programs generate net benefits with respect to their cost effectiveness (Aos et al. 2006). This suggests that, at least for some incarcerated offenders, the prison experience can

make a bad situation less bad by some measures, provided they are matched to the appropriate services.

We end this section by reiterating a curiosity: much of the research on the social structure and context of the prison took place before the massive increases in incarceration in the late 1970s and early 1980s. Research on the modern prison boom is thus largely de-contextualized today. Yet we know that the modern prison presents a number of difficulties for inmate adjustment while incarcerated and upon release. Modern prisons are often overcrowded places, mixing less experienced offenders with a criminal core, high rates of mental illness prevail, especially in jails, and the provision of vocational training and treatment services is highly variable. Often as a result of scarce data sources, few studies are able to link variation in institutional experience to later outcomes, thus much current research on imprisonment and the life course ignores the enormous ‘black box’ of institutional context.

3 Timing: Age-Graded Effects of Criminal Justice Contact

Timing is the principle that “the developmental impact of a succession of life transitions or events is contingent on when they occur in a person’s life” (Elder 1998: 3). Age is a central feature of life-course analysis of the criminal justice system, and encompasses such diverse themes as the age distribution of crime and criminal justice involvement, the age-graded consequences of involvement, the aging of the inmate population, and the very conception of criminal culpability (and the historical justification for a juvenile justice system distinct from the criminal justice system).

3.1 Age and the Evolution of Punishment

Age is inextricably linked to crime—self-reported criminal involvement tends to peak in

middle adolescence and fall off sharply by the late 20s. Indeed, the aggregate age-crime curve varies so little that criminologists Michael Gottfredson and Travis Hirschi (1986) deemed it unworthy of social explanation, though criminologists continue to examine its shape across place, space, and demographic groups (e.g., Lauritsen 1998; Liu 2015), as well as to develop life-course theories for individual-level trajectories of criminal involvement, persistence, and desistance (Moffitt 1993; Sampson and Laub 1994). For our purposes, the punitive turn described above also dramatically altered the consequences of criminal involvement for juveniles.

While age is inextricably linked to criminal involvement, youthful offenders were historically buffered from the most serious forms of criminal punishment. This is much less true today. Many of the social, cultural, and political changes that drove punitive policy adoption in the adult criminal justice system influenced the juvenile justice system as well—in addition, real increases in youth crime and gang violence in the 1980s and 1990s gave the impression that the country's youth were out of control (Welch et al. 2002). Prominent commentators warned of remorseless and violent juvenile “super-predators” and a wave of violent crime (DiIulio 1995). This never happened—as Fig. 1, presented earlier, clearly shows—but the commentary did support a host of policy shifts, to dramatic effect, in the juvenile justice system (Roberts 2004; but see Nagin et al. 2006). Among them, the transfer of juveniles to adult court became relatively common and juveniles, some only pre-teens, were increasingly subject to adult punishment—long custodial sentences, mandatory life without parole, and even death (Bishop 2000; Fagan and Zimring 2000; Feld 1999). More subtle changes that reduced flexibility, encouraged mandatory sentences, and reduced legal protections were also evident throughout the early stages of the prison boom—taken together, all of these trends made it difficult to discern substantive differences between juvenile and criminal justice by the early 1990s (Feld 1990, 1997).

3.2 Aging in Prison

Just as the proportion of juveniles serving time increased, so too did the proportion of aging and elderly inmates. Lengthier sentences resulted in significant graying of the prison population. While the changes in the juvenile justice system brought immediate criticism, the problems associated with an aging prison population took longer to reveal. Beginning in the 2000s, however, bloated state prisons began to buckle at the weight and cost of such large prison populations (Auerhahn 2006; Mitka 2004). The costs imposed by older inmates are considerable; the group is characterized by the significant health problems that often accompany lives led in instability, violence, and substance abuse. The most notorious example is California—a leader in punitive sentencing laws like Three Strikes and the reliance on incarceration as a response to crime—as overcrowding and lack of adequate medical care in its prisons were deemed tantamount to cruel and unusual punishment by the U.S. Supreme Court in 2011 (Simon 2014).

3.3 Age-Graded Consequences of Criminal Justice Contact

Moving beyond the age profile of prison populations and the relative unimportance of age for punishment decisions, we can also think of the age-graded consequences of contact with the criminal justice system. First, custodial confinement during the late teens and early twenties corresponds to a critical period in the life course—the transition to adulthood. The expansion of the criminal justice system corresponds to the same historical moment that life-course sociologists began to describe the transition to adulthood as more variable, more precarious, and, for some, lengthier than during earlier eras (Arnett 2000; Shanahan 2000). While we can offer no direct test of this hypothesis at the aggregate level, locking up large numbers of adolescents and young adults presents numerous challenges for their ability to achieve common markers of adult status.

In life-course parlance, serving time puts youthful inmates “off-time” with their same age peers (Neugarten et al. 1965; Uggen and Wakefield 2005). This happens in a variety of ways—incarceration removes inmates from pro-social peers that may aid subjective desistance processes (Massoglia and Uggen 2010) and reduces their attainment of adult status markers like obtaining a degree (Page 2004), stable employment (Apel and Sweeten 2010; Pager 2003), family formation (Apel et al. 2010; Massoglia et al. 2011), and civic engagement (Manza and Uggen 2006). Mass incarceration thus targets a critical population for inclusion—young people on the cusp of adulthood—and dramatically influences their ability to move forward once they leave the criminal justice system. Importantly, these effects are not limited to convicted felons and former inmates. The era of mass incarceration is notable not just for the breadth of effects observed for inmates but the degree to which the experience of incarceration cascades to other groups socially connected to inmates (Comfort 2007). It is to these groups that we turn in the next section.

4 Interdependency: Linked Lives, Social Ties, and Spillover

Interdependency touches on the notion that “lives are lived interdependently, and social and historical influences are expressed through this network of shared relationships” (Elder 1998: 4). Individuals who become entangled in the criminal justice system are embedded within familial and social relationships with others who might experience vicarious consequences because of that entanglement, not to mention that the concentration of criminal justice involvement in certain neighborhoods potentially erodes the ability of communities to solve their own problems.

Many of us have a tendency to think of inmates as social isolates even before they entered the criminal justice system. Yet the majority of inmates were employed prior to entering prison (Bureau of Justice Statistics 2007), most have children (Mumola 2000), and, despite significant

lengthening of sentences for violent offenders, most serve relatively short sentences prior to returning to their communities (Petersilia 2003). These characteristics of the prison population, coupled with the sheer size of the “criminal class” in the United States (Shannon et al. 2014), results in enormous potential for spillover of incarceration effects to those socially-connected to inmates. Among the most studied are the effects of the prison population for social inequality, labor markets, neighborhoods, families, and schools.

4.1 Inequality in Labor Market and Family Outcomes

The prison boom has shaped the labor market in the aggregate and employment prospects at the individual level. Former inmates have great difficulty obtaining employment and incarceration experiences, even those that are relatively short, are associated with significant reductions in earnings over the life course (Apel and Sweeten 2010; Pager 2003; Ramakers et al. 2014; Western 2006). In the aggregate, the size of the prison population obscures indicators of economic health by removing large numbers of the unemployed to prisons where they are uncoun­ted in household employment surveys (Pettit 2012; Western and Beckett 1999); this is most problematic because it leads to the false conclusion that racial inequality in wages/income is improving when it is in fact worsening (Neal and Rick 2014; Western 2006).

A large research literature also details the near universal harmful effects of imprisoning large numbers of fathers for the wellbeing of their children and partners. The effects of paternal incarceration are global and nearly always in the direction of harm—worsening everything from mental health and behavioral problems (Geller et al. 2009; Wakefield and Wildeman 2013; Wildeman 2010) and financial security (Schwartz-Soicher et al. 2011) to school performance (Turney and Haskins 2014) and infant mortality rates (Wakefield and Wildeman 2013). The effects of maternal incarceration are more

heterogeneous (Turney and Wildeman 2015; Wildeman and Turney 2014), reflecting both greater seriousness and the smaller number of incarcerated mothers, but the chaos imposed on children by their mother's involvement in the criminal justice system is clear (E. Johnson and Waldfogel 2004; Siegel 2011).

Similar effects are observed with respect to the partners of inmates; incarceration is associated with divorce (Apel et al. 2010; Massoglia et al. 2011), maternal depression (Wildeman et al. 2012), harsh parenting (Turney 2014) and abuse (Wakefield 2005), and financial insecurity (Braman 2004; Schwartz-Soicher et al. 2011). Taken together, the consequences of incarceration for families are overwhelming. In perhaps the most apt description we have read, Megan Comfort (2008) refers to the instability, hassles, and stigma imposed on the families of inmates as a form of "secondary prisonization."

The rapid increase in incarceration in the United States has had important implications for social inequality as well. Shifts in inequality depend on two factors: first, that some experience or event do measureable harm and second, that there are large race and class differences in the likelihood of experiencing it. Both of these are clearly characteristic of the prison boom in the United States. An abundance of research describes the social disabilities and racial disproportionality associated with incarceration—declines in mental and physical health, wages, and family wellbeing are well-documented, among a host of others (see Wakefield and Uggen 2010; Wildeman and Muller 2012 for broad reviews)—and suggest that the prison boom is a consequential institution for the maintenance and durability of social inequality.

The effects of paternal incarceration for children and social inequality are often larger in magnitude than the effects of incarceration for inmates themselves (Wakefield and Wildeman 2013; Wildeman and Muller 2012). While most children of incarcerated parents will not serve time themselves, the negative effects of parental imprisonment in childhood nonetheless reflect a form of intergenerational transmission of disadvantage via contact with the criminal justice sys-

tem. The effects of incarceration for adult men's life course trajectories are limited because they have already accumulated a host of disadvantages by the time they enter prison. This necessarily limits the ability of prison to make a bad situation worse or drastically improve their circumstance. Contrast this with the experiences of their children. For all children relative to adults, there is more room for an important change in trajectory (in both positive and negative directions) because their lives are much less fixed and consequential childhood events are often more important than events that occur later in life. As a result, the effects of paternal incarceration for children are much more global (influencing mental and physical health, educational outcomes, occupational attainment, and increasing the risk of homelessness), tend to be larger in magnitude, and have much larger potential effects for social inequality (Wakefield and Wildeman 2013, 2011).

4.2 Institutional Spillover and 'Prison-Like' Contexts

Finally, just as incarceration effects spill over to socially-connected others, trends in the criminal justice system structure other social institutions as a result of co-occurring cultural and political trends. The same social undercurrents that have given rise to stark changes in the criminal justice system can be seen in other institutions that have taken on 'prison-like' conditions. The same sorts of practices that now dominate the criminal justice system can be seen in the practices of public schools, for example. Indeed, the overlap between punitive practices in the criminal justice system and punitive school discipline is so large that many commonly refer to the reciprocal institutional linkages between the two as a "school-to-prison pipeline" (Kim et al. 2010), and one can think of schools as sites of preparation for later carceral contact (Hirschfield 2008). The comparison between schools and prisons is most notable in two respects: first, racial disparity in school discipline, suspension, and expulsion is "colored" in much the same way as incarceration risk

(Skiba et al. 2002), and second, innovations to disciplinary policy parallel innovations to sentencing policies in effect and tone. It is hard, for example, to view Zero Tolerance policies in schools as anything other than directly analogous to Mandatory Minimum or Three Strikes laws in the criminal justice system (Schwartz and Rieser 2001). Both innovations rely on harsh punishment for first (or second or third) offenses, reduce discretion by allowing little to no deviation from prescribed punishments, and result in enormous racial disparities in outcomes.

More subtle forms of criminal justice system spillover are found with respect to broader institutional avoidance following contact with the criminal justice system. Mass surveillance and police attention is focused on a small number of neighborhoods and demographic groups—as a result, high warrant rates, police raids, and correctional supervision characterize some neighborhoods and demographic groups. In her ethnography of one Philadelphia neighborhood, for example, Alice Goffman (2014) describes a process of institutional avoidance and a life led constantly ‘on the run’ following initial criminal justice system contact. The men in Goffman’s study spent some time in prison but contact also structures their lives (and the lives of their families and friends) once released—much of their time was spent avoiding institutions in an effort to avoid entanglements with police or parole officers. Living on the run also precludes any form of stable employment or family life because to avoid the police is to avoid establishing a stable residence or employment, seeking medical care at hospitals (or being present for the birth of one’s child), or engaging any other institution that may keep a record of stable attendance. Using quantitative data, sociologist Sarah Brayne (2014) has confirmed this result—those who have had contact with the criminal justice system are significantly less likely to report contact with “surveilling institutions” that might lead to criminal justice system entanglements (e.g., hospitals, banks, employers, or schools).

Subtle forms of institutional avoidance as a result of contact with the criminal justice system (such those described by Goffman and Brayne)

are an emerging area of research and offer yet another example of the long reach of the prison into all facets of social life. It is nearly impossible for one to imagine how to establish a stable life-course trajectory without interacting with employers, schools, banks, or families. We suggest that all of these trends—mass incarceration, mass surveillance, and institutional spillover—add up to a population that is hidden, locked out, and living on the margins of society (Pettit 2012). Having fully described the structural conditions and constraints that characterize the mass incarceration era, we complete our essay by assessing the role of individual agency within the criminal justice system.

5 Agency: Crime Decision Making, Disrepute, and Individual Constraints

Agency is the acknowledgement that “individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstances” (Elder 1998: 4). However one thinks about choices in the presence of constrained options and extreme disadvantage, it is nevertheless the case that “crime pays” for many offenders. For other offenders, embedded in criminal subculture and in search of respect, criminal justice entanglement might actually confer a “badge of honor.” For yet other offenders, crime might very well provide a means to express their contempt for conventional society. These possibilities point to the fact that much criminal behavior arises from a series of choices made under a variety of institutional and social constraints, and that it can often serve a purpose that is quite useful when viewed from the perspective of the offender.

For individuals heavily involved in street criminal activity, criminal justice involvement is an ever-present liability. To use a labor market analogy—and at the risk of implying that criminal behavior is a kind of career when in fact it is highly intermittent and resembles no such thing—arrest is an “occupational hazard” that accompanies high-risk behavior. The economic

benefits of crime are most obvious in the case of drug trafficking. Early studies of the pecuniary benefits of drug selling indicated that it yielded mean earnings of about \$1,000 per year (Vicusi 1986; Wilson and Abrahamse 1992). What is notable about these estimates is their timing—the late 1970s, prior to the introduction of crack cocaine to urban drug markets. The earnings opportunities from drug selling would change considerably in the ensuing decade. For example, Reuter and colleagues (MacCoun and Reuter 1992; Reuter et al. 1990) conducted interviews with admitted drug offenders on probation in the District of Columbia in 1988. These offenders reported net income (gross income less expenses) from drug selling of over \$700 per month at the median (\$1,800 at the mean; \$2,500 at the 75th percentile). (Note that the 1988 estimates should be doubled to convert them to 2014 dollars.) Among those who sold drugs daily, they estimated a wage of \$30 per h for only 3 h of “work” each day, which was about 4 times the wage from legitimate employment for this sample.

Some offenders are also immersed in a “street culture,” and might feel compelled to adopt the attributes that are believed to characterize that culture, such as aggressiveness, a confrontational style, and an exaggerated sense of masculinity (Anderson 1999). Coupled with the notion of “deviance avowal,” this draws attention to the fact that some individuals may actively seek out criminal labels resulting from conviction or incarceration (Turner 1972). For example, criminal justice involvement may offer prestige and confer a “badge of honor” upon individuals from certain segments of the population where such experiences are a normal part of the life course. Thus, far from being a social stigma, criminal behavior and its legal consequences justice may serve as a status symbol that legitimates an offender’s criminal accomplishments in the eyes of his or her peers.

The two foregoing possibilities—criminal justice involvement as an occupational hazard and a badge of honor—are not necessarily mutually exclusive. A theme that has emerged from interviews with active offenders is that, in their pursuit of a party lifestyle, they commonly experience

an intense, pressing need for cash bordering on desperation. Jacobs and Wright (1999) observed that many offenders are immersed in a street-based culture that rewards “fast living,” referring to “fetishized consumption” of status-enhancing luxury goods and cash-intensive, “every night is a Saturday night” illicit activities (e.g., gambling, heavy drinking, hard drug use). Financial desperation arises when participants need a quick infusion of cash in order to keep the party going, as it were. Crime often provides the most efficient means available to resolve an acute financial crisis. While this suggests that much criminal activity has an economic motivation, it is not, strictly speaking, in the sense that offenders face financial hardship and are pushed by circumstances completely beyond their control.

In an empirical demonstration of the occupational facet of some criminal activity, Matsueda and colleagues (1992) analyzed data from the National Supported Work Demonstration Project, an evaluation of a transitional work program from the 1970s. The sample was composed of men released from jail or prison in the 6 months prior to entry into the study, as well as men involved in a drug treatment program in the year prior to study entry. They demonstrated that ex-inmates rated some legitimate occupations significantly lower than ex-addicts, despite the fact that both groups were chronically unemployed. Moreover, for both groups, the number of prior arrests was positively correlated with the prestige accorded to criminal occupations. While a lack of legitimate work opportunities for the ex-inmates might have accounted for this effect, it is also possible that it stemmed, in part, from outright defiance toward conventional society and its institutions (Sherman 1993).

Putting aside the numerous advantages to be acquired by risking involvement with the criminal justice system, the “mark” of a felony conviction or a prison sentence has the ironic effect of constraining opportunities and therefore channeling offenders into long-term criminality. While a felony conviction or prison sentence would be a consequential event in the life course in any era, the modern era is characterized by an overwhelming number of collateral consequences from which it is nearly impossible to escape

(American Bar Foundation 2015; Olivares et al. 1996). Formal legal consequences bar felons from employment, educational opportunities, family reintegration, public housing, various forms of civic engagement, among others, and effectively restrict the number of potential pathways to redemption. Informal legal consequences of a felony conviction (stigma, collateral consequences, and exposure to widespread surveillance, among others) also limit the ability of former inmates to rebuild their lives away from the criminal justice system. Agency is thus more limited and operates in countervailing ways for those involved in crime—it first brings people into the system through individual-level choices but the contours, breadth, and scope of criminal punishment today limits the ability of individuals to fully move beyond that criminal past. Even long after a criminal identity has been shrugged off, ex-offenders find that their legitimate options are severely limited. For convicted felons and former inmates in the current era, contact with the criminal justice system carries with it a permanent mark of dishonorable status.

5.1 Conclusion and Future Challenges

In this essay, we have used core concepts from life-course sociology to examine the role of the criminal justice system in modern life. We end our discussion by suggesting fruitful pathways for research in the area to move forward. Most importantly, we note a number of signs that suggest the prison boom era is receding. The increase in the incarceration rate has slowed (and even decreased in some states and at the federal level), significant legal reforms in the last 10 years have reduced the scope and punitiveness of criminal punishment, and the public is currently engaged in a sustained discussion surrounding police practices and issues of social justice.

It is becoming clear that our experiment in mass incarceration is a failure, imposing too many unintended consequences for social life and inequality for too small reduction in crime (Clear and Frost 2013; National Research Council 2014; Simon 2014). With respect to ever smaller crime

reduction benefits, there are a growing number of empirical studies that document these diminishing returns to prison growth, indicating that incarceration is far less effective at preventing crime today than it was in the not-too-distant past (R. Johnson and Raphael 2012; Liedka et al. 2006; Spelman 2000). Relatedly, many studies of the deterrent impact of incarceration relative to non-custodial sanctions indicate that, at best, incarceration has no relationship with criminal recidivism and might under certain circumstances make recidivism more likely (Nagin et al. 2009).

The potential to scale back our reliance on imprisonment as a response to crime control makes it all the more critical that sociologists and criminologists do more to describe how and for whom imprisonment is most consequential. Estimates of the relationship between crime and incarceration vary widely, suggesting that increases in the incarceration rate may have reduced crime by as little as zero and as much as 25 % but are hotly debated (see, for example, reviews, research, and commentary in Durlauf and Nagin 2011; Levitt 1996; Wakefield and Uggen 2010; Western 2006). At first glance, these estimates are surprisingly low given the sheer scale of imprisonment in the United States. One explanation for this is that while locking up large numbers of crime-prone young men reduces crime, locking up *so many* young men is a strategy with rapidly diminishing returns and has the potential to increase crime through its collateral consequences.

Mass incarceration brought fundamental changes in the types of law violators that are sent to prison. This is no doubt due in large part to the war on drugs that commenced in the early 1970s during the Nixon administration and accelerated during the Reagan administration of the 1980s. Since that time, growth in the drug incarceration rate has far outpaced growth in other crimes, contributing to 33 % of total prison growth (Blumstein and Beck 1999; Caulkins and Chandler 2006). Put simply, once you have locked up the most violent, troublesome, and high-rate offenders, further increases to the incarceration rate tend to concentrate on less serious offenders, yielding smaller crime benefits.

Yet because of the phenomenon of diminishing returns, discussed above, these estimates are

invalid for contemporary deliberation. We do not engage this debate in any great detail but, following Sampson (2011), suggest that even if one takes the mean crime reduction estimate (~10–15 %) as fact, this is an enormously important social intervention and likely to have profound effects on people's lives. Given voluminous research demonstrating the harms associated with exposure to violence (e.g., Bingenheimer et al. 2005; Sharkey 2010; Singer et al. 1995), a reduction in the violent crime rate on the order of 15 % is not to be taken lightly. These potential benefits, however, must be weighed against the potential costs to social life that accompany such a high rate of incarceration. That mass incarceration is associated with a host of damages to former inmates, their families, and their communities arises from the fact that mass incarceration swept up too many citizens who might better have been left in the community.

The lack of research on heterogeneity in criminal justice contact and its consequences is a glaring weakness in the area—without providing information on who *should* go to prison, researchers are out of conversation with policy makers in how to most effectively reduce the prison population while maintaining low crime rates. Similarly, while it is important to call attention to the massive increases in social inequality brought about by the prison boom (Goffman 2014; Wakefield and Uggen 2010; Western 2006), appeals to social justice have little chance for success if reductions in the prison population or changes in policing practices results in large increases to the crime rate. Again, following Sampson (2011), we suggest that research that better adjudicates between the consequences of incarceration for social life *while also accounting for its crime reduction impact* is an important consideration for future research.

We also see reason for tempering optimism about recent sentencing reforms and [small] reductions in the incarceration rate in some states. The abolition of the death penalty and mandatory life without parole sentences for juveniles by the Supreme Court (in 2005 and 2011, respectively), California Realignment (a program aimed to reduce state prison populations by 40,000) and its reform of Three Strikes in the last election, or recent reforms to federal drug sentencing laws

are substantial interventions, of course. Yet many of the reforms aimed at reducing the size and scope of the criminal justice system are limited to the low-hanging fruit of non-violent and low-level offenders. This is a worthy goal but it is worth noting that even if every drug offender in America's prisons were released tomorrow, the United States would still have the highest incarceration rate in the world. Similarly, California's prison population will remain a crushing problem for the state unless it allows for some discussion of the release of elderly inmates who were convicted of violent crimes.

Today, a full third of all youth are arrested by their early 20s (Brame et al. 2011), often for less serious crimes. African American men who dropped out of high school are more likely to spend time in prison than to eventually obtain a college degree or spend time in the military (Western 2006). Paternal incarceration is a consequential cause of the intergenerational transmission of disadvantage (Wakefield and Wildeman 2013). Differences in risks across cohorts and demographic groups like these suggest the potential for aggregate-level, cohort-, and period-specific effects—and evoke classic life-course analyses on the long-term effects of other institutional, economic, and political shifts (e.g., Elder 1974, 1999; McAdam 1988; McLanahan and Percheski 2008). While the criminal justice system or incarceration experiences may have occupied a niche position in life-course sociology in the past, our review suggests that it ought to occupy a central place going forward—alongside the family, the labor market, or social movements—as a force that powerfully alters the lives of those who come into direct contact with it, as well as those who do so only indirectly because of who their family members are or the communities in which they reside.

References

- Alexander, M. (2010). *The new Jim Crow: Mass incarceration in the age of color blindness*. New York: The New Press.
- American Bar Foundation. (2015). *National inventory of the collateral consequences of conviction*. <http://www.abacollateralconsequences.org>. Accessed 31 Jan 2015.

- Anderson, E. (1999). *Code of the street: Decency, violence, and the moral life of the inner city*. New York: W. W. Norton.
- Aos, S., Miller, M., & Drake, E. (2006). *Evidence-based public policy options to reduce future prison construction, criminal justice costs, and crime rates*. Olympia: Washington State Institute for Public Policy.
- Apel, R., & Sweeten, G. (2010). The impact of incarceration on employment during the transition to adulthood. *Social Problems*, 57(3), 448–479.
- Apel, R., Blokland, A. A. J., Nieuwebeerta, P., & van Schellen, M. (2010). The impact of imprisonment on marriage and divorce: A risk set matching approach. *Journal of Quantitative Criminology*, 26, 269–300.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480.
- Auerhahn, K. (2006). Selective incapacitation, three strikes, and the problem of aging prison populations: Using simulation modeling to see the future. *Criminology & Public Policy*, 1(3), 353–388.
- Bachman, J. G., Wallace, J. M., O'Malley, P. M., Johnston, L. D., Kurth, C. L., & Neighbors, H. W. (1991). Racial/ethnic differences in smoking, drinking, and illicit drug use among American high school seniors, 1976–1989. *Journal of Public Health*, 81(3), 372–377.
- Baumer, E. P. (2013). Reassessing and redirecting research on race and sentencing. *Justice Quarterly*, 30, 231–260.
- Bayer, P., Hjalmarsson, R., & Pozen, D. (2009). Building criminal capital behind bars: Peer effects in juvenile corrections. *Quarterly Journal of Economics*, 124, 105–147.
- Beck, A. J., & Maruschak, L. (2001). *Mental health treatment in state prisons*. Washington, DC: U.S. Government Printing Office.
- Beckett, K. (1997). *Making crime pay: Law and order in contemporary American politics*. New York: Oxford University Press.
- Beckett, K., Nyrop, K., & Pfingst, L. (2006). Race, drugs, and policing: Understanding disparities in drug delivery arrests. *Criminology*, 44(1), 105–137.
- Bingenheimer, J. B., Brennan, R. T., & Earls, F. J. (2005). Firearm violence exposure and serious violent behavior. *Science*, 308(5726), 1323–1326.
- Bishop, D. M. (2000). Juvenile offenders in the adult criminal justice system. *Crime and Justice: A Review of Research*, 27, 81–167.
- Blumstein, A., & Beck, A. J. (1999). Population growth in US prisons, 1980–1996. In M. Tonry & J. Petersilia (Eds.), *Crime and justice: A review of research* (Vol. 26, pp. 17–61). Chicago: University of Chicago Press.
- Blumstein, A., & Cohen, J. (1973). A theory of the stability of punishment. *Journal of Criminal Law, Criminology, and Police Science*, 63, 198–207.
- Blumstein, A., & Moitra, S. (1979). An analysis of the time series of imprisonment rate in the states of the United States: A further test of stability of the punishment hypothesis. *Journal of Criminal Law and Criminology*, 70, 376–390.
- Braman, D. (2004). *Doing time on the outside: Incarceration and family life in urban America*. Ann Arbor: University of Michigan Press.
- Brame, R., Turner, M. G., Paternoster, R., & Bushway, S. D. (2011). Cumulative prevalence of arrest from ages 8 to 23 in a national sample. *Pediatrics*, 129(1), 21–27.
- Brame, R., Bushway, S., Paternoster, R., & Turner, M. G. (2014). Demographic patterns of cumulative arrest prevalence by ages 18 and 23. *Crime and Delinquency*, 60, 471–486.
- Brayne, S. (2014). Surveillance and system avoidance: Criminal justice contact and institutional attachment. *American Sociological Review*, 79(3), 367–391.
- Bureau of Justice Statistics. (2007). *Survey of inmates of state and federal correctional facilities, 2004*. U.S. Department of Commerce, Bureau of the Census. Ann Arbor, MI: Inter-university Consortium for Political and Social Research (producer and distributor).
- Caulkins, J. P., & Chandler, S. (2006). Long-run trends in incarceration of drug offenders in the United States. *Crime and Delinquency*, 52, 619–641.
- Clear, T. R. (2007). *Imprisoning communities: How mass incarceration makes disadvantaged neighborhoods worse*. New York: Oxford University Press.
- Clear, T. R., & Frost, N. A. (2013). *The punishment imperative: The rise and failure of mass incarceration*. New York: NYU Press.
- Clemmer, D. (1940). *The prison community*. New York: Rhinehart.
- Comfort, M. (2007). Punishment beyond the legal offender. *Annual Review of Law and Social Science*, 3(1), 271–284.
- Comfort, M. (2008). *Doing time together: Love and family in the shadow of the prison*. Chicago: University of Chicago Press.
- DiIulio, J. (1987). *Governing prisons: A comparative study of prison management*. New York: The Free Press.
- DiIulio, J. (1995). The coming of the super-predator. *The Weekly Standard*, pp 23–28.
- Durlauf, S. N., & Nagin, D. S. (2011). Imprisonment and crime: Can both be reduced? *Criminology and Public Policy*, 10(1), 13–54.
- Elder, G. H. (1974, 1999). *Children of the great depression: Social change in life experience* (25th anniversary ed.). Boulder: Westview Press.
- Elder, G. H. (1998). The life course as developmental theory. *Child Development*, 69(1), 1–12.
- Fagan, J., & Zimring, F. E. (Eds.). (2000). *The changing borders of juvenile justice: Transfer of adolescents to the criminal court*. Chicago: University of Chicago Press.
- Federal Bureau of Investigation. (1960–2012). Crime in the United States. *Uniform Crime Reports Series*. Washington, DC.

- Feld, B. C. (1990). The punitive juvenile court and the quality of procedural justice: Disjunctions between rhetoric and reality. *Crime and Delinquency*, 36, 443–466.
- Feld, B. C. (1997). Abolish the juvenile court: Youthfulness, criminal responsibility, and sentencing policy. *Journal of Criminal Law and Criminology*, 88(1), 68–136.
- Feld, B. C. (1999). *Bad kids: Race and the transformation of the juvenile court*. New York: Oxford University Press.
- Frost, N. A., & Clear, T. R. (2009). Understanding mass incarceration as a grand social experiment. In A. Sarat (Ed.), *Studies in law, politics, and society* (Vol. 47, pp. 151–191). Bingley: JAI Press.
- Garland, D. (2001a). *The culture of control: Crime and social order in contemporary society*. New York: Oxford University Press.
- Garland, D. (2001b). The meaning of mass imprisonment. *Punishment and Society*, 3(1), 5–7.
- Geller, A., Garfinkel, I., Cooper, C., & Mincy, R. (2009). Parental incarceration and childhood wellbeing: Implications for urban families. *Social Science Quarterly*, 90, 1186–1202.
- Gelman, A., Fagan, J., & Kiss, A. (2007). An analysis of the New York City police department's "stop-and-frisk" policy in the context of claims of racial bias. *Journal of the American Statistical Association*, 102, 813–823.
- Goffman, E. (1961). *Asylums: Essays on the social situation of mental patients and other inmates*. Garden City: Anchor Books.
- Goffman, A. (2014). *On the run: Fugitive life in an American city*. Chicago: University of Chicago Press.
- Gonnerman, J. (2004, November 16). Million-dollar blacks: The neighborhood costs of America's prison boom. *Village Voice*.
- Gottfredson, M., & Hirschi, T. (1986). The true value of lambda would appear to be zero: An essay on career criminals, criminal careers, selective incapacitation, cohort studies, and related topics. *Criminology*, 24(2), 213–234.
- Hagan, J. (1993). The social embeddedness of crime and unemployment. *Criminology*, 31, 465–491.
- Hirschfield, P. J. (2008). Preparing for prison? The criminalization of school discipline in the USA. *Theoretical Criminology*, 12(1), 79–101.
- Irwin, J. (1970). *The felon*. Berkeley: University of California Press.
- Irwin, J. (2005). *The warehouse prison: Disposal of the new dangerous class*. Los Angeles: Roxbury Publishing.
- Jacobs, J. (1977). *Stateville: The penitentiary in mass society*. Chicago: University of Chicago Press.
- Jacobs, D., & Helms, R. E. (1996). Toward a political model of incarceration: A time series examination for prison admission rates. *American Journal of Sociology*, 102, 323–357.
- Jacobs, B. A., & Wright, R. (1999). Stick-up, street culture, and offender motivation. *Criminology*, 37(1), 149–174.
- Johnson, R., & Raphael, S. (2012). How much crime reduction does the marginal prisoner buy? *Journal of Law and Economics*, 55(2), 275–310.
- Johnson, E., & Waldfogel, J. (2004). Children of incarcerated parents: Multiple risks and children's living arrangements. In M. E. Patillo, D. F. Weiman, & B. Western (Eds.), *Imprisoning America: The social effects of mass incarceration* (pp. 97–131). New York: Russell Sage.
- Kim, C. Y., Losen, D. J., & Hewitt, D. T. (2010). *The school-to-prison pipeline: Structuring legal reform*. New York: NYU Press.
- Kreager, D. A., Schaefer, D. R., Bouchard, M., Haynie, D. L., Wakefield, S., Young, J., et al. (2015). Toward a criminology of inmate social networks. *Justice Quarterly*, 1–29.
- Kruttschnitt, C., & Gartner, R. (2005). *Marking time in the golden state: Women's imprisonment in California*. Cambridge: Cambridge University Press.
- Lauritsen, J. L. (1998). The age-crime debate: Assessing the limits of longitudinal self-report data. *Social Forces*, 77(1), 127–154.
- Levitt, S. (1996). The effect of prison population size on crime: Evidence from prison overcrowding and litigation. *Quarterly Journal of Economics*, 111, 319–351.
- Liedka, R. V., Piehl, A. M., & Useem, B. (2006). The crime-control effect of incarceration: Does scale matter? *Criminology and Public Policy*, 5, 245–276.
- Liu, S. (2015). Is the shape of the age-crime curve invariant by sex evidence from the national sample with flexible non-parametric modeling. *Journal of Quantitative Criminology*, 31, 93–123.
- MacCoun, R., & Reuter, P. (1992). Are the wages of sin \$30 an hour? An economic analysis of street-level drug dealing. *Crime and Delinquency*, 38, 477–491.
- Manza, J., & Uggen, C. (2006). *Locked out: Felon disenfranchisement and American democracy*. New York: Oxford University Press.
- Massoglia, M., & Uggen, C. (2010). Settling down and aging out: Toward an interactionist theory of desistance and the transition to adulthood. *American Journal of Sociology*, 116(2), 543–582.
- Massoglia, M., Remster, B., & King, R. D. (2011). Stigma or separation? Understanding the incarceration-divorce relationship. *Social Forces*, 90(1), 133–155.
- Matsueda, R. L., Gartner, R., Piliavin, I., & Polakowski, M. (1992). The prestige of criminal and conventional occupations: A subcultural model of criminal activity. *American Sociological Review*, 57, 752–770.
- McAdam, D. (1988). *Freedom summer*. New York: Oxford University Press.
- McLanahan, S., & Percheski, C. (2008). Family structure and the reproduction of inequalities. *Annual Review of Sociology*, 34(1), 257–276.

- Mitka, M. (2004). Aging prisoners stressing health care system. *Journal of the American Medical Association*, 292(4), 423–424.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial-behavior—A developmental taxonomy. *Psychological Review*, 100(4), 674–701.
- Mumola, C. J. (2000). *Incarcerated parents and their children*. Washington, DC: Bureau of Justice Statistics, US Government Printing Office.
- Myers, R. R., & Wakefield, S. (2014). Sex, gender, and imprisonment: Rates, reforms, and lived realities. In R. Gartner & B. McCarthy (Eds.), *The oxford handbook of gender, sex, and crime* (pp. 572–593). New York: Oxford University Press.
- Nagin, D. S., Piquero, A. R., Scott, E. S., & Steinberg, L. (2006). Public preferences for rehabilitation versus incarceration of juvenile offenders: Evidence from a contingent valuation survey. *Criminology*, 5(4), 627–651.
- Nagin, D. S., Cullen, F. T., & Jonson, C. L. (2009). Imprisonment and reoffending. In M. Tonry (Ed.), *Crime and justice* (Vol. 38, pp. 115–200). Chicago: University of Chicago Press.
- National Commission on Correctional Health Care. (2002). *The health status of soon-to-be-released inmates*. Chicago: National Commission on Correctional Health Care.
- National Research Council. (2014). *The growth of incarceration in the United States: Exploring causes and consequences*. Committee on Law and Justice, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academies Press.
- Neal, D., & Rick, A. (2014). *The prison boom and the lack of black progress after Smith & Welch* (NBER Working Paper No. 20283). Cambridge, MA.
- Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology*, 70(6), 710–717.
- Olivares, K., Burton, V. S., & Cullen, F. T. (1996). Collateral consequences of a felony conviction: A national study of legal codes 10 years later. *Federal Probation*, 60, 1–17.
- Page, J. (2004). Eliminating the enemy: The import of denying prisoners access to higher education in Clinton's America. *Punishment and Society*, 6(4), 357–378.
- Pager, D. (2003). The mark of a criminal record. *American Journal of Sociology*, 108(5), 937–975.
- Petersilia, J. (2003). *When prisoners come home: Parole and prisoner reentry*. New York: Oxford University Press.
- Pettit, B. (2012). *Invisible men: Mass incarceration and the myth of black progress*. New York: Russell Sage.
- Pettit, B., Sykes, B., & Western, B. (2009). *Technical report on revised population estimates and nlsy-79 analysis tables for the pew public safety and mobility project*. Cambridge, MA: Harvard University.
- Phelps, M. (2011). Rehabilitation in the punitive era: The gap between rhetoric and reality in US prison programs. *Law & Society Review*, 45, 33–68.
- Ramakers, A., Apel, R., Nieuwebeerta, P., Dirkzwager, A., & Wilsem, J. V. (2014). Imprisonment length and post-prison employment prospects. *Criminology*, 52(3), 499–527.
- Reuter, P., MacCoun, R., & Murphy, P. (1990). *Money from crime: A study of the economics of drug dealing in Washington, D.C.* Santa Monica: Rand Corporation.
- Roberts, J. V. (2004). Public opinion and youth justice. *Crime and Justice: A Review of Research*, 31, 495.
- Sampson, R. J. (2011). The incarceration ledger: Toward a new era in assessing societal consequences. *Criminology & Public Policy*, 10, 819–828.
- Sampson, R. J., & Laub, J. H. (1994). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Sampson, R. J., & Loeffler, C. (2010). Punishment's place: The local concentration of mass incarceration. *Daedalus*, 139, 20–31.
- Schwartz, R., & Rieser, L. (2001). Zero tolerance as mandatory sentencing. In W. Ayers, B. Dohrn, & R. Ayers (Eds.), *Zero tolerance: Resisting the drive for punishment in our schools* (Vol. 126–136). New York: The New Press.
- Schwartz-Soicher, O., Geller, A., & Garfinkel, I. (2011). The effect of paternal incarceration on material hardship. *Social Service Review*, 3, 447–473.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in the life course perspective. *Annual Review of Sociology*, 26, 667–692.
- Shannon, S. K. S., Uggen, C., Schnittker, J., Thompson, M., Wakefield, S., & Massoglia, M. (2014). *The growth, scope, and spatial distribution of America's criminal class, 1949–2010* (Working Paper). Minneapolis, MN: Department of Sociology, University of Minnesota.
- Sharkey, P. (2010). The acute effect of local homicides on children's cognitive performance. *Proceedings of the National Academy of Sciences*, 107, 11733–11738.
- Sherman, L. W. (1993). Defiance, deterrence, and irrelevance: A theory of criminal sanction. *Journal of Research in Crime and Delinquency*, 30, 445–473.
- Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routine activities and the criminology of place. *Criminology*, 27, 27–55.
- Siegel, J. (2011). *Disrupted childhoods: Children of women in prison*. New Brunswick: Rutgers University Press.
- Simon, J. (2000). The 'society of captives' in the era of hyper-incarceration. *Theoretical Criminology*, 4, 285–308.
- Simon, J. (2007). *Governing through crime: How the war on crime transformed American democracy and cre-*

- ated a culture of fear. New York: Oxford University Press.
- Simon, J. (2014). *Mass incarceration on trial: A remarkable court decision and the future of prisons in America*. New York: New Press.
- Singer, M. I., Anglin, T. M., Song, L. Y., & Lunghofer, L. (1995). Adolescents' exposure to violence and associated symptoms of psychological trauma. *Journal of the American Medical Association*, 273(6), 477–482.
- Skarbeck, D. (2014). *The social order of the underworld: How prison gangs govern the American penal system*. New York: Oxford University Press.
- Skiba, R. J., Michael, R. S., Nardo, A. C., & Peterson, R. L. (2002). The color of discipline: Sources of racial and gender disproportionality in school punishment. *The Urban Review*, 34(4), 317–342.
- Smith, D. A. (1986). The neighborhood context of police behavior. In J. Albert, J. Reiss, & M. Tonry (Eds.), *Crime and justice: A review of research* (Vol. 8, pp. 313–341). Chicago: University of Chicago Press.
- Sourcebook of Criminal Justice Statistics. (2014). *Number and rate (per 100,000 resident population in each group) of sentenced prisoners under jurisdiction of state and federal corectional authorities on December 31*. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics. Available online at <http://www.albany.edu/sourcebook/pdf/t6282009.pdf>
- Spelman, W. (2000). The limited importance of prison expansion. In A. Blumstein & J. Wallman (Eds.), *The crime drop in America* (pp. 97–129). New York: Cambridge University Press.
- Steiner, B., & Wooldredge, J. (2009). Rethinking the link between institutional crowding and inmate misconduct. *The Prison Journal*, 89(2), 205–233.
- Sykes, G. (1958/2007). *The society of captives: A study of maximum security prisons*. Princeton: Princeton University Press.
- Teplin, L. A. (1984). Criminalizing mental disorder: The comparative arrest rate of the mentally ill. *American Psychologist*, 39(7), 794–803.
- Terry v. Ohio (1968). 392: U.S. Supreme Court.
- Turner, R. H. (1972). Deviance avowal as neutralization of commitment. *Social Problems*, 19, 308–321.
- Turney, K. (2014). The consequences of paternal incarceration for maternal neglect and harsh parenting. *Social Forces*, 92, 1607–1636.
- Turney, K., & Haskins, A. R. (2014). Falling behind? Children's early grade retention after paternal incarceration. *Sociology of Education*, 87(4), 241–258.
- Turney, K., & Wildeman, C. (2015). Detrimental for some? The heterogeneous effects of maternal incarceration on child wellbeing. *Criminology & Public Policy*, 14, 125–156.
- Tyler, T. R. (2006). *Why people obey the law*. Princeton: Princeton University Press.
- Uggen, C., & Wakefield, S. (2005). Young adults reentering the community from the criminal justice system: The challenge of becoming an adult. In D. W. Osgood, M. Foster, & C. Flanagan (Eds.), *On your own without a net: The transition to adulthood for vulnerable populations* (pp. 114–144). Chicago: University of Chicago Press.
- Vicusi, W. K. (1986). The risks and rewards of criminal activity: A comprehensive test of criminal deterrence. *Journal of Labor Economics*, 4, 317–340.
- Wacquant, L. (2000). The new 'peculiar institution': On the prison as surrogate ghetto. *Theoretical Criminology*, 4(3), 377–389.
- Wacquant, L. (2001). Deadly symbiosis: When ghetto and prison meet and mesh. *Punishment and Society*, 3(1), 95–134.
- Wakefield, S. (2015). Accentuating the positive or eliminating the negative? Paternal incarceration and caregiver-child parenting quality. *Journal of Criminal Law and Criminology*, 104(4), 905–928.
- Wakefield, S., & Uggen, C. (2010). Incarceration and stratification. *Annual Review of Sociology*, 36(1), 387–406. doi:10.1146/annurev.soc.012809.102551.
- Wakefield, S., & Wildeman, C. (2011). Mass imprisonment and racial disparities in childhood behavioral problems. *Criminology & Public Policy*, 10(3), 793–817.
- Wakefield, S., & Wildeman, C. (2013). *Children of the prison boom: Mass incarceration and the future of American inequality* (Crime and public policy series). New York: Oxford University Press.
- Welch, M., Price, E. A., & Yankey, N. (2002). Moral panic over youth violence: Wilding and the manufacture of menace in the media. *Youth and Society*, 34, 3–30.
- Western, B. (2006). *Punishment and inequality in America*. New York: Russell Sage.
- Western, B., & Beckett, K. (1999). How unregulated is the U.S. Labor market? The penal system as a labor market institution. *American Journal of Sociology*, 104(4), 1030–1060.
- Western, B., & Pettit, B. (2010). Incarceration & social inequality. *Daedalus*, 139(3), 8–19.
- Wildeman, C. (2009). Parental imprisonment, the prison boom, and the concentration of childhood advantage. *Demography*, 46, 265–280.
- Wildeman, C. (2010). Parental incarceration and children's physically aggressive behaviors: Evidence from the fragile families and child wellbeing study. *Social Forces*, 89, 285–310.
- Wildeman, C., & Muller, C. (2012). Mass imprisonment and inequality in health and family life. *Annual Review of Law and Social Science*, 8, 11–30.
- Wildeman, C., & Turney, K. (2014). Positive, negative, or null? The effects of maternal incarceration on children's behavioral problems. *Demography*, 51, 1041–1068.
- Wildeman, C., Schnittker, J., & Turney, K. (2012). Despair by association? The mental health of mothers with children by recently incarcerated fathers. *American Sociological Review*, 77(2), 216–243.

- Wilson, J. Q., & Abrahamse, A. (1992). Does crime pay? *Justice Quarterly*, 9, 359–377.
- Wilson, J. Q., & Kelling, G. L. (1982). Broken windows: The police and neighborhood safety. *Atlantic Monthly*, March, 249(3), 29–38.
- Wilson, D. B., Gallagher, C. A., & MacKenzie, D. L. (2000). A meta-analysis of corrections-based education, vocation, and work programs for adult offenders. *Journal of Research in Crime and Delinquency*, 37, 347–368.
- Zimring, F. E. (2012). *The city that became safe: New York's lessons for urban crime and its control*. New York: Oxford University Press.

Disaster and Life Course Processes

Jack DeWaard

1 Introduction

Disasters exist when the hazards, or “forces of harm” (Schultz et al. 2007: 69), associated with an environmental event adversely affect the functioning of persons and places.¹ To the extent that persons and places are adversely affected by environmental hazards, it follows that they were vulnerable, or susceptible, to harm in the first place (Adger 2006). It is well documented that persons and places are differentially vulnerable to environmental hazards (Cutter 1996; Thomalla et al. 2006). The first aim of this chapter is therefore to discuss and demonstrate the import of a life course perspective for studying differences in

the vulnerability, or “potential for loss” (Cutter et al. 2003: 242), of persons and places to environmental hazards.

Disasters are also routinely characterized as rapid-onset, rapid-desistance events (Kates et al. 2006; Masten and Narayan 2012; Sampson and Laub 1996). However, if persons and places are adversely affected by environmental hazards for prolonged periods (Yule et al. 2000), then disasters must be understood as processes, not events. As processes that unfold in and over the life course, disasters encompass interconnected life course moments and domains, and thus have the potential to alter short- and long-run life course trajectories and outcomes. The second aim of this chapter is to discuss and demonstrate this idea.

This chapter is organized as follows. First, I provide a brief example to motivate the two ideas above. Second, I review and summarize past and current research on disasters and the life course that attends to these ideas. While this review is not exhaustive, it samples from multiple disciplines and life course processes and domains. Third, in a stylized demonstration, I illustrate these ideas in the context of a simple dynamic population model. While not typically described as such, the model itself is a model of the life course, and relates the timing of life course transitions to short- and long-run trajectories and outcomes. To connect my work in this demonstration to a real-world example, I consider several recent studies on the potential impacts of climate change for

¹The term *environmental* is used broadly throughout this chapter to cover natural, technological, and man-made events (Guha-Sapir et al. 2013).

Readers may be struck by the broad scope of this definition; however, this is the definition of *disaster* used by a number of research and relief organizations in the United States and worldwide, including the Center for Research on the Epidemiology of Disasters (CRED), Doctors Without Borders, the Federal Emergency Management Agency (FEMA), the Intergovernmental Panel on Climate Change (IPCC), the International Federation of Red Cross and Red Crescent Societies (IFRC), the Office of U.S. Foreign Disaster Assistance (USAID), and the United Nations (U.N.), to name only a few.

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human migration, which suggest that disasters are not only rapid-onset, slow-desistance processes, but are in some cases slow-onset processes, as well (Leighton 2009; McLeman 2014; McLeman and Hunter 2010). I conclude this chapter with a restatement of the two key ideas, followed by discussing potential avenues for future research on disaster and life course processes.

2 Motivating Example: The 2005 Kashmir Earthquake

On October 8, 2005, an earthquake registering 7.6 on the Richter scale and lasting 30–45 s struck an area in the disputed Kashmir region northeast of Muzaffarabad, Pakistan. As of November 2005, an estimated 87,000 people had died as a result of this earthquake. Another 138,000 and 3.5 million people were injured and displaced, respectively (Earthquake Engineering Research Institute 2006; U.S. Geological Survey 2005).

There is likely universal agreement that the 2005 Kashmir Earthquake was a disaster. However, it was not a disaster because of the magnitude or duration of the earthquake. It was a disaster because the hazards associated with this earthquake adversely affected the functioning of persons and places. This is evidenced by the number of people killed, injured, and displaced, as well as by the extent of damage to housing and infrastructure (Earthquake Engineering Research Institute 2006). Had the estimated 780,000 structures that were damaged or destroyed been able to withstand this earthquake, for example, the number of dead, injured, and displaced would likely have been much lower. The implication, then, is that had this earthquake not adversely affected the functioning of persons and places, it would not have been a disaster. This statement is not intended to undermine the significance of what took place on October 8, 2005, most especially the loss of life, which is always unfortunate. Instead, it is meant to highlight the contingent and “mostly social” nature of disasters (Alexander 2005: 27).

Evidence suggests that persons and places were differentially affected by this earthquake,

which raises important questions about their pre-disaster vulnerability. To illustrate, although incidence rates are difficult to come by, Rathore et al. (2007) and Taquir et al. (2007) estimated that between 600 and 750 spinal cord injuries were sustained during this earthquake. Female homemakers of middle age accounted for the majority of these victims. Not only does this figure represent an important life course transition from uninjured to injured, Taquir et al. (2007) further showed that many of these cases developed into paraplegia, which presented additional short-term complications, e.g., urinary tract infections, pressure and stress ulcers, etc. In the long-run, Rathore et al. (2008) noted the scarcity of rehabilitation resources in the region, which presents a host of difficulties for victims’ future physical health, not to mention their functioning in other life course domains, e.g., mental health, family and work, etc.

The above example demonstrates that the 2005 Kashmir Earthquake was a disaster because the hazards associated with this earthquake adversely affected the functioning of persons and places. Like other disasters, they did so unevenly in accordance with the pre-disaster vulnerability of persons and places. Moreover, while the hazards associated with this disaster occurred suddenly and lasted only seconds, the duration and desistance of this disaster were prolonged, especially for some (versus other) victims. A life course perspective is uniquely suited for studying these ideas given a number of emphases, most especially the emphasis placed on the timing of events and processes at specific stages of the life course (Elder et al. 2003).

3 Disasters and the Life Course: A Selected Review and Summary of Previous Research

There are any number of ways to organize a review and summary of previous research on disasters and the life course. These include: by disaster (Cherry 2009), disaster type (Guha-Sapir et al. 2013), the characteristics of and differences between those adversely affected (Cherniack

2008; Johnson and Galea 2009), and life course domain (Johnson and Galea 2009; Shenk et al. 2009). Erring on the side of depth over breadth, I organize this review and summary into two parts. In the first, I focus on studies that have applied (explicitly or implicitly) a life course perspective to understand the origins of the differential vulnerability of persons and places adversely affected by environmental hazards. In the second, I focus on studies that have applied a life course perspective to understand disasters as processes that persist in time and desist slowly. As such, I do not claim that this review is exhaustive. Instead, it is organized in such a way so that these ideas are clearly illustrated within the context of life course theory and empirical research.

3.1 Differential Vulnerability

In 2013, some 330 disasters worldwide were responsible for the deaths of 21,610 people; these disasters likewise adversely affected 96.5 million people, and caused \$118.6 billion in damages (Guha-Sapir et al. 2013). According to the Center for Research on the Epidemiology of Disasters (CRED), in order to qualify as a disaster, two classes of environmental hazards—natural and technological—must be accompanied by one or more of the following: 10 or more fatalities, 100 or more people adversely affected, a declaration of a state of emergency, or a call for assistance (Guha-Sapir et al. 2013).² Excluding some types of man-made hazards, e.g., wars or terrorist attacks, environmental hazards are typically indiscriminate with respect to objects in their path(s). Disasters, however, reveal much about pre-existent (which is not to say primordial) characteristics and differences that render some persons and places more vulnerable, or susceptible, to harm than others (Adger 2006; Cutter 1996;

Cutter et al. 2003; Thomalla et al. 2006). This directs attention to the *characteristics and origins* of differential vulnerability.

Past and current research has documented a range of salient characteristics and origins. To illustrate, consider the case of Hurricane Katrina. Studies have documented pronounced racial differences, for example, in the timing of evacuations relative to when Hurricane Katrina made landfall (Elliott and Pais 2006), subsequent out-migration from disaster-affected areas (Myers et al. 2008), post-traumatic stress (Paxson et al. 2012), return migration to disaster-affected areas (Fussell et al. 2010; Groen and Polivka 2010), and the repopulation of local areas and neighborhoods (Chamlee-Wright and Storr 2009; Logan 2009; Pais and Elliott 2008). Ultimately, these studies raise questions about the origins of these differences, e.g., past (and current) economic, political, and social conditions “that make people and places more or less susceptible to environmental hazards” (Myers et al. 2008: 272).

A life course perspective is uniquely suited for studying the differential vulnerability of persons and places to environmental hazards because it locates differences in vulnerability in the life stage of persons and places. Because life stages are characterized by unique forms and accumulations of human capital (broadly conceived) (KC et al. 2014), it follows that the origins of these differences across life stages are diverse. Below, I illustrate this in the context of three examples focusing on selected sources of vulnerability in three life course stages. As mentioned above, this review is not intended to be exhaustive, but, instead, is meant to take an in-depth look at selected sources of vulnerability over the life course.

To begin, consider past and current research on the mental health of children and adolescents after a hazard event, compared to adults. Jones et al. (2009) conducted a review of 12 studies on the effects of Hurricane Katrina on the mental health of children and adolescents. Outcomes examined in these studies included intrusive thoughts, post-traumatic stress disorder (PTSD), mood and anxiety disorders, depression, and somatic and behavioral problems. Likewise, similar studies have been conducted on the effects of

²CRED further subdivides natural hazards into five groups: geophysical, meteorological, hydrological, climatological, and biological (Guha-Sapir et al. 2013). Others, e.g., Logan and Xu (2011) and Schultz et al. (2007), focus instead on the characteristics of hazards, both natural and technological, with respect to such features as spatial scope, magnitude, duration, etc.

Hurricane Katrina on the mental health of adults (Fussell and Lowe 2014; Paxson et al. 2012; Rhodes et al. 2010). Outcomes considered in these studies also include PTSD, as well as other forms of psychological distress. Generally, the above studies show that Hurricane Katrina negatively affected the mental health of children and adolescents, as well as of adults, with the severity of these effects appearing to diminish over time and conditioned by a number of aggravating and protective factors at the individual-, household-, and community-levels, including poverty, social support, local healthcare infrastructure, etc. (Berggren and Curiel 2006; Weems and Overstreet 2009).

In many of the studies above, mental health outcomes are assessed in the context of a *dose-response* framework (Masten and Osofsky 2010), where the mental health outcome of interest (the response) is situated in relation to the “number, intensity, or severity of hazards” (the dose) (Masten and Narayan 2012: 234). While these studies provide convincing evidence that Hurricane Katrina affected the subsequent mental health of children and adolescents, as well as of adults, relatively few of these studies consider the reasons *why*. This is an important consideration because, to the extent that persons were adversely affected by Hurricane Katrina, they were vulnerable, or susceptible, to harm in the first place (Adger 2006). What are the origins of this vulnerability? And how do these origins differ for individuals at different life stages?

Among children and adolescents, one important reason why the above effects were observed is on account of the fact that children and adolescents are undergoing a number of highly “sensitive” transitions in the areas of “cognition and interpretation of experiences, emotion and emotional understanding, self-regulation skills, knowledge, social connections and relationships, physical size and strength, beliefs and faith,” etc., that are known to be consequential for both short- and long-run trajectories and outcomes (Masten and Narayan 2012: 241; see also Buchanan et al. 2009). In contrast, with respect to adults, the origins of vulnerability to environmental hazards are different, and seem to lie in processes of

attachment to resources and resource conservation (Cohan and Cole 2002; Fussell and Lowe 2014), among others.

To illustrate, adopting a *conservation of resources* framework (Hobfoll 1989), Fussell and Lowe (2014) examined the impact of housing displacement during and after Hurricane Katrina on the subsequent mental health of low-income parents. The central idea underlying this study is that [real or perceived] threats to *already scarce* resources, e.g., housing and material well-being, are associated with secondary forms of stress, e.g., PTSD, after a hazard event that go beyond primary forms of stress that are associated with directly experiencing the hazard event itself. In analyzing three housing “displacement profiles,” Fussell and Lowe (2014: 138) showed that, relative to low-income parents who returned home after Hurricane Katrina, low-income parents who relocated (or were relocated) and those who were unstably housed experienced significantly elevated levels of stress. Like the studies reviewed by Jones et al. (2009), this finding demonstrates that Hurricane Katrina adversely affected the functioning of low-income parents (through the medium of housing displacement), however, it did so *because* low-income parents (and adults in general) are attached to and seek to conserve resources, which are often scarce. In a different setting (Hurricane Hugo) and at a different spatial scale (counties in South Carolina), Cohan and Cole (2002: 16) effectively make the same argument, suggesting that the origins of vulnerability to environmental hazards in adulthood fundamentally involve processes of “attachment” to scarce resources.

To briefly step back at this point, the fact that vulnerability to environmental hazards differs across life stages ultimately suggests that the framework of dose-response is insufficient for analyzing outcomes after a hazard event. This is so because observed outcomes reflect changes in response to the hazard event itself, as well as the extent to which persons and places were vulnerable to begin with. This points to the need for an encompassing framework that situates dose-response in a more holistic life course sequence that considers

pre-disaster vulnerability, e.g., Ingram and Luxton's (2005) *vulnerability-stress* model.

This observation is made especially clear in studies of elderly adults. Cherniack (2008) locates the origins of vulnerability to environmental hazards at this life stage in the pre-disaster physical and mental health of elderly adults. About 80 % of elderly adults (persons age 65 or older) in the United States have a least one chronic condition; some 50 % of elderly adults in the United States have two or more chronic conditions (Aldrich and Bensen 2008). These figures raise a number of important observations about the vulnerability of elderly adults to environmental hazards. First, elderly adults are more dependent on the availability, consistency, and quality of medical care. Second, the nature of these dependencies depends on a number of critical intersections, including the costs and administrative hurdles associated with securing care, as well as the difficulties that come with doing so with multiple chronic conditions, especially those related to mental health (Fultz et al. 2003). It is also well documented that chronic conditions often lead to functional limitations and long-term disability (Vogeli et al. 2007). This presents additional challenges, especially when caring is provided in the context of family relationships, i.e., "linked lives," involving multiple generations (Elder et al. 2003: 13). Given these complex origins of vulnerability, it is therefore not surprising that elderly adults are disproportionately adversely affected by environmental hazards because they are relatively less equipped to maintain and/or seek out and secure new forms of care during and after the hazard event itself (Cherniack 2008).

A life course perspective is uniquely suited for locating differences in vulnerability to environmental hazards in the life stage of persons and places, and subsequently isolating the origins of, i.e., reasons for, these differences in operative life course processes, e.g., developmental transitions and trajectories in childhood and adolescence. An important implication for empirical research, then, is the need to thoroughly inventory and analyze the pre-disaster characteristics of persons and places (Jones et al. 2009; Masten and Narayan 2012). For example, in an assessment of

mental health outcomes among children and adolescents after Hurricane Katrina, Olteanu et al. (2011) documented the importance of pre-disaster psychological distress. Likewise, in the study discussed earlier by Fussell and Lowe (2014), the most important predictor of post-disaster mental health among low-income parents was pre-disaster mental health. McFarlane (1988) made a similar observation in his study of firefighters exposed to a bushfire disaster in South Australia in 1983, and demonstrated that three pre-disaster variables—adverse life events, avoidance of thinking about problems, and past psychological treatment—were strong predictors of post-disaster acute, chronic, and delayed-onset negative mental health outcomes. The importance of pre-disaster characteristics has also been shown in studies of psychological resilience after the terrorist attacks on September 11, 2001 (Bonanno et al. 2007).

By understanding the uniqueness and interconnectedness of life stages, a life course perspective is well-suited for studying differential vulnerability to environmental hazards and, thus, disasters for what they are, namely "social phenomena" (Perry 2007: 10).

3.2 Disasters as Slow-Desistance Processes

Disasters are often characterized as rapid-onset, rapid-desistance events (Kates et al. 2006; Masten and Narayan 2012; Sampson and Laub 1996). While some types of disasters might fit this profile, as Gallopín (2006) notes, these characteristics typically belong to the hazards, or the "forces of harm" (Schultz et al. 2007: 69), that are associated with environmental events, and are not essential properties of disasters themselves. As social phenomena, disasters exist only when persons and places are adversely affected by environmental hazards. To the extent that persons and places are adversely affected for prolonged periods, disasters must be understood as processes, not events.

The suggestion that disasters are processes that persist in time and desist slowly intersects

with the concept of resilience (Cutter et al. 2008; Gallopín 2006; Paton and Johnston 2006), which the IPCC (2012: 563) defines as the “ability...to anticipate, absorb, accommodate or recover from a hazardous event.” A recent study by Kates et al. (2006) of the timing of reconstruction in New Orleans after Hurricane Katrina nicely illustrates the distinction between disaster and resilience processes. Kates et al. (2006) identified three consecutive and overlapping periods to characterize the time after Hurricane Katrina: emergency, restoration, and reconstruction. Each period is illustrated with a density plot, wherein the x -axis corresponds to the number of weeks after Hurricane Katrina and the y -axis corresponds to the level of activity. While the latter two periods—restoration and reconstruction—are clearly rooted in the idea of resilience, and include such activities as the return of displaced residents, restoration of levees, and issuing of building permits, the first period—emergency—is somewhat different.

Kates et al. (2006: 14656) describe the emergency period as one of substantial “dewatering,” further accompanied by the completion of search and rescue activities. Importantly, while the density plots for the restoration and reconstruction periods exhibit pronounced left-skews, the density plot for the emergency period is strongly right-skewed, suggesting a transition from a process that is ending (emergency) to one that is beginning (restoration). It is also illustrative that the respective right and left tails of these plots overlap. With respect to exactly *what* is ending in the emergency period, this is largely left to interpretation. Of course, recalling from earlier in this chapter that disasters exist by virtue of the fact that persons and places are adversely affected by environmental hazards, it seems reasonable to interpret the emergency period as a process of disaster persistence and, eventually, desistance that overlaps, but is nonetheless distinct from, processes of resilience, e.g., restoration and reconstruction.

Having made the above distinction, disasters persist in the time and desist slowly because the adverse effects of environmental hazards are often prolonged. Places, e.g., homes, neighbor-

hoods, communities, cities, etc., are frequently decimated by environmental hazards. This includes damage to structures and physical infrastructure (Burton and Hicks 2005; Nigg et al. 2006), as well as to the “social fabric” of places held together by networks of trust, mutual support, reciprocity, and collaboration (Sampson and Groves 1989: 780). Ethnographic research suggests that the damage experienced at the level of place is an important factor in the persistence of disasters in the lives of individuals. Chamlee-Wright and Storr (2009: 621), for example, noted that decisions to return to the Ninth Ward in New Orleans after Hurricane Katrina were strongly influenced by “bundle[s] of characteristics” attributed to “home.”

Other evidence also points to the fact that disasters can persist in the lives of individuals. Marmar et al. (1999), for example, surveyed 322 rescue workers who were on duty during the collapse of Interstate 880 in the 1989 Loma Prieta Earthquake. Peritraumatic dissociation and emotional distress were assessed 1.9 and 3.5 years out. They found that while most rescue workers showed improvement over time, those with greater exposure to the collapse were at higher risk of chronic symptomatic distress. Likewise, in a study of 217 survivors of the 1988 sinking of the *Jupiter*, Yule et al. (2000) found that one-third of survivors who had developed PTSD 1 year after this event were still suffering from PTSD 5–8 years later. Similar findings have also been documented with respect to Hurricane Katrina (Paxson et al. 2012).

The above studies demonstrate that disasters persist in time depending on a number of factors. However, these studies do not pinpoint an exact moment at which disasters desist. That said, it is reasonable to think that disasters do desist slowly, and, in many cases, cease to exist. Evidence for this idea comes from a number of sources, including memory research. Among elderly adults, Shenk et al. (2009) noted that isolated, i.e., occasional, memories of disasters are associated with positive ideation, e.g., the stimulation of other positive memories and memory retention. Likewise, in a meta-analysis of 25 studies of depression in elderly adults, Kraaij et al. (2002)

examined depression as a function of the total number of negative life events, broken down into several classes: death of significant others, severe illness (on the part of self and others), negative socioeconomic circumstances, negative relationships, and sudden unexpected events. Sudden unexpected events included disasters and wartime events, crime, car accidents, etc. Importantly, they found that sudden life events were “the only negative life events...not to be related to depression scores” (Kraaij et al. 2002: P91).

Although past and current research has yet to determine exactly when and under what conditions disasters desist, the above studies indicate that disasters do, in many cases, desist, with existing research suggesting that the nature of desistance is likely slow (versus rapid) depending on whether and the extent to which adverse effects associated with environmental hazards are prolonged.

4 Disaster and Life Course Processes: A Demonstration

In this section of the chapter, I provide a stylized demonstration in which I illustrate the two ideas discussed above in the context of a dynamic population model, with roots in multiregional, or multi-state, demography (Rogers 1975, 1995; Palloni 2001; Schoen 1988). Although not usually described as a model of the life course, the model itself has a number of properties that are consistent with the “paradigmatic principles” of life course theory (Elder et al. 2003: 10). Among these, the model relates the timing of life course transitions to short- and long-run trajectories and outcomes.

In this demonstration, I show that (1) differential vulnerability to environmental hazards across life course stages has different implications for long-run life course outcomes in the presence of an environmental event that is experienced at a given age (or stage) in the life course, and (2) that disaster processes that persist in time and desist slowly are more consequential for long-run life course outcomes than rapid-onset, rapid desistance disaster events. These two ideas are illustrated in this demonstration in the context of a

system of region-to-region migration flows before, during, and after a hazard event. While I focus on migration for the reasons described below, it is important to point out that this model can be applied to any process that involves a set of *transitions* among *states*, e.g., health and mental health states (Palloni 2001; Yang and Waliji 2010), family and household contexts (Bumpass and Lu 2000), etc.

To connect my work in this demonstration to a substantive example, I consider several recent studies on the potential impacts of climate change for human migration (Leighton 2009; McLeman 2014; McLeman and Hunter 2010). These studies are rooted in a broader class of literature on environmental migration, i.e., migration that is due to environmental factors and/or changes such as climate change (Bates 2002; El-Hinnawi 1985), that seeks to incorporate features of the natural environment, e.g., rainfall deficits (Nawrotzki et al. 2013) and natural capital, e.g., access to land and landholdings (Hunter et al. 2014), into canonical migration accounts, e.g., push-pull theories of neoclassical micro- and macro-economics (Black et al. 2011, 2013; Findlay 2011). With respect to the aims of this demonstration, these studies suggest that persons and places are threatened by *both* “slow- and rapid-onset climate disasters (from droughts to floods to hurricanes to landslides)” (Leighton 2009: 337). Subsequently taking this observation into account, I conclude this demonstration by further showing that disaster processes that start and desist slowly (i.e., slow-onset, slow-desistance) are the *most* consequential for long-run life course outcomes.

4.1 A Model of Migration over the Life Course

There are two primary outcomes of interest in this demonstration. These include:

$$e_0^{ii} = \frac{T_0^{ii}}{l_0^i} \quad (1)$$

$$e_0^{ij} = \frac{T_0^{ij}}{l_0^i} \quad (2)$$

Each outcome is a conditional life expectancy at birth, and summarizes the average total number of years that members of a birth cohort could expect to live in, e_0^{ii} , and outside of, e_0^{ij} , the region in which they were born over the course of their lives. Each measure is constructed by tracking the migration transitions and deaths among members of a cohort born in region i at each age over their lives. The numerators in (1) and (2) refer to the total number of person-years lived in regions i and j , respectively. The denominators refer to the number of persons born in region i , i.e., persons eligible to contribute person-years. Accordingly, the measures in (1) and (2) can be viewed as long-run life course outcomes that reflect transitions involving two life course domains (migration and to death, discussed in detail below) at multiple life course moments (ages). Clearly, the model could be adapted to accommodate any number and type of life course domains.

To estimate the quantities in (1) and (2), one starts by considering a birth cohort in region i at exact age zero:

$$\mathbf{I}(0) = \begin{bmatrix} l_0^i & l_0^j & l_0^d \end{bmatrix} \quad (3)$$

where $l_0^i > 0$ and $l_0^j = l_0^d = 0$. This cohort is then “exposed” to the prevailing age-specific risks (probabilities) of migrating and dying, summarized in the transition matrix, $\mathbf{P}(0)$:

$$\mathbf{P}(0) = \begin{bmatrix} {}_n P_0^{ii} & {}_n P_0^{ij} & {}_n P_0^{id} \\ {}_n P_0^{ji} & {}_n P_0^{jj} & {}_n P_0^{jd} \\ 0 & 0 & 1 \end{bmatrix} \quad (4)$$

Each off-diagonal element in (4) denotes the probability of migrating from one region (i or j) to another or dying (d) between age 0 and age $0+n$, where n is the width of the age interval. The elements in the main diagonal denote the probabilities of not migrating or dying. The final row expresses the fact that death is absorbing.

The process itself follows a simple first-order Markov process, such that the number of persons in each region, as well as the number of persons who have died, at age $0+n$ is contained in the updated population vector, $\mathbf{I}(0+\mathbf{n})$:

$$\mathbf{I}(0+\mathbf{n}) = \mathbf{I}(0)\mathbf{P}(0) \quad (5)$$

The process in (5) then repeats consecutively across all age intervals. Person-years lived in each region over the life course are calculated from the population vectors at each age, e.g., $\mathbf{I}(0)$, $\mathbf{I}(0+\mathbf{n})$, $\mathbf{I}(0+2\mathbf{n})$, etc., under the assumption that migration transitions and deaths occur at the midpoint of each age interval (Palloni 2001). These quantities are divided through by the size of the birth cohort, l_0^i , to arrive at the summary measures in (1) and (2).

Data for the $\mathbf{P}(\mathbf{x})$ matrices are taken from Wilson (2010) and the Australian Bureau of Statistics, and are shown in Fig. 1. Migration data pertain to male in-migration to Canberra, Australia, between 2005 and 2006. Mortality data pertain to male deaths in southern Australia between 2004 and 2006.

In this demonstration, I refer to the age schedules, or profiles, of migration and mortality displayed in Fig. 1 as *typical* because they exhibit several well-known regularities. Migration, for example, typically exhibits peaks at early childhood, at entry into the labor force, and at retirement (Rogers and Castro 1981). Mortality likewise exhibits a “bathtub” shape, such that probabilities of dying are relatively high in the first year of life, decline thereafter, and increase rapidly at older ages.

4.2 Disasters

In this section, I discuss how a rapid-onset, rapid-desistance disaster event is incorporated into the model, and subsequently modified to approximate a disaster process that is rapid-onset, slow-desistance, followed by slow-onset, slow-desistance. In doing so, building on my discussion thus far in this chapter, the primary intuition is that disasters exist by virtue of the fact that they adversely affect persons (i.e., a birth cohort) in the model. Because I am considering two processes, migration and mortality, this means that a disaster exists in the model by disrupting the typical age profiles of migration and mortality, shown earlier in Fig. 1.

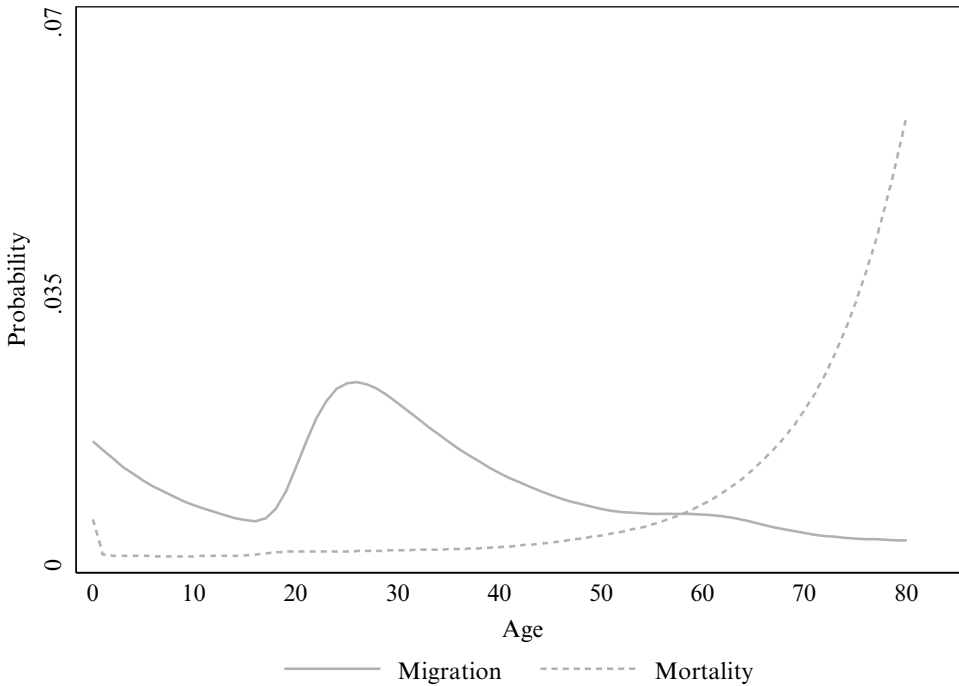


Fig. 1 Typical age schedules of migration and mortality

From a life course perspective, the extent of these disruptions depends on the stage in the life course when the disaster is experienced. Life course stages are characterized by different risks (probabilities) of migrating and dying, as well as by differential vulnerability to environmental hazards. To operationalize vulnerability in the model, I consider the definition used by the IPCC (2012) and subsequently elaborated by McLeman (2014), which situates vulnerability as the product of three factors: exposure, sensitivity, and adaptive capacity. Exposure refers to the presence of persons and places that could potentially be adversely affected by environmental hazards. Sensitivity refers to the idea that some persons and places are more likely to be adversely affected by environmental hazards than others. And adaptive capacity refers to the “resources available...that can be used to prepare for and undertake actions” to minimize the extent of harm potentially caused by environmental hazards (IPCC 2012: 556).

Neither the IPCC (2012) nor McLeman (2014) provide a functional form of vulnerability.

Accordingly, I proceed in exploratory fashion, and consider what exposure, sensitivity, and adaptive capacity might “look like” at different stages in the life course. Envisioning each of these components on a scale ranging from zero to one, first, I assume that exposure increases as a linear function of age. This is to say that older persons have greater previous exposure to environmental hazards than younger persons. Next, I assume that persons near the beginning and end of their lives are the most sensitive to environmental hazards. I therefore model sensitivity as an exponentially decreasing function from age zero to middle age, and as an exponentially increasing function from middle age to the oldest age, which is 100 in this demonstration. I model adaptive capacity in the opposite way, as an exponentially increasing function from age zero to middle age, and as an exponentially decreasing function from middle age to oldest age. I then calculate vulnerability at each age as an average of exposure, sensitivity, and the reciprocal of adaptive capacity. Vulnerability scores are displayed in Fig. 2.

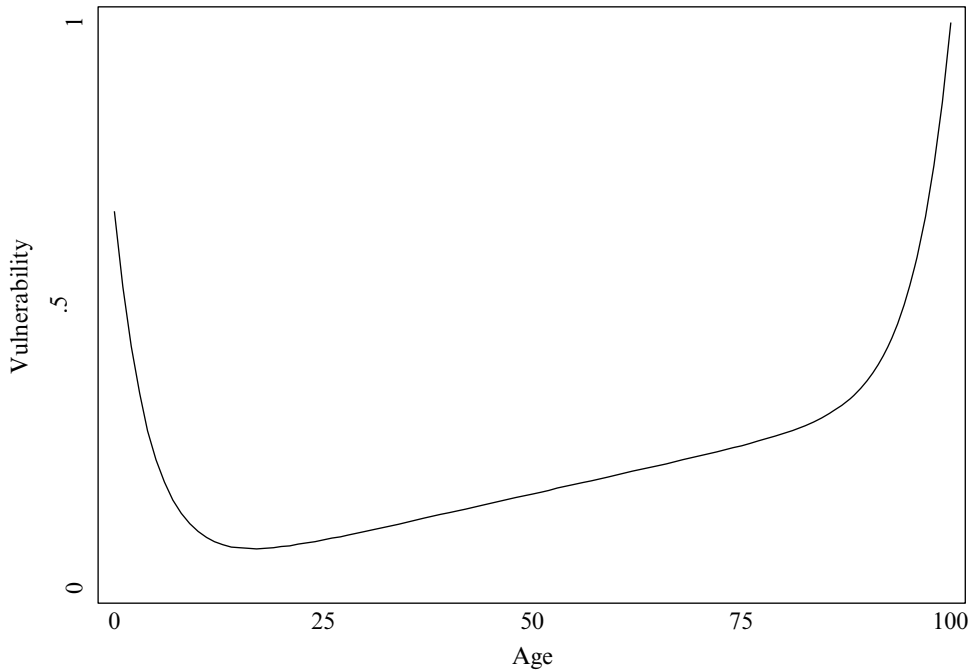


Fig. 2 Vulnerability scores by age

Given the specifications above, older persons are more vulnerable to environmental hazards than younger persons. However, those in the earliest stages of life are more vulnerable to environmental hazards than those at, say, middle age. The fact that vulnerability does not reach zero indicates that persons in all life course stages are, to some degree or another, vulnerable to environmental hazards.

Using the vulnerability scores at each age, ${}_n v_x$, I then construct a set of alternative age schedules of migration and mortality. Hereafter, I refer to these schedules as *disaster age profiles* of migration and mortality. These are constructed by weighting the age-specific probabilities of migrating and dying in the typical age profiles, as shown in Fig. 1, by a factor of: $1 + {}_n v_x$. The typical and disaster age profiles of migration and mortality are displayed in Fig. 3.

Given the specifications above, as is evident in Fig. 3, relative to the typical age profile of migration, the disaster age profile of migration is more pronounced at the earliest ages because younger persons are vulnerable to environmental hazards, and an environmental event experi-

enced at an early age increases the probability of migration, which is already quite high to begin in the typical schedule. This explains why the probabilities of migrating at older ages in the disaster age profile are hardly elevated at all, relative to corresponding probabilities in the typical schedule. That is, despite the fact that older persons are vulnerable to environmental hazards (see Fig. 2), older persons are at a low risk of migrating in the first place per the typical age profile. In contrast, the disaster age profile of mortality indicates that older persons are at much greater risk of dying in the presence of a disaster because they are vulnerable to environmental hazards and at a greater risk of dying to begin with.

With this background in place, I consider the impact of a rapid-onset, rapid-desistance disaster event that is experienced at age x , and only age x , on the conditional expectations of life in (1) and (2). This is achieved by substituting the probabilities of migrating and dying from the disaster age profiles, e.g., ${}_n^D p_x^{ij}$ and ${}_n^D p_x^{id}$, where D denotes “disaster,” into the typical age profiles for the corresponding probabilities, e.g., ${}_n p_x^{ij}$ and ${}_n p_x^{id}$,

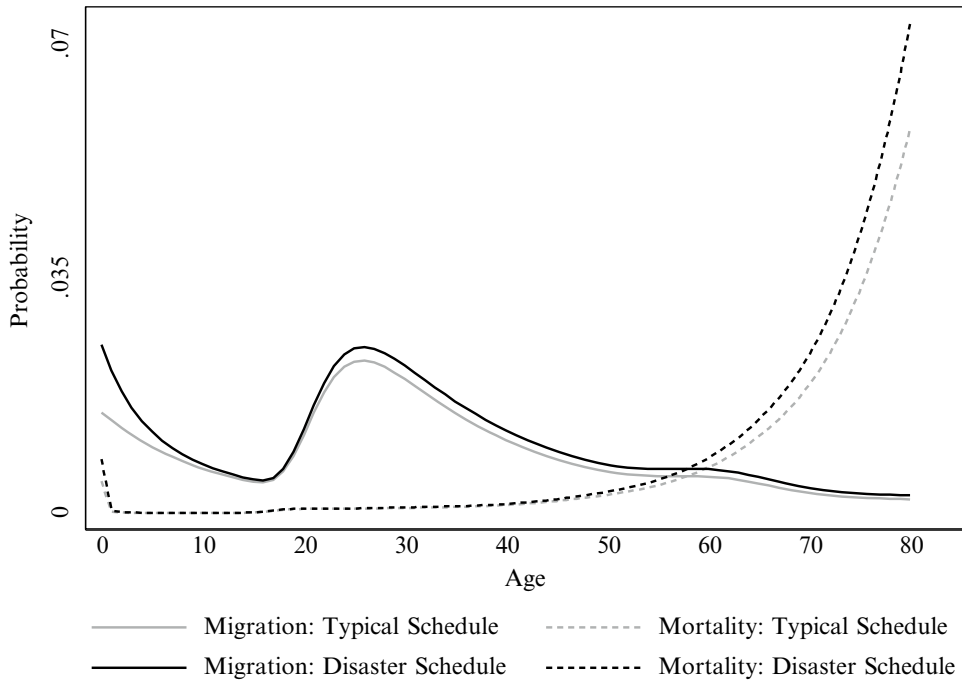


Fig. 3 Typical and disaster age schedules of migration and mortality

respectively. Accordingly, a rapid-onset, rapid-desistance disaster event approximates a shock, or disruption, to the typical age profiles of migration and mortality at age x . I consider the impact of a rapid-onset, rapid-desistance disaster event at each and every age, one at a time, on the conditional expectations of life in (1) and (2), and subsequently graph these results.

Next, I consider the impact of a rapid-onset, slow-desistance disaster process. This is achieved by carrying out the same substitution described above at exact age x , followed by making similar substitutions at all subsequent ages. To illustrate, given a disaster that begins at age 65, for those in region i at exact age 66, the probability of migrating from region i to region j , ${}_n p_{66}^{ij}$, is weighted by a factor of $\frac{{}^D{}_n P_{66}^{ij} - {}_n P_{66}^{ij}}{66 - 65}$. Likewise, the probability of migrating from region i to region j at age

73, ${}_n p_{73}^{ij}$, is weighted by a factor of $\frac{{}^D{}_n P_{73}^{ij} - {}_n P_{73}^{ij}}{73 - 65}$.

In this way, the age-specific probabilities of migration and mortality gradually (versus instan-

taneously) return to the levels in the typical age schedules, and so approximate a rapid-onset, slow-desistance disaster process.

Finally, in recalling my earlier discussion of the potential impacts of climate change for human migration, particularly the fact that persons and populations are threatened by *both* “slow- and rapid-onset climate disasters” (Leighton 2009: 337; see also McLeman 2014; McLeman and Hunter 2010), I conclude this demonstration by considering the impact of a slow-onset, slow-desistance disaster process that “peaks” at age x on the conditional expectations of life in (1) and (2). This is achieved by applying the procedure described in the previous paragraph to all ages before and after the peak of the disaster.

4.3 Results

Based on the typical age profiles of migration and mortality displayed in Fig. 1, the average number of years that members of a birth cohort could expect to live in the region in which they were

born is $e_0^{ii} = 57.95$. Persons could likewise expect to live $e_0^{ij} = 21.32$ years outside of their region of birth. These two estimates serve as the baselines against which all subsequent figures will be compared. Additionally, as a quality check, because e_0^{ii} and e_0^{ij} are additive (Rogers 1975, 1995; Palloni 2001; Schoen 1988), they should sum to total life expectancy at birth, as reported by the Australian Bureau of Statistics. The Australian Bureau of Statistics reports a figure to one decimal point of 79.3 years. My estimates sum to $57.95 + 21.32 = 79.27$ years.

In Fig. 4, I consider the impact of a rapid-onset, rapid-desistance disaster event that occurs at age x on the conditional expectations of life in (1) and (2). The estimates presented in Fig. 4 are *differences* (in years) in the conditional expectations of life that include a rapid-onset, rapid-desistance disaster event experienced at age x and the corresponding baseline estimates of $e_0^{ii} = 57.95$ years and $e_0^{ij} = 21.32$ years above.

Given the stylized nature of this demonstration, I am not concerned with the magnitudes of the differences shown in Fig. 4 because these will vary depending on the set of inputs, i.e., typical and disaster age profiles of migration and mortality, used. That said, to walk through an example of how to read the differences in Fig. 4, consider a rapid-onset, rapid-desistance disaster event that occurs at, say, age two. Over the life course, this will reduce the number of years that persons could be expected to live in the region in which they were born by one-fifth of 1 year, and increase the number of years lived outside of the region in which they were born by slightly less than one-fifth of 1 year. Similarly, a rapid-onset, rapid-desistance disaster event that occurs at age 25 will result in changes of -0.04 and $+0.03$ years, respectively. The story is somewhat different for persons who experience a rapid-onset, rapid-desistance disaster event at older ages on account of higher mortality, which reduces the number of years that they could be expected to live both in and outside of their region of birth.

Beyond the magnitudes of the differences displayed in Fig. 4, it is the substantive insights gen-

erated from this demonstration that are of primary interest. In particular, the results displayed in Fig. 4 evidence how three factors—the risks of migration and mortality, vulnerability to environmental hazards, and a disaster event that is slow-onset, slow-desistance—combine to alter long-run life course outcomes. Moreover, exactly *how* these three factors combine depends on *when* in the life course they actually come together.

In Fig. 5, I consider the impact of a rapid-onset, slow-desistance disaster process that occurs at age x and subsequently desists slowly after age x on the conditional expectations of life in (1) and (2). Like in Fig. 4, the estimates displayed in Fig. 5 are differences from the baseline estimates of $e_0^{ii} = 57.95$ years and $e_0^{ij} = 21.32$ years above.

Relative to a rapid-onset, rapid-desistance disaster event, a disaster process that is rapid-onset, slow-desistance results in considerably less time lived in one's region of birth. This is especially the case for those at the earliest ages, and, to a lesser extent, those at peak working age and the elderly. For those at the earliest ages and at peak working age, much of these losses in the amount of time that could be expected to be lived in one's region of birth is accounted for by gains lived outside of one's region of birth. In contrast, among the elderly, elevated mortality reduces the number of years that could be expected to be lived both in and outside of one's region of birth.

In substantive terms, relative to rapid-onset, rapid-desistance disaster events, disaster processes that persist in time and desist slowly are more consequential for long-run life course outcomes because the adverse effects of a hazard event are effectively prolonged. While, in this demonstration, I am concerned with disruptions to the typical age profiles of migration and mortality, the insights generated from Fig. 5 (and Fig. 4) apply to any life course process, e.g., marriage and fertility (Cohan and Cole 2002), physical and mental health (Cherniack 2008; Yule et al. 2000), etc. As is shown in Fig. 5, while it is common to envision disasters as instantaneous events (Kates et al. 2006; Masten and Narayan 2012; Sampson

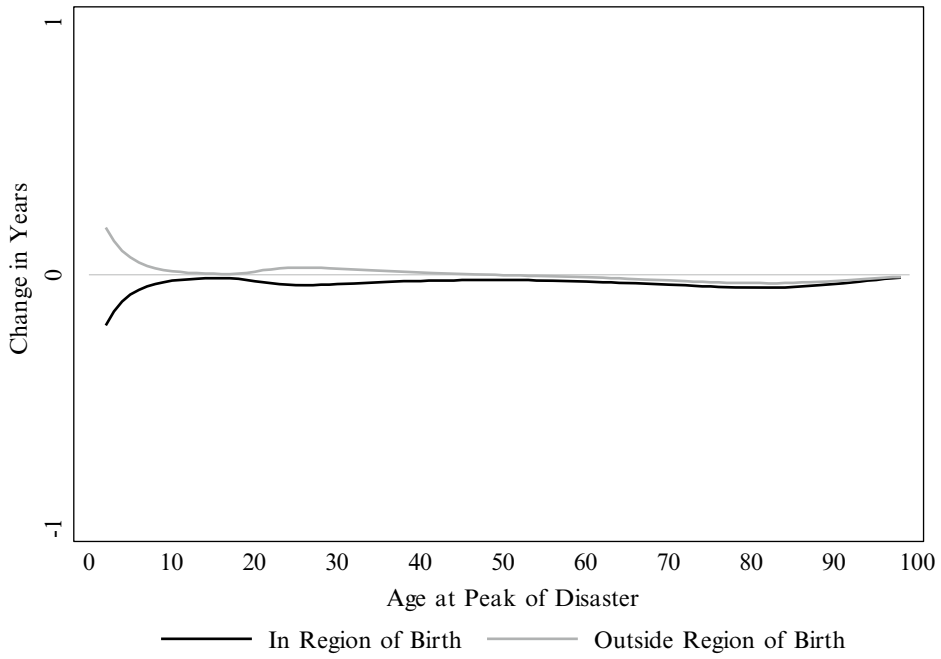


Fig. 4 Differences (from baseline) in conditional life expectancies at birth by age at peak of disaster: rapid-onset, rapid-desistance

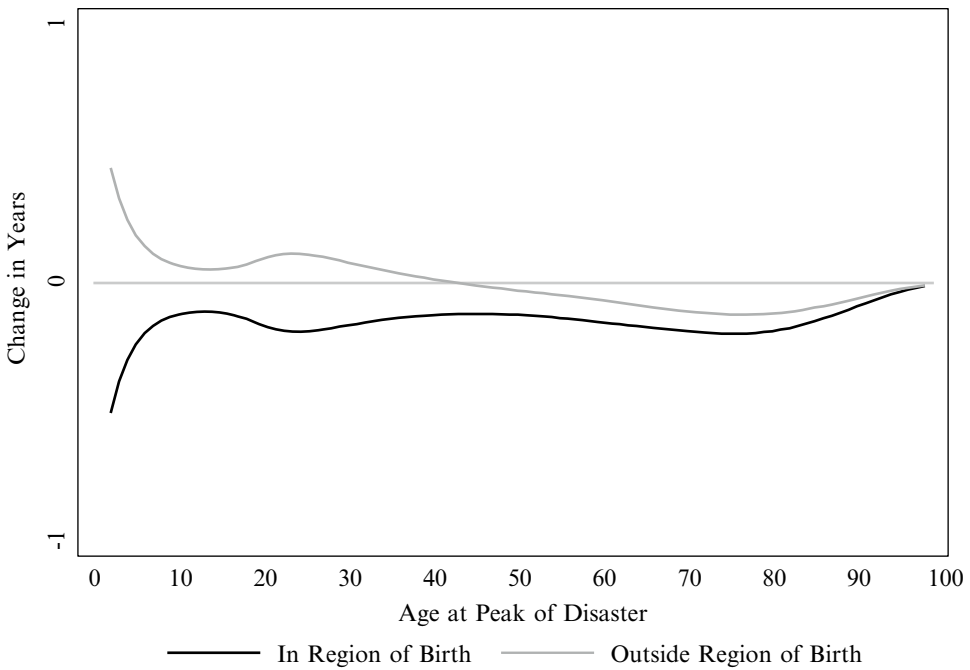


Fig. 5 Differences (from baseline) in conditional life expectancies at birth by age at peak of disaster: rapid-onset, slow-desistance

and Laub 1996), to the extent that the adverse effects of a hazard event are prolonged, there are consequential implications for long-run life course outcomes, which clearly depend on the life course stage in which these effects are experienced.

As such, in further considering the impacts of slow-onset, slow-desistance disaster process, one should expect to see greater fluctuations around the baseline estimates of $e_0^{ii} = 57.95$ years and $e_0^j = 21.32$ years because the adverse effects of a hazard event encompass an even greater portion of persons' lives. These results are shown in Fig. 6.

Clearly, slow-onset, slow-desistance disaster processes amount to extended "perturbations" to life course transitions, and thus to long-run life course outcomes (Gallopín 2006: 294). As is evident, relative to at older ages, disasters are more consequential when experienced at earlier ages; moreover, disasters are *especially* consequential when they intersect stages and moments in the life course when persons and places are particularly vulnerable to environmental hazards *and* undergoing "sensitive" transitions (Masten and Narayan 2012: 241), which, in this demonstra-

tion, correspond to ages in the life course when migration and mortality are pronounced.

5 Discussion

In adopting the view that disasters are inherently "social phenomena" (Perry 2007: 10), in this chapter, I developed and subsequently demonstrated two ideas. First, because disasters exist to the extent that environmental hazards adversely affect the functioning of persons and places, I considered the import of a life course perspective for understanding how persons and places are differentially vulnerable to such hazards in the first place. I focused especially on differential vulnerability by life course stage. I further considered selected origins of differential vulnerability at various stages in the life course. In the process, I suggested that prevailing conceptual and empirical models, e.g., dose-response, must be situated in a broader framework that includes consideration of pre-disaster vulnerability, e.g., see Ingram and Luxton (2005).

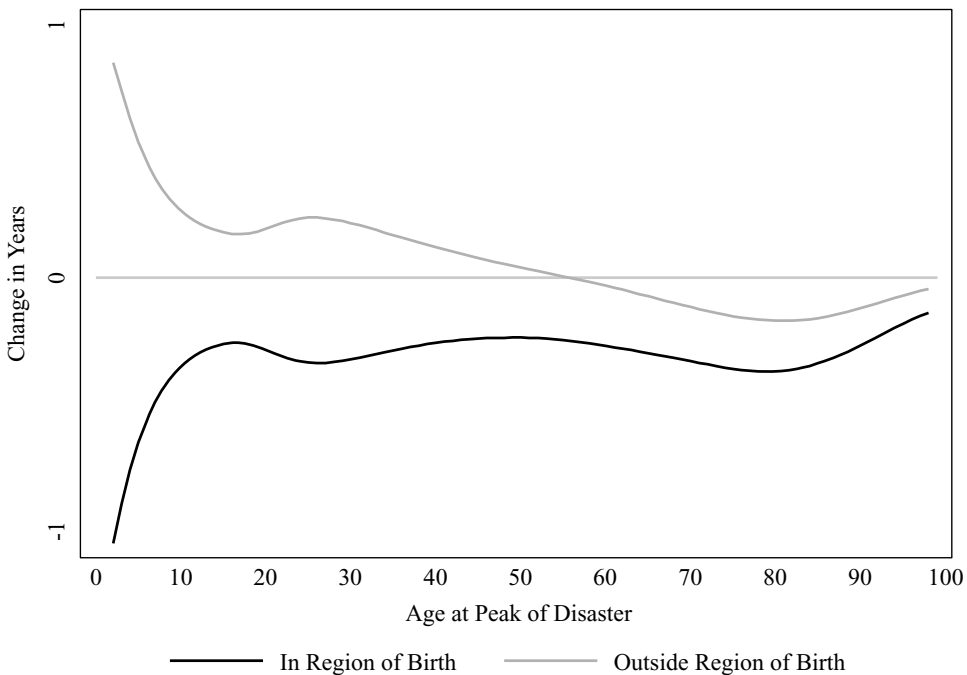


Fig. 6 Differences (from baseline) in conditional life expectancies at birth by age at peak of disaster: slow-onset, slow-desistance

Second, because disasters potentially encompass interconnected life course moments and domains, I further considered the idea that disasters exist as processes, not events, such that the adverse effects of environmental hazards persist and desist slowly in the lives of those who have experienced them. Although the point at which the adverse effects of such hazards fully cease and are replaced (instantaneously or gradually) by processes of resilience and recovery is not well understood to date, evidence suggests that disasters do, at some point, desist, and slowly at that (Kates et al. 2006). Drawing on an emerging body of research on the potential implications of climate change for human migration (Leighton 2009; McLeman 2014; McLeman and Hunter 2010), I also considered the idea that disaster processes are, in some cases, slow-onset, as well.

These ideas were illustrated in the context of a stylized demonstration, which provided a platform grounded in the “paradigmatic principles” of life course theory to jointly consider the intersections of life course processes and domains, vulnerability to environmental hazards, and the nature of disaster onset and desistance (Elder et al. 2003: 10). Despite the stylized use of the model in this chapter, the model itself is amenable to empirical investigations of other life course processes and specific disasters provided that suitable data are available.

With respect to other implications for future research, I noted earlier in my discussion of differential vulnerability to environmental hazards, that one important implication for future research is the need to inventory and analyze the pre-disaster characteristics of persons and places (Jones et al. 2009; Masten and Narayan 2012). Previous research has documented a number of aggravating and protective factors at the individual-, household-, and community-levels which condition the impact(s) of a hazard event on subsequent outcomes. While these factors have been shown to be important during and after the hazard event itself, these factors are also important in investigations into the characteristics and origins of differential vulnerability (Weems and Overstreet 2009). Rather than simply “controlling” for pre-disaster characteristics, the central

challenge from the vantage point of life course studies is to see these factors as bridges which connect past life course transitions to future ones, thereby shaping short- and long-run life course trajectories and outcomes.

At a conceptual level, this suggests that the origins of differential vulnerability to environmental hazards are diverse. Moreover, it points to the need for longitudinal and dynamical frameworks capable of linking the past to the future via the present. Ultimately, this intersects with existing conceptualizations of disasters (and there are many (e.g., see Perry 2007)), which, rather than events, are social processes that fundamentally reflect variability in the life course.

References

- Adger, W. N. (2006). Vulnerability. *Global Environmental Change, 16*, 268–281.
- Aldrich, N., & Bensen, W. F. (2008). Disaster preparedness and the chronic disease needs of vulnerable older adults. *Preventing Chronic Disease: Public Health Research, Practice, and Policy, 5*, 1–7.
- Alexander, D. (2005). An interpretation of disaster in terms of changes in culture, society, and international relations. In R. W. Perry & E. L. Quarantelli (Eds.), *What is a disaster? New answers to old questions* (pp. 25–38). Philadelphia, PA: XLibris Press.
- Bates, D. C. (2002). Environmental refugees? Classifying human migration caused by environmental change. *Population and Environment, 23*, 465–477.
- Berggren, R. E., & Curiel, T. J. (2006). After the storm: Health care infrastructure in post-Katrina New Orleans. *The New England Journal of Medicine, 354*, 1549–1552.
- Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. S. G. (2011). The effect of environmental change on human migration. *Global Environmental Change, 21S*, S3–S11.
- Black, R., Arnell, N. W., Adger, W. N., Thomas, D. S. G., & Geddes, A. (2013). Migration, immobility and displacement outcomes following extreme events. *Environmental Science & Policy, 27S*, S32–S43.
- Bonanno, G., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology, 75*, 671–682.
- Buchanan, T. K., Casbergue, R. M., & Baumgartner, J. J. (2009). Young children’s demonstrated understanding of hurricanes. In K. E. Cherry (Ed.), *Lifespan perspectives on natural disasters: Coping with Katrina, Rita, and other storms* (pp. 3–26). New York: Springer.

- Bumpass, L., & Lu, H. (2000). Trends in cohabitation and implications for children's family contexts in the United States. *Population Studies*, *54*, 29–41.
- Burton, M. L., & Hicks, M. J. (2005). *Hurricane Katrina: Preliminary estimates of commercial and public sector damages*. Huntington: Center for Business and Economic Research, Marshall University.
- Chamlee-Wright, E., & Storr, V. H. (2009). 'There's no place like New Orleans': Sense of place and community recovery in the ninth ward after Hurricane Katrina. *Journal of Urban Affairs*, *31*, 615–634.
- Cherniack, E. P. (2008). The impact of natural disasters on the elderly. *American Journal of Disaster Medicine*, *3*, 133–139.
- Cherry, K. E. (2009). *Lifespan perspectives on natural disasters: Coping with Katrina, Rita, and other storms*. New York: Springer.
- Cohan, C. L., & Cole, S. W. (2002). Life course transitions and natural disaster: Marriage, birth and divorce following Hurricane Hugo. *Journal of Family Psychology*, *16*, 14–25.
- Cutter, S. L. (1996). Vulnerability to environmental hazards. *Progress in Human Geography*, *20*, 529–539.
- Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, *84*, 242–261.
- Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, *18*, 598–606.
- Earthquake Engineering Research Institute. (2006). *The Kashmir earthquake of October 8, 2005: Impacts in Pakistan*. EERI Special Earthquake Report, Oakland.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–22). New York: Kluwer Academic/Plenum Publishers.
- El-Hinnawi, E. (1985). *Environmental refugees*. Nairobi: United Nations Environmental Programme.
- Elliott, J. R., & Pais, J. (2006). Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Social Science Research*, *35*, 295–321.
- Findlay, A. M. (2011). Migrant destinations in an era of environmental change. *Global Environmental Change*, *21S*, S50–S58.
- Fultz, N. H., Ofstedal, M. B., Herzog, A. R., & Wallace, R. B. (2003). Additive and interactive effects of comorbid physical and mental conditions on functional health. *Journal of Aging and Health*, *15*, 465–481.
- Fussell, E., & Lowe, S. R. (2014). The impact of housing displacement on the mental health of low-income parents after Hurricane Katrina. *Social Science and Medicine*, *113*, 137–144.
- Fussell, E., Sastry, N., & VanLandingham, M. (2010). Race, socioeconomic status, and return migration to New Orleans after Hurricane Katrina. *Population and Environment*, *31*, 20–42.
- Gallopín, G. C. (2006). Linkages between vulnerability, resilience, and adaptive capacity. *Global Environmental Change*, *16*, 293–303.
- Groen, J. A., & Polivka, A. E. (2010). Going home after Hurricane Katrina: Determinants of return migration and changes in affected areas. *Demography*, *47*, 821–844.
- Guha-Sapir, D., Hoyois, P., & Below, R. (2013). *Annual disaster statistical review 2013: The numbers and trends*. Centre for Research on the Epidemiology of Disasters (CRED), Université Catholique de Louvain.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513–524.
- Hunter, L. M., Leyk, S., Nawrotzki, R., MacLaurin, G., Twine, R., Collinson, M., & Erasmus, B. (2014). Rural outmigration, natural capital, and livelihoods in rural South Africa. *Population, Space and Place*, *20*, 402–420.
- Ingram, R. E., & Luxton, D. D. (2005). Vulnerability-stress models. In B. L. Hankin & J. R. Z. Abela (Eds.), *Development of psychopathology: A vulnerability-stress perspective* (pp. 32–46). Beverly Hills: Sage Publications.
- Intergovernmental Panel on Climate Change. (2012). Glossary of terms. In C. B. Field, V. Barros, T. F. Stocker, D. Qin, D. J. Dokken, K. L. Ebi, M. D. Mastrandrea, K. J. Mach, G. K. Plattner, S. K. Allen, M. Tignor, & P. M. Midgley (Eds.), *Managing the risks of extreme events and disasters to advance climate change adaptation* (pp. 555–564). Cambridge: Cambridge University Press.
- Johnson, J., & Galea, S. (2009). Disasters and population health. In K. E. Cherry (Ed.), *Lifespan perspectives on natural disasters: Coping with Katrina, Rita, and other storms* (pp. 281–326). New York/Frankfurt am Main: Springer/Campus Verl.
- Jones, R. T., Burns, K. D., Immel, C. S., Moore, R. M., Schwartz-Goel, K., & Culpepper, B. (2009). The impacts of Hurricane Katrina on children and adolescents: Conceptual and methodological implications for assessment and intervention. In K. E. Cherry (Ed.), *Lifespan perspectives on natural disasters: Coping with Katrina, Rita, and other storms* (pp. 65–96). New York: Springer.
- Kates, R. W., Colten, C. E., Laska, S., & Leatherman, S. P. (2006). Reconstruction of New Orleans after Hurricane Katrina: A research perspective. *Proceedings of the National Academy of Sciences*, *103*, 14653–14660.
- KC, S., Lutz, W., Loichinger, E., Mutarak, R., & Striebnig, E. (2014). *Reducing vulnerability in critical life course phases by enhancing human capital* (Occasional Paper, Human Development Reports). New York: United Nations.
- Kraaij, V., Arensman, E., & Spinhoven, P. (2002). Negative life events and depression in elderly persons: A meta-analysis. *Journal of Gerontology*, *57B*, 87–94.
- Leighton, M. (2009). Migration and slow-onset disasters: Desertification and drought. In F. Laczko &

- C. Aghazarm (Eds.), *Migration, environmental and climate change: Assessing the evidence*. Geneva: International Organization for Migration.
- Logan, J. R. (2009). Unnatural disaster: Social impacts and policy choices after Katrina. In R. D. Bullard & B. Wright (Eds.), *Race, place and environmental justice after Hurricane Katrina* (pp. 249–264). Boulder: Westview Press.
- Logan, J. R., & Xu, Z. (2011). *Increasing population vulnerability to hurricane damage on the U.S. Gulf Coast, 1950–2009* (Working Paper, Spatial Structures in the Social Science). Providence: Brown University.
- Marmar, C. R., Weiss, D. S., Metzler, T. J., Delucchi, K. L., Best, S. R., & Wentworth, K. A. (1999). Longitudinal course and predictors of continuing distress following critical incident exposure in emergency services personnel. *Journal of Nervous and Mental Disease, 187*, 15–22.
- Masten, A. S., & Narayan, A. J. (2012). Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience. *Annual Review of Psychology, 63*, 227–257.
- Masten, A. S., & Osofsky, J. (2010). Disasters and their impacts on child development. *Child Development, 81*, 1029–1039.
- McFarlane, A. C. (1988). The longitudinal course of post-traumatic morbidity: The range of outcomes and their predictors. *The Journal of Nervous and Mental Disease, 176*, 30–39.
- McLeman, R. A. (2014). *Climate change and human migration: Past experiences, future challenges*. Cambridge: Cambridge University Press.
- McLeman, R. A., & Hunter, L. M. (2010). Migration in the context of vulnerability and adaptation to climate change: Insights from analogues. *Wiley Interdisciplinary Reviews: Climate Change, 1*, 450–461.
- Myers, C. A., Slack, T., & Singelmann, J. (2008). Social vulnerability and migration in the wake of disasters: The case of Hurricanes Katrina and Rita. *Population and Environment, 29*, 271–291.
- Nawrotzki, R. J., Riosmena, F., & Hunter, L. M. (2013). Do rainfall deficits predict U.S. bound migration from rural Mexico? Evidence from the Mexican census. *Population Research and Policy Review, 31*, 129–158.
- Nigg, J. M., Barnshaw, J., & Torres, M. R. (2006). Hurricane Katrina and the flooding of New Orleans: Emergent issues in sheltering and temporary housing. *The Annals of the American Academy of Political and Social Science, 604*, 113–128.
- Olteanu, A., Amberger, R., Grant, R., Davis, C., Abramson, D., & Asola, J. (2011). Persistence of mental health needs among children affected by Hurricane Katrina in New Orleans. *Prehospital Disaster Medicine, 36*, 3–6.
- Pais, J. F., & Elliott, J. R. (2008). Places as recovery machines: Vulnerability and neighborhood changes after major hurricanes. *Social Forces, 86*, 1415–1453.
- Palloni, A. (2001). Increment-decrement life tables. In S. Preston, P. Heuveline, & M. Guillot (Eds.), *Measuring and modeling population processes* (pp. 256–273). Oxford: Blackwell Publishers.
- Paton, D., & Johnston, D. M. (2006). *Disaster resilience: An integrated approach*. Springfield: Charles C. Thomas Publisher.
- Paxson, C., Fussell, E., Rhodes, J., & Waters, M. (2012). Five years later: Recovery from post-traumatic stress and psychological distress among low-income mothers affected by Hurricane Katrina. *Social Science and Medicine, 74*, 150–157.
- Perry, R. W. (2007). What is a disaster? In H. Rodríguez, E. L. Quarantelli, & R. R. Dynes (Eds.), *Handbook of disaster research* (pp. 1–15). New York: Springer.
- Rathore, M. F. A., Rashid, P., Butt, A. W., Malik, A. A., Gill, Z. A., & Haig, A. J. (2007). Epidemiology of spinal cord injuries in the 2005 Pakistan earthquake. *Spinal Cord, 45*, 658–663.
- Rathore, M. F. A., Farooq, F., Muzammil, S., New, P. W., Epi, M. C., Ahmad, N., & Haig, A. J. (2008). Spinal cord injury management and rehabilitation: Highlights and shortcomings from the 2005 earthquake in Pakistan. *Archives of Physical Medicine and Rehabilitation, 89*, 579–585.
- Rhodes, J., Rouse, C. E., Waters, M., & Fussell, E. (2010). The impact of Hurricane Katrina on the mental and physical health of low-income parents in New Orleans. *American Journal of Orthopsychiatry, 80*, 237–247.
- Rogers, A. (1975). *Introduction to multiregional mathematical demography*. New York: Wiley.
- Rogers, A. (1995). *Multiregional demography: Principles, methods and extensions*. London: Wiley.
- Rogers, A., & Castro, L. J. (1981). *Model migration schedules* (RR-81-30). Laxenburg: International Institute for Applied Systems Analysis.
- Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social disorganization theory. *American Journal of Sociology, 94*, 774–802.
- Sampson, R. J., & Laub, J. H. (1996). Socioeconomic achievement in the life course of disadvantaged men: Military service as a turning point, circa 1940–1965. *American Sociological Review, 61*, 347–367.
- Schoen, R. (1988). *Modeling multigroup populations*. New York: Plenum.
- Schultz, J. M., Espinel, Z., Galea, S., & Reissman, D. B. (2007). Disaster ecology: Implications for disaster psychiatry. In R. J. Ursano, C. S. Fullerton, L. Weisaeth, & B. Raphael (Eds.), *Textbook of disaster psychiatry* (pp. 69–96). Cambridge: Cambridge University Press.
- Shenk, D., Ramos, B., Kalaw, K. J., & Tufan, I. (2009). History, memory, and disasters among older adults: A life course perspective. *Traumatology, 15*, 35–43.
- Taqir, S. F., Mirza, S., Gul, S., Ghaffar, H., & Zafar, A. (2007). Complications in patients with spinal cord injuries sustained in an earthquake in northern Pakistan. *Journal of Spinal Cord Medicine, 30*, 373–377.

- Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockström, J. (2006). Reducing hazard vulnerability: Towards a common approach between disaster and risk reduction and climate adaptation. *Disasters*, *30*, 39–48.
- United States Geological Survey. (2005). *M7.6 northern Pakistan earthquake of 8 October 2005*. Reston: National Earthquake Information Center.
- Vogeli, C., Shields, A. E., Lee, T. A., Gibson, T. B., Marder, W. D., Weiss, K. B., & Blumenthal, D. (2007). Multiple chronic conditions and implications for quality, care management, and costs. *Journal of General Internal Medicine*, *22*, 391–395.
- Weems, C. F., & Overstreet, S. (2009). An ecological-needs-based perspective of adolescent and youth emotional development in the context of disaster: Lessons from Hurricane Katrina. In K. E. Cherry (Ed.), *Lifespan perspectives on natural disasters: Coping with Katrina, Rita, and other storms* (pp. 27–44). New York: Springer.
- Wilson, T. (2010). Model migration schedules incorporating student migration peaks. *Demographic Research*, *23*, 191–222.
- Yang, Y., & Walji, M. (2010). Increment-decrement life table estimates of happy life expectancy for the U.S. population. *Population Research and Policy Review*, *29*, 775–795.
- Yule, W., Bolton, D., Udwin, O., Boyle, S., O’Ryan, D., & Nurrish, J. (2000). The long-term psychological effects of a disaster experience in adolescence: The incidence and course of PTSD. *Journal of Child Psychology and Psychiatry*, *41*, 503–511.

Part III

Health and Development Through the Life Course

Early Childhood Poverty: Short and Long-Run Consequences Over the Lifespan

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1 Introduction

Using a poverty line of about \$22,000 for a family of four, the U.S. Census Bureau counted more than 15 million U.S. children living in poor families in 2012. Poor children begin school well behind their more affluent age mates and, if anything, lose ground during the school years. Although poorer and more affluent children make similar gains on standardized achievement tests during each school year, poor children fall behind during the summers when school is not in session, particularly in the early grades, while their more affluent counterparts continue to forge ahead. As a result, the gap between them widens over time (Entwisle et al. 2003). At age 4, children from families in the poorest income quintile score on average at the 32nd percentile of the national distribution on math and the 34th percentile in a test of literacy while children in the rich-

est quintile score at the 69th percentile on math and literacy (Waldfogel and Washbrook 2011). Gaps in conduct problems and attention/hyperactivity are also apparent albeit less pronounced.

Duncan and Magnuson (2005) examined teacher-reported gaps in attention and engagement in first and fifth grade. They showed that children from the top income quintile are reported by teachers to be far more engaged in school (the gap is approximately two-thirds of a standard deviation) compared with their counterparts in the bottom quintile. Children from poor families also go on to complete less schooling, work less and earn less. Understanding the origins and persistence of these differences in fortunes is a vital step for understanding the intergenerational reproduction of poverty and ensuring the prosperity of future generations.

Social scientists have been investigating links between family poverty and subsequent child outcomes for decades (see Mayer 1997 for a review). As in many research areas, early empirical studies were typically based on point-in-time cross-sectional data. The creation of nationally representative longitudinal data sets in the late 1960s and 1970s enabled researchers to test more refined and dynamic models of links between children's poverty experiences and later outcomes, which predicted, for example, that persistent poverty is more harmful than transient poverty. Although large-scale random-assignment social experiments conducted in the

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United States in the 1970s manipulated family income, most of them focused on the question of how additional income affected adult work effort rather than on child well-being (Maynard and Murnane 1979).

Almost universally neglected in the poverty indicators and impacts literatures are careful thought about the *timing* of economic hardship across childhood and adolescence. Emerging research in neuroscience and developmental psychology suggests that poverty early in a child's life may be particularly harmful. Not only does the astonishingly rapid development of young children's brains leave them sensitive (and vulnerable) to environmental conditions, but the family context (as opposed to schools or peers) dominates children's everyday lives.

After a brief review of theoretical perspectives and both experimental and nonexperimental evidence linking poverty with childhood outcomes, we highlight emerging research based on newly available data providing both poverty measures as early as the prenatal year and adult outcomes measured in the fourth decade of life. Our review and discussion of the existing literature pays particular attention to the issue of causal evidence.

2 Theoretical Perspectives

What are the short and long-run consequences of growing up in a poor household? Economists, sociologists, developmental psychologists, and neuroscientists emphasize different pathways by which poverty may influence children's development. The two main theoretical frameworks describing these processes are: family and environmental stress, on the one hand and resources and investment on the other. A third perspective, which we also describe, is social selection.

Family and Environmental Stress Perspective Economically disadvantaged families experience higher levels of stress in their everyday environments than more affluent families, and these disparities may affect children's development. The family stress model was first developed by Glen Elder to document the

influence of economic loss during the Great Depression (Elder 1974). According to this perspective, poor families face significant economic pressure as they struggle to pay bills and purchase important goods and services, and these economic pressures, coupled with other stressful life events that are more prevalent in the lives of poor families, creates high levels of psychological distress, including depressive and hostile feelings, in poor parents (Kessler and Cleary 1980; McLeod and Kessler 1990).

This perspective has been broadened by recent behavioral economics work showing that conditions of poverty and scarcity not only create psychological distress, but also deplete important cognitive resources (Spears 2011). Studies, most of which have been conducted in developing countries, find that making economic decisions under conditions of scarcity reduces adults' subsequent behavioral self-control and renders them less able to regulate their own behavior in order to pursue less immediate goals.

Psychological distress spills over into marital and co-parenting relationships. As couples struggle to make ends meet, their interactions tend to become more hostile and conflicted, and this leads them to withdraw from each other (Brody and Stoneman 1994; Conger and Elder 1994). Parents' psychological distress and conflict, in turn, are linked with parenting practices that are on average more punitive, harsh, inconsistent, and detached, as well as less nurturing, stimulating, and responsive to children's needs. Such lower-quality parenting is likely to elevate children's physiological stress responses, and ultimately harms children's development (Conger et al. 2002; Conger and Dogan 2007; McLoyd 1990). At the same time, methodologically strong studies that have manipulated family income have shown few impacts on parenting behavior or parent-child relationships (Morris et al. 2001).

Furthermore, although the biological links between low income and stress are compelling, no methodologically strong studies have linked poverty and elevated and prolonged stress reactions in children. Some rigorous studies have

examined these connections in mothers. One of these linked expansions of the Earned Income Tax Credit (EITC) to data from the National Health Examination and Nutrition Survey and found that when compared with mothers with just one child, low-income mothers with two or more children (who received a greater increase in income under the program expansion) experienced larger reductions in risky biomarkers and self-reported better mental health (Evans and Garthwaite 2010). A study of the impacts of increases in the Canadian Child Benefit also found improvements in maternal mental health. However, studies of the impacts of other welfare and anti-poverty programs that increased both income and maternal employment did not show similar improvements in mental health (Duncan et al. 2009).

The Family Stress perspective has undergone major conceptual and empirical advances in recent years. On the conceptual side, a narrow focus on environmental toxins and parental mental health and parenting has been broadened by neurobiological evidence on the importance of maintaining tolerable levels of stress for both parents and children, and a cognitive psychological perspective on links between stress, information processing and decision-making. Increasingly sophisticated studies suggest linkages between income support and maternal stress.

In particular, emerging evidence from neuroscience and social epidemiology suggests that the *timing* of child poverty matters, and that for some outcomes later in life, particularly those related to attainment and health, poverty *early* in a child's life may be particularly harmful. Both human and animal studies highlight the critical importance of early childhood for brain development and for establishing the neural functions and structures that will shape future cognitive, social, emotional and health outcomes (Knudsen et al. 2006). Essential properties of most of the brain's architecture are established very early in life by genes and, importantly, early experience. Children's brains are "programmed" to be wired efficiently based on everyday interactions with sights, sounds and supportive caregivers (Sapolsky 2004). The brains of children in

deprived or traumatic environments often develop differently. Traumatic stress that arises from child maltreatment, for example, produces measurable changes in brain structures and is likely to impart long-lasting disadvantages for adult mental and physical health and labor market functioning (Danese et al. 2007).

Based on insights from this emerging neuroscience literature, Cunha et al. (2006) propose an economic model of development in which pre-school cognitive and socio-emotional capacities are key ingredients for human capital acquisition during the school years. In their model, "skill begets skill" and early capacities can affect the likelihood that later school-age human capital investments will be successful and productive. This model predicts that economic deprivation in early childhood creates disparities in school readiness and early academic success that widen over the course of childhood.

Complementary studies in psychology and social epidemiology illustrate that both *in utero* environments and early childhood experiences can have long-run impacts on adult physical and mental health (Sapolsky 2004; Strauss 1997). The "fetal origins hypothesis" posits a programming process whereby stimulants and insults during the prenatal period have long-lasting implications for physiology and disease risk (Barker et al. 2002). Chronic stress from growing up poor could also play a role in dysregulation across multiple physiological systems whose effects persist (or possibly compound) into adulthood. For example, Evans and Schamberg (2009) showed that childhood poverty increases allostatic load, a biological index of the cumulative wear and tear on the body, during the teenage years. Moreover, the longer the children had lived in poverty, the higher their allostatic load.

Allostatic load is caused by the mobilization of multiple physiological systems in response to chronic stresses in the environment. Thus childhood poverty may actually "reset" the immune system so that inflammation processes become dysregulated, resulting in higher levels and prolonged production of proinflammatory cytokines (i.e., chemical signals that can cause blood

vessels to leak, leading to the swelling and redness that is associated with inflammation; Miller et al. 2009).

Resource and Investment Perspective Household production theory has played a central role in how economists conceive of family influences on child development. Gary Becker's *A Treatise on the Family* (1991) posits that child development is "produced" from a combination of endowments and parental investments. Endowments include genetic predispositions and the values and preferences that parents instill in their children. Parents' preferences, such as the importance they place on education and their orientation toward the future, combined with their resources, shape parental investments.

Economists argue that time and money are the two basic resources that parents invest in their children. For example, investments in high-quality child care and education, housing in good neighborhoods, and rich learning experiences enhance children's development, as do investments of parents' time. Links among endowments, investments, and development appear to differ by the domain of development under consideration (e.g. achievement, behavior, health).

Household production theory suggests that children from poor families lag behind their economically advantaged counterparts in part because their parents have fewer resources to invest in them. Compared with more affluent parents, poor parents are less able to purchase inputs for their children, including books and educational materials at home, high-quality child care settings and schools, and safe neighborhoods. Economically disadvantaged parents may also have less time to invest in their children, owing to higher rates of single-parenthood, nonstandard work hours, and less flexible work schedules (Smolensky and Gootman 2003). This too may have negative consequences for children. Evidence suggests that the amount of cognitive stimulation in the home environment varies with changes in family income (Votruba-Drzal 2006).

Kaushal et al. (2011) provide new evidence, based on recent Consumer Expenditure Surveys, of the nature of child enrichment expenditures

such as books, computers, high-quality child care, summer camps, and private school tuition. They investigate total expenditures per child, enrichment expenditures per child and per-child expenditures in selected categories for different income groups and for families with either only preschoolers or children age 6 or more.

Adjusted for family size and composition, they find that child enrichment expenditures are highly income elastic, constituting only 3 % of total expenditures for families in the bottom expenditure quintile, and 9 % of total expenditures for families in the top expenditure quintile. Trips and child care expenditures are most important for the high-income families, while expenditures are spread more evenly across categories for low-income families. Moreover, 40 years ago, low-income families spent about \$850 (in 2011 dollars) on child enrichment expenditures such as books, computers, high-quality child care, summer camps and private school tuition, while higher-income families spent more than \$3,500, already a substantial difference (Duncan and Murnane 2011). By 2005–2006, low-income families had increased their expenditures to over \$1,300, but high-income families had increased theirs much more, to more than \$9,000 per child. The differences in spending between the two groups had almost tripled in the intervening years. The largest spending differences were for activities such as music lessons, travel, and summer camps (Duncan and Murnane 2011).

One of the most important parenting differences between advantaged and disadvantaged parents is in how much time the parent spends with the child. Annette Lareau's (2003) qualitative study of family life reported that middle-class parents target their time with children toward developmentally enhancing activities. In her study, middle-class families (whose jobs, by her definition, require college-level skills) engage in a pattern of "concerted cultivation" to actively develop children's talents and skills. By contrast, in lower-class families, Lareau identified a pattern that she calls "the accomplishment of natural growth," wherein parents attend to children's material and emotional needs but presume that their talents and skills will develop without concerted parental intervention.

Numerous quantitative studies not only show large differences in the time investments of advantaged and disadvantaged parents but also that these gaps persist even when other differences across families, such as employment hours and schedules, are accounted for (Guryan et al. 2008). Using education as a marker of economic advantage, Guryan et al. (2008) use data from the American Time Use Survey to show that conditional on hours worked in the labor market mothers with a college education spend 6 more hours per week in child care activities than women who did not finish high school and twice the amount of time as mothers who graduated from high school. These researchers posited that economically advantaged parents view time with children as an “investment behavior” with which to increase children’s human capital (for either altruistic or selfish reasons) and do not view market alternatives as highly effective substitutes for their own time investments. Kalil et al. (2012) further show that highly-educated mothers are more “efficient” in their parental time investments by tailoring their specific activities to children’s developmental stage. Their work shows that highly educated mothers shift the composition of their time in ways that promote children’s development at different developmental stages, for example by emphasizing play and teaching when children are in preschool and management of life outside the home for adolescents.

The most commonly used measure of parenting behavior in large national studies is the Home Observation for Measurement of the Environment (HOME), an observational and parent-report measure of the quantity and quality of cognitive stimulation and emotional support children receive in the home. The HOME captures all of the parenting behaviors found to differ between more and less advantaged children including parents’ promotion of language and literacy, engagement in enriching activities, and warmth and affection. Bradley et al. (2001) analyzed HOME scores in a large nationally representative data set (the National Longitudinal Survey of Youth-Child Survey) to show that poverty status had a larger association with both Teaching and Parental Responsiveness (subscales that emerged across ages that tap cognitive stimulation and

emotional support) than did race/ethnicity, with children in poor families having less stimulating and responsive parent-child interactions than children in higher SES families. Differences were relatively consistent across ages. These findings reflect parenting patterns across income groups found in smaller studies (e.g., Conger and Conger 2000; Dodge et al. 1994; McLoyd 1990).

Selection Perspective Researchers seeking to identify the causal influences of income face formidable challenges. They must take seriously threats to internal validity from a variety of sources, including bias from simultaneous causation and potential omitted variables (Sobel 1998). A key challenge involves isolating the effects of income from other disadvantages that poor families face. A first issue is that socioeconomic characteristics tend to cluster together, so that children who live in poverty are likely to have parents with lower levels of education, which makes it difficult to isolate the unique influence of any one indicator of SES. A second problem is that family income or low parental education are linked with several other family circumstances such as greater prevalence of single-parent families, low levels of parents’ cognitive skills, and poor parental mental health. Each of these factors may have an independent negative effect on children. Thus, to ascribe a causal effect to poverty requires ruling out other explanations for the associations between socioeconomic factors and children’s development.

Some researchers have argued that income effects are largely the spurious result of unmeasured differences that are correlated both with income and child outcomes (Mayer 1997). In other words, unmeasured characteristics such as parental mental health or motivation that contribute to greater income and earnings may also enhance child development, leading to a spurious correlation between SES and child development. This threat of omitted variable bias is an important concern in most nonexperimental research. Studies that use rigorous statistical techniques to address bias issues tend to uncover smaller effect sizes than studies that do not (Duncan 2006; Holmlund et al. *in press*).

Duncan (2006) describes a continuum for evaluating the methodological rigor of studies aimed at estimating poverty and income's influence on child development. On one end are correlational studies that analyze associations between concurrent measures of family income and child outcomes, with few adjustments for confounding factors. These studies are common, but likely plagued by biases. On the other end are experiments in which families are randomly assigned to receive additional income, without any strings attached. If implemented correctly, experiments provide unbiased estimates of income effects, but such studies are exceptionally rare. Between these two extremes, ranging from less to more rigorous, are natural experiments, studies that employ econometric techniques to reduce omitted variable bias (e.g., fixed effects, instrumental variables regression), and longitudinal studies (see also Duncan et al. 2004).

Regardless of the timing of low income, isolating its causal impact on children's well-being is very difficult. The best way to identify how much money itself really matters is to conduct an experiment that compares families that receive some additional money with families that are otherwise similar, but do not receive such money. We are not aware of any experimental or quasi-experimental studies that compare the effect of family income contemporaneously, in early childhood, with the effect of family income later in childhood. But methodologically-strong studies have estimated the causal effects of overall childhood family income on later outcomes. We turn to these studies next.

3 Empirical Evidence

The strongest causal evidence in the literature relates income increases to children's school achievement and attainment. The only large-scale randomized interventions to alter family income directly were the U.S. Negative Income Tax Experiments, which were conducted between 1968 and 1982 with the primary goal of identifying the influence of guaranteed income on parents' labor force participation. Published reports

from three of the sites (Gary, Indiana, and rural areas in North Carolina and Iowa) investigate impacts on achievement gains for children in elementary school; two of the three found significant impacts (Maynard and Murnane 1979; Maynard 1977). In contrast, no achievement differences were found for adolescents. Impacts on school enrollment and attainment for youth were more uniformly positive, with both the Gary and the New Jersey sites reporting increases in school enrollment, high school graduation rates, or years of completed schooling. Second- through eighth-grade teachers rated student "comportment" in the two rural sites; results showed income-induced improvements in one of the sites but not the other.

Taken together, these studies appear to suggest that income is more important for the school achievement of pre-adolescents than adolescents but may also matter for the school attainment of adolescents. None of the results from the Negative Income Tax experiments bear on the "early is best" hypothesis, because none tracked the possible achievement impacts for children who had not yet entered school when the income "treatment" was being administered.

Experimental welfare reform evaluation studies undertaken during the 1990s incentivized parental employment by providing income supports to working-poor parents through wage supplements. Moreover, some measured the test scores of children who were just entering school during the time that the programs were in place. Morris et al. (2005) analyzed data from seven random-assignment welfare and antipoverty policies, all of which increased parental employment, while only some of them increased family income (Morris et al. 2005).

The combined impacts of higher income and more maternal work on children's school achievement varied markedly by the children's age. Treatment-group children between the ages of 4 and 7 when the programs took effect, many of whom made the transition into elementary school during the programs, scored significantly higher on achievement tests than their control group counterparts. A sophisticated statistical analysis of the data on these younger children suggests

that a \$3,000 annual income boost is associated with a gain in achievement scores of about one-fifth of a standard deviation (Duncan et al. 2011). In contrast, there were no impacts on either teacher- or parent-reported behavior problems (Duncan et al. 2009).

The achievement of children age 8–11 did not appear to be affected by the programs, and the achievement of children who were 12 and 13 during the programs seemed to be hurt by the programs' efforts to increase family income and parental employment (Morris et al. 2005).

Another recent study took advantage of the increasing generosity of the U.S. EITC between 1993 and 1997 to compare children's test scores before and after it was expanded (Dahl and Lochner 2012). Most of the children in this study were between the ages of 8 and 14 and none was younger than 5. The authors found improvements in low-income children's achievement in middle childhood that coincided with the EITC expansion.

A second study, conducted in Canada, took advantage of variations in the generosity of the National Child Benefit program across Canadian provinces to estimate income impacts on child achievement. Among children age 6–10 residing in low-income families, policy-related income increases had a positive and significant association with math scores and a negative link with the likelihood of a child receiving a diagnosis of a learning disability. For 4- to 6-year-olds, the income increases were associated with higher scores on a test of receptive vocabulary for boys, but not for girls. Turning to behavior, higher benefits led to less aggression among 4- to 10-year-olds, but did not appear to affect other behavioral dimensions assessed in the study.

Researchers have rarely used rigorous experimental or strong quasi-experimental designs to study children's psychological and behavioral health. An exception is work by Costello et al. (2003), who were able to take advantage of the Great Smoky Mountain Study of Youth, which gathered longitudinal data on child outcomes during the introduction of a casino by a tribal government in North Carolina. The casino dis-

tributed about \$6,000 each year to all adult tribal members. Akee and colleagues (2010) compared Native American children with non-Native American children, before and after the casino opened, and found that receipt of casino payments increased the educational attainment of poor Native American youth by nearly a year and reduced criminal behavior and drug use.

Finally, one study used the oil boom in Norway in the beginning of the 1970s as a source of exogenous variation in family income. Instrumenting childhood family income with being born in the region and cohorts affected by the oil boom, Løken (2010) finds little or no linear effect of overall childhood family income (mean for age 1–13) on educational attainment. Løken et al. (2012) builds on Løken (2010), and develops a non-linear instrumental variable method. They find that the linear estimator misses the significant effect of family income because it assigns little weight to the large and positive marginal effects in the lower part of the income distribution. They look at effects on education (and IQ for men) and conclude that childhood family income (mean over age 2–12) has large positive effects for children from families in the lower part of the income distribution.

Several lessons emerge from these experimental and quasi-experiment studies. First, achievement gains are selective and depend at least in part on the children's age when income gains were received. Children in their preschool years or making the transition to school and elementary school students generally enjoyed the most consistent achievement increases. For adolescents, the achievement changes were mixed, with various studies finding positive, null, and even negative impacts. Second, in the case of adolescents, income appears to affect educational attainments such as high school graduation and completed years of schooling rather than test scores. Given the high costs of post-secondary education, the effect of family income on completed schooling is not surprising. Third, we know far more about how poverty reduction affects achievement and schooling outcomes than we do about its effects on behavior problems including childbearing and criminal activity.

Virtually none of the experimental literature on income effects has been able to estimate the impacts of changes in family income during the very earliest years of a child’s life – the time when children are developing rapidly and may be very sensitive to family and home conditions. Nor have these studies been able to examine the consequences of income changes during childhood for outcomes measured in adulthood. This is particularly unfortunate, since the goals of policies directed at children are often couched in terms of lifetime impacts – a middle-class standard of living or higher labor market earnings.

4 Linking Early Poverty to Adult Outcomes

None of the past income literature has been able to relate family income early in a child’s life to adult attainments, largely because no single study had collected data on both early childhood income and later adult outcomes. However, recent research has made this link using data from the Panel Study of Income Dynamics, which has followed a nationally representative

sample of U.S. families and their children since 1968 (Duncan et al. 2010). The study is based on children born between 1968 and 1975 and collected information on their economic fortunes between ages 25 and 37. Health conditions were assessed in 2006, when these individuals were between the ages of 30 and 37.

The PSID measured income in every year of a child’s life from the prenatal period through age 15. This enabled Duncan et al. (2010) to measure poverty across several distinct periods of childhood, distinguishing income early in life (prenatal through fifth year) from income in middle childhood and adolescence. The simple associations between income early in life and adult outcomes are striking (Table 1). Compared with children whose families had incomes of at least twice the poverty line during their early childhood, poor children completed 2 fewer years of schooling, earned less than half as much, worked 451 fewer hours per year, and received \$826 per year more in food stamps as adults. Poor males were twice as likely to be arrested. For females, poverty was associated with a more than fivefold increase in the likelihood of bearing a child out of wedlock prior to age 21. As for health, poor chil-

Table 1 Adult outcomes by poverty status between the prenatal year and age 5 (Duncan et al. 2010)

	Early childhood income below the official U.S. poverty line	Early childhood income between one and two times the poverty line	Early childhood income more than twice the poverty line
	<i>Mean or %</i>	<i>Mean or %</i>	<i>Mean or %</i>
Completed schooling (years)	11.8	12.7	14.0
Adult earnings between ages 25 and 37 (in \$10,000)	\$17.9	\$26.8	\$39.7
Annual work hours between ages 25 and 37	1,512	1,839	1,963
Food stamps between ages 25 and 37	\$896	\$337	\$70
Ever arrested (men only)	26 %	21 %	13 %
Nonmarital birth (women only)	50 %	28 %	9 %
Poor health in 2005	13 %	13 %	5 %
Obese in 2005 (BMI>30)	45 %	32 %	26 %
Hypertension in 2005	25 %	10 %	9 %
Arthritis in 2005	7 %	7 %	3 %
Diabetes in 2005	4 %	6 %	2 %
Work-limiting hypertension in 2005	4 %	2 %	2 %

Note: The sample consists of individuals born between 1968 and 1975 in the PSID. Earnings and food stamp values are in 2005 dollars

dren were nearly three times as likely to report poor overall health as adults and more than twice as likely to report various activity-limiting health conditions, and members of this group were 19 percentage points more likely to be overweight.

Looking beyond these simple correlations, Duncan and colleagues regressed the adult outcomes listed in Table 1 on three childhood stage-specific measures of family income – average income between the prenatal year and age 5, average income between ages 6 and 10, and average income between ages 11 and 15 – plus an extensive list of background controls. The background controls consist of birth year, race, sex, whether the child’s parents were married and living together at the time of the birth, mother’s age at birth, region, number of siblings, parent schooling, parent test score, cleanliness of the house, parent’s expectations for child, parent achievement motivation, parent locus of control and parent risk avoidance. To account for the possibility that income effects are nonlinear, two coefficients were estimated for each childhood stage, the first reflecting the estimated effect of an additional \$3,000 of annual income in the given stage for children whose income during that stage averaged less than \$25,000 and the second reflecting comparable effects for higher-income children (all three sets of income variables, plus

other controls, are included in all regressions). The \$3,000 amount was chosen for the interpretation of coefficients because it is well within the range of an actual U.S. policy – the Earned Income Tax Credit. Given that a linear function was fit to the entire income range up to \$25,000, estimated impacts of income increments smaller or larger than \$3,000 can be obtained with proportionate reductions or increases in the impacts shown in the figures.

Turning first to their central measure of labor market productivity – average annual earnings between ages 25 and 37 – Duncan and colleagues found that for children growing up in families with average early childhood incomes below \$25,000, a \$3,000 annual boost to family income between the prenatal year and age 5 was associated with a 17 % increase in adult earnings (Fig. 1). For children growing up in higher-income households (more than \$25,000 per year), a \$3,000 boost to family income was statistically significant but was estimated to increase adult earnings by only about 2 %. None of the income increments later in childhood was estimated to have statistically significant effects on later earnings.

Results for work hours are broadly similar to those for earnings, showing a highly significant estimated impact of early, but not later, childhood income. In this case, a \$3,000 annual increase in

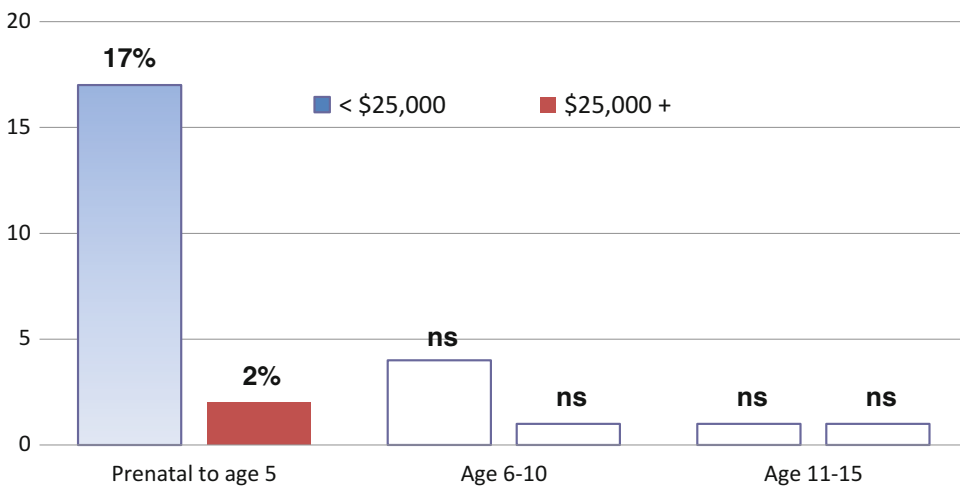


Fig. 1 Percentage increase in adult earnings associated with a \$3,000 annual increase in childhood income (“ns” means not statistically significant at $p < 0.10$). Reproduced from Duncan et al. 2010)

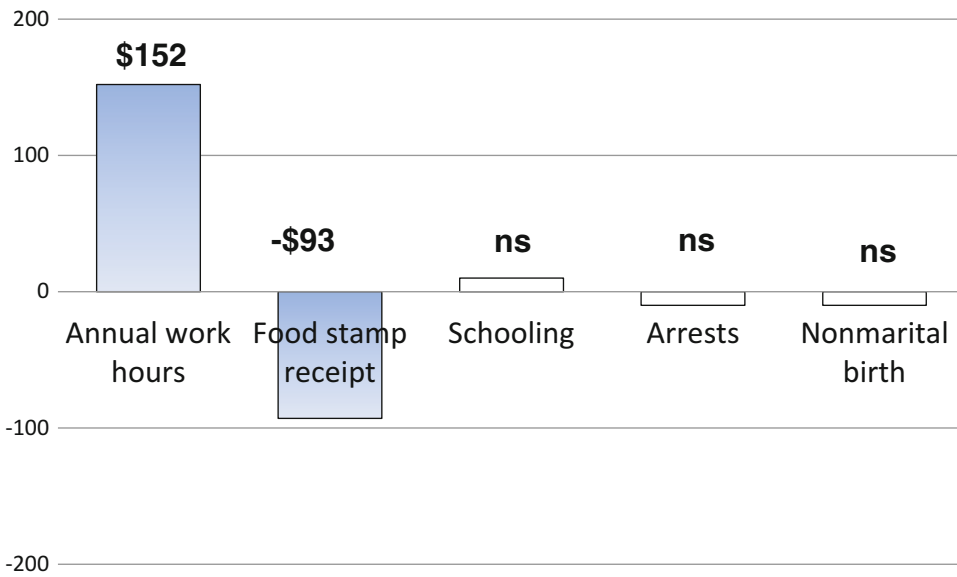


Fig. 2 Impacts on various adult outcomes associated with a \$3,000 annual increase in prenatal to age 5 income, for incomes <\$25,000 (“ns” means not statistically significant at $p < 0.10$). Reproduced from Duncan et al. 2010)

the prenatal to age-5 average income of low-income families is associated with 152 additional work hours per year after age 25. This is shown as the first bar in Fig. 2. Other results presented in Fig. 2 show that the boost in adult productivity associated with additional income in early childhood also led to significantly less food stamp receipt.

Earnings are the product of work hours and the hourly wage rate. There is clearly a strong relationship between early income and work hours, but it is also important to determine how important early income is for the hourly wage rate. In results not shown, Duncan et al. (2010) found no connection between early income and hourly earnings – virtually all of the earnings effect was carried by increases in labor supply rather than the wage rate. Accordingly, it is perhaps not surprising that early income was not significantly related to completed schooling, the most potent determinant of hourly wage rates. Nor were there significant impacts of early poverty on problem behavior – being arrested or incarcerated (for males) or having a nonmarital birth (for females); family income during adolescence seemed to matter more for these outcomes.

So if neither the human capital (schooling and wage rates) nor the behavioral (lack of arrests or

nonmarital births) outcomes account for links between early income and adult labor market productivity, what does? Consistent with the “early origins” work in social epidemiology and neuroscience, it appears that early income has long-term effects on work-limiting health conditions (Ziol-Guest et al. 2012).

Regression results are shown in Fig. 3. As with earnings and work hours, each of the health conditions was regressed on stage-specific childhood income, demographic control variables. As before, the income associations are allowed to be nonlinear, with one linear segment fit across average annual incomes within a given childhood stage up to \$25,000 and another fit to incomes above \$25,000. Only the coefficients on the low-income segment for early childhood are shown in Fig. 3 (in only one case – for incomes above \$25,000 for ages 11–15 in the diabetes regression was the coefficient more than twice its standard error.) Given the dichotomous nature of the health outcomes, the models are estimated with logistic regression. The bars in Fig. 3 represent the percentage reductions in the odds of a given condition associated with a \$3,000 increase in annual income between the prenatal year and age 5.

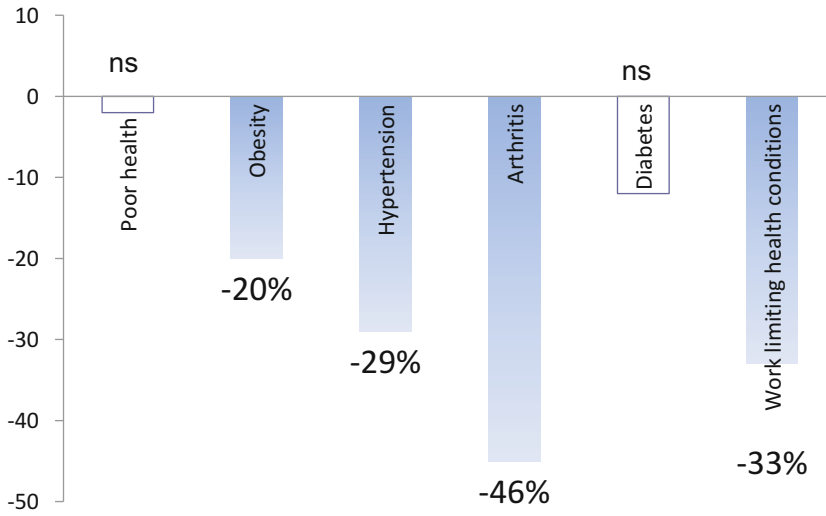


Fig. 3 Percentage reductions in odds of various health conditions in 2006 associated with a \$3,000 annual increase in prenatal to age 5 income, for family income

<\$25,000 (“ns” means not statistically significant at $p < 0.10$). Reproduced from Duncan et al. 2010)

Figure 3 shows a remarkable pattern of effects on the emerging (mid- to late-30s) adult health problems. Although increments to early income do not appear to affect self-rated overall adult health or diabetes, \$3,000 increments to low income early in life are associated with a 20 % reduction in the odds of obesity, a 29 % reduction in the odds of reporting hypertension, a 46 % reduction in the odds of reporting arthritis, and a 33 % reduction in the odds of reporting a health-related work limitation. Although more research is obviously needed, these health pathways involving stress and inflammation appear to be very promising linkages between poverty early in life and adult labor market productivity.

5 Directions for Future Research

Despite recent growth in research addressing links between income and child and adult health, it is difficult to draw causal connections because health has received much less attention by researchers than achievement and behavioral development. Moreover, most studies seeking to link pre-adult family income with later health has drawn their income measures from children’s

adolescent years. Although some studies have produced suggestive associations between early-life income and adult health, the more general preponderance of conflicting results raises more questions than answers.

Given the conflicting empirical results, the current literature raises more questions than it answers, pointing to the need for more research. Specifically, future work should consider differences in income’s effect by developmental stage and the domain of health outcomes. Another fruitful direction would be to construct trajectories of income over the early lifecourse and link these trajectories to later life outcomes (Shanahan and Hofer 2010). Future studies could also investigate the relevance of cumulative processes by which early disadvantages beget yet more disadvantages with a compound-interest-like effect (DiPrete and Eirich 2006). A greater research emphasis on mechanisms would also provide important insights. That is, one might wish to know whether increases to income correlates with specific types of changes in low-income families – quality of parenting, nutritional adequacy, various investments – that might help us to further understand the gradients in adult outcomes for their children. Finally, methodological considerations, such as differences in measurement, may also be impor-

tant. Indeed, prior studies suggest that income gradients tend to be more pronounced for more subjective measures of child health, such as parent-report measures, and are less evident in more objective measures, such as biomarkers or physician diagnosis (Currie and Lin 2007).

An alternative, if somewhat expensive, strategy would be to launch a neuroscience study devoted to assessing the impact of experimental manipulation of SES. Suppose low income families with newborns were recruited into a 5-year study of brain development and randomly assigned to treatment or controls groups. Further suppose that experimental families received an extra \$12,000 income in the form of monthly payments of \$333, and control-group families receiving a nominal \$20 monthly payment. The \$333 monthly income supplements constitute a substantial income increase for a family with an income near the poverty line. And a simple power calculation shows that 1,000 total cases, evenly divided between experimental and control groups is sufficient to provide 80 % power to detect a .20 sd impact on child cognitive outcomes. Non-experimental studies reviewed above suggest that this income increase would be sufficient to boost test scores by around .25 sd; careful thought would need to be given to judge whether more sophisticated measures of brain functioning might be expected to change by this much, and to take into account concerns about sample attrition. Nevertheless, the reorientation of the field to the goal of studying experimentally or quasi-experimentally induced variation in changes in SES components will vastly increase both the specificity and the certainty of our knowledge about how SES affects the neurocognitive development that provides the foundation for the cognitive and non-cognitive skill development that in turn shape later life outcomes.

6 Conclusions and Policy Implications

Early childhood is a particularly sensitive period in which economic deprivation may compromise children's health and employment opportunities.

This research suggests that greater policy attention should be given to remediating situations involving deep and persistent poverty *in utero* and occurring early in childhood. In terms of indicators, it is crucial to track rates of poverty among children – especially deep poverty occurring early in childhood – to inform policy discussions regarding children's well-being.

In the case of welfare policies, sanctions and other regulations denying benefits to families with very young children would appear particularly harmful. Not only do young children appear to be most vulnerable to the consequences of deep poverty, but mothers with very young children are also least able to support themselves through employment in the labor market.

More effective would be income transfer policies that provided more income to families with young children. In the case of work support programs like the Earned Income Tax Credit, this might mean extending more generous credits to families with young children. In the case of child tax credits, this could mean ensuring that the full credit was refundable and also providing relatively larger credits to families with young children.

Interestingly, several European countries gear the time-limited benefits provided by their assistance programs to the age of children. In Germany, a modest parental allowance is available to a mother working fewer than 20 h per week until her child is 18 months old. France guarantees a minimum income to most of its citizens, including families with children of all ages. Supplementing this basic support is the Allocation de Parent Isolé (API) program for lone parents with children under age 3. In effect, the API program acknowledges a special need for income support during this period, especially if a parent wishes to care for very young children and forgo income from employment. The state-funded child care system in France beginning at age 3 alleviates the problems associated with a parent's transition into the labor force.

In emphasizing the potential importance of policies to boost income in early childhood, we do not mean to suggest that this is the only policy path worth pursuing. Obviously investments later

in life and those that provide direct services to children and families may also be well advised. Economic logic requires a comparison of the costs and benefits of the various programs that seek to promote the development of disadvantaged children throughout the life course. In this context, expenditures on income-transfer and service-delivery programs should be placed side by side and judged by their benefits and society's willingness to pay for the outcomes they produce, relative to their costs.

References

- Akee, R. K. Q., Copeland, W. E., Keeler, G., Angold, A., & Costello, E. J. (2010). Parents' incomes and children's outcomes: A quasi-experiment. *American Economic Journal: Applied Economics*, 2, 86–115.
- Barker, D., Forsén, T., Eriksson, J., & Osmond, C. (2002). Growth and living conditions in childhood and hypertension in adult life: A longitudinal study. *Journal of Hypertension*, 20, 1951–1956.
- Becker, G. S. (1991). *A treatise on the family*. Cambridge, MA: Harvard University Press.
- Bradley, R. H., Corwyn, R. F., McAdoo, H. P., & Garcia Coll, C. (2001). The home environments of children in the United States. Part 1: Variations by age, ethnicity, and poverty status. *Child Development*, 72, 1844–1867.
- Brody, G. H., & Stoneman, Z. (1994). Financial resources, parent psychological functioning, parent cocaregiving, and early adolescent competence in rural two-parent African-American families. *Child Development*, 65, 590–605.
- Conger, R. D., & Conger, K. J. (2000). Resilience in mid-western families: Selected findings from the first decade of a prospective longitudinal study. *Journal of Marriage & Family*, 64, 361–373.
- Conger, R., & Dogan, S. (2007). Social class and socialization in families. In J. Grusec & P. Hastings (Eds.), *Handbook of socialization theory and research* (pp. 433–460). New York: Guilford Press.
- Conger, R., & Elder, G. H., Jr. (1994). *Families in troubled times: Adapting to change in rural America*. New York: Aldine de Gruyter.
- Conger, R., et al. (2002). Economic pressure in African American families: A replication and extension of the family stress model. *Developmental Psychology*, 38, 179–193.
- Costello, E. J., Compton, S. N., Keeler, G., & Angold, A. (2003). Relationships between poverty and psychopathology: A natural experiment. *JAMA, the Journal of the American Medical Association*, 290(15), 2023–2029.
- Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. (2006). Interpreting the evidence on life cycle skill formation. In E. Hanushek & F. Welch (Eds.), *Handbook of the economics of education* (pp. 697–812). Amsterdam: North-Holland.
- Currie, J., & Lin, W. (2007). Chipping away at health: More on the relationship between income and child health. *Health Affairs*, 26, 331–344.
- Dahl, G. B., & Lochner, L. (2012). The impact of family income on child achievement: Evidence from the earned income tax credit. *American Economic Review*, 102, 1927–1956.
- Danese, A., Pariante, C., Caspi, A., Taylor, A., & Poulton, R. (2007). Childhood maltreatment predicts adult inflammation in a life-course study. *Proceedings of the National Academy of Sciences*, 23(104), 319–324.
- DiPrete, T., & Eirich, G. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, 32, 271–297.
- Dodge, K. H., Pettit, G. S., & Bates, J. E. (1994). Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Development*, 65, 649–665.
- Duncan, G. J. (2006). *Income and child well-being: Thirty-fourth Geary Lecture, 2005* (Vol. 34). Dublin: Economic and Social Research Institute.
- Duncan, G., & Magnuson, K. (2005). Test score gaps: The contributions of family economic and social conditions. *The Future of Children*, 15, 35–52.
- Duncan, G. J., & Murnane, R. (Eds.). (2011). *Whither opportunity: Rising inequality, schools, and children's life chances*. New York: Russell Sage.
- Duncan, G. J., Magnuson, K., & Ludwig, J. (2004). The endogeneity problem in developmental studies. *Research in Human Development*, 1, 59–80.
- Duncan, G., Gennetian, L., & Morris, P. (2009). Parental pathways to self-sufficiency and the well-being of younger children. In C. Heinrich & K. Scholz (Eds.), *Making the work-based safety net work better: Forward-looking policies to help low-income families* (pp. 117–148). New York: Russell Sage.
- Duncan, G. J., Ziol-Guest, K. M., & Kalil, A. (2010). Early childhood poverty and adult attainment, behavior, and health. *Child Development*, 81, 306–325.
- Duncan, G. J., Morris, P. A., & Rodrigues, C. (2011). Does money really matter? Estimating impacts of family income on young children's achievement with data from random-assignment experiments. *Developmental Psychology*, 47, 1263–1279.
- Elder, G. H. (1974). *Children of the great depression*. Chicago: University of Chicago Press.
- Entwisle, D., Alexander, K., & Olson, L. (2003). The first grade transition in life course perspective. In J. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (Vol. 1, pp. 229–250). New York: Kluwer.
- Evans, W., & Garthwaite, C. (2010). *Giving mom a break: The impact of higher EITC payments on maternal health* (Working Paper 16296). Cambridge, MA: National Bureau of Economic Research.
- Evans, G., & Schamberg, M. (2009). Childhood poverty, chronic stress, and adult working memory. *Proceedings*

- of the *National Academy of Sciences*, 106, 6545–6549.
- Guryan, J., Hurst, E., & Kearney, M. (2008). Parental education and parental time with children. *Journal of Economic Perspectives*, 22, 23–46.
- Holmlund, H., Lindahl, M., Plug, E. (in press). The causal effect of parent's schooling on children's schooling: A comparison of estimation methods. *Journal of Economic Literature*.
- Kalil, A., Ryan, R., & Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography*, 49, 1361–1383.
- Kaushal, N., Magnuson, K., & Waldfogel, J. (2011). How is family income related to investments in children's learning? In G. J. Duncan & R. J. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 187–206). New York: Russell Sage.
- Kessler, R., & Cleary, P. (1980). Social class and psychological distress. *American Sociological Review*, 45, 463–478.
- Knudsen, E., Heckman, J., Cameron, J., & Shonkoff, J. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences*, 103, 10155–10162.
- Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. Berkeley: University of California Press.
- Løken, K. (2010). Family income and children's education: Using the Norwegian oil boom as a natural experiment. *Labour Economics*, 17, 118–129.
- Løken, K., Mogstad, M., & Wiswall, M. (2012). What linear estimators miss: The effects of family income on child outcomes. *American Economic Journal: Applied Economics*, 4, 1–35.
- Mayer, S. (1997). *What money can't buy: The effect of parental income on children's outcomes*. Cambridge, MA: Harvard University Press.
- Maynard, R. A. (1977). Some aspects of income distribution: The effects of the rural income maintenance experiment on the school performance of children. *The American Economic Review*, 67, 370–375.
- Maynard, R., & Murnane, R. (1979). The effects of a negative income tax on school performance: Results of an experiment. *Journal of Human Resources*, 14, 463–476.
- McLeod, J., & Kessler, R. (1990). Socioeconomic status differences in vulnerability to undesirable life events. *Journal of Health and Social Behavior*, 31, 162–172.
- McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development*, 61, 311–346.
- Miller, G. E., Chen, E., Fok, A. K., Walker, H., Lim, A., Nicholls, E. F., et al. (2009). Low early-life social class leaves a biological residue manifested by decreased glucocorticoid and increased proinflammatory signaling. *Proceedings of the National Academy of Sciences*, 106, 14716–14721.
- Milligan, K., & Stabile, M. (2011). Do child tax benefits affect the well-being children? Evidence from Canadian child benefit expansions. *American Economic Journal-Economic Policy*, 3, 175–205.
- Morris, P., Huston, A., Duncan, G., Crosby, D., & Bos, H. (2001). *How welfare and work policies affect children: A synthesis of research*. New York: MDRC.
- Morris, P., Duncan, G. J., & Clark-Kauffman, E. (2005). Child well-being in an era of welfare reform: The sensitivity of transitions in development to policy change. *Developmental Psychology*, 41, 919–932.
- Sapolsky, R. (2004). Mothering style and methylation. *Nature Neuroscience*, 7, 791–792.
- Shanahan, M., & Hofer, S. (2010). Molecular genetics, aging and well-being: Sensitive period, accumulation and pathway models. In R. Binstock & L. George (Eds.), *Handbook of aging and the social sciences* (7th ed., pp. 135–147). Amsterdam: Elsevier.
- Smolensky, E., & Gootman, J. (Eds.). (2003). *Working families and growing kids: Caring for children and adolescents*. Washington, DC: National Academies Press.
- Sobel, M. E. (1998). Causal inference in statistical models of the process of socioeconomic achievement – A case study. *Sociological Methods & Research*, 27, 318–348.
- Spears, D. (2011). Economic decision-making in poverty depletes behavioral control. *The B.E. Journal of Economic Analysis & Policy* 11(1) (Contributions). Article 72.
- Strauss, R. (1997). Effects of the intrauterine environment on childhood growth. *British Medical Bulletin*, 53, 81–95.
- Votruba-Drzal, E. (2006). Economic disparities in middle childhood: Does income matter? *Developmental Psychology*, 42, 1154–1167.
- Waldfogel, J., & Washbrook, E. (2011). Early years policy. *Child Development Research*, 2011, 12 pages.
- Ziol-Guest, K. M., Duncan, G. J., Kalil, A., & Boyce, T. (2012). Early childhood poverty, immune-mediated disease processes and adult productivity. *Proceedings of the National Academy of Sciences*, 106(Supplement 2), 17289–17293.

Does the Body Forget? Adult Health, Life Course Dynamics, and Social Change

Mark D. Hayward and Connor M. Sheehan

1 Introduction

The life course approach is a powerful lens for understanding the origins of adult health problems. Most highly prevalent adult health problems are a long time in the making and reflect the combinations of exposures stretching from the prenatal environment and childhood, to adolescence, and adulthood. Because the social conditions, institutions, and stratification systems of societies are powerful forces that shape the nature of individuals' life courses, adult health is fundamentally a reflection of these *lifetime* social forces.

Social conditions, institutions, and stratification systems, however, are far from static. Over the course of the twentieth century, for example, the *social capacity for health in many countries, particularly more developed countries*, has dramatically improved through technological innovation, dramatic growth in biomedical knowledge, and improvements in social institutional resources (Easterlin 1997), and these societal forces have had rippling consequences for changes in the nature and timing of life course experiences for

cohorts born at different points in history. In turn, changes in the nature and timing of life course experiences can lead to a host of changes in population health. Major conditions that were once important in defining the health of the population may wane (e.g., the long-run decline in heart disease or the near eradication of polio) while other conditions may become more prevalent (e.g., some cancers). The concept of the birth cohort is critical in understanding these trends, due to cohort differences in the nature and timing of exposures. For example, given the role of childhood vaccinations in improving childhood health and survival in the twentieth century in the United States (Andre et al. 2008; Centers for Disease Control and Prevention 1999), combined with the dramatic decline in adult smoking (Fenelon and Preston 2012), more recent birth cohorts have experienced fewer and less exposure to *lifetime* health risks than earlier cohorts, contributing in important ways to historical declines in U.S. adult mortality (Yang 2008). Thus, the health of birth cohorts, often portrayed as age-specific trends in health, may change due to fundamental shifts in the nature and timing of life course experiences. A key issue that is developed in this chapter is that life course influences on adult health are largely endogenous to the historical context and that we are only at the initial stages of understanding how life course influences on health are being transformed by changes in the social capacity for health.

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The idea that life course influences are embedded in a historical context is hardly new, and it has long been recognized as a central tenet in the life course conceptual framework (Elder et al. 2003; Elder 1994, 1998; Riley 1987). Despite general agreement over this conceptual framework, however, researchers applying this framework to adult health outcomes nonetheless face important practical and conceptual challenges that warrant serious consideration. Three challenges are considered in this essay. First, we take up the thorny question of how life course researchers ought to define health. We offer a population health perspective as one possible framework to understand how life course exposures give rise – perhaps differentially – to a “portfolio” of health outcomes encompassing biological risk, morbidity, functioning and disability, and mortality. Second, we argue that life course studies of adult health would benefit significantly by having a clearer biologically informed framework of how life course exposures from childhood into adulthood potentially contribute to the development of adult health conditions. In the discussion below, we discuss how life course exposures shape health and health disparities through both developmental and aging processes. Finally, this chapter makes a case that life course research on adult health must attend more explicitly to the historical context to better understand trends and differences in the life course pathways leading to adult health problems. Dramatic changes have occurred across current birth cohorts represented in the adult population in their prenatal, childhood and adult exposures, yet these changes are rarely central in life course studies of health. The development of conceptual models requires sensitivity to the fact that stratification systems, institutions, social conditions, technology, and even the epidemiological environment are changing, which has implications for appropriate measures and analytical strategies.

These issues are raised to better guide the development of future life course studies of health. Researchers are increasingly awash in a wealth of data from around the world. Whether they have the conceptual and analytical tools to make the most of these data is not clear.

2 From Biological Risk to Mortality: A Population Health Perspective

Most research on the life course origins of adult health focuses on single diseases or domains of health. Examples include studies of cardiovascular disease, diabetes, physical and cognitive functioning, disability and all-cause mortality. Only recently have life course researchers begun to take a more integrative view of adult health and examined how life course experiences influence multiple facets of adult health (e.g., how life course factors influence the interplay of functioning and mortality to determine healthy life expectancy (Montez and Hayward 2014)). Life course researchers have largely ignored the idea of how exposures may give rise to a cascade of adult health conditions starting, say, from morbidity, to disability, and then to mortality – or not. Research often assumes that such a cascade exists, it underlies more “endogenous” health outcomes such as disability and mortality, and is unidirectional – despite warnings that these assumptions need not necessarily hold (Verbrugge and Jette 1994).

Health at the population level is a multidimensional concept, and it is difficult to describe the life course origins of population health in a simple way. Increasingly, definitions of health reference the core domains of physiological dysregulation (e.g., metabolic functioning), conditions (e.g., disease conditions such as diabetes), functioning (e.g., physical and cognitive deficits), and important facets of well-being and health potential (e.g., ability to live independently, developmental potential). The measurement of these domains is complex and so too are the relationships among these domains. Physiological dysregulation, disease onset, functioning loss, and frailty, for example, are all parts of the process of health change that can – *but need not* – precede death (Crimmins et al. 2010; Crimmins and Beltrán-Sánchez 2011; Martin et al. 2010). The result is that population trends in these domains need not move in the same direction, and social group differences may vary, depending on the domain of interest.

Life course exposures and behaviors need not affect all parts of the process of health change in the same way. Some life course exposures may be specific to certain parts of the process of health change, and this is important in considering policies and interventions to improve health. For example, it is plausible that some childhood health problems (e.g., infectious conditions that heighten inflammation) give rise to adult morbidity conditions (e.g., coronary heart disease) that results in a cascade of increased risks of functional problems and mortality from cardiovascular disease (CVD). In this hypothetical example, childhood health problems' association with CVD-related mortality stems primarily from increasing disease incidence.

In contrast, other life course factors may come into play through the process of health changes. Educational attainment, for example, not only is associated with a lower risk of heart disease incidence but potentially educational attainment may differentiate the risks of functional problems and mortality *among* persons with heart disease. Educational attainment positively influences human agency and financial resources, factors that allow persons to better manage disease processes, alter the environment to minimize physical challenges, and actively seek the best care (Mirowsky and Ross 2003). This point was illustrated by Manton and colleagues (1997), who observed that higher educational attainment was associated with a lower risk of functional problems, *and* a lower risk of mortality after conditioning on functional status using data from the National Long-Term Care Study. In this case, it appears that a major social resource acquired relatively early in life, educational attainment, exacerbates disparities throughout the disablement process (Manton et al. 1997; Merkin et al. 2009).

Although life course studies of health are beginning to investigate how life course factors influence health processes involving multiple health domains and their connections (e.g., Freedman et al. 2008; Manton et al. 1997; Montez and Hayward 2014), the body of research as a whole is relatively small. The lack of progress ultimately has implications for understanding

health disparities as well as trends in population health and their life course origins. For example, with regard to racial/ethnic health disparities, native-born U.S. older adult whites and blacks appear to experience a health process in which increased physiological dysregulation heightens disease onset, which in turn heightens functional loss, disability and death (Crimmins et al. 2004; Hayward et al. 2000; Hayward and Heron 1999). In this case, blacks experience higher risk compared to whites throughout the health process. Adult Hispanics in the U.S., particularly older foreign-born Hispanics, however, appear to experience relatively low rates of certain chronic conditions as well as mortality compared to blacks and whites (Cantu et al. 2013; Lariscy et al. 2014), while their disability rates substantially exceed those for the other racial/ethnic groups (Hayward et al. 2014a; Melvin et al. 2014). The etiologies of these health domains appear to vary in important ways across the racial/ethnic groups, pointing to the need to carefully identify how life course factors and pathways may come into play differently across the groups. How we think about health disparities in this example necessarily depends on the domain of health of interest. A "population health" portfolio of measures, thus, allows for a more comprehensive assessment of health disparities. The same is also the case for assessing trends in population health.

3 A Biologically Informed Conceptual Framework for the Life Course Origins of Adult Health

Life course research on adult health often lacks a biologically informed conceptual framework of how exposures and events influence health. Life course researchers appropriately attend to issues such as the timing of exposures, turning points in a lifetime, human agency, and linked lives (Elder et al. 2003; Elder 1994, 1998), but the conceptual connections of these more social types of concepts with adult health are less evident in the literature. This problem potentially results in under- or mis-conceptualized frameworks,

conflicting results, and poorly understood mechanisms and pathways. As will be discussed later, these problems become compounded when turning to questions about historical change or cross-national studies of life course influences on health.

Although the bulk of research often fails to consider a strong biologically informed conceptual framework, such frameworks exist. One such framework is the developmental framework of life course health. The core idea is that processes of the major biological systems (e.g., endocrine, immune, neurological, respiratory) display a similar pattern of development – a steady curvilinear growth in functional capacity during childhood followed by maintenance and eventually some decline in adulthood (Halfon and Hochstein 2002). Figure 1 summarizes the basic life course trajectory of functional capacity that has been used to summarize a number of biological systems (Halfon and Hochstein 2002; Kuh 2007; Miller et al. 2011). Halfon and Hochstein (2002) and Miller and colleagues (2011) provide more detailed discussions of the “micropathways” underlying these types of functional trajectories. Here, we focus on the utility of this framework for understanding the life course origins of adult health.

For heuristic purposes, the developmental trajectories shown in Fig. 1 are expressed in terms of physical and cognitive capacity, which are dependent on the major biological systems. In this example, trajectories are shown for four people, but myriad trajectories are possible in the population. For simplicity, persons A and B are assumed to share the same pattern of childhood growth in capacity as do persons C and D. Persons A and B begin to diverge in early adulthood, with person B exhibiting a steeper rate of decline. The pattern of decline in capacity for persons C and D similarly begin to diverge in early adulthood.

The figure conveys a number of important ideas to keep in mind when considering the factors that come into play in understanding differences/disparities in adult health.

- Differences in capacity begin as early as in utero and are evident at birth. This speaks to the seminal work by Barker and his colleagues (Barker 1997, 1998, 1999, 2004).
- Childhood is a period of growth in capacity, and differences in capacity widen because of differences in inputs throughout childhood (e.g., SES, diet, family relationships). This is the period in which cohort morbidity phenotypes (e.g., lifelong health risks that accrue

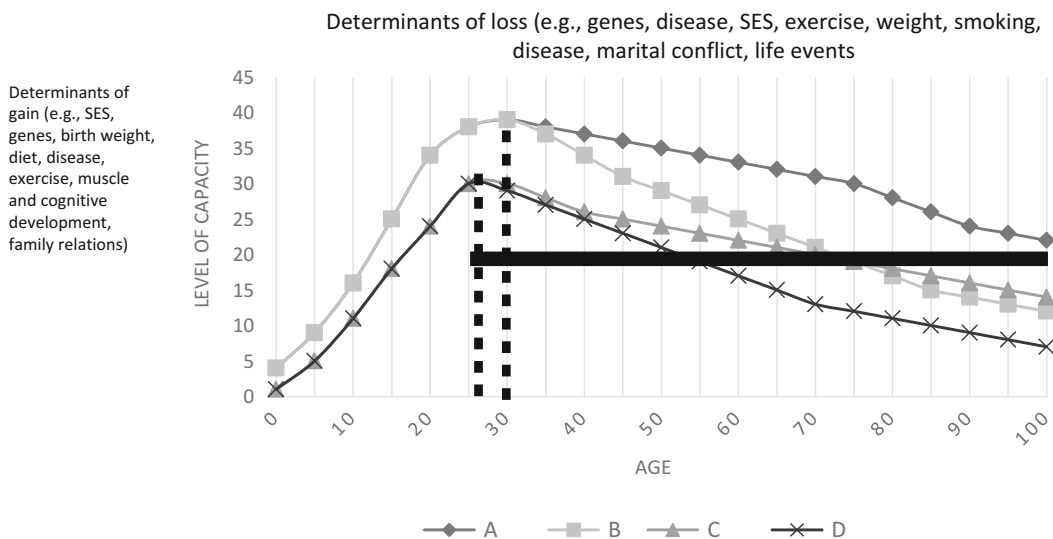


Fig. 1 Trajectories of physical and cognitive capacity over the life course (20=hypothetical level below which adult limitations occur)

through early life exposures such as infection and inflammation) are established (Crimmins and Finch 2006; Finch and Crimmins 2004).

- The maximum level and period of growth are highly dependent on the level of inputs. In the figure, for example, persons A & B reach a maximum value of 39 at age 30 compared to a maximum value of 33 at age 25 for persons C & D. In this sense, both the length and degree of development are highly malleable to inputs (Finch and Crimmins 2004).
- Declines in capacity can start at different ages and exhibit varying rates of decline. Resources such as quality jobs, marriages, and the avoidance of disease result in less steep declines, e.g., persons A and C. The lack of resources and risk factors (e.g., smoking) contribute to relatively accelerated rates of decline for persons B and D. Indeed, it is possible that despite early life developmental advantages, adult circumstances can result in rates of decline that negate their earlier advantage; note the crossing of the trajectories for persons B and C.
- The combination of lifetime gains and losses results in growing heterogeneity of capacity across most of the adult life course – the period of life where losses occur in capacity. Assuming a hypothetical score of 20 as an indicator of “limitations,” the ages at which people reach this level differ greatly. Moreover, the pathways can differ greatly for persons who become limited at the same age. Note the trajectories for persons B and C.

In a very real sense, growth and decline in capacity both contribute to “health disparities,” pointing directly to the importance of *both* childhood and adulthood for adult health disparities. In this sense, the body does not appear to forget. An example might help to convey this idea. Atherosclerosis is the cause of myocardial infarction, stroke and ischemic heart disease. Atherosclerosis involves on-going inflammatory response at all stages of the disease, and research has documented an array of risk factors across the entire life course influencing inflammation. Although debate continues about the specific role of the prenatal environment and the biological

mechanisms, there is evidence that factors such as maternal smoking, infections, and malnutrition may initiate the atherosclerosis process even before birth (Leduc et al. 2010; Napoli et al. 1999; Palinski and Napoli 2002). During childhood, factors such as fatty diets, infections, and obesity may accelerate atherogenesis (Charakida et al. 2007; Crimmins and Finch 2006; Gurven et al. 2008; Juonala et al. 2005). Adult exposures that elevate inflammation and other pathways such as smoking, obesity, socioeconomic status, and psychosocial stress further accelerate the process (Libby et al. 2002; Roberts et al. 2010; Wang et al. 2007), while statins may control the further development of atherosclerosis (Blum and Shamburek 2009). The key point is that the *combination* of early and later-life factors frequently comes into play in influencing the development of adult diseases (see Dannefer “Opening the Social: Sociological Imagination in Life Course Studies”, this volume). Different combinations of exposures of the life course can lead to a significantly degree of heterogeneity in disease development such as illustrated in Fig. 1.

Although this idea is not novel, it nonetheless has broader implications. For example, it points to the need for life course researchers to attend to the combinations of lifetime exposures that may put adults at greater or lesser risk of various health outcomes. In addition, this idea suggests that, depending on the inputs over a lifetime, the *balance* of childhood and adult influences on health disparities can change. This is a very important idea in that the developmental “origins” of adult health are highly dynamic and mutable to a variety of inputs across the lifetime. No phase is inherently more important than the other in terms of influencing adult health disparities. That said, life course stratification processes often reinforce childhood advantages and disadvantages in adulthood, compounding the effects of childhood (see also chapter “Life Course Lens on Aging and Health” by Ferraro, this volume). There is no “lottery” in early adulthood that randomly assigns adolescents to adult trajectories of resources and risks. Moreover, some combinations of life course exposures are likely to be relatively common while others quite rare due to life course

stratification processes and social change. As discussed below, the malleability of life course trajectories in physical and cognitive capacity has significant implications for understanding social group differences and trends in the life course origins of adult health.

4 The Importance of Social Change for Life Course Influences on Adult Health

Much of the research on the life course influences on adult health has occurred in the context of single birth cohorts or a relatively narrow band of birth cohorts, e.g., the British Cohort Studies and the U.S. Health and Retirement Study. In a very real sense, much of what we know – or think we know – about the life course origins of adult health is necessarily framed by the experiences of individuals in these studies. With the explosion of international studies built on the life course framework of the Health and Retirement Study (including the Study on Global Ageing and Health (SAGE)), we also have an expanding array of studies to conduct comparative research on a global scale.

Yet, there are a number of challenges both in interpreting what we think we know and what we might learn from the proliferation of new data. Perhaps the key issue confronting researchers is that research is often insensitive to the specific historical conditions that characterized the cohorts' experiences at particular ages in the life course. Stratification systems and their metrics may change across cohorts (and differ across countries). For example, occupation was more strongly tied to resources that garnered health advantages in the early part of the twentieth century in the U.S. compared to educational attainment (Hayward and Gorman 2004; Preston and Haines 1991). However, educational attainment, particularly advanced education, has grown in importance for reducing mortality in the U.S. in the last half of the twentieth century (Hayward et al. 2014b; Masters et al. 2012; Montez et al. 2011). The twentieth century in the United States also was a period of large reductions in infectious

disease exposure and rising obesity. This period was characterized first by massive increases in post-secondary educational institutions and the prevalence of post-secondary education post WWII. This trend was followed in the later part of the century by the stalling of post-secondary attainment and the rise in student load debt. These are only a few examples but they lead to important questions about how researchers measure key concepts relating to the types of inputs over cohorts' lifetimes (e.g., childhood health, socioeconomic resources) shown in Fig. 1.

As Ryder noted 50 years ago, “[t]he principal motor of contemporary social change is technological innovation” (Ryder 1965, p. 851). Technological change is fundamentally important for the level of social capacity for population health (Easterlin 1997). It is embedded in social institutions and defines the stock of knowledge and institutional resources that individuals in the population have access to and can act on to garner health advantages. The idea is similar to Fogel's concept of technophysio evolution (Fogel 2004; Fogel and Costa 1997) which reflects the synergistic association between technological and physiological improvements in the modern era. Although technological change is sometimes thought to be felt most strongly by persons about to make “lifelong” choices (Ryder 1965), the developmental trajectories shown earlier in Fig. 1 illustrate that technological change may have implications for inputs of changes in physical and cognitive capacity at all stages of the life course.

The pace of technological change is an issue that is rarely considered in life course studies of health, yet this phenomenon has enormous implications for understanding how the inputs to the growth and decline in capacity ultimately influence adult health (Goldin and Katz 2009; McEniry 2014; Palloni and Souza 2013). To illustrate how rapid technological change can be – and how the pace of change (and variation in the types of inputs) can vary across countries – Table 1 shows infant mortality rates (IMR) for a select group of countries for a 50-year period, 1950–2010 (National Center for Health Statistics 2014, p. Table 16). Infant mortality rates provide

Table 1 Infant mortality rates for selected countries, 1960–2010 (infant deaths per 1,000 live births) (National Center for Health Statistics 2014)

Country	International rankings							
	1960	1970	1980	1990	2000	2010	1960	2010
Australia	20.2	17.9	10.7	8.2	5.2	4.1	5	20
Austria	37.5	25.9	14.3	7.8	4.8	3.9	19	19
Belgium	31.4	21.1	12.1	8.0	4.8	3.6	17	12
Canada	27.3	18.8	10.4	6.8	5.3	–	12	–
Chile	120.3	79.3	33.0	16.0	8.9	7.4	27	27
Czech Republic	20.0	20.0	16.9	10.8	4.1	2.7	4	5
Denmark	21.5	14.2	8.4	7.5	5.3	3.4	8	9
Finland	21.0	13.2	7.6	5.6	3.8	2.3	6	1
France	27.7	18.2	10.0	7.3	4.5	3.6	13	12
Germany	35.0	22.5	12.4	7.0	4.4	3.4	18	9
Greece	40.1	29.6	17.9	9.7	5.9	3.8	20	15
Hungary	47.6	35.9	23.2	14.8	9.2	5.3	23	23
Ireland	29.3	19.5	11.1	8.2	6.2	3.8	15	15
Israel	–	24.2	15.6	9.9	5.5	3.7	–	14
Italy	43.9	29.6	14.6	8.1	4.3	3.4	22	9
Japan	30.7	13.1	7.5	4.6	3.2	2.3	16	1
Korea	–	45.0	–	–	–	3.2	–	7
Mexico	92.3	–	52.6	–	19.4	14.1	26	29
Netherlands	16.5	12.7	8.6	7.1	5.1	3.8	2	15
New Zealand	22.6	16.7	13.0	8.4	6.3	5.5	10	24
Norway	16.0	11.3	8.1	6.9	3.8	2.8	1	6
Poland	56.1	36.4	25.4	19.4	8.1	5.0	24	22
Portugal	77.5	55.5	24.3	10.9	5.5	2.5	25	3
Slovak Republic	28.6	25.7	20.9	12.0	8.6	5.7	14	25
Spain	43.7	28.1	12.3	7.6	4.3	3.2	21	7
Sweden	16.6	11.0	6.9	6.0	3.4	2.5	3	3
Switzerland	21.1	15.1	9.1	6.8	4.9	3.8	7	15
Turkey	189.5	145.0	117.5	51.5	31.6	7.8	28	28
United Kingdom	22.5	18.5	12.1	7.9	5.6	4.2	9	21
United States	26.0	20.0	12.6	9.2	6.9	6.1	11	26

an excellent indicator of the nature of epidemiological environment and the social capacity for population health (Easterlin 1997). High infant mortality rates reflect an epidemiological environment characterized by high rates of infectious exposure, malnutrition, poor sanitation, few parental socioeconomic resources to avoid risks, an absence of modern health care, and a lack of knowledge about how to minimize risk (Guyer et al. 2000). In comparison, low infant mortality rates reflect an environment with low levels of exposure to infections, well developed sanitation systems and clean water, advanced health care,

and a knowledge base and socioeconomic resources that allow parents to minimize risk.

As is evident, infant mortality dropped dramatically for all selected countries since 1960, and there has been a marked convergence in the rates (and early life epidemiological conditions) by 2010. Yet, some countries experienced greater change than others, due largely to adverse epidemiological environments in 1960. This is clearly the case for Chile, Turkey and Mexico. Even within Europe – and countries that are part of the Survey of Health, Ageing, and Retirement in Europe (SHARE) – there was substantial

variation in the rate of decline. The implications of these types of patterns for life course studies of adult health are substantial. Continuing with the example of early life infection and the development of atherosclerosis, for birth cohorts born in 1960, exposure to infections was much lower in some countries (e.g., Netherlands, Norway, and Sweden) with already low levels of IMR compared to exposure in other countries (e.g., Turkey, Mexico, Chile, Portugal) with high IMRs. This suggests that the development of atherosclerosis started much earlier in the life course and was faster in countries such as Chile, Mexico, Portugal, and Turkey compared to countries such as Norway, the Netherlands, and Sweden. In addition, if one looks at the rates across years within a country, the pattern points to the lifetime development of atherosclerosis stemming from infection. Turkey, for example, exhibits a pattern of a relatively high level of infectious exposure across most of the lifetime of the 1960 birth cohort, pointing to the likely important role of infection for atherosclerosis over most of the lifetime. Chile exhibits high rates of exposure in childhood and early adulthood for this cohort, yet the exposure drops dramatically in those years indicative of prime adulthood. At the other extreme, countries such as Sweden, Norway and the Netherlands exhibited low levels of infectious

exposure over the 1960 birth cohort’s entire lifetime. Although atherosclerosis is affected by factors other than infection, the patterns shown in Table 1 illustrate the types of heterogeneity in the range and pace of technological change reflected in adult populations and its potential impact on an important disease process.

Palloni and Souza (2013) also make a similar argument in their study of adult mortality in Latin American and Caribbean countries. Using a scenario approach, their study considers how cohorts’ exposure to adverse early conditions influences old-age mortality. Their results illustrate that to the extent that exposure to adverse early life conditions is high, it is difficult to offset these effects even with advances in medical and other technology. More generally, the pace of technological change in combination with early life exposures shown in Table 1 relates strongly to the heterogeneity of lifetime inputs to the gain and loss of physical and cognitive capacity shown in Fig. 1.

As noted earlier, technological change and its pace are an integral part of the larger process of change in the social capacity for health in the population (Easterlin 1997). To get a better sense of how the social capacity for health has changed in the United States, Table 2 provides a timeline of major social, biomedical, and technological

Table 2 Timeline of twentieth century major social, biomedical, and technological changes influencing population health

1901–1910	
Public Health Service Established	Beta blockers invented to lower BP and risk of heart attacks and strokes
US Meat Inspection Act	Highway Safety Act
Existence of different blood types discovered	National Traffic and Motor Vehicle Act
1911–1920	
Refrigerators for home use	Mumps vaccine licensed
Rabies and typhoid vaccines licensed in US	Mammography developed
Spanish flu epidemic	First humans walked on the moon
Vitamins discovered	EPA & OSHA established
1921–1930	
Tetanus vaccine developed	DDT banned
Diphtheria & tetanus vaccines recommended for children	Divorce rates began to escalate

(continued)

Table 2 (continued)

TB vaccine developed	Car airbags invented
Insulin (best treatment of diabetes) was discovered	WIC program made permanent
Penicillin discovered	Safe Drinking Water Act
Frozen food processes discovered	First drive-thru McDonalds
	Microsoft founded
1931–1940	Apple 1 was built
TVA founded & Rural Electrification Act	Pneumonia vaccine licensed
Social Security Act	Antiviral drugs developed
Minimum Wage	1981–1990
A shift in home to hospital deliveries	FDA approved first commercial statin
DDT invented	Women earned more bachelors degree than men for the 1st time
1941–1950	Commercial internet providers emerged
Mass production of penicillin	Start of US obesity epidemic
Influenza vaccine licensed	Food labeling legislation enacted
Risk factors identified for heart disease	Human Genome Project begins
CDC established	1991–2000
Water fluoridation started	Introduction of pneumococcal conjugate vaccine and routine rotavirus vaccination
1951–1960	Rapid rise in Americans’ internet use
Polio epidemic with 57,628 cases reported in US; vaccine licensed	Google was incorporated
Fluoride toothpaste	BlackBerry smart phone was launched
Commercial nuclear energy begins	Genetically engineered crops developed for commercial use
Interstate Highway System launched	Large increase in immigration from Latin America
Sputnik and the start of the space race	2001–2010
2.2 million vets had used the GI Bill to attend college & 5.6 million used benefits for other training programs	The genome is sequenced
1961–1970	Strides made in stem cell research
National fluoride recommendations	Major strides made in controlling HIV
Measles vaccine licensed	Targeted cancer therapies
Beginning of 12-years escalation in post-secondary educational enrollment	First hybrid car
U.S. Surgeon’s report on smoking and health	Smartphone use rapidly grew
Head Start	
Higher Education Act provided need based financial assistance	
Medicare and Medicaid Established	
Cigarette warning labels	
FDA approved the first combined oral contraceptive	

changes (both positive and negative) that reflect a century’s change in the social capacity for health in the U.S.

Scanning across the timeline, it is evident that each decade brought important social, technological, and biomedical changes, most of which –

though not all – led to gains in social capacity. Prior to 1930, many of the changes were related to biomedical discoveries – blood types, vaccines for a number of conditions, and penicillin. Some technological changes, however, improved individuals’ control over their health-related

environment – refrigerators for home use and frozen food processes. And, the early part of the twentieth century saw some of the very first institutional developments that had population-level health consequences – the establishment of the Public Health Service and the U.S. Meat Inspection Act.

The 1930s marked an era of widespread institutional developments – the expansion of electrical power in American homes, Social Security and the setting of a minimum wage. In the 1940s, major changes occurred in public health initiatives – the mass production of penicillin, the influenza vaccine, the discovery of the risk factors for heart disease, and water fluoridation. The Centers for Disease Control and Prevention (CDC) was also established in the 1946.

In the latter half of the twentieth century, there was an acceleration of institutional changes that improved the social capacity for population health, especially in the 1960s – the War on Poverty, the Civil Rights Act, the Voting Rights Act, the Food Stamp Act, Medicare and Medicaid, and the Older Americans Act all came into existence in the 1960s. Profound changes in public health policies occurred as well – e.g., the Surgeon General’s report on smoking and health. Educational levels also skyrocketed in the American population, fueled by the growth in post-secondary educational institutions, the GI Bill, and the Higher Education Act. Biomedical technologies grew rapidly in the latter part of the twentieth century as well – e.g., the widespread use of beta blockers and statins. A number of technological advances were made that fundamentally changed how individuals’ accessed health-related information, including personal computing and the internet. At the same time, other changes point to losses in social capacity – e.g., the growth of fast food as a part of the American diet. The key point of Table 2 is that the twentieth century was characterized by a profound and enormously fast-paced improvement in the social capacity in population health that was fueled by multiple and reinforcing types of changes – changes in technology, social institutions, and biomedical knowledge.

How, then, have these changes in social capacity for population health influenced the changes in the way that the life course influences adult health? A recent study by Hayward and colleagues (2014b) provide some insights into this question. Their study examined long-term trends in the ways in which educational attainment was associated with adult mortality. Congruent with past research (Montez et al. 2012), their results provided evidence that the shape of the association reflects increasingly lower mortality for very highly educated Americans compared to their low-educated counterparts over the latter part of the twentieth century and continuing into the twenty-first century. Importantly, these results point to an array of mechanisms associated with advanced education that account for this pattern – increases in psychosocial resources, valuable information and support for healthy lifestyles, quality medical care, wealth, sense of control and cognitive skills (Cutler and Miller 2005; Cutler and Lleras-Muney 2010). These are the types of resources made possible by the historical change in the social capacity for health in the United States shown in Table 2. In this sense, the long-term association between education and mortality is endogenous to the larger macro changes in the social capacity for health.

An important tenet in life course conceptual frameworks is the importance of historical context. Here, we have seen that the historical context is likely to matter a great deal and that rapid changes have occurred in the social capacity for health. In addition, current surviving American birth cohorts are likely to differ in important ways in their lifetime exposures to important features of the social capacity for population health. The types of exposures and the pace of change in social capacity necessarily will shape how birth cohorts’ physical and cognitive capacities are changed over the lifetimes, ultimately influencing trends and disparities in the major domains of population health. The important of broader societal forces for health can thus only be appreciated by studies that include a range of cohorts and that analyze the data with sensitivity to between-cohort differences.

5 Conclusions

This essay has laid out three conceptual issues that we view as challenges in making significant advances in understanding the life course origins of health. Of critical importance, we believe, is the need for researchers to carefully consider adult health outcomes as part of a larger process of health change that encompasses biological risk, morbidity, functioning and disability and mortality. Viewing health outcomes as part of this larger process is fundamentally important in gaining a clearer understanding how life course conditions influence multiple facets of health – perhaps differentially.

A second conceptual challenge is that life course conceptual frameworks are often not biologically informed when examining health outcomes. Little attention is thus devoted to the ways in which childhood and adult conditions get “under the skin” to influence important health processes. Here, we have revisited a developmental framework in which the processes of major biological systems are characterized by a growth in capacity during childhood, followed by maintenance and eventual decline. We have described how the health of adults is forged by exposures over an entire lifetime through the gains and losses in capacity.

Finally, we have argued that although the life course framework conceptually acknowledges the importance of historical context, much of life course research on health is a historical. The classic debates that characterize much of the current life course research on health – the role of childhood SES and health, the balance of childhood and adulthood in influencing health, the pathways linking early life with adult health – are all endogenous in fundamentally important ways to the historical context. Here, historical context has been framed as the social capacity for health in a society to better understand the macro-level forces in play.

This third challenge, the endogeneity of life course studies of health to macro social conditions, has especially important implications for how we think about the empirical results of current research. First, much of what we know – or

think we know – is necessarily constrained by a set of macro-level boundary conditions reflecting the levels of technology, social institutions, and the stock of knowledge in the population, the degree of change in these factors, and the rate at which change occurs. Second, the boundary conditions set by social capacity point to the malleability of associations and pathways influencing adult health across time and place. Some associations are likely to become more causal over time while other associations may become less causal or become trivial in magnitude (Hayward et al. 2014b). Third, adult health is clearly being shaped by human control at many levels – by individuals, families, communities, and larger societal institutions. This issue speaks directly to Fogel and Costa’s (1997) concept of technophysio evolution. Humans have gained unprecedented control over their bodies and thus shape the trends and disparities that are evident in the population. Although it is tempting to think that this phenomenon points to ever improving population health, human control also means that social capacity may decline in important ways. The rise in obesity (see also chapter “Life Course Lens on Aging and Health” by Ferraro, this volume), growing economic inequality, environmental degradation, and economic segregation are only a few examples of macro forces that threaten long-term historical improvements in health. Moreover, there are important social group differences, especially racial/ethnic disparities, that point to inequality in the ways that groups are able to marshal resources to garner health advantages (Hayward et al. 2014b; Montez et al. 2012).

As is hopefully evident, future improvements in population health will come from myriad interacting and reinforcing macro influences making up the social capacity for population health. These influences shape birth cohorts’ lifetime gains and losses of physical and cognitive capacity, and, in turn, these gains and losses play out in terms of trends and disparities in the key domains of population health. Life course researchers have laid important groundwork to examine these processes in detail, but much more can be achieved by explicitly attending to understanding how domains of health interact,

how gains and losses of physical and cognitive capacity shape trends and disparities in health outcomes, and how this basic process is embedded in a society's ever-changing social capacity for population health.

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References

- Andre, F., Booy, R., Bock, H., Clemens, J., Datta, S., John, T., & Schmitt, H. (2008). Vaccination greatly reduces disease, disability, death and inequity worldwide. *Bulletin of the World Health Organization*, *86*, 140–146.
- Barker, D. J. P. (1997). Maternal nutrition, fetal nutrition, and disease in later life. *Nutrition*, *13*(9), 807–813.
- Barker, D. J. P. (1998). *Mothers, babies, and health in later life* (2nd ed.). London: Churchill Livingstone.
- Barker, D. (1999). Early growth and cardiovascular disease. *Archives of Disease in Childhood*, *80*(4), 305.
- Barker, D. J. P. (2004). The developmental origins of well-being. *Philosophical Transactions: Biological Sciences*, *359*(1449), 1359–1366.
- Blum, A., & Shamburek, R. (2009). The pleiotropic effects of statins on endothelial function, vascular inflammation, immunomodulation and thrombogenesis. *Atherosclerosis*, *203*(2), 325–330. doi:10.1016/j.atherosclerosis.2008.08.022.
- Cantu, P. A., Hayward, M. D., Hummer, R. A., & Chiu, C. T. (2013). New estimates of racial/ethnic differences in life expectancy with chronic morbidity and functional loss: Evidence from the National Health Interview Survey. *Journal of Cross-Cultural Gerontology*, *28*(3), 283–297. doi:10.1007/s10823-013-9206-5.
- Centers for Disease Control and Prevention. (1999). CDC on infectious diseases in the United States: 1900–99. *Population and Development Review*, *25*(3), 635–640. doi:10.2307/172366.
- Charakida, M., Deanfield, J. E., & Halcox, J. P. (2007). Childhood origins of arterial disease. *Current Opinion in Pediatrics*, *19*(5), 538–545. doi:10.1097/MOP.1090b1013e3282eff1585.
- Crimmins, E. M., & Beltrán-Sánchez, H. (2011). Mortality and morbidity trends: Is there compression of morbidity? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *66B*(1), 75–86. doi:10.1093/geronb/gbq088.
- Crimmins, E., & Finch, C. (2006). Infection, inflammation, height, and longevity. *Proceedings of the National Academy of Sciences*, *103*(2), 498–503. doi:10.1073/pnas.0501470103.
- Crimmins, E. M., Hayward, M. D., & Seeman, T. (2004). Race/ethnicity, socioeconomic status and health. In N. B. Anderson, R. A. Bulatao, & B. Cohen (Eds.), *Critical perspectives on racial and ethnic differences in health in later life* (pp. 310–352). Washington, DC: National Academy Press.
- Crimmins, E., Kim, J. K., & Vasunilashorn, S. (2010). Biodemography: New approaches to understanding trends and differences in population health and mortality. *Demography*, *47*(Supplement), S41–S64.
- Cutler, D. M., & Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *Journal of Health Economics*, *29*(1), 1–28. doi:10.1016/j.jhealeco.2009.10.003.
- Cutler, D., & Miller, G. (2005). The role of public health improvements in health advances: The twentieth-century United States. *Demography*, *42*(1), 1–22. doi:10.1353/dem.2005.0002.
- Easterlin, R. A. (1997). *Growth triumphant, the twenty-first century in historical perspective*. Ann Arbor: The University of Michigan Press.
- Elder, G. H. J. (1994). Time, human agency, and social change: Perspectives on the life course. *Social Psychology Quarterly*, *57*, 4–15.
- Elder, G. H., Jr. (1998). The life course as developmental theory. *Child Development*, *69*(1), 1–12.
- Elder, G., Jr., Johnson, M., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer.
- Fenelon, A., & Preston, S. (2012). Estimating smoking-attributable mortality in the United States. *Demography*, *49*(3), 797–818. doi:10.1007/s13524-012-0108-x.
- Finch, C. E., & Crimmins, E. M. (2004). Inflammatory exposure and historical changes in human life-spans. *Science*, *305*(5691), 1736–1739. doi:10.1126/science.1092556.
- Fogel, R. W. (2004). *The escape from hunger and premature death, 1700–2100*. New York: Cambridge University Press.
- Fogel, R. W., & Costa, D. L. (1997). A theory of technophysio evolution, with some implications for forecasting population, health care costs, and pension costs. *Demography*, *34*(1), 49.
- Freedman, V. A., Martin, L. G., Schoeni, R. F., & Cornman, J. C. (2008). Declines in late-life disability: The role of early- and mid-life factors. *Social Science & Medicine*, *66*(7), 1588–1602. doi:10.1016/j.socscimed.2007.11.037.
- Goldin, C. D., & Katz, L. F. (2009). *The race between education and technology*. Boston: Harvard University Press.
- Curven, M., Kaplan, H., Winking, J., Finch, C., & Crimmins, E. M. (2008). Aging and inflammation in

- two epidemiological worlds. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 63(2), 196–199.
- Guyer, B., Freedman, M. A., Strobino, D. M., & Sondik, E. J. (2000). Annual summary of vital statistics: Trends in the health of Americans during the 20th century. *Pediatrics*, 106(6), 1307–1317. doi:10.1542/peds.106.6.1307.
- Halfon, N., & Hochstein, M. (2002). Life course health development: An integrated framework for developing health, policy, and research. *Milbank Quarterly*, 80(3), 433–479. doi:10.1111/1468-0009.00019.
- Hayward, M. D., & Gorman, B. (2004). The long arm of childhood: The influence of early life conditions on men's mortality. *Demography*, 41, 87–107.
- Hayward, M. D., & Heron, M. (1999). Racial inequality in active life among adult Americans. *Demography*, 36, 77–91.
- Hayward, M., Crimmins, E., Miles, T., & Yu, Y. (2000). The significance of socioeconomic status in explaining the racial gap in chronic health conditions. *American Sociological Review*, 65, 910–930.
- Hayward, M., Hummer, R., Chiu, C.-T., González-González, C., & Wong, R. (2014a). Does the hispanic paradox in U.S. adult mortality extend to disability? *Population Research and Policy Review*, 33(1), 81–96. doi:10.1007/s11113-013-9312-7.
- Hayward, M. D., Hummer, R. A., & Sasson, I. (2014b). Trends and group differences in the association between educational attainment and U.S. adult mortality: Implications for understanding education's causal influence. *Social Science & Medicine*. doi:10.1016/j.socscimed.2014.11.024.
- Juonala, M., Järvisalo, M. J., Mäki-Torkko, N., Kähönen, M., Viikari, J. S. A., & Raitakari, O. T. (2005). Risk factors identified in childhood and decreased carotid artery elasticity in adulthood: The cardiovascular risk in Young Finns Study. *Circulation*, 112(10), 1486–1493. doi:10.1161/circulationaha.104.502161.
- Kuh, D. (2007). A life course approach to healthy aging, frailty, and capability. *Journal of Gerontology: Medical Sciences*, 62(7), 717–721.
- Lariscy, J. T., Hummer, R. A., & Hayward, M. D. (2014). Hispanic adult mortality in the United States: A review, new estimates, and comparisons to other population groups. *Demography*. doi:10.1007/s13524-014-0357-y.
- Leduc, L., Levy, E., Bouity-Voubou, M., & Delvin, E. (2010). Fetal programming of atherosclerosis: Possible role of the mitochondria. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 149(2), 127–130. doi:10.1016/j.ejogrb.2009.12.005.
- Libby, P., Ridker, P. M., & Maseri, A. (2002). Inflammation and atherosclerosis. *Circulation*, 105(9), 1135–1143. doi:10.1161/hc0902.104353.
- Manton, K. G., Stallard, E., & Corder, L. (1997). Education-specific estimates of life expectancy and age-specific disability in the U.S. elderly population 1982 to 1991. *Journal of Aging and Health*, 9(4), 419–450. doi:10.1177/089826439700900401.
- Martin, L. G., Schoeni, R. F., & Andreski, P. M. (2010). Trends in health of older adults in the United States: Past, present, future. *Demography*, 47(Supplement), S17–S40.
- Masters, R. K., Hummer, R. A., & Powers, D. A. (2012). Educational differences in U.S. adult mortality: A cohort perspective. *American Sociological Review*, 77(4), 548–572. doi:10.1177/0003122412451019.
- McEniry, M. (2014). *Early life conditions and rapid demographic changes in the developing world*. Dordrecht: Springer.
- Melvin, J., Hummer, R., Elo, I., & Mehta, N. (2014). Age patterns of racial/ethnic/nativity differences in disability and physical functioning in the United States. *Demographic Research*, 31(17), 497–510.
- Merkin, S. S., Karlamangla, A., Crimmins, E., Hayward, M., & Seeman, T. (2009). Education differentials by race in the diagnosis and management of hypercholesterolemia. *International Journal of Public Health*, 54(3), S1–S1.
- Miller, G. E., Chen, E., & Parker, K. J. (2011). Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving toward a model of behavioral and biological mechanisms. *Psychological Bulletin*, 137(6), 959–997. doi:10.1037/a0024768.
- Mirowsky, J., & Ross, C. E. (2003). *Education, social status, and health*. New York: Aldine De Gruyter.
- Montez, J. K., & Hayward, M. D. (2014). Cumulative childhood adversity, education, and active life expectancy among U.S. adults. *Demography*, 51, 415–435.
- Montez, J. K., Hummer, R. A., Hayward, M. D., Woo, H., & Rogers, R. G. (2011). Trends in the educational gradient of U.S. adult mortality from 1986 to 2006 by race, gender, and age group. *Research on Aging*, 33(2), 145–171. doi:10.1177/0164027510392388.
- Montez, J. K., Hummer, R. A., & Hayward, M. D. (2012). Educational attainment and adult mortality in the United States: A systematic analysis of functional form. *Demography*, 49, 315–336. doi:10.1007/s13524-011-0082-8.
- Napoli, C., Glass, C. K., Witztum, J. L., Deutsch, R., D'Armiento, F. P., & Palinski, W. (1999). Influence of maternal hypercholesterolemia during pregnancy on progression of early atherosclerotic lesions in childhood: Fate of Early Lesions in Children (FELIC) study. *The Lancet*, 354(9186), 1234–1241. doi:10.1016/S0140-6736(99)02131-5.
- National Center for Health Statistics. (2014). *Health, United States, 2013: With special feature on prescription drugs*. Hyattsville.
- Palinski, W., & Napoli, C. (2002). The fetal origins of atherosclerosis: Maternal hypercholesterolemia, and cholesterol-lowering or antioxidant treatment during pregnancy influence in utero programming and

- postnatal susceptibility to atherogenesis. *The FASEB Journal*, 16(11), 1348–1360. doi:[10.1096/fj.02-0226rev](https://doi.org/10.1096/fj.02-0226rev).
- Palloni, A., & Souza, L. (2013). The fragility of the future and the tug of the past: Longevity in Latin America and the Caribbean. *Demographic Research*, 29(21), 543–578.
- Preston, S. H., & Haines, M. R. (1991). *Fatal years: Child mortality in late nineteenth century America*. Princeton: Princeton University Press.
- Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review*, 52(1), 1–14. doi:[10.2307/2095388](https://doi.org/10.2307/2095388).
- Roberts, C. B., Couper, D. J., Chang, P. P., James, S. A., Rosamond, W. D., & Heiss, G. (2010). Influence of life-course socioeconomic position on incident heart failure in blacks and whites: The Atherosclerosis Risk in Communities Study. *American Journal of Epidemiology*. doi:[10.1093/aje/kwq193](https://doi.org/10.1093/aje/kwq193).
- Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review*, 30(6), 843–861. doi:[10.2307/2090964](https://doi.org/10.2307/2090964).
- Verbrugge, L. M., & Jette, A. M. (1994). The disablement process. *Social Science & Medicine*, 38(1), 1–14.
- Wang, H. X., Leineweber, C., Kirkeeide, R., Svane, B., Schenck-Gustafsson, K., Theorell, T., & Orth-Gomér, K. (2007). Psychosocial stress and atherosclerosis: Family and work stress accelerate progression of coronary disease in women. The Stockholm Female Coronary Angiography Study. *Journal of Internal Medicine*, 261(3), 245–254. doi:[10.1111/j.1365-2796.2006.01759.x](https://doi.org/10.1111/j.1365-2796.2006.01759.x).
- Yang, Y. (2008). Trends in U.S. adult chronic disease mortality, 1960–1999: Age, period, and cohort variations. *Demography*, 45, 387–416.

Living Healthier and Longer: A Life Course Perspective on Education and Health

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1 Introduction

Current research using diverse datasets clearly shows that adults in the United States with higher levels of education enjoy better health, both physically and psychologically, and they live significantly longer (see reviews by Baker et al. 2011; Eide and Showalter 2011; Institute of Medicine 2012, 2014; Pampel et al. 2010; Ross and Mirowsky 2010; Woolf and Aron 2013). This association is strong and enduring, and spans a diverse set of health indicators. Indeed, it is “one of the most powerful relationships in social science research” (Lynch 2003:309).

A large and vibrant body of scholarship exists on this basic relationship and our purpose here is not to thoroughly review it. Instead, our aim is to help advance the scholarship in this area in new and needed directions by further incorporating a life course perspective. We begin with a brief summary of some of the major perspectives on

how education relates to health-risk behaviors, mental and physical health, and mortality, selectively summarizing past research as a foundation for our later observations. From there we highlight ways in which taking a life course perspective directs scholars and summarize issues that arise as a result.

To illustrate how a life course perspective can be used to examine educational disparities in health, we then briefly present analyses based upon longitudinal data from the Monitoring the Future (MTF) study. Beginning in 1976, the MTF study has been conducting annual surveys with nationally representative samples of high school seniors, and following a randomly selected subsample of each cohort into adulthood with mail surveys biennially through age 30 and then every 5 years through middle adulthood (Johnston et al. 2014a, b). Finally, we summarize the key issues covered over the course of this chapter.

2 Education as a Cause of Health

A large body of research promotes the idea that education shapes health in beneficial ways; that is, higher educational attainment contributes to better health and longevity. A key issue is the extent to which selection plays a strong role in this connection between education and health; the literature has given attention to this issue and

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the search for a common cause of education and health continues on. We will say more about this later, but for now we note that studies that attend to selection effects in various ways find that educational attainment independently contributes to health and longevity. Furthermore, numerous mechanisms have been identified linking greater education to a wide range of physical and mental health outcomes, supporting a causal perspective.

One key mechanism involves the strong link between educational attainment and the conditions of people's employment. Educational attainment has a long-standing and strong, positive association with workers' earnings, as well as other valued conditions of jobs (Day and Newberger 2002; Goldin and Katz 2008; Hout 2012; Kalleberg 2011). With respect to earnings, financial resources are linked with better health (Cutler and Lleras-Muney 2010; Mirowsky and Ross 2003; Pampel et al. 2010; Ross and Wu 1995). Controlling for earnings, or household income more broadly, substantially reduces but does not usually eliminate the positive relationship of education with health (Cutler and Lleras-Muney 2010; Mirowsky and Ross 2003; Ross and Wu 1995). It does not appear to be the case that money simply buys better health, however. Economic resources can facilitate healthy behaviors (e.g., gym memberships, purchasing fresh and healthier foods), but other healthy behaviors are not costly (e.g., wearing a seatbelt) and some unhealthy behaviors are quite costly (e.g., smoking, heavy daily drinking). Observing that the primary differences in health by income appear between low to middle incomes, Mirowsky and Ross (2003) argue that it is primarily economic hardship that undermines health through its activation of the body's stress response, often intensely and over long periods of time (see also Pampel et al. 2010).

With respect to other job conditions, autonomy, flexibility and intrinsically engaging features of jobs such as task variety, learning opportunities and problem solving are also linked to better health and likewise explain part of the association between education and health (Mirowsky and Ross 2003; Qiu et al. 2012; Ross

and Wu 1995). Because earnings are positively associated with these other job conditions, studies that measure only earnings or income may also be capturing the effects of these conditions.

Alongside education's effects through placement in the labor market, education is also thought to build knowledge and cognitive skills—literacy, numeracy, reasoning, and “learning how to learn”—all of which enhance risk assessment and decision-making skills, enabling people to live healthier lives (Baker et al. 2011, 2012; Mirowsky and Ross 2003). Indeed, human capital theory's explanation for the better labor market returns of more educated people is that education imparts skills that are valuable to employers. These same skills are resources that people who value health marshal to live lives in ways that promote their health (Mirowsky and Ross 2003). These skills also underlie a sense of having control over one's life. A strong sense of control provides motivation and confidence to pursue goals, tackle challenges and solve problems (Mirowsky and Ross 2003). More educated people tend to have more of this efficacy, or learned effectiveness, which enables people to better gather and act on information, overcome obstacles to live a healthy life, and confront health problems when they arise (Pampel et al. 2010). Consistent with this argument, personal control is positively associated with health and explains a significant portion of the relationship between education and health (Mirowsky and Ross 2003; Ross and Mirowsky 1999; Ross and Wu 1995).

Another way in which education is thought to facilitate better health is through greater access to and utilization of health care, arising in part through financial resources and the cognitive and social psychological resources just outlined. The picture is not entirely straightforward, however. Utilizing check-ups and screenings is generally not associated with better health (Ross and Wu 1995), nor is medical insurance coverage a factor (Mirowsky and Ross 2003). Looking internationally, health disparities have not been reduced in countries instituting universal health care systems either (Glied and Lleras-Muney 2008; Mirowsky and Ross 2003). In Great Britain, for

example, Mirowsky and Ross (2003) point out that instituting national care equalized medical services but did not reduce health disparities. Yet, at the population level, mortality declines across countries are significantly related to medical advances (Beckett 2000). In addition, educational gradients in mortality rise with improvements in health technologies (Glied and Lleras-Muney 2008). Glied and Lleras-Muney (2008) find that mortality's strongest inverse relationship to education is for deaths attributable to diseases for which there have been greater advances in medical technology. They argue that this pattern arises because better educated individuals adopt newer technologies more quickly than less educated individuals.

The higher levels of social support more educated people enjoy is another mechanism through which education is thought to operate. Educational attainment is positively associated with general indicators of social support as well as the likelihood of getting and staying married (Goldstein and Kenny 2001; Martin n.d.; McLanahan 2004), both of which are good for one's health (Mirowsky and Ross 2003; Pampel et al. 2010; Ross and Mirowsky 1999; Ross and Wu 1995). Social support, through marriage and other social relationships, improves mental and physical health and buffers the negative effects of stress (Thoits 1995, 2011).

Finally, lifestyle factors, including what are considered health-risk and health-maintenance behaviors, loom large as mediators of the effects of education on health (Cutler and Lleras-Muney 2010; Mirowsky and Ross 2003; Pampel et al. 2010). For instance, education is inversely associated with smoking and positively associated with wearing seatbelts, physical activity, and eating a healthy diet (Cutler and Lleras-Muney 2010; Ross and Wu 1995), and these factors account for around one-quarter of the association between education and health (Pampel et al. 2010). Indeed, most of the mechanisms discussed above also implicate participation in health-risk and health-maintenance behaviors to some extent, as well as stress processes. Mirowsky and Ross (2003:52), for example, suggest that the learned effectiveness of more educated people

allows them to "merge otherwise unrelated habits and ways into a healthy lifestyle." Thus between financial resources, social psychological resources, or social support and health outcomes also lies behavioral patterns that complete the links back to education levels.

Lifestyle differences may be driven by attempts of higher status individuals to distinguish themselves from the lower classes and vice versa (Pampel et al. 2010). "Tastes" vary by class, according to this argument, with implications for exercise levels, diet, smoking, and so on. Social networks, which are becoming increasingly homogenous by education level in society over time, are also involved in differential sanctioning with respect to health-related behaviors in ways that may perpetuate behavioral differences (Pampel et al. 2010).

The range of mechanisms through which greater education is thought to improve health, the range of mental and physical health conditions for which the relationship is observed, along with the durability of the relationship over time, have led to calls to consider education a "fundamental cause" of health. As Link and Phelan (1995) argue, "A fundamental cause involves access to resources, resources that help individuals avoid diseases and their negative consequences through a variety of mechanisms. Thus, even if one effectively modifies intervening mechanisms or eradicates some diseases, an association between a fundamental cause and disease will reemerge." The resources of education are flexible, according to this argument, such that no matter what strategies of risk avoidance and protective actions are conducive to good health in a given place and time, education-related resources allow people to adopt those strategies (Link et al. 2008).

Despite the consistency with which studies link education and health, it remains unclear in the literature whether the health benefits of education are linear or depend on degree attainment. Though some research has found a positive relationship between years of schooling and health (Cutler and Lleras-Muney 2010; Ross and Mirowsky 1999), others have found that health returns depend on degree attainment (Liu et al.

2011; Rosenbaum 2012). Psychologically, each additional year of education may improve health incrementally as students gain a better understanding of health risks and become more agentic and skillful in addressing health problems. The health benefits that come from greater material resources, however, may depend more on degree completion than total years of schooling. Though research has shown some health benefits of 2-year degree completion (Rosenbaum 2012), college dropouts might show limited health benefits of postsecondary education due to the stressors associated with high student loan debt and their higher likelihood of floundering in the labor market (Vuolo et al. 2012). At least one study indicates college dropouts have equivalent or worse health outcomes than high school graduates, as do those earning non-academic, vocational-technical degrees after high school (Zajacova et al. 2012). Moreover, little research has addressed the health benefits of educational attainment past the 4-year bachelor degree despite the growing number who have attended and completed graduate and professional programs (the number of master's degrees conferred has increased by 50 % in the past 10 years, doctoral degrees by 34 %; Snyder and Dillow 2012). Research that uses more standard treatments of education—by counting years of attendance or comparing outcomes for high school graduates and 4-year degree recipients—may miss differences in health outcomes between those who start college but do not complete a degree (“drop-outs”) and those who have an associate’s degree (a degree that has become increasingly common) or differences in health between students who attend graduate or professional school versus those who take more than 4 years to complete a bachelor degree (something that is also becoming more common).

In summary, though the functional form of educational effects is understudied, education is widely theorized as a fundamental cause of health and mortality through the creation of hierarchies in social, psychological, informational, and material resources (Link and Phelan 1995). Young people are taught in school to be more agentic, future oriented, masterful, and conscientious as

well as to be better assessors of risky behaviors. Education, particularly the receipt of 4-year college degrees, also improves occupational outcomes and facilitates stable and supportive unions with partners of similar educational credentials. Each of these enable more educated people to lead a healthier lifestyle, and to avoid and buffer stress across the life course.

3 A Life Course Perspective on Education and Health

As is apparent from even our brief discussion above, the relationship between education and health has been well-studied, and recent studies continue to show that educational attainment is positively related to self-rated health and psychological wellbeing and inversely related to mortality (Glied and Lleras-Muney 2008; Herd 2010; Herd et al. 2007; Masters et al. 2012; Montez et al. 2011, 2012; Ross and Mirowsky 2010, 2011; Scharoun-Lee et al. 2011; Wheaton and Clarke 2003; Yang 2008; Zheng et al. 2011). And as we will discuss below, the life course perspective is readily visible in many studies on this issue. Given this, can the life course perspective offer anything further to stimulate new lines of inquiry and advance our understanding of the social processes involved? We argue that it can, and discuss several possibilities in the remainder of this chapter. First, we highlight aspects of the life course perspective that are particularly pertinent to our observations.

For purposes here, we focus on two important and interrelated themes from the life course perspective: historical time and life-long development. Recognizing that the life course perspective offers many orienting concepts and principles to scholars (Elder et al. 2003), we suggest that one of its core features is its emphasis on time. Time is marked by several clocks, one is historical, another developmental-aging, and a third is social (Elder 1998). Multiple clocks are implicated whenever we think about when experiences happen, in what order, or for how long, or when we think about stability and change. These clocks are also tied to one another, as captured in the life

course perspective's emphasis on the intersection of biography and history. Thinking about time is fundamental to taking a life course perspective, and within that, taking the "long view" of lives as embedded in historical times illuminates new avenues of investigation helpful in building a deeper understanding of social processes.

The life course principle of time and place (Elder et al. 2003) emphasizes historical influences on lives. This time-oriented lens is evident in the extant research on education and health in the focus on historical trends, as well as cohort x age patterns, in the education-health gradient. Indeed, attention to historical time in empirical patterns was a major factor prompting the argument that education is a fundamental cause of health. Health disparities by socioeconomic status in the late 1800s and early 1900s were thought to result from differences in basic living conditions tied to housing, sanitation, nutrition and related factors (Link and Phelan 1995; Lynch 2003). Major improvements in public health (e.g., improved sanitation, widespread immunization) reduced mortality rates early in the twentieth century. Although many believed health and mortality disparities would be reduced as well, they actually increased across the twentieth century, particularly over the latter half of the twentieth century, as the leading health problems and causes of death became chronic and degenerative diseases (Mirowsky and Ross 2003, 2008; Lynch 2003; Link and Phelan 1995).¹ Whereas at the turn of the century the terrible living conditions

of the poor may have been a key issue, later, other factors arose as central mediating mechanisms. For example, Link and Phelan (1995) note how smoking was not linked to socioeconomic status until the 1960s, when information about the health risks of smoking became available. The negative association emerged as smokers from higher socioeconomic backgrounds quit and higher socioeconomic status non-smokers became less likely to start. Differences in other health-risk behaviors by education and occupational status also emerged over time. Mirowsky and Ross (2005) suggest that education became more closely tied to health because variation in health over history has become more a product of choices in how to live. Education, they argue, equips people to make and implement choices with better health results.

While the reasons may not yet be fully understood, a consideration of history has substantially advanced our understanding of health disparities. Indeed, the basic idea that the landscape of health and health care changes with time is a defining feature of the fundamental cause perspective. As Link and Phelan (1995:87) explain, "If no new diseases emerged (such as AIDS), no new risks developed (such as pollutants), no new knowledge about risks emerged (as about cigarette smoking in the 1950s and 1960s), and no new treatments were developed (such as heart transplants), the concept of fundamental social causes would not apply."

No clearer example exists illustrating the use of life course themes in research on this subject than that in the debate about whether educational disparities in health, which generally widen with age, continue to widen into old age or whether they eventually narrow (Herd 2006; House et al. 1994; Lynch 2003; Mirowsky and Ross 2003). On the one hand, the "cumulative advantage" perspective posits that disparities continue to grow, as education-based inequalities continue to widen into old age (Mirowsky and Ross 2003). On the other hand, the "age-as-leveler" hypothesis posits that disparities eventually narrow in old age. This is thought to occur as the limits of bodily functioning and life expectancy eventually trump the advantages of being highly educated,

¹ Some scholars suggest that health disparities widened even in the face of major public health improvements; others describe initial declines in disparities before widening disparities over the latter half of the Twentieth Century. For example, Mirowsky and Ross (2003) argue that disparities widened even with public health improvements early in the century. Lynch (2003) claims public health improvements disproportionately benefited those of higher socioeconomic status, consistent with this view. Schnittker (2004), focusing on income disparities, argues disparities were reduced as people shared broadly in the benefits of the public health infrastructure improvements, but widened as later advances in knowledge and technology required more effort and choice on the part of individuals to improve health. Masters et al. (2012) also describes a narrowing at midcentury followed by widening gap thereafter.

and as the social institutions of old age (e.g., social security, Medicare) provide a baseline of support to the least advantaged, narrowing the gap in health-protective resources (Beckett 2000; Herd 2006; House et al. 1994). There has also been concern that apparent narrowing results from selective mortality; that is, because those in the poorest of health die at earlier ages, the pool of individuals alive at older ages may represent a particularly healthy group. However, several studies conclude that selective mortality is not a major factor (Beckett 2000; Herd 2006). Dupre (2007) argues that we need to distinguish patterns at the individual and aggregate level, offering support for the idea that selective mortality leads to leveling at the aggregate level, but that individual changes in health with age by education level follow a cumulative advantage process.

Sorting out age, period, and cohort patterns has been a fundamental aspect of comparing the cumulative advantage and age-as-leveler hypotheses (Goesling 2007; Lauderdale 2001; Lynch 2003; Mirowsky and Ross 2003, 2008). Goesling (2007), for instance, found that educational disparities in self-reported health have increased among adults over age 70 in recent years but have narrowed among younger adults (i.e., those ages 30–49). One issue this literature reveals quite clearly is that data capable of adjudicating these arguments is rare. The research to date typically makes use of cross-sectional data (e.g., Goesling 2007; Schnittker 2004) or longitudinal data with limited cohorts or limited waves of data (e.g., Lynch 2003; Lauderdale 2001) instead of multiple cohorts of longitudinal data over many years, which are needed to fully assess the cumulative advantage hypothesis. Yet existing research points to the value of such data. Lynch (2003), for instance, shows that the effect of education on self-rated health strengthens across age (in a quadratic pattern in cross-sectional data, but a positive linear pattern in panel data). This “fanning with age” pattern is also becoming stronger across cohorts. Importantly, Lynch shows that without taking cohort differences into account, the growing disparities with age appear much more minimal; likewise, without taking the age differences into account, cohort differences

appear minimal. These studies highlight the need to examine the cumulative advantage and age-as-leveler hypotheses with multi-cohort longitudinal data.

The notion that human development is a life-long process is a second key principle in life course research, and scholars in this tradition have called for studies that look at individuals over substantial periods of time. As Elder and colleagues (2003) note, development is a life-long process, as individuals show biological as well as social and psychological changes throughout the life course. Yet, the literature on how education affects health has been almost exclusively focused on adulthood. Though there is much to be gained by tracking how education relates to adult health from midlife to older ages, there are additional ways of thinking about time that can shape the research questions we pursue in developing our understanding of how and why education promotes health. For instance, by taking the long view of human development we can ask how much of the education-health association observed in middle to late adulthood results from experiences much earlier in life, such as motivations, abilities, and orientations that are expressed in childhood and adolescence. Similarly, we can assess the long-term influence of child and adolescent health and health-risk behaviors on subsequent educational attainment. By following children and adolescents through the transition to adulthood and beyond, and by considering processes across multiple generations, we can more accurately place individuals in developmental and historical time as well as better understand the social pathways and processes linking education and health.

Studying lives over an extended period of time can also help researchers identify *short-term* impacts of education on health and health-risk behaviors. College attendance, in particular, may ultimately be beneficial to health in the long run but leads to short-term increases in substance use (Schulenberg and Maggs 2002) and other health-risk behaviors (poor diet, inadequate sleep, lack of exercise). In some instances, these health-risk behaviors during the college years may have long-term negative health consequences,

especially if they lead to dropout, accidents, or substance use problems.

The ages and life stages at which college is pursued may moderate these patterns. According to the life course principle of timing, the consequences of transitions and events depend on when they occur in a person's life (Elder et al. 2003). For instance, older first-year college students may have a lower risk of experiencing a dramatic increase in substance use upon college entrance compared to more "traditional" first-year students. On the other hand, students who pursue college degrees after making other important role transitions do not have the benefits in-hand of their degree as they navigate work and family experiences. Assessing whether the timing of education matters for health is especially important as the age of school completion increasingly is stretching well into adulthood. Currently, over a third of postsecondary students are age 25 or older (Snyder and Dillow 2012).

Finally, building on these themes, we must address whether the potential mechanisms linking education and health have changed historically. This may be especially important to consider as the pool of college goers has diversified and expanded over the past three decades in the United States,² the links between education and other social institutions have changed, and educational disparities have shifted as new threats to population health have emerged. As we discuss later in the chapter, these broad changes in mechanisms may lead to increased educational disparities in health. At the same time, the landscape and nature of education has changed, with a diversification of institution types at both the secondary and tertiary levels, and the possibility that educational quality is eroding.

In the sections that follow, we discuss further these three general possibilities for further incorporation of a life course perspective: (1) merging selection and causal effect processes into a long-term, multigenerational view; (2) linking health across the years in which people largely achieve

their educations, and the short-term processes involved, with longer-term processes and mid- to late-life health outcomes; and (3) assessing historical trends in the mediating mechanisms and their implications for health disparities.

4 Merging Selection and Causal Processes into a Long-Term, Multigenerational View

Children's and adolescents' experiences, orientations, and social backgrounds have played a somewhat limited role in research on education and health. The primary attention given to this early period of life is directed toward assessing the causal direction between education and adult health, or whether a cause-effect relationship is justified at all.

First, scholars have considered whether the relationship between education and health may be spurious due to family socioeconomic background and parental support, prenatal and childhood risk factors, and genetic endowments that give rise to both educational and health outcomes (Pampel et al. 2010). Part of the positive association between educational attainment and adult health does appear to be generated through such processes. Parents' education and other childhood background advantages have long-term effects on both education and health (Ross and Mirowsky 2011), and controlling for these factors substantially reduces estimates of education effects for adults in some studies (Behrman et al. 2011; Fujiwara and Kawachi 2009). Adolescent academic performance and interest also predict health declines later in life and partially account for educational attainment's impact (Herd 2010).

Second, scholars have considered whether the causal process works primarily in the other direction, with health influencing educational attainment. Research shows how poor childhood and adolescent health reduce educational attainment, especially for non-Hispanic whites (Haas and Fosse 2008; Jackson 2009; Palloni 2006). Moreover, other research designs creating proxy measures for early health differences through

²College enrollment in the United States is currently at an all-time high (20.6 million students) and is expected to increase 14 % by 2019 (Snyder and Dillow 2012).

birth weight, childhood height, or differences in birth weight among twins, or research that capitalizes on exogenous shocks in quasi-experimental designs (e.g., exposure to a major influenza outbreak, the Chernobyl disaster, the Swedish phase out of lead in gasoline), document significant effects of early health on later education levels and occupational attainment (Eide and Showalter 2011).

One of the greatest challenges in addressing the impact of education on health and health-risk behaviors is the lack of sufficiently compelling long-term data and analytic strategies to offer insight into causal relations and mechanisms (Palloni 2006). Given that random assignment to different levels of education is not possible, scholars have used a range of methodological strategies to assess whether these arguments about spurious factors and causal order erase the possibility of education having a causal impact on health. Some studies have taken the approach of identifying and measuring childhood health and other early conditions and including them as controls in regression analyses. Studies controlling for many of these factors, including childhood socioeconomic status, intelligence, and health, do continue to document education effects on adult health and mortality (Hayward and Gorman 2004; Herd 2010; Link et al. 2008; Liu et al. 2011). In a recent study, Schafer and colleagues (2013) used these and other childhood factors in propensity score models by which individuals were matched on all prior constructs and varied only in whether they completed college; propensity score models are viewed as among the strongest approaches to attending to selection effects and in these models they found that completing college did indeed contribute to health. Researchers have also used quasi-experimental and instrumental variable approaches to more rigorously tackle selection issues and these studies generally provide support for a causal interpretation (Eide and Showalter 2011). For example, studies have capitalized on siblings' and twins' shared genetic and environmental histories, and other studies have compared cohorts across changes in compulsory education laws or significant changes in the informational

environment (e.g., Surgeon General's warning against smoking in 1964).

Yet, as George (2003) articulated beautifully in the previous *Handbook*, life course perspectives push scholars to move beyond viewing social selection as a methodological nuisance, and social selection and social causation as competing hypotheses or even fully distinct. George (2003:675) writes:

From a life course perspective, the distinctions between social selection and social causation are much less important. An investigator can have an outcome of interest (e.g., health, employment status) and wish to identify the social factors associated with that outcome. But the distinction between selection and causation is relatively moot. The focus is on the long-term processes and pathways that result in the outcome of interest, not categorizing those processes and pathways as selection or causation. Many investigators who address social selection and social causation from the traditional perspective apparently fail to understand that they are attempting to eliminate the life course from their inquiries. Using statistical procedures to estimate a coefficient that represents selection essentially means that the investigator is bundling the study participants' pasts into a neat little package that is ignored substantively and interpretively. This is one of the ways in which social and behavioral research tends to be ahistorical—it ignores not only the social history, but also personal history.

By putting concerns with selection and causal order at the apex in our studies, we are not giving appropriate attention to developmental processes and mechanisms that come over time and are responsible for the myriad longitudinal connections (Schulenberg 2006). That is, "...it is the ongoing interaction between individuals and contexts that contributes to the direction of development, so it is inaccurate to suggest that picking up midstream in such relations is simply charting processes that are playing out their inevitable course set by unmeasured third variables" (Schulenberg 2006, p 111). Obviously, selection and causal order deserve careful attention, but our argument here is that, from a life course perspective, the intricacies of long-term effects that shape lives in personal and historical time also deserve careful attention.

Fully solving the "problems" of selection and causal order and demonstrating the unequivocal

effect of education level on health might help justify investments in education, but would still not give us a complete picture. It is not simply the case that educational attainment affects health via a range of mechanisms that scholars can map, but that (a) parents' education levels and health affect childhood and adolescent health which affects educational attainment, (b) parents' education levels and health affect children's eventual educational attainment via childhood health but also parenting behavior and other mechanisms, and that (c) educational attainment has further important implications for health, and both attainment and health in turn presumably shape these outcomes for future children. Rarely is this process, which unfolds over generations and very long periods of individuals' lives, considered as a whole (Bauldry et al. 2012; Hayward and Gorman 2004). Yet extrapolating across studies that look at different periods of the life course or incorporate information on socioeconomic origins, it would appear this is the larger story. Viewing it that way (and better yet, investigating it) enables connection to important questions about the intergenerational transmission of advantage. What are the patterns in disparity not just during the adult years, but beginning much earlier in life? What is the causal "reach" of these early life health disparities? Do they extend into mid life and old age? Perhaps most importantly, for whom does education have the greatest long-term health benefits?

Recent evidence that education has heterogeneous effects on health highlights the importance of these interconnected questions. Arguing a "resource substitution" model, that education benefits most those who otherwise have fewer resources, Ross and Mirowsky (2011) find conditional effects of personal educational attainment by parental educational attainment. The benefits of one's own education matter more for those whose parents had completed less schooling. Likewise, Schafer and colleagues (2013) find that those people least likely to complete college (based on parental socioeconomic status but also a range of factors) gain the most with respect to later health outcomes when they do complete college. Indeed the group with the highest propensity for college

graduation saw no health benefit to earning the degree. These findings echo earlier ones by Brand and Xie (2010) that the earnings pay-off of a college education is also greatest for those least likely to earn a college degree.

The resource substitution model also predicts more education improvements in health for women than men. Social scientists have long shown that women have fewer resources (e.g., power, authority, earnings) than men, making education potentially more important to their health. For example, this hypothesis argues that men more often have redundant resources, but in the absence of higher education, earnings and power can also facilitate better health. Educational attainment is more important for women because without it they are otherwise likely to have fewer resources than men. The findings of several recent studies provide some support for these hypothesized conditional effects by gender (Ross and Mirowsky 2006, 2010b). More research is needed on how these background characteristics moderate education effects on health, especially as the pool of students pursuing education beyond high school has undergone substantial transformation in recent years.

In summary, continued conceptual and empirical attention to how education and health affect one another within and across generations is needed. Several studies show that poor health and health-risk behaviors as assessed in infancy, childhood, and adolescence are associated with reduced educational attainment in adulthood. In addition, parental socioeconomic status, among other conditions of the early life course, is linked to health, as well as children's eventual educational attainment. As such, health prior to the completion of education and parental socioeconomic status are considered key "controls" in assessments of the effects of education on health, although there has been some recent interest in the long-term processes linking conditions in childhood to health in young and later adulthood (e.g., Bauldry et al. 2012; Hayward and Gorman 2004). These studies point to a need for continued research that uses longitudinal data within an historical and intergenerational framework and analytic methodologies that more fully map

relationships between adolescent achievements, orientations, socioeconomic advantages, and other background factors (both observed and unobserved), educational pathways, and health. Concern with, and controls for selection and causal order are obviously important, but represent only part of the overall picture of how education and health are interrelated across the life course.

5 The Transition to Adulthood, Short-Term Effects and Links with Adulthood

If childhood and adolescence have played a narrow or limited role in research on education and health, young adulthood is practically absent altogether (Bauldry et al. 2012). The heavy focus on adulthood, particularly mid- to late-life adulthood, is understandable from the perspective that most serious physical health problems are not very prevalent until these life stages. A focus on adulthood proper also enables a simple consideration of “final” education levels in analytic models. Indeed, a common (though by no means universal) strategy across studies is to restrict analysis to those who have reached a specific age in adulthood authors deem to be one in which further education can be assumed to be trivial, typically age 25 or 30 (Cutler and Lleras-Muney 2010; Goesling 2007; Lynch 2003; Ross et al. 2012; Zajacova et al. 2012). That choice effectively requires analysis strategies to model between-person variation—that is, looking at health outcomes in adulthood as they differ across persons with different education levels. It also means the effects of education on health are necessarily long-term effects. For the most part, the study of education and health is separated from the time in which education occurs. The period in which educational differences emerge is left out.

There is little attention to the effects of education on health as it is differentially gained, largely, though not exclusively, in the late teens and twenties. There has been research emerging, however, on post-secondary educational patterns and a

range of health-risk and health-protective *behaviors*. The transition from adolescence to young adulthood is a time of change in many of these behaviors, with aggregate levels of physical activity and healthy eating declining, and alcohol and other substance use, and participation in risky sexual behavior, rising (Bauldry et al. 2012; Eaton et al. 2007; Institute of Medicine 2014; Johnston et al. 2014b; Schulenberg and Maggs 2002). Research on education and health-related behaviors during this period focuses on short-term effects and uses a mix of between-person and within-person (that is, individual change over time) modeling strategies. This research is still quite limited, but suggests greater attention be paid to the potential short-term and sometimes detrimental effects of schooling, especially the uptick in health-risk behaviors that occurs during college (i.e., heavy drinking, drug use, poor eating habits, weight gain, etc.).

Educational status, for example currently attending or not attending college, is related to substance use, though there is some conflicting evidence across studies. Some studies have documented that college students engage in heavier and more frequent alcohol and marijuana use than young adults who are not attending college (e.g., Schulenberg and Patrick 2012; Staff et al. 2010; White et al. 2006), while others have found fewer differences between college and noncollege drinking levels (e.g., Chen et al. 2004; Lanza and Collins 2006). Research shows that attendance at 4-year universities, but not 2-year universities, increases engagement in heavy drinking as well as illicit drug use (Patrick et al. 2012; Staff et al. 2010). Evidence also suggests that greater increases in alcohol use across the transition to college are associated with a lower likelihood of dropping out, and students who drop out of college decrease their drinking after leaving college (Schulenberg and Patrick 2012), likely because alcohol use can be a proxy for engagement in college social life (Carter et al. 2010; Schulenberg and Maggs 2002). One recent study comparing patterns of heavy drinking from adolescence through the transition to adulthood in the Add Health data indicates that non-Hispanic whites who attend and graduate from a 4-year

college or university experience a steeper rise with age in heavy drinking and ultimately reach higher levels of heavy drinking compared to those who do not attend college at all (Chen and Jacobson 2013). Those obtaining 2-year degrees or attending some college without earning a degree fall in between. No group differences remain significant by age 30–31, however. For Blacks, in contrast, pathways through school were much less associated with trajectories of heavy drinking. By the mid to late 20s, however, Blacks who had attended some post-secondary education but did not earn either a 2- or 4-year degree (college-withdrawers) had significantly higher levels of heavy drinking than other groups that persisted until at least age 30–31. The study was not designed to assess whether problematic drinking led to or resulted from college drop-out.

As discussed earlier with respect to the relation between education and health more broadly, studies of this age period indicate that influence between education and health-related behaviors can go both ways. Prospective associations between health behaviors and college attendance and graduation demonstrate the effect of health behaviors on educational attainment. For example, substance use in high school is associated with lower likelihood of college attendance and graduation, even after controlling for academic performance and expectations (Bachman et al. 2008, 2011; Patrick et al. 2013; Siennick and Staff 2008). Patterns for high school alcohol use differ, with drinking positively related to educational attainment (Patrick et al. 2013). This echoes again that alcohol use can be a marker for social engagement (Crosnoe 2011). Obesity in adolescence is also associated with college attendance, though only among girls (Crosnoe 2007). The lower likelihood of college entrance among obese girls, which was especially prominent when girls attended high schools where obesity was less common, was partially explained by increased internalizing symptoms, self-medication, and disengagement from academics in high school (Crosnoe 2007).

Assessments of the short-term effects of education have not yet encompassed the full range of

health-related behaviors that may be relevant or that have been implicated in adult health disparities and, as such, additional work is needed. Furthermore, a continued focus on health-risk and health-protective behaviors may be quite appropriate for this part of the life course, again given the age patterns of disease and other health problems. Yet there is a need to link these short-term effects with longer-term patterns of behavior and to later health outcomes to complement the study of adult health and the often contemporaneous measures of mediating mechanisms (e.g., job quality, social support, and lifestyle factors). Do effects of education visible in the short-term have direct implications for later health? Might the health-risk behaviors associated with college attendance partially offset long-term health gains from education, perhaps especially if the young person attends but does not finish college? Do short-term changes in health behavior affect later health through persistence in behavioral patterns? Upticks in health-risk behaviors, like heavy drinking during the years of college attendance, may have little long-term consequence so long as they do not lead to alcohol use disorders, contribute to accidental injury, or cause school difficulties; indeed, although certainly not a recommended practice, heavy drinking and other risky behaviors during this time may have more social benefits than negative consequences (Institute of Medicine 2014; Schulenberg and Maggs 2002).

How health-related behaviors tied to schooling are linked to longer-term trajectories of behavior is an important piece of this puzzle. Piecing empirical patterns across the largely cross-sectional studies, the picture associated with college-going is that college students engage in heavy drinking at higher rates while in school, but that sometime within the post-college decade or so rates drop off enough to reverse the comparison entirely, such that less educated adults are more likely to drink heavily than those having pursued higher education. Trajectories of obesity, healthy diet, and physical activity need to be examined from the ages when educational attendance patterns begin to diverge. Importantly, education may be tied not only to each, but to the

way in which they come together into more or less healthy lifestyles over time.

Despite lower rates of disease among young adults compared to older adults, it is also important to examine health itself among young adults as it relates to education. Are disparities in health immediately observable as further pursuit of education differentially establishes the adult education levels often measured for assessments of health later in the life course? Or are differences at this stage largely due to earlier experiences also tied to educational pursuits (e.g., childhood socioeconomic status), with health effects due to education emerging over time in the years after education levels are achieved and as adult lives are organized. Low rates of specific diseases may make them impractical measures of (ill) health at young ages, but self-rated health, mental health, and general measures of activity limitation show sufficient variation (Amato and Kane 2011; Bauldry et al. 2012; Eaton et al. 2007; Schulenberg et al. 2005).

In pursuing these questions focused on education and health during the young adult years, we need to consider a number of interrelated issues. First, are the mechanisms theorized to link education and health and health-related behaviors the same for long- and short-term processes? Second, how long does it take for them to materialize and matter? Though postsecondary students do not usually have access yet to the higher paying jobs they will eventually hold, nor are they usually married (school attendance is inversely related to the likelihood of marriage), they do have access to health services and mental health counseling, school-organized social activities, and perhaps the financial resources of their parents. These school-related resources may protect students from potential long-term risk. The cognitive and social psychological benefits of education would also seem to be candidates for mediators that are evident in the short-term and work similarly to improve health-related behaviors and health in the short- and long-term. More careful attention to the school-going years would potentially yield additional insights into how the mechanisms believed to link education and health actually operate.

In addition, it is important to note that the first transition out of education is increasingly not a

permanent one. In more recent cohorts it has become more common to pursue postsecondary education at older ages. Life course scholars highlight how the developmental consequences of key transitions and events depend on when they occur in life as well as the historical context. The increased average age of college students raises important questions about whether education gained at later stages in life has the same beneficial impact on health in general and for different cohorts. Students over the traditional age may be less susceptible than younger students to the risky behaviors of college life such as binge drinking, thus minimizing the potential for short-term negative effects; and more recently, they may have more like-aged peers thus increasing social integration effects. However, education might also make less of a difference the later in life it is earned, as long-term behavioral patterns may be more difficult to disrupt later in life and the fewer number of years lived after education is achieved for which its associated resources can operate to promote health. Miech and colleagues (2015) also show that even among young adults, the sequencing of postsecondary education with respect to entering other adult social roles moderates the impact of education on health. They argue that people who earn their degrees before entering marriage and parenthood have greater resources in place to avoid the weight gain that these familial transitions can often bring. Consistent with their argument, they find the probability of obesity much higher among those who married before completing college compared to those completing college first. For black men only, the probability of obesity is also higher among those who become parents before completing college. Heterogeneity in the health benefits of education by when education is earned in the life course is beginning to be considered, but to date most other studies have relied on inadequate data to fully address the issue.

In summary, examining health disparities tied to education during the late adolescence and young adult years has two primary advantages. First, more and more youth are extending their educations past high school, and research shows that the likelihood of engaging in unhealthy behaviors increases during periods of college attendance.

Whether this unprecedented growth in college going, and the short-term health risks associated with it, will lead to long-term population health problems is unknown. Perhaps these short-term health risks are offset by on campus health and social services (when available), or maybe college going has long-term negative health consequences only among those who do not graduate from college, or among those who develop more serious health problems (e.g., addiction). Second, postsecondary students today are on average older compared to previous generations. This changing demographic suggests young people are staying in school longer and/or increasingly returning to college after periods of work. Health studies that view educational attainment as static, both developmentally and historically, potentially miss key mechanisms of education duration and timing and of interlinked social and employment experiences on long-term health outcomes.

6 Assessing Historical Trends in the Mediating Mechanisms and Their Implications for Health Disparities

The fundamental cause perspective posits that the relationship between education and health is enduring—even though the mechanisms involved may emerge and fade and diseases may change. That is, the links between education and health are often overlapping (e.g., those with higher education levels benefit in myriad and often redundant ways), and across historical time, some mechanisms capture more of the mediation and others capture less. This assertion awaits testing with multi-cohort long-term data. But meanwhile, the life course perspective complements this tenet of fundamental cause by directing needed attention to historical changes in the intervening mechanisms that can serve to potentiate or counter the long-term effects of earlier education-based experiences. As mentioned previously, educational attainment is thought to be positively linked to health and inversely linked to mortality because education facilitates securing better jobs, increases the likelihood of

more supportive relationships, and imparts cognitive skills and other resources that are conducive to good health. Social scientists have documented important ways in which education (particularly a 4-year college degree) is becoming increasingly tied to several of these potential mediators, each suggesting changing linkages between education and health for more recent cohorts.

Prior research has clearly documented the health benefits of completing high school versus dropping out or temporarily stopping out of high school, but college is now the central focus of students' futures, both from their own point of view—as reflected in their educational plans (Goyette 2008)—as well as at a broad cultural level—as reflected in the “college for all” era in the United States (Pascarella and Terenzini 2005; Rosenbaum 2011). President Obama has set the goal that the United States has the highest proportion of college graduates (including 2-year degrees) in the world by 2020. In addition, the long-term health benefits of a postsecondary degree may be as strong or stronger than the effect of high school graduation (compared to not graduating from high school) with respect to mortality, chronic disease, self-rated physical health, psychological wellbeing, and health-risk behaviors (Baum et al. 2010; Palloni 2006). Given this, we focus our illustrative examples of historical change in mediating mechanisms as they relate to postsecondary levels of education.

First, employment status and conditions are among the major theorized mediators linking education and health, yet the relationship between education and these work-related experiences is changing in fundamental ways. Postsecondary educational credentials are increasingly needed to secure a “good” job in the contemporary economy. In particular, the employment and earnings gap between those who earn 4-year degrees and those who obtain less education is substantial and growing (Day and Newburger 2002; Goldin and Katz 2008; Grusky et al. 2011; Institute of Medicine 2014). If these education differences in economic outcomes continue to widen we may soon witness a health gradient that is more clearly based upon the achievement of certain educational milestones, such as the receipt of a Bachelors' degree.

Second, the links between education and family formation are changing. Demographers have identified the “diverging destinies” in family life for those with and without college degrees (McLanahan 2004), finding that the latter are less likely to marry and more likely to experience union dissolution and family instability. Stable sources of social support may be increasingly more difficult to achieve for less educated people. If multiple pathways through which education matters (employment, family formation) are increasingly concentrated among the college-educated in recent cohorts, that has important implications for health trends.

Third, it is important to address possible changes in educational quality when predicting whether education will have commensurate benefits for health in contemporary cohorts of youth in comparison to their predecessors in decades past. Though concerns about the current quality of higher education are not new, there appears to be growing worries that the experience of going to college, for both traditional advantaged students and “non-traditional” older students from more disadvantaged backgrounds, has changed for the worse (Arum and Roksa 2011; Côté and Allahar 2011; Professor X 2011). Issues such as grade inflation, the retreat from public financing of higher education (leading to more use of adjunct professors), increasing class sizes, and limited time students spend studying (while getting good grades nonetheless) all raise the question as to whether college degrees will have the same “pay-off” in terms of work benefits, cognitive growth, and health for today’s young people and for future generations (if these trends continue).

Documenting changes in the quality of higher education is certainly not easy to do. Arum and Roksa (2011) examine both historical changes in time spent studying among college students as well as whether postsecondary students show cognitive gains while attending school. The authors find that time spent studying has indeed historically declined, and cognitive gains among recent college students are modest, leading them to conclude that learning on college campuses is now limited. Yet, the cognitive test was based upon one essay question from the Collegiate Learning Assessment, and as Farkas (2011)

points out, is “over-time improvement in writing a single, knowledge-free essay a good measure of what is learned in college?” (1001). Furthermore, time spent studying alone was not significantly ($p < 0.05$) associated with gains in cognitive scores in Arum and Roska’s study, raising questions as to whether time spent studying is a good measure of educational quality or more generally whether the decline in studying is a cause for concern. Thus, whether quality of college education is declining is an open question, along with the effects of any decline on health benefits.

A fourth historical change of potential importance is the expansion and diversification of the pool of postsecondary students (Hout 2012). As mentioned before, this expansion has included students age 25 or older. The number of degrees conferred has also risen dramatically, with the greatest gains among female and minority students. Since research has shown that the long-term health benefits to education are greatest among those who have been least likely to attend college (e.g., Schafer et al. 2013), the increased heterogeneity in college going is likely to lead to greater educational disparities in health. On the other hand, if the quality of higher education has been eroding substantially over time, educational disparities could diminish. Nontraditional and minority students are also more likely to attend 2-year vs. 4-year programs, and less selective schools among the 4-year programs, and the relative benefits of education across these institution types is not well understood. Research is needed that accounts for these broad changes in postsecondary education, health outcomes, and mechanisms among recent U.S. cohorts. Specifically, given that historical change in college going and its links to family formation and employment outcomes are evident across the period from the 1970s to 2010s, research is needed comparing cohorts moving from adolescence to midlife from these decades (Hout 2012).

Though the effect of a college degree on health may result from access to better jobs, higher earnings, and greater social support, or from enhanced cognitive resources and self-direction that lead to a healthier lifestyle (Baker et al. 2011; Link and Phelan 1995; Mirowsky and Ross 2003), these varied potential mechanisms (i.e., economic, social psychological and interpersonal, and health

lifestyle) for education-health relationships are often not considered in tandem. Thus, in addition to research attending to historical change, research is needed that approaches these explanatory mechanisms synergistically (Leigh and Dhir 1997; Schnittker 2004), assessing the relative predictive power of each in explaining education effects on health, and illuminating their potentially changing roles and explanatory power across cohorts.

In summary, as recommended by a recent Institute of Medicine (2014) report on health and well-being during the transition to adulthood, continued research is needed addressing whether educational disparities in health are changing over time as new health threats emerge, economic conditions and general patterns of family formation change, and college education expands and diversifies. According to the rising importance hypothesis, educational disparities in health will emerge at younger ages and last longer for more recent cohorts (Goesling 2007; Mirowsky and Ross 2008). As Montez and colleagues (2011) noted, this may be due to several mechanisms we note above, such as the increasing importance of education for wage attainment or education being more positively associated with marriage and staying married, which in turn creates a network of more educated people (Breen and Salazar 2011). However, the recent economic downturn in the United States may have exacerbated health declines or may have led to health declines at younger ages (due in part to the inability of many recent college graduates to find jobs or jobs that match their educational credentials).

7 Some Illustrative Examples from the Monitoring the Future Study

Previous analyses using MTF have stressed the important role adolescent health-risk behaviors play in influencing educational attainment. For instance, we have found that adolescent substance use reduces the likelihood of both college matriculation and completion above and beyond the standard controls, such as academic performance, expectations, and socioeconomic background (Bachman et al. 2008, 2011, 2013).

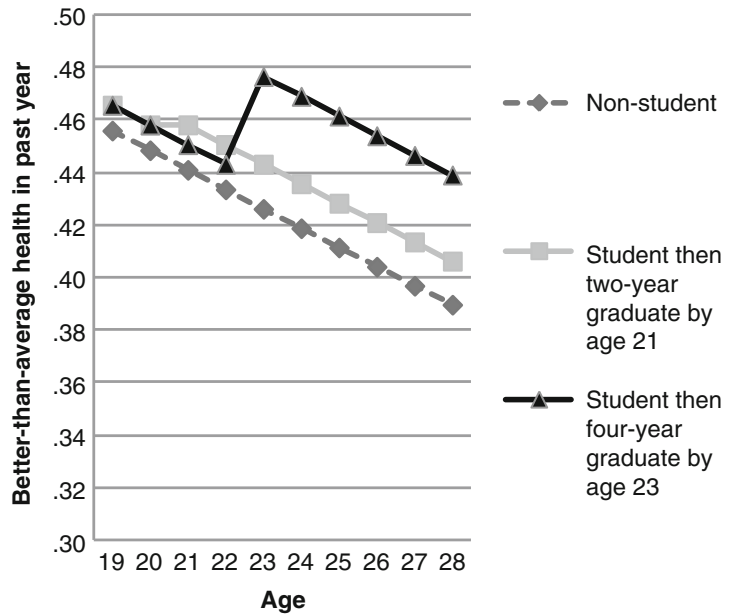
Patrick et al. (2013) showed that substance use during high school predicted a greater likelihood of never attending college (for cigarettes and illegal drugs), of graduating from a 2-year rather than a 4-year school (for cigarettes), and of dropping out versus graduating from a 4-year school (for cigarettes, marijuana, and other illegal drugs). Interestingly, high school alcohol use was positively related to longer-term educational attainment. Consistent with other recent research (e.g., Jackson 2009), these findings provide reason for giving attention to reciprocal effects over time when educational experiences are happening, as well as controlling for adolescent health-risk behaviors when looking at education-health relationships in adulthood.

In a series of papers, we have examined how family transitions account for changes in well-being and health-risk behaviors during the transition to adulthood (i.e., from ages 19 to 28). Using analyses of within-person change to control for all time-stable sources of spuriousness, Staff and colleagues (2010) showed how marriage and cohabitation lead to reductions in health-risk behaviors. These analyses of within person change also revealed potential negative health effects in the short term during periods of school attendance. For instance, heavy drinking and marijuana use increase when young people are attending college but then decline sharply after degree completion.

In new analyses reported here for the first time, we used MTF data for the 1976–2010 senior year cohorts to examine how college attendance and completion predict changes in overall self-reported health. To illustrate these findings, Fig. 1 shows predicted probabilities of self-reported physical health by age, student status, and degree attainment using analyses of within-person change (again to control for unobserved time-stable sources of spuriousness).³ As shown in Fig. 1,

³At each wave, respondents were asked, “Overall, relative to people your age, do you think your physical health over the past year has been...” (responses range on a five-point scale from “much poorer than average” to “much better than average”). For the purposes of these analyses, this outcome was dichotomized (1 = somewhat or much better than average). These findings are based upon a subsample of 11,441 MTF respondents who completed surveys from ages 19 to 28 (encompassing 38,231 person waves).

Fig. 1 Predicted probability of better-than-average health in the past year by college matriculation and degree attainment using analyses of within-person change (n = 11,441)



the predicted probability of “better than average” health significantly declines by 3 % each year from ages 19 to 28. When students attend college, health increases by 4 %, but this change is not statistically significant.⁴ However, completing a degree is linked to improved self-reported health, but it depends on the degree. Health increases by 23 % when students graduate from 4-year programs.⁵ Interestingly, 2-year degree completion does not significantly increase health in the same way as 4-year degree completion,⁶ highlighting a need for more research on whether different types of degrees matter more for health beyond years of school attained.

8 Conclusion

A life course perspective is already evident in the sociological and gerontological study of education and health. In many ways the topic provides

an excellent illustration of how life course thinking has fundamentally changed traditional areas of study and stimulated new debates (e.g., “cumulative advantage” vs. “age as leveler” hypotheses of health disparities). But we believe more is possible. By fully embracing the principle that development is life-long, and attending to issues of timing and historical context, we can build an understanding of how education and health are related across generations as well as reciprocally in the early life course, with implications for later life. The life stages of childhood, adolescence, and younger and older adulthood are linked such that theoretical advancement requires attention to earlier life stages. Our understanding of the mechanisms linking educational pursuits and attainments to health in the short- and long-term will grow, and we will identify the processes linking short- and long-term change. Paying more attention to historical change as it intersects lives at every age—particularly via changes in educational institutions and the interrelationships of educational, familial, and labor market institutions during young adulthood to midlife—will assist in assessing the implications of social change for future disparities in health.

⁴Estimate=0.039; Robust standard error=0.029; Odds ratio=1.039; *p*=0.191.

⁵Estimate=0.203; Robust standard error=0.041; Odds ratio=1.225; *p*=0.001.

⁶Estimate=0.069; Robust standard error=0.048; Odds ratio=1.071; *p*=0.152.

References

- Amato, P. R., & Kane, J. B. (2011). Life-course pathways and the psychosocial adjustment of young adult women. *Journal of Marriage and Family*, 73, 279–295. doi:10.1111/j.1741-3737.2010.00804.x.
- Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*. Chicago: University of Chicago Press.
- Bachman, J. G., O'Malley, P. M., Schulenberg, J. E., Johnston, L. D., Freedman-Doan, P., & Messersmith, E. E. (2008). *The education-drug use connection: How successes and failures in school relate to adolescent smoking, drinking, drug use, and delinquency*. New York: Lawrence Erlbaum Associates/Taylor & Francis.
- Bachman, J. G., Staff, J., O'Malley, P., Schulenberg, J. E., & Freedman-Doan, P. (2011). Student work intensity: New evidence on links to educational attainment and problem behaviors. *Developmental Psychology*, 47, 344–363.
- Bachman, J. G., Staff, J., O'Malley, P., & Freedman-Doan, P. (2013). Race-ethnicity and socioeconomic status moderate how student paid work intensity is related to scholastic performance and substance use. *Developmental Psychology*, 49, 2125–2134.
- Baker, D. P., Leon, J., Smith Greenaway, E. G., Collins, J., & Movit, M. (2011). The education effect on population health: A reassessment. *Population and Development Review*, 37, 307–332.
- Baker, D. P., Salinas, D., & Eslinger, P. J. (2012). An envisioned bridge: Schooling as a neurocognitive developmental institution. *Developmental Cognitive Neuroscience*, 2S, S6–S17.
- Bauldry, S., Shanahan, M. J., Boardman, J. D., Miech, R. A., & Macmillan, R. (2012). A life course model of self-rated health through adolescence and young adulthood. *Social Science & Medicine*, 75, 1311–1320.
- Baum, S., Ma, J., & Payea, K. (2010). *Education pays, 2010: The benefits of higher education for individuals and society*. Washington, DC: The College Board.
- Beckett, M. (2000). Converging health inequalities in later life—An artifact of mortality selection? *Journal of Health and Social Behavior*, 41, 106–109.
- Behrman, J. R., Kohler, H., Jensen, V. M., Pedersen, D., Petersen, I., Bingley, P., & Christensen, K. (2011). Does more schooling reduce hospitalization and delay mortality? New evidence based on Danish twins. *Demography*, 48, 1347–1375.
- Brand, J. E., & Xie, Y. (2010). Who benefits most from college? Evidence for negative selection in heterogeneous economic returns to higher education. *American Sociological Review*, 75(2), 273–302.
- Breen, R., & Salazar, L. (2011). Educational assortative mating and earnings inequality in the United States. *American Journal of Sociology*, 117, 808–843.
- Carter, A. C., Brandon, K. O., & Goldman, M. S. (2010). The college and noncollege experience: A review of the factors that influence drinking behavior in young adulthood. *Journal of Studies on Alcohol and Drugs*, 71, 742–750.
- Chen, P., & Jacobson, K. C. (2013). Longitudinal relationships between college education and patterns of heavy drinking: A comparison between Caucasians and African-Americans. *Journal of Adolescent Health*, 53, 356–362.
- Chen, C. M., Dufour, M. C., & Yi, H. (2004). Alcohol consumption among young adults ages 18–24 in the United States: Results from the 2001–2002 NESARC survey. *Alcohol Research & Health*, 28, 269–280.
- Côté, J. E., & Allahar, A. (2011). *Lowering higher education: The rise of corporate universities and the fall of liberal education*. Buffalo: University of Toronto Press.
- Crosnoe, R. (2007). Gender, obesity, and education. *Sociology of Education*, 80, 241–260.
- Crosnoe, R. (2011). *Fitting in, standing out: Navigating the social challenges of high school to get an education*. New York: Cambridge University Press.
- Cutler, D. M., & Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *Journal of Health Economics*, 29(1), 1–28. doi:10.1016/j.jhealeco.2009.10.003.
- Day, J. C., & Newburger, E. C. (2002). *The big payoff: educational attainment and synthetic estimates of work-life earnings* (Current population reports pp. 23–210). Washington, DC: U.S. Census Bureau U.S. Department of Commerce, Economics and Statistics Administration.
- Dupre, M. E. (2007). Educational differences in age-related patterns of disease: Reconsidering the cumulative disadvantage and age-as-leveler hypotheses. *Journal of Health and Social Behavior*, 48, 1–15.
- Eaton, D. K., Kann, L., Okoro, C. A., & Collins, J. (2007). Selected health status indicators and behaviors of young adults, United States—2003. *American Journal of Health Education*, 38, 66–75.
- Eide, E. R., & Showalter, M. H. (2011). Estimating the relation between health and education: What do we know and what do we need to know? *Economics of Education Review*, 30, 778–791.
- Elder, G. H. (1998). The life course and human development. In R. M. Lerner (Ed.), *Handbook of child psychology, volume 1: Theoretical models of human development* (pp. 939–991). New York: Wiley.
- Elder, G. H., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer Academic/Plenum Publishers.
- Farkas, G. (2011). Book review of academically adrift: Limited learning on college campuses, by R. Arum and J. Roksa. *American Journal of Sociology*, 117, 1000–1002.
- Fujiwara, T., & Kawachi, I. (2009). Is education causally related to better health? A twin fixed-effect study in the USA. *International Journal of Epidemiology*, 38, 1310–1322.

- George, L. K. (2003). Life course research: Achievements and potential. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 671–680). New York: Kluwer Academic/Plenum Publishers.
- Glied, S., & Lleras-Muney, A. (2008). Technological innovation and inequality in health. *Demography*, 45(3), 741–761.
- Goesling, B. (2007). The rising significance of education for health? *Social Forces*, 85, 1621–1644.
- Goldin, C. D., & Katz, L. F. (2008). *The race between technology and education*. Cambridge: Harvard.
- Goldstein, J. R., & Kenney, C. T. (2001). Marriage delayed or marriage forgone? New cohort forecasts of first marriage for U.S. women. *American Sociological Review*, 66(4), 506–519. doi:10.2307/3088920.
- Goyette, K. A. (2008). College for some to college for all: Social background, occupational expectations, and educational expectations over time. *Social Science Research*, 37(2), 461–484.
- Grusky, D. B., Western, B., & Wimer, C. (2011). *The great recession*. New York: Russell Sage.
- Haas, S. A., & Fosse, N. (2008). Health and the educational attainment of adolescents: Evidence from the NLSY97. *Journal of Health and Social Behavior*, 49(2), 178–192.
- Hayward, M. D., & Gorman, B. K. (2004). The long arm of childhood: The influence of early-life social conditions on men's mortality. *Demography*, 41, 87–107.
- Herd, P. (2006). Do functional health inequalities decrease in old age? Educational status and functional decline among the 1931–1941 birth cohort. *Research on Aging*, 28, 375–392.
- Herd, P. (2010). Education and health in late-life among high school graduates: Cognitive versus psychological aspects of human capital. *Journal of Health and Social Behavior*, 51(4), 478–496.
- Herd, P., Goesling, B., & House, J. S. (2007). Socioeconomic position and health: The differential effects of education versus income on the onset versus progression of health problems. *Journal of Health and Social Behavior*, 48, 223–238.
- House, J. S., Lepkowski, J. M., Kinney, A. M., Mero, R. P., Kessler, R. C., & Herzog, A. R. (1994). The social stratification of aging and health. *Journal of Health and Social Behavior*, 35, 213–234.
- Hout, M. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology*, 28, 327–400.
- Institute of Medicine. (2012). *How far have we come in reducing health disparities?: Progress since 2000: Workshop summary*. Washington, DC: The National Academies Press.
- Institute of Medicine. (2014). *Investing in the health and well-being of young adults*. Washington, DC: The National Academies Press.
- Jackson, M. I. (2009). Understanding links between adolescent health and educational attainment. *Demography*, 46, 671–694.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Miech, R. A. (2014a). *Monitoring the future national survey results on drug use, 1975–2013: Volume I, secondary school students*. Ann Arbor: Institute for Social Research, The University of Michigan.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Miech, R. A. (2014b). *Monitoring the future national survey results on drug use, 1975–2013: Volume 2, college students and adults ages 19–55*. Ann Arbor: Institute for Social Research, The University of Michigan.
- Kalleberg, A. L. (2011). *Good jobs, bad jobs: The rise of polarized and precarious employment systems in the United States, 1970s to 2000s*. New York: Russell Sage.
- Lanza, S. T., & Collins, L. M. (2006). A mixture model of discontinuous development in heavy drinking from ages 18 to 30: The role of college enrollment. *Journal of Studies on Alcohol*, 67(4), 552–561.
- Lauderdale, D. S. (2001). Education and survival: Birth cohort, period, and age effects. *Demography*, 36(4), 551–561.
- Leigh, J. P., & Dhir, R. (1997). Schooling and frailty among seniors. *Economics of Education Review*, 16, 45–57.
- Link, B. G., & Phelan, J. C. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, 35 (Extra Issue), 80–94.
- Link, B. G., Phelan, J. C., Miech, R., & Westin, E. L. (2008). The resources that matter: Fundamental social causes of health disparities and the challenge of intelligence. *Journal of Health and Social Behavior*, 49, 72–91.
- Liu, S. Y., Buka, S. L., Linkletter, C. D., Kawachi, I., Kubzansky, L., & Loucks, E. B. (2011). The association between blood pressure and years of schooling versus educational credentials: Test of the sheepskin effect. *Annals of Epidemiology*, 21, 128–138.
- Lynch, S. M. (2003). Cohort and life course patterns in the relationship between education and health: A hierarchical approach. *Demography*, 40(2), 309–331.
- Martin, S. P. (n.d.). *Growing evidence for a 'divorce divide'? Education and marital rates in the U.S. since the 1970s* (Working Paper). New York: Russell Sage Foundation.
- Masters, R. K., Hummer, R. A., & Powers, D. A. (2012). Educational differences in U.S. adult mortality: A cohort perspective. *American Sociological Review*, 77(4), 548–572.
- McLanahan, S. (2004). Diverging destinies: How children fare under the second demographic transition. *Demography*, 41, 607–627.
- Miech, R., Shanahan, M. J., Boardman, J., & Bauldry, S. (2015). The sequencing of a college degree during the transition to adulthood: Implications for obesity. *Journal of Health and Social Behavior*, 56(2), 281–95.

- Mirowsky, J., & Ross, C. E. (2003). *Education, social status, and health*. Hawthorne: Aldine de Gruyter.
- Mirowsky, J., & Ross, C. E. (2005). Education, cumulative advantage, and health. *Ageing International*, 30, 27–62.
- Mirowsky, J., & Ross, C. E. (2008). Education and self-rated health: Cumulative advantage and its rising importance. *Research on Aging*, 30, 93–122.
- Montez, J. K., Hummer, R. A., Hayward, M. D., Woo, H., & Rogers, R. G. (2011). Trends in the educational gradient of U.S. adult mortality from 1986 through 2006 by race, gender and age group. *Research on Aging*, 33, 145–171.
- Montez, J. K., Hummer, R. A., & Hayward, M. D. (2012). Educational attainment and adult mortality in the United States: A systematic analysis of functional form. *Demography*, 49, 315–336.
- Palloni, A. (2006). Reproducing inequalities: Luck, wallets, and the enduring effects of childhood health. *Demography*, 43, 587–615.
- Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic disparities in health behaviors. *Annual Review of Sociology*, 36, 349–370.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: Volume 2. A third decade of research*. San Francisco: Jossey Bass.
- Patrick, M. E., Wightman, P., Schoeni, R. F., & Schulenberg, J. E. (2012). Socioeconomic status and substance use among young adults: A comparison across constructs and drugs. *Journal of Studies on Alcohol and Drugs*, 73, 772–782.
- Patrick, M. E., Schulenberg, J. E., & O'Malley, P. M. (2013). High school substance use as a predictor of college attendance, completion, and dropout: a national multi-cohort longitudinal study. *Youth & Society*. NIHMSID528548. doi:10.1177/0044118x13508961
- Professor X. (2011). *In the basement of the Ivory Tower: Confessions of an accidental academic*. New York: Penguin.
- Qui, H., Bures, R., & Shehan, C. L. (2012). The inconsistent mediating effects of psychosocial work characteristics on the education-health relationship. *Social Science & Medicine*, 75, 1539–1546.
- Rosenbaum, J. E. (2011). The complexities of college for all: Beyond fairy-tale dreams. *Sociology of Education*, 84(2), 113–117.
- Rosenbaum, J. (2012). Degrees of health disparities: Health status disparities between young adults with high school diplomas, sub-Baccalaureate degrees, and Baccalaureate degrees. *Health Services and Outcomes Research Methodology*, 12(2), 156–168.
- Ross, C. E., & Mirowsky, J. (1999). Refining the association between education and health: The effects of quantity, credential, and selectivity. *Demography*, 36, 445–460.
- Ross, C. E., & Mirowsky, J. (2006). Sex differences in the effect of education on depression: Resource multiplication or resource substitution. *Social Science & Medicine*, 63, 1400–1413.
- Ross, C. E., & Mirowsky, J. (2010a). Why education is the key to socioeconomic differentials in health. In C. E. Bird, P. Conrad, A. M. Fremont, & S. Timmermans (Eds.), *The handbook of medical sociology*. Nashville: Vanderbilt University Press.
- Ross, C. E., & Mirowsky, J. (2010b). Gender and the health benefits of education. *The Sociological Quarterly*, 51, 1–19.
- Ross, C. E., & Mirowsky, J. (2011). The interaction of personal and parental education on health. *Social Science & Medicine*, 72, 521–599.
- Ross, C. E., & Wu, C. (1995). The links between education and health. *American Sociological Review*, 60, 719–745.
- Ross, C. E., Masters, R., & Hummer, R. A. (2012). Education and the gender gaps in health and mortality. *Demography*, 49, 1157–1183.
- Schafer, M. H., Wilkinson, L., & Ferraro, K. (2013). Childhood (mis)fortune, educational attainment, and adult health: Contingent benefits of a college degree. *Social Forces*, 93, 1007–1034.
- Scharoun-Lee, M., Gordon-Larsen, P., Adair, L. S., Popkin, B. M., Kaufmann, J. S., & Suchindran, C. M. (2011). Intergenerational profiles of socioeconomic disadvantage and obesity during the transition to adulthood. *Demography*, 48, 625–651.
- Schnittker, J. (2004). Education and the changing shape of the income gradient in health. *Journal of Health and Social Behavior*, 45, 286–305.
- Schulenberg, J. E. (2006). Understanding the multiple contexts of adolescent risky behavior and positive development: Advances and future directions. *Applied Developmental Science*, 10, 107–113.
- Schulenberg, J. E., & Maggs, J. L. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol. Supplement*, 14, 54–70.
- Schulenberg, J. E., & Patrick, M. E. (2012). Historical and developmental patterns of alcohol and drug use among college students: Framing the problem. In H. R. White & D. Rabiner (Eds.), *College drinking and drug use* (pp. 13–35). New York: Guilford.
- Schulenberg, J., O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (2005). Early adult transitions and their relation to well-being and substance use. In R. A. Settersten, F. F. Furstenberg, & R. G. Rumbaut (Eds.), *On the frontier of adulthood: Theory, research, and public policy* (pp. 417–453). Chicago: University of Chicago Press.
- Siennick, S. E., & Staff, J. (2008). Explaining the educational deficits of delinquent youths. *Criminology*, 46, 609–636.
- Snyder, T. D., & Dillow, S. A. (2012). *Digest of education statistics 2011 (NCES 2012–001)*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

- Staff, J., Schulenberg, J. E., Maslowsky, J., Bachman, J. G., O'Malley, P. M., Maggs, J. L., & Johnston, L. D. (2010). Substance use changes and social role transitions: Proximal developmental effects on ongoing trajectories from late adolescence through early adulthood. *Development and Psychopathology, 22*, 917–932.
- Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior, 35*, 53–79.
- Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior, 52*, 145–161.
- Vuolo, M., Staff, J., & Mortimer, J. T. (2012). Weathering the great recession: Psychological and behavioral trajectories in the transition from school to work. *Developmental Psychology, 48*, 1759–1773.
- Wheaton, B., & Clarke, P. (2003). Space meets time: Integrating temporal and contextual influences on mental health in early adulthood. *American Sociological Review, 68*, 680–706.
- White, H., McMorris, B. J., Catalano, R. F., Fleming, C. B., Haggerty, K. P., & Abbott, R. D. (2006). Increases in alcohol and marijuana use during the transition out of high school into emerging adulthood: The effects of leaving home, going to college, and high school protective factors. *Journal of Studies on Alcohol, 67*, 810–822.
- Woolf, S. H., & Aron, L. (2013). *U.S. health in international perspective: Shorter lives, poorer health*. Washington, DC: National Academies Press.
- Yang, Y. (2008). Social inequalities in happiness in the United States, 1972–2004: An age-period-cohort analysis. *American Sociological Review, 73*, 204–226.
- Zajacova, A., Rogers, R. G., & Johnson-Lawrence, V. (2012). Glitch in the gradient: Additional education does not uniformly equal better health. *Social Science & Medicine, 75*(11), 2007–2012. doi:10.1016/j.socscimed.2012.07.036.
- Zheng, H., Yang, Y., & Land, K. C. (2011). Variance function regression in hierarchical age-period-cohort models: Applications to the study of self-reported health. *American Sociological Review, 76*(6), 955–983.

Life Course Lens on Aging and Health

Kenneth F. Ferraro

1 Introduction

A lens is a transparent object used to help form an image of something. Humans with 20-20 vision have optimal visual function for everyday life, but many humans rely on glasses or contact lenses to enhance their visual function. Even with corrective lenses, however, there are untold phenomena that remain undetectable to the human eye. Thus, we turn to telescopes, microscopes, or an “imaging” device to help us to capture images that were previously undetected. Use the appropriate lens and a new world appears, whether in outer space or within the cell. Indeed, imaging devices are transforming science in remarkable ways. The same can be said of the scientific study of aging and health. How we form our images of what it means to grow older is essential to our understanding of concepts such as normal aging, public health, and health inequality.

There are many lenses that can be used to observe the myriad changes in health as one grows older. A medical lens emphasizes geriatric syndromes and has long held sway in the study of aging and health. Other valuable lenses, however,

have emerged in recent decades. Chief among them is a *life course lens*—a perspective or way of thinking that has spawned the development of new theories and methods to analyze the aging process and the health changes that accompany it (Cain 1964; Elder 1974). Although many scholars find the medical lens with its focus on geriatric syndromes to be very helpful, scholars from a variety of fields are turning to the life course lens. Indeed, it could be argued that within some fields, the life course lens is emerging as one of the most useful ways to study health during adulthood and later life. Instead of a focus on the health problems of later life, the life course lens emphasizes the long-term antecedents of both survival and the health status of the survivors. By adopting this lens to study aging and health, scientists from multiple disciplines including sociologists, epidemiologists, economists, and psychologists, have deposited breakthrough discoveries in the vault of knowledge about aging and health. Indeed, the application of the life course lens has helped to transform our knowledge of the intersection of aging and health.

The purposes of this chapter are to critically evaluate why the life course lens has been widely adopted for studying aging and health and to review how it has aided our understanding of health dynamics. Doing so enables one to (a) evaluate the degree to which the life course lens is challenging long-held views of aging and

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health and (b) suggest theoretical and methodological avenues for future application.

2 What Do We Mean by Aging?

Other chapters in this volume apply a life course lens to the study of health during adolescence and mid-life, which could also be characterized as the study of “aging and health.” Thus, it may be useful to briefly clarify what is meant in this chapter by the term *aging*. Some definitions are tightly linked to *chronological aging*: to age is to change with the passage of time, as reflected in birthdays. Infants age, adolescents age, and older people age. The value of this definition lies in its universality, but that can also be a limitation. Aging reduces to chronological aging, an essential concept for our endeavor, but one that fails to convey what interests most scholars when studying what it means to grow older.

Gerontology and geriatrics systematically examine senescence or the process of gradual declines in function. Given the attention to deterioration in function, and its accompanying greater risk for mortality, one can conceptualize *biological aging* as the rate of such decline. Biological aging affects all members of a species, not just those afflicted by disease. Juxtaposing chronological aging with biological aging provides a vantage point for identifying the factors that accelerate or decelerate the pace of aging. Scholars refer to “accelerated aging” or “weathering” as *premature* declines in physiological status and function, typically assessed by earlier declines than those experienced in the population (Geronimus et al. 2010). Identifying the factors that lead to deviations from average decline provides essential information for detecting a weathering effect and developing effective interventions to slow the processes of senescence.

The reference in this chapter to *aging and health* is intended to focus attention on adult health outcomes while recognizing their early antecedents. Drawing from the biological sciences, it can be argued that “reproduction is a fulcrum for defining life course trajectories and population aging” (Ferraro and Shippee 2009, p. 337). In many biological studies of organisms,

especially by evolutionary biologists, there are three basic life stages: pre-reproductive, reproductive, and post-reproductive. What we think of as aging is qualitatively different in these three stages. It could be argued that the field of geriatrics focuses on post-reproductive aging.

The three stages convey fundamental differences in how the organism is changing over time but do not imply they are tightly tethered to chronological age. By surviving, a child accumulates time from the date of birth (we celebrate anniversaries of the birth date), but biological, psychological, and social changes during childhood are quite distinct from those occurring during the reproductive or post-reproductive periods. Although the focus of gerontology has been adaptation during the last stage, there is a rapidly developing body of research revealing vital links between the pre- and the post-reproductive periods.

Using a life course lens, therefore, is inconsistent with an exclusive focus on post-reproductive aging. Essential to the life course lens is recognizing the interrelatedness of various life stages and the resulting continuities and discontinuities that are apparent from the long view of growing older (see also chapter by “Does the Body Forget? Adult Health, Life Course Dynamics, and Social Change” Hayward and Sheehan, this volume). At its core, the life course lens provides a view of the entire period of time from conception to death (Ferraro 2011; Kuh and Ben-Shlomo 1997). In this sense, the study of aging using a life course lens is more closely linked to family medicine than to geriatrics (Daaleman and Elder 2007). As a result, the term aging is used herein to focus on adulthood, especially the post-reproductive period, while acknowledging its interrelatedness to both the pre-reproductive stage and the reproductive stage.

Moreover, the use of life stages in this chapter is distinct from many stage depictions. A *strict-stage approach* to aging reifies the periods of the life course and looks for solutions to many later-life health problems within the post-reproductive period, typically uncovering proximal causes. A strict-stage approach gives priority to periods of the life course, presuming that most people proceed through the stages in a similar sequence and

often at predictable ages. What may be considered a *soft-stage approach* to aging, by contrast, emphasizes the interrelatedness of the stages albeit with detailed examination of outcomes measured in later life. In short, a soft-stage approach acknowledges qualitative differences in the three basic stages, many of which are biologically driven, but the interrelatedness of the three stages and the environmental processes that shape the biological processes. In this chapter, I use a soft-stage approach to focus on the early origins of adult health outcomes. Although there remains profound interest in the study of later (post-reproductive) life, it is counterbalanced by interest in the long-term antecedents of health status in the later years.

3 Sources of Evidence for Research on Aging and Health

3.1 Age Contrasts: Types and Meaning of Age Differences

Many scholars of aging and health make use of age contrasts to study the processes involved with growing older. Commonly used experimental designs entail studying age contrasts such as young people (18–25 year olds, frequently college students), middle-age persons (40–49), and older people (65 and older). Whether used in psychology, hearing science, or toxicology, the goal is to identify age differences in levels of functioning or some phenomenon under investigation (Abdala et al. 2014). This may be a wholly acceptable design for some research questions, but its limitations are substantial.

First, the purported “age differences” are confounded with cohort differences. Failure to account for cohort differences, reflecting historical context, entails an assumption that differences in functioning (or the outcome under study) between persons 18 and 25 years old and those in middle or older categories are untainted by social change. Historical context is very important to many outcomes of interest, but external validity may be threatened by age-contrast studies that

assume that historical context is not consequential to the outcome. Second, the age differences described above are actually contrasts across noncontiguous age categories. The gaps between the three age groups are presumed to be inconsequential to the outcome or simply reflected in the midpoint of estimates between the two closest categories. This assumption is also a threat to external validity because it presumes that age and cohort differences are linear. Disordered cohort flow, resulting from variations in fertility (e.g., Baby Boom), means that a linear assumption is probably unwarranted. Cross-sectional studies of a survey sample also confound age and cohort, but the typical age range enables one to at least compare contiguous age groups.

A related research approach, with even stronger assumptions, is the extreme-contrast design for assessing “age differences” (Getzmann et al. 2015). Why even bother with the middle-age group if one is truly interested in contrasts between young—presumably healthy—adults and older adults? Why not just compare persons 18–25 to those who are age 65 and older? The two problems associated with the three-category age contrast are exacerbated in the extreme-contrast design. The engines of health change over time (see also chapter by “[Does the Body Forget? Adult Health, Life Course Dynamics, and Social Change](#)” Hayward and Sheehan, this volume). Whether considering water fluoridation, consumption of unsaturated fats, or noise exposure, there are major social trends that influence health and health behavior. Extreme-contrast designs make ferreting out the influence of such social trends exceedingly difficult. As such, it is convenient to assume that they are trivial. In the process, one misses social and historical forces that are essential to the life course lens and may actually be the keys to health improvement.

3.2 Longitudinal Study of Aging and Health

By contrast, the life course lens values historical context, seeks to explicate cohort variability, and questions assumptions of linear age or cohort differences. As a result, emphasis is given to

longitudinal formulations of data. Again, cross-sectional studies may be wholly appropriate for some research questions, but most research questions focused on *aging* and health require more than associations between point estimates of phenomena. Integrating some type of longitudinal or temporally-sequenced data is critical for opening vistas of understanding regarding how health status *changes* as one grows older.

The most commonly-used designs involve repeated measures, and a growing number of these studies involve many follow-ups over fairly long time periods. Indeed, several large longitudinal surveys of representative samples now provide exceptional data for studying aging and health. The net effect is that the study of aging and health has catapulted during the past four decades from a field reliant on age differences in health to observed changes in health. Some studies have had fairly short windows of assessing change in repeated measures, but the trend toward the analysis of rich longitudinal data has been in effect for years and will probably accelerate (Ferraro and Kelley-Moore 2003a). Both the length of time participants are studied and the number of measurement occasions are rising in studies such as the Health and Retirement Study, National Longitudinal Study of Adolescent Health, and Panel Study of Income Dynamics. These large probability surveys are enabling investigators to make unparalleled observations about how health changes during adulthood—and the health inequalities that emerge over the life course (e.g., McDade et al. 2014; Shuey and Willson 2014).

There has also been growing interest in asking retrospective questions to incorporate experiences from childhood. As discussed below, there are studies tracking people from birth to later life, but representative samples are largely limited to European studies (e.g., Järvelin et al. 2004; Wadsworth et al. 2006). Catching the wave of life course epidemiology, however, many U.S. studies have included questions probing childhood health, socioeconomic status (SES), and misfortune. There is measurement error in all procedures asking respondents for information, but research during the past decade has probed

potential bias derived from retrospective questions (Alwin 2007). For persons of advanced age, there are salient concerns about recall accuracy, but this is minimized by effective question wording (Henkel 2014; Schryer and Ross 2014) and adjusting estimates for respondent attributes that have been shown to influence reporting: adult self-rated health, psychological disorder, and SES (Vuolo et al. 2014). Although long-term prospective studies are the gold standard for studying aging and health, information from retrospective questions is having a demonstrable impact on the study of aging and inequalities in health, especially when coupled with a prospective study.

3.3 Contributions from the Long-Term Study of Aging and Health

There are at least three main vantage points for the long-term study of aging and health, and each approach has generated a vibrant research literature: centenarians, early origins, and family lineage. The life course lens can be used to clarify many processes related to aging and health, but its application is distinct based on the vantage point.

3.3.1 Centenarians: The Remarkable Rearview Mirror

There are no studies of which I am aware that were designed to prospectively study centenarians from the day of birth to 100 years. The practical challenges of such a study are obvious; thus, investigators do the opposite: they study people who have lived to 100 (or perhaps 95), chronicling their lives, summarizing their exposures and, if possible, integrating vital or health records. Centenarian studies frequently capitalize on a mixture of retrospective and prospective data, but sampling persons 100 years old means that the prospective tracking is relatively limited. Instead, the emphasis in centenarian studies is documenting the validity of reported age, capturing notable life events and transitions, and measuring current characteristics of the phenotype at

age 100 or more. The overall approach, therefore, is a rearview mirror.

The Okinawan Centenarian Study begun in 1975 is the longest-running investigation of its type, and many other centenarian studies have appeared since then, including U.S. studies in New England (Perls and Silver 1999) and Georgia (Cho et al. 2012), as well as a host of studies across the globe (e.g., Heidelberg, Southern Italy, Sweden, and Tokyo).

Beyond their remarkable similarity—that of reaching 100—centenarians are a diverse lot. In the New England Centenarian Study, the investigators identified three basic categories: *escaper* (people who reach 100 without any major disease or illness: 13 % of the sample); *delayer* (major disease onset at age 80 or later: 45 %); and *survivor* (major disease onset before age 80: 42 %) (Perls and Silver 1999; Sebastiani and Perls 2012).

Although one might hypothesize that leading an advantaged life should increase the odds of living to 100, Stathakos et al. (2005, p. 514) reported that Greek centenarians “have experienced special hardships at some point of their lives, extending from poverty and starvation (mostly during war) to participation in battles, captivity, or exile.” Buettner (2012, p. 193) similarly reported that many long-lived persons experienced “hard times” and remarked that in Costa Rica “an early life of hardship had tempered” men to embrace physically demanding work and deal with life challenges. The evidence from these studies is not derived from a prospective or control-group design, but perhaps there is something about *overcoming* misfortune that is associated with exceptional longevity. Regardless of their life circumstances, scholars agree that “adaptation to the challenges of aging is also a key protective factor for healthy aging and longevity” (Willcox et al. 2010, p. 2).

Tracing the life course of centenarians has yet to reveal any magic bullets for exceptional longevity. No single factor such as diet, physical activity, water consumption, mental outlook, or genes satisfactorily explains who lives to 100 nor the health variability among centenarians. Rather, the literature points to multiple factors operating

together to extend longevity and enhance health in adulthood. Genes are indispensable to the calculus of longevity, especially because there is growing evidence that centenarians are more likely to be nested within long-lived families, but the life course circumscribes the exposures and choices known to influence health.

3.3.2 Early Origins: Tracking the Way We Age

Although the rearview mirror approach has yielded far-reaching findings about aging and health, a different genre of research—the early origins approach—has delivered unprecedented insights into life course health. Instead of relying on a reconstruction of the life course from retrospective data, long-term tracking of human lives has opened a window for studying health over large periods of time. To begin, it altered a widely-held definition of the life course.

For decades, gerontologists exhorted others to examine the entire life—from birth to death—but research in recent decades has led to a revision: from conception to death.

There is a rapidly growing body of research examining the early origins of adult health, and this line of inquiry has been stimulated by the work of Barker (1997, 2001) on the *fetal* origins of adult health (see also chapter by “Mental Health” Avison, this volume). Thus, the range of life course analyses has been extended in contemporary epidemiology because it also covers gestation. Indeed, Barker’s research revealed that multiple health problems, which emerged during adulthood, actually originated in the womb. Low birth weight, which often reflects some type of negative prenatal exposure such as fetal malnutrition, has been shown to predict a host of maladies in middle and later life such as insulin resistance, cardiovascular disease, and lung cancer (e.g., Barker 1997; Barker et al. 2002; Eriksson et al. 2010). This research program has grown, especially in England and Finland, via clever record linkage of middle- and older-age persons to their birth records and body measurements during infancy (some studies also capitalized on records of mother’s height and weight and/or father’s occupation). And some of these

studies augmented the life course data by splicing in hospital records (e.g., Finland maintains national registers of hospital discharges by cause; Barker et al. 2002). Findings from this line of inquiry have been transformative on the study of aging and health.

Even more impressive in terms of research design are long-term studies of the life course that were structured to track one or more birth cohorts over decades. One exemplar is the British National Survey of Health and Development (NSHD), which capitalized on a maternity study to track all births during 1 week in March 1946. This means that the NSHD has data on individuals from gestation to about 70 years—a treasure for applying the life course lens to health (Wadsworth et al. 2006). Another birth cohort study, tracking persons born in northern Finland during 1966 also reveals that birth weight and infant growth are associated with the risk of multiple diseases during middle age (Järvelin et al. 2004).

Most studies from the United States and Canada rely on surveys of adults with retrospective questions to tap experiences during childhood or adolescence (Felitti et al. 1998) or retrospective questions posed to the mothers of research subjects for information on infancy (birthweight, breastfeeding; McDade et al. 2014). A notable exception is the Berkeley Guidance study that sampled 248 infants in 1928–1929 and followed them for 70 years, but the sample was small and restricted to mostly White middle-class families in California (Wink et al. 2007).

Although current U.S. studies cannot match the duration of prospective design available in the British NSHD, multiple prospective studies of adolescents or adults are providing scholars with data that answer important questions about exposures that are related to life course health. These studies include, but are not limited to, Americans' Changing Lives, Health and Retirement Study, National Longitudinal Studies, National Survey of Midlife Development in the United States, Project Talent, and Wisconsin Longitudinal Study.

Tremendous interest has been shown in parental SES, generally revealing that it is inversely

related to a host of adult risks, including adult cardiovascular disease, depression, chronic pain, and mortality (Cohen et al. 2010; Goosby 2013; O'Rand and Hamil-Luker 2005; Pudrovska and Anikputa 2014; Schafer et al. 2013). Childhood health has also received attention, generally revealing life course continuity: poor health during childhood heightens the risk of poor health in adulthood and later life (Blackwell et al. 2001; Case and Paxson 2011; Latham 2014). Although acquired immunity occurs for some infectious diseases, there are relatively few studies that find evidence for it affecting chronic disease risk.

Researchers have systematically studied whether various types of negative exposures, referred to as misfortune or adversity, influence health status in later life—and the picture is daunting. Dozens of studies reveal the long-term consequences of child abuse on multiple diseases during adulthood including, but not limited to, cancer (Felitti et al. 1998; Fuller-Thomson and Brennenstuhl 2009; Morton et al. 2012), hypertension (Stein et al. 2010), myocardial infarction (heart attack) (Morton et al. 2014; O'Rand and Hamil-Luker 2005), ulcers (Springer 2009), and mental distress (Edwards et al. 2003). Beyond child abuse per se, there is growing evidence that being raised in a risky family is associated with a host of physical and mental health problems (Brown et al. 2009a, 2010; Nock and Kessler 2006; Repetti et al. 2002; Schafer and Ferraro 2012; Williamson et al. 2002).

Although there are studies reporting no relationship between noxious exposures during childhood and adult health (e.g., Korpimäki et al. 2010), most of the published studies show notable links. The emergent research questions for the next decade, therefore, include: (1) What are the most consequential types of misfortune influencing adult health? (2) Are the presumed health consequences of negative life exposures inexorable? (3) What psychosocial resources enable people to blunt or compensate for the negative exposures? (4) What biological mechanisms are involved in how these negative exposures influence adult health?

Vincent Felitti (2002, p. 44), a physician researcher and lead investigator of the Adverse

Childhood Experiences Study of enrollees in the Kaiser Health Plan in San Diego summarized the extant findings by concluding that:

Our findings are of direct importance to the everyday practice of medicine and psychiatry because they indicate that much of what is recognized as common in adult medicine is the result of what is not recognized in childhood.

3.3.3 Family Lineage: Intergenerational Health

The first two approaches for studying aging and health provide glimpses of the third approach. Felitti's claim above, for instance, emphasizes the role of families and households in setting distinct paths for adolescent and adult development—and the health consequences of early exposures, whether positive or negative. And with centenarians, there is the recognition that longevity is nested within families. Indeed, a proposition of cumulative inequality theory identifies the central role of family lineage on health and functioning: “Influenced by genes and environment, family lineage is critical to status differentiation early in the life course” (Ferraro and Shippee 2009, p. 337).

There are different literatures that bring into focus the influence of family lineage on aging and health. First, whereas parents endow their children with both traits and experiences that shape their life chances, many studies search for a common genetic source of health risks. Although scholars may debate the relative influences of nature, nurture, and the combination of the two, there is no denying the genetic origins of many physical and mental diseases, cognitive ability, and behaviors. In this sense, not only is there a genetic component to the diseases that compromise health, but also the health-risk behaviors that lead to or reinforce poor health (Corcoran 1995; Shanahan and Hofer 2005; Wickrama et al. 1999, 2005). Both behavioral genetics studies of twins (in search of shared genetic and environmental overlap) and studies of how specific alleles are related to behavior and health risks are helping to explicate the role of environmental contingencies shaping exposures and how such exposures combine with genetics

to influence health, sometimes described as stress-diathesis processes (Johnson and Krueger 2005a, b; Shanahan et al. 2008).

Second, although lacking information on genetics per se, there is growing interest in studying linked lives within families. Most of these studies either purposively study multiple family members over one or more generations (Fingerman et al. 2012) or tap linked lives via retrospective questions on parental characteristics (Quesnel-Vallée and Taylor 2012). Other studies of family lineage merge related data sets or components of a large study such as the Panel Study of Income Dynamics (e.g., Davis et al. 2008). These types of studies are not only adding to the stock of knowledge on parental influence but also to the reciprocal influence between grandparents and grandchildren. Examples include how grandparents' SES (including investment in college savings plans) may influence the status attainment of grandchildren and how raising a grandchild influences health and financial well-being of grandparents (see respectively, Jæger 2012; Hayslip et al. 2015).

Finally, any discussion of how family lineage is central to studying aging and health also needs to consider the well-established fact that parental SES is an important influence on one's SES. Although there is clearly intergenerational mobility, there is considerable continuity in SES across generations. And since family-of-origin SES is related to health, the intergenerational transmission of SES is a contributing factor to the intergenerational transmission of health. As such, studies of the influence of family lineage on health need to adjust adequately for SES. Failure to do so may lead to overestimating the influence of other factors relative to SES. This literature reveals that there are independent effects of SES on health, but also that childhood health, nutrition, and schooling partially mediate the SES relationship across generations (Carvalho 2012).

3.3.4 Three Vantage Points for the Study of Aging and Health

After a brief review of these three vantage points, it may be helpful to integrate and graphically

summarize these three positions for viewing aging and health. A lens enables one to see something more clearly, but photography or magnetic resonance imaging is very dependent upon the vantage point. I depict the three vantage points in Fig. 1. In the top section of the diagram, labeled Generation 1, the first isosceles triangle is labeled A, which represents the field of vision for studying centenarians. Viewing from the right side of the diagram (vertex with the smallest-degree angle), one assumes the vantage point of age 100 or older to gaze back on the life course. By contrast, B moves the vantage point to the left side of the diagram and represents the early origins study of life course; one begins as early as gestation, birth, or childhood and looks forward to prospectively track the life course. The idea is that the same person can be studied retrospectively or prospectively, and one would no doubt ask distinct questions when trying to uncover the antecedents of health and functioning from two vantage points. Of course, only a small fraction of humans become centenarians, but one could theoretically modify the vantage points on the x-axis to suit the age range under consideration.

The lower half of Fig. 1 replicates these two vantage points (A and B) but the triangles and vantage points are shifted to the right on the historical time axis to depict a second generation. C, which crosses over Generations 1 and 2, represents the family lineage approach where at a given point in time, one can examine health across generations. We know that family medical history is important to predict the health of subsequent generations, and scholars have begun to integrate multiple generations to examine disease risk, functioning, and longevity. Studies implementing a family-lineage approach open up new ways to study not only genetic influences but also shared environments and the influence of SES across generations.

Figure 1 is intended to summarize the three vantage points, each of which is extremely valuable, and foster conversation about integrating them in future research. Additional generations may be added to enrich the study of family health while attending to social change on the historical axis. The figure may also suggest the utility of

prospectively studying the grandchildren or great-grandchildren of centenarians.

4 Compression of Morbidity?

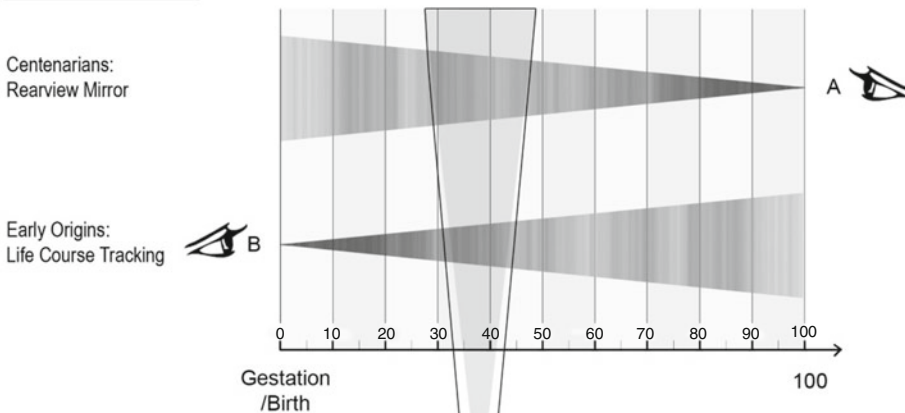
One of the major issues confronting scholars of aging during the past three decades has focused on the consequences of the public health success referred to as population aging. It is source of great satisfaction that many societies are seeing a rise in life expectancy, largely spurred by improvements in nutrition and public hygiene as well as reduced fertility. Although population aging is a remarkable success, it also raises questions about what this means for the quality of later life. How might we describe the years that are being added to life expectancy? Is it an addition of years of healthy life, perhaps disability-free aging? Or might the aging of the population usher in more years of life constrained by morbidity and disability?

These questions prompted Fries (1980) to proffer the idea of a compression of morbidity, in which he envisioned a delay in the onset of chronic disease, enabling many people to live a larger proportion of their lives free from disease and disability. Sociological study of the compression of morbidity has given fairly limited attention to disease onset but warmly embraced efforts to examine whether disability has been compressed.

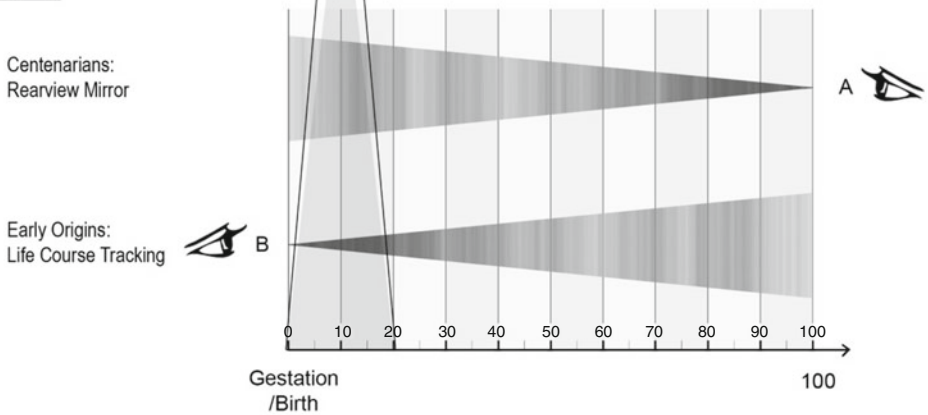
Two studies of disability were especially influential in shaping the field and discussions of the compression of morbidity. First, Verbrugge and Jette (1994) described a disablement process, by which diseases—as diverse as arthritis, cancer, diabetes, emphysema, and hypertension—led to functional disability. For older people, the expectation was that the disablement process had a strong pull. Although not universal, the disablement process, once begun, offers only a modicum of hope to escape it. Many presumed that the task is to minimize or stall the decline in functional ability. The authors identified factors that might “speed or slow disablement,” with little attention given to reversing the process (Verbrugge and Jette 1994, p. 1).

A finding about reversing the disablement process, however, emerged about the same

Generation 1



Generation 2



Historical Time →

Fig. 1 Three vantage points for the study of aging and health: *A* Centenarians, *B* Early origins, and *C* Family lineage

time. Manton et al. (1993, p. S194) reported that disability actually *declined* among “chronically disabled community-dwelling and institutionalized elderly populations.” Many scholars challenged this finding, which was based on analyses of the National Long-Term Care Survey, and attempted replication. To date, the findings are mixed, with some studies reporting partial support, especially among the oldest members of the population (Crimmins et al. 2009; Freedman et al. 2004; Manton et al. 2008; Martin et al. 2009).

4.1 Interpreting the Evidence

Although efforts to replicate these findings continue, three conclusions are apparent from the extant literature. First, there is now considerable evidence—from studies of both individual- and cohort-change—that disability among older adults, measured via activities of daily living (ADL), declined during the mid-1980s to 2000 (Freedman et al. 2004; Manton 2008). Second, more recent evidence reveals that the trend of a disability decline has stalled since 2000 and is

unlikely to resume because “adults poised to enter late life over the next decade” have slightly higher rates of activity limitations (Freedman et al. 2013:669). Third, whereas ADL disability taps whether or not a person is functionally capable of independent living, there are many implications of this finding for projecting the future of aging and health. The way in which disability was measured focused on more advanced forms of disability, and some surveys actually limited their samples to persons who were screened to have some disability (e.g., components of the National Long Term Care Survey). The reported decline in disability, although important, needs to be interpreted as a short-term trend among persons who previously reported some ADL disability. In other words, the decline was a real; but it was temporary and a proverbial tip of the iceberg in the study of disability among adults (Verbrugge 1986).

So has a compression of *morbidity* occurred? Can we expect more years of active life expectancy? Will the life course two decades from now have a similar period of morbidity and disability or will it be further compressed? Answers to these questions are challenging scholars of aging and health to interpret the extant data in light of recent trends.

In a follow-up essay about three decades after the provocative idea, Fries understandably argued that a compression of morbidity had occurred (Fries et al. 2011). Although his 1980 article focused on the compression of morbidity (i.e., disease), Fries et al. (2011) subsequently enlarged the definition of morbidity to include disability. Classical epidemiology holds that morbidity refers to disease and that disability refers to an inability in physical function. Thus, simply changing the definition of morbidity to include disability seems to be a strained approach to interpreting the evidence.

4.2 Informing Future Projections of Compression of Morbidity

Crimmins and Beltrán-Sánchez (2011) argued for a more nuanced view of what has happened

and what will likely happen when one considers the health consequences of the rise in life expectancy. They convincingly outlined how there are inklings of a compression of morbidity on some diseases or conditions. Examples include a recent decline in rates of myocardial infarction as well as an increase in survivorship after a heart attack. A decline in some types of cancer incidence has also been observed recently, and cancer survival continues to rise. On the other hand, the prevalence of diabetes, arthritis, and some types of cancer (e.g., liver) has risen in recent years—evidence that is counter to the claims of a compression of morbidity. Perhaps the correct answer is that a compression of morbidity has been observed in the U.S. on some diseases but not on others. Regardless, it seems that survival after disease onset has improved, consistent with a compression of *disability* interpretation.

This pattern of findings also led Crimmins and Beltrán-Sánchez (2011) to offer some further interpretation. First, “diseases are both less lethal and less disabling; they have become more chronic but perhaps less progressive” (p. 82). It could be argued that we are better at medicating people with various diseases to keep them functioning with their conditions. Second, they contend that what we are witnessing is not that people are less likely to get a disease but that people are better at living with each disease, thereby aiding longevity. As a result, they argue that there is little evidence that a compression of *morbidity* has occurred.

The fact that both the prevalence and incidence of diabetes continues to rise is also indicative of another trend of epic proportions: the increased prevalence of obesity. There is ample evidence to expect that an increasing number of older people in developed nations will be able to maintain their physical function. At the same time, this buoyant view of the later years may be tempered by the rising prevalence of obesity. Many scholars contend that the growing rate of obesity may well halt any further compression of morbidity (Manton 2008). The rising prevalence of obesity, and severe obesity, is yielding an epidemic of diabetes mellitus (Ogden et al. 2006). Given that obesity is a potent risk factor for

disability (Ferraro and Kelley-Moore 2003b), the increase in the prevalence of obesity over the past 30 years may compromise further improvements in population health, even those related to maintaining physical function. Unfortunately, the most recent evidence shows that prevalence of both childhood and adult obesity has not abated, suggesting little relief regarding this ominous trend (Ogden et al. 2014).

5 Advancing Life Course Research on Aging and Health

Although we have learned much in recent decades about life course health, there are so many important research questions that merit sober scientific consideration, both theoretically and empirically. In an effort to advance this genre of research—and apply the life course lens—I articulate several areas of inquiry that hold great promise for understanding aging and health as well as laying the foundation for effective interventions to improve public health in adulthood and later life.

5.1 Cumulative Inequality in Health

It is noteworthy in many respects that the term *inequality* has entered more widely into the public lexicon in recent years. No doubt research on the social gradient in health has played a role in this popularity. There has been growing interest in how inequality influences health, sparked by studies examining the relationship between SES and health (House et al. 1990; Link and Phelan 1995; Link et al. 2008; Marmot 2005; Marmot et al. 1991).

What is distinctive in recent scholarship on the topic, however, is the integration of the life course lens to transform the study of the social gradient in health from one focused on social status at a given time to more dynamic models of social hierarchies and health. Research questions now include: How do status hierarchies early in life influence social status and health in later life?

Are health trajectories influenced by parental status and health? Do changing status hierarchies modulate health trajectories? Interest has grown in theoretical articulation of these relationships as manifest in cumulative inequality theory (Ferraro and Shippee 2009; Schafer et al. 2011) and efforts to link stress process theory to the life course lens (Pearlin 1989, 2010). Persons of low SES generally have greater lifetime exposure to a variety of risks that may compromise health. Given that SES shapes the life course from conception to death, many investigators seek to splice together long-term exposures to socioeconomic stressors and evaluate the potential health consequences (e.g., Lynch et al. 1997; Shippee et al. 2012). Most of this research is informed by a soft-stage approach to aging, revealing continuity and change in both status hierarchies and health, not just how SES is related to health at one period of life.

At the same time, interest in multi-level models has grown exponentially (Bollen and Curran 2006; Singer and Willett 2003). These types of statistical procedures are useful for elegantly analyzing large data arrays of the life course. Rich data from detailed and long-term studies of the life course provide exceptional opportunities for studying how health inequality develops over time. Yet, investigators seek parsimony in representing the life course. The response of many scholars has been to embrace multi-level models for trajectory analyses, including parallel trajectories. Using such methods means that one may simultaneously track changes in social status and changes in health and functioning. The life course lens leads one to consider related trajectories, and these and other statistical procedures have empowered investigators to see important continuities and discontinuities in the life course (Lynch 2003).

Cumulative inequality theory also calls attention to selection processes, most notably mortality and non-response attrition, when studying trajectories. According to Ferraro et al. (2009, p. 428), “the premature mortality associated with accumulated risks—selective survival—will result in *compositional change to a population*. Cohorts shrink in a nonrandom manner;”

sometimes reducing population heterogeneity. If selection is not accounted for when modeling the relationships between status hierarchies and health, it is possible that conclusions may be misdirected by what appears to be decreasing inequality over time. Thus, trajectory analyses, which capitalize on impressive data arrays of the life course, also need to ask how selection may influence the findings and conclusions. Persons with high levels of stress exposure (e.g., forced to relocate due to financial strain) and/or many health problems may be more difficult to recruit into surveys but also more likely to retain in long-term longitudinal follow-ups. They are important for accurately characterizing cumulative inequality in a sample, and our analytic methods need to test for these forms of selection.

5.2 Biomarkers for Early Detection and Pathway Specificity

A second approach to studying aging and health that has received considerable attention in the past decade involves the integration of biomarkers (or biomeasures) into social science research. Family lineage approaches to studying aging and health, including behavioral genetics and genome-wide association studies (GWAS), have integrated genetic information into the study of aging and health, but life course epidemiology is also tapping a wide array of other biological markers that reflect *current* physiological condition. Many biomarkers can be collected in a minimally-invasive way from blood (lancet prick), saliva, or toenail clippings. Of course, these sources can also be used to identify DNA and epigenetics (methylation of DNA), but the study of aging and health has gravitated to those biomarkers that are sensitive to the body's *response* to stimuli (e.g., cortisol, alpha amylase, C-reactive protein).

In the process, we learn more about how the person responds and adapts to exposures, whether positive or negative. The underlying premise is that biological systems are responsive to the effects of context, and we will learn more about

the aging *process* by integrating this type of information into behavioral and social science studies. Studying biomarkers also may reveal psychosomatic pathways in the response to stressors (Seplaki et al. 2004).

The use of biomarkers is especially useful to life course scholars because it can reveal some aspects of the rate of biological aging and dysregulated patterns of stress reactivity. Specific substances such as cortisol or C-reactive protein (CRP)—or a complex of indicators such as allostatic load—may help us reliably characterize persons as having higher or lower levels of health risk than persons of comparable age (Friedman et al. 2012; Seeman et al. 2002). With that information, we are able to capture some measure of biological aging or weathering, and most of these biomarkers should not be biased by self-report.

Biomarkers also enable investigators to be more specific about how social factors influence health. Although the phrase “get under the skin” is widely used, it could be argued that it remains a “black box” (see also chapter by “[Mental Health](#)” Avison, this volume). Biomarkers provide the opportunity to be more specific in explicating biopsychosocial processes.

The influence of social context on a variety of indicators during adulthood is striking. Consider, for example, the role of social context on CRP, an acute-phase protein, which is widely used as a marker of chronic inflammation (Herd et al. 2012). Browning and colleagues (2012) examined whether a sharp rise in the crime rate might be associated with elevated CRP. In this study of rising crime rates in Dallas, TX, the authors observed that a spike in the burglary rate was associated with elevated CRP among men but not for women. A different type of stressor was examined in a study of Brazilian immigrants dwelling in Boston. Holmes and Marcelli (2012) observed that CRP was higher in unauthorized residents than in legal residents, even after adjusting for variability in neighborhood socioeconomic status.

Other studies have examined religion as a source of integration and support as potentially protective against rising CRP in later life. Using data from the National Social Life, Health, and

Aging Project, Hill et al. (2014) found that attending religious services was associated with lower levels of CRP as well as Epstein–Barr virus. Given notable differences in the social organization of predominantly Black and White congregations, Ferraro and Kim (2014) observed that religious attendance protected against elevated CRP for Black adults only. Moreover, this relationship was observed in cross-sectional and longitudinal analyses: religious attendance was negatively associated with initial levels of CRP but also led to a decrease or slower rise in CRP among Black adults who frequently attended religious services.

These findings reveal not only how risks such as neighborhood crime or living as an unauthorized immigrant are associated with a marker of inflammation but also how social resources can protect against rising CRP. The contribution of biomarkers for research on aging and health is immense because they can signal health risks long before diseases are diagnosed—and this is particularly important for assessing risk in populations with limited access to medical care. Whereas CRP is highly predictive of cardiac events such as myocardial infarction and stroke for men and women, it is a harbinger of major cardiovascular risks (Ridker et al. 1998; Sesso et al. 2003). Integrating biomarkers across the life course, moreover, can avoid the problems associated with self-reported health and identify *upstream* indicators of health risks.

5.3 Social and Physical Context as Influences on Aging and Health

The terse review of how biomarkers are increasingly being integrated to study aging and health also revealed a cross-cutting theme that has come into sharper focus in recent decades: how social and physical context influences aging and health. This is not a new interest; it has long been observed in medical sociology, sociology of aging, and developmental science. Classic studies of life in age-segregated communities illuminated how social forces shape health and

well-being (Carp 1967; Hochschild 1978; Marshall 1975). Although many of these early studies capitalized on relocation to a single senior community, the recent work is observing contextual variability to see how variation in place is associated with variation in aging and health. In short, the study of “clustered observations” has advanced considerably in recent years.

Social scientists, including sociologists, epidemiologists, and anthropologists, are well aware of the influence of social context on health across the life course, but scholarship in the past 15 years has accentuated this tenet in new ways. Research has identified important influences on physical and mental health due to social capital (Snelgrove et al. 2009), neighborhood characteristics (Clarke et al. 2008; Lee and Ferraro 2007), and even architectural features of the neighborhood that facilitate social interaction (Brown et al. 2009b). These are especially important findings when considering the health of older people: limited mobility means that the importance of the built environment and local social ties are magnified. Older adults may be particularly vulnerable when social capital is low. This is illustrated well by Klinenberg’s (2002) finding that mortality was highest for older adults with limited social integration when facing a Chicago heat wave.

Relocation is another important consideration because it calls attention to person-environment fit. Older adults are less likely than younger adults to relocate to independent residences. When they do, however, there are major differences between moves that are due to “pull” factors (e.g., amenities, milder climate) and those that are involuntary or entail highly constrained choices (“push” factors such as poor health and cognitive impairment). Environments are also important because they are markers for physical environmental exposures, creating opportunities for social scientists to collaborate with toxicologists to examine the life course confluence of social and environmental exposures. Residential history conveys exposure to water, air, noise, crime, and social capital; thus, integrating environmental change into life course epidemiology may yield considerable dividends for the field (Wheaton and Clarke 2003).

At the same time, investigators should not limit environmental change to studying relocation only. The irony of “aging in place” is that residential *stability* is often associated with neighborhood *change*. Because of their generally lower rates of relocation, older adults often see appreciable neighborhood change. Familiarity with one’s residence may be salubrious, especially if there are positive connections to the community, but residential stability increases the odds of observing neighborhood decline, which may affect morale and physical health (Brown et al. 2003). This is another important arena for future research.

As noted before, some of these emergent or reinvigorated areas of study are evolving on both theoretical and methodological fronts. Many theories in sociology and economics have some component that addresses multiple levels of analysis such as macro, meso, and micro structures and processes. Multi-level models discussed earlier in the context of trajectory analysis also occupy a prominent role in studies of contextual influences on aging and health. The challenge will be incorporating so many levels in multi-level models (involving both ecological and temporal clustering) while rendering findings and conclusions that are useful and succinct.

6 Concluding Comments: Interrupting Chains of Risk

The past two decades have ushered in a spectacular array of life course research on health. Using different vantage points and longitudinal designs, the scientific community has opened new vistas for understanding how social factors influence aging and health. The findings have transformed the field by giving more theoretical attention and more rigorous analyses of data on individuals over the life course. The role of context is unmistakable. Whether context is seen as place or time, the aging process influences health through multiple mechanisms. Those mechanisms begin at conception, and we now know that the in utero environment is consequential to more than just early survival and child development. Indeed, a

focus on the early origins of adult health is becoming paradigmatic for many scholars of the life course—and even those who identify themselves as gerontologists. The study of life course health is influencing multiple fields and leading to both methodological and theoretical advances in subfields that are not blatantly related to health. At the same time, it is difficult to pinpoint the timing of causal processes because in utero factors are probably related to subsequent risks and resources (Shanahan and Hofer 2011).

It is understandable that much of the research during recent decades has focused on explicating the exposures and the health consequences of those exposures. Now that we have accumulated a strong foundation of empirical generalizations on the topic, perhaps it is time to give more attention to (a) interrupting chains of risk or (b) redirecting etiological pathways by providing resources that can neutralize or reverse the anticipated effects of negative early exposures (DiPrete and Eirich 2006; Ferraro and Shippee 2009). Studying cumulative inequality is important in its own right, but it also demands more attention to what types of resources are best suited for interrupting chains of risk—and for which populations subgroups. Some interventions are effective for men but not for women or vice versa. The same can be said for ethnicity and cultural groups. Thus, the call for greater attention to ameliorating the effects of negative exposures is also a call for sensitivity to heterogeneity in the aging process.

References

- Abdala, C., Dhar, S., Ahmadi, M., & Luo, P. (2014). Aging of the medial olivocochlear reflex and associations with speech perception. *Journal of the Acoustical Society of America*, 135(2), 754–765.
- Alwin, D. F. (2007). *Margins of error: A study of reliability in survey measurement*. Hoboken: Wiley Interscience.
- Barker, D. J. (1997). Maternal nutrition, fetal nutrition, and disease in later life. *Nutrition*, 13(9), 807–813.
- Barker, D. J. P. (Ed.). (2001). *Fetal origins of cardiovascular and lung disease*. New York: Marcel Dekker.
- Barker, D. J., Eriksson, J. G., Forsén, T., & Osmond, C. (2002). Fetal origins of adult disease: Strength of effects and biological basis. *International Journal of Epidemiology*, 31(6), 1235–1239.

- Blackwell, D. L., Hayward, M. D., & Crimmins, E. M. (2001). Does childhood health affect chronic morbidity in later life? *Social Science & Medicine*, *52*(8), 1269–1284.
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Hoboken: Wiley.
- Brown, B., Perkins, D. D., & Brown, G. (2003). Place attachment in a revitalizing neighborhood: Individual and block levels of analysis. *Journal of Environmental Psychology*, *23*(3), 259–271.
- Brown, D. W., Anda, R. F., Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B., & Giles, W. H. (2009a). Adverse childhood experiences and the risk of premature mortality. *American Journal of Preventive Medicine*, *37*(5), 389–396.
- Brown, S. C., Mason, C. A., Lombard, J. L., Martinez, F., Plater-Zyberk, E., Spokane, A. R., ... & Szapocznik, J. (2009b). The relationship of built environment to perceived social support and psychological distress in Hispanic elders: The role of “eyes on the street”. *Journal of Gerontology: Social Sciences*, *64B*(2), 234–246.
- Brown, D. W., Anda, R. F., Felitti, V. J., Edwards, V. J., Malarcher, A. M., Croft, J. B., & Giles, W. H. (2010). Adverse childhood experiences are associated with the risk of lung cancer: A prospective cohort study. *BMC Public Health*, *10*, 20.
- Browning, C. R., Cagney, K. A., & Iveniuk, J. (2012). Neighborhood stressors and cardiovascular health: Crime and C-reactive protein in Dallas, USA. *Social Science & Medicine*, *75*(7), 1271–1279.
- Buettner, D. (2012). *The blue zones: 9 lessons for living longer from the people who've lived the longest*. Washington, DC: National Geographic Books.
- Cain, L. D., Jr. (1964). Life course and social structure. In R. E. L. Faris (Ed.), *Handbook of modern sociology* (pp. 272–309). Chicago: Rand McNally.
- Carp, F. M. (1967). The impact of environment on old people. *The Gerontologist*, *7*(2 Part 1), 106–108.
- Carvalho, L. (2012). Childhood circumstances and the intergenerational transmission of socioeconomic status. *Demography*, *49*(3), 913–938.
- Case, A., & Paxson, C. (2011). The long reach of childhood health and circumstance: Evidence from the Whitehall II Study. *The Economic Journal*, *121*(554), F183–F204.
- Cho, J., Martin, P., Margrett, J., MacDonald, M., Poon, L. W., & Johnson, M. A. (2012). Cohort comparisons in resources and functioning among centenarians: Findings from the Georgia Centenarian Study. *International Journal of Behavioral Development*, *36*(4), 271–278.
- Clarke, P., Ailshire, J. A., Bader, M., Morenoff, J. D., & House, J. S. (2008). Mobility disability and the urban built environment. *American Journal of Epidemiology*, *168*(5), 506–513.
- Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. *Annals of the New York Academy of Sciences*, *1186*, 37–55.
- Corcoran, M. (1995). Rags to rags: Poverty and mobility in the United States. *Annual Review of Sociology*, *21*, 237–267.
- Crimmins, E. M., & Beltran-Sanchez, H. (2011). Mortality and morbidity trends: Is there a compression of morbidity? *Journal of Gerontology: Social Sciences*, *66B*(1), 75–86.
- Crimmins, E. M., Hayward, M. D., Hagedorn, A., Saito, Y., & Brouard, N. (2009). Change in disability-free life expectancy for Americans 70 years old and older. *Demography*, *46*(3), 627–646.
- Daaleman, T. P., & Elder, G. H., Jr. (2007). Family medicine and the life course paradigm. *Journal of the American Board of Family Medicine*, *20*(1), 85–92.
- Davis, M. M., McGonagle, K. A., Schoeni, R. F., & Stafford, F. P. (2008). Grandparental and parental obesity influences on childhood overweight: Implications for primary care practice. *Journal of American Board of Family Medicine*, *21*(6), 549–554.
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, *32*, 271–297.
- Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *American Journal of Psychiatry*, *160*(8), 1453–1460.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press.
- Eriksson, J. G., Thornburg, K. L., Osmond, C., Kajantie, E., & Barker, D. J. P. (2010). The prenatal origins of lung cancer. I. The fetus. *American Journal of Human Biology*, *22*(5), 508–511.
- Felitti, V. J. (2002). The relationship between adverse childhood experiences and adult health: Turning gold into lead. *The Permanente Journal*, *6*, 44–47.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, *14*(4), 245–258.
- Ferraro, K. F. (2011). Health and aging: Early origins, persistent inequalities? In R. A. Settersten & J. L. Angel (Eds.), *Handbook of sociology of aging* (pp. 465–475). Dordrecht: Springer.
- Ferraro, K. F., & Kelley-Moore, J. A. (2003a). A half century of longitudinal methods in social gerontology: Evidence of change in the Journal”. *Journal of Gerontology: Social Sciences*, *58B*(5), S264–S270.
- Ferraro, K. F., & Kelley-Moore, J. A. (2003b). Cumulative disadvantage and health: Long-term consequences of

- obesity? *American Sociological Review*, 68(5), 707–729.
- Ferraro, K. F., & Kim, S. (2014). Health benefits of religion among Black and White older adults? Race, religiosity, and C-reactive protein. *Social Science & Medicine*, 104, 92–99.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49(3), 333–343.
- Ferraro, K. F., Shippee, T. P., & Schafer, M. H. (2009). Cumulative inequality theory for research on aging and the life course. In V. L. Bengtson, D. Gans, N. M. Putney, & M. Silverstein (Eds.), *Handbook of theories of aging* (2nd ed., pp. 413–433). New York: Springer.
- Fingerman, K. L., Pillemer, K. A., Silverstein, M., & Sutor, J. J. (2012). The baby boomers' intergenerational relationships. *The Gerontologist*, 52(2), 199–209.
- Freedman, V. A., Crimmins, E., Schoeni, R. F., Spillman, B. C., Aykan, H., Kramarow, E., Land, K., Lubitz, J., Manton, K., Martin, L. G., Shinberg, D., & Waidmann, T. (2004). Resolving inconsistencies in trends in old-age disability: Report from a technical working group. *Demography*, 41(3), 417–441.
- Freedman, V. A., Spillman, B. C., Andreski, P. M., Cornman, J. C., Crimmins, E. M., Kramarow, E., Lubitz, J., Martin, L. G., Merkin, S. S., Schoeni, R. F., Seeman, T. E., & Waidmann, T. A. (2013). Trends in late-life activity limitations in the United States: An update from five national surveys. *Demography*, 50, 661–671.
- Friedman, E. M., Karlamangla, A. S., Almeida, D. M., & Seeman, T. E. (2012). Social strain and cortisol regulation in midlife in the US. *Social Science & Medicine*, 74(4), 607–615.
- Fries, J. F. (1980). Aging, natural death, and the compression of morbidity. *New England Journal of Medicine*, 303(3), 130–135.
- Fries, J. F., Bruce, B., & Chakravarty, E. (2011). Compression of morbidity 1980–2011: A focused review of paradigms and progress. *Journal of Aging Research*, 261702, 1–10.
- Fuller-Thomson, E., & Brennenstuhl, S. (2009). Making a link between childhood physical abuse and cancer. *Cancer*, 15(14), 3341–3350.
- Geronimus, A. T., Hicken, M. T., Pearson, J. A., Seashols, S. J., Brown, K. L., & Cruz, T. D. (2010). Do US Black women experience stress-related accelerated biological aging? A novel theory and first population-based test of Black-White differences in telomere length. *Human Nature*, 21(1), 19–38.
- Getzmann, S., Falkenstein, M., & Wascher, E. (2015). ERP correlates of auditory goal-directed behavior of younger and older adults in a dynamic speech perception task. *Behavioural Brain Research*, 278, 435–445.
- Goosby, B. J. (2013). Early life course pathways of adult depression and chronic pain. *Journal of Health and Social Behavior*, 54(1), 75–91.
- Hayslip, B., Blumenthal, H., & Garner, A. (2015). Social support and grandparent caregiver health: One-year longitudinal findings for grandparents raising their grandchildren. *Journal of Gerontology: Social Sciences*, 70B, in press. doi:10.1093/geronb/gbu165
- Henkel, L. A. (2014). Do older adults change their eyewitness reports when re-questioned? *The Journal of Gerontology: Psychological Sciences*, 69(3), 356–365.
- Herd, P., Karraker, A., & Friedman, E. (2012). The social patterns of a biological risk factor for disease: Race, gender, socioeconomic position, and C-reactive protein. *Journal of Gerontology: Social Sciences*, 67B(4), 503–513.
- Hill, T. D., Rote, S. M., Ellison, C. G., & Burdette, A. M. (2014). Religious attendance and biological functioning: A multiple specification approach. *Journal of Aging and Health*, 26(5), 766–785.
- Hochschild, A. R. (1978). *The unexpected community: Portrait of an old age subculture*. Berkeley: University of California.
- Holmes, L. M., & Marcelli, E. A. (2012). Neighborhoods and systemic inflammation: High CRP among legal and unauthorized Brazilian migrants. *Health & Place*, 18(3), 683–693.
- House, J. S., Kessler, R. C., & Herzog, A. R. (1990). Age, socioeconomic status, and health. *The Milbank Quarterly*, 68(3), 383–411.
- Jæger, M. M. (2012). The extended family and children's educational success. *American Sociological Review*, 77(6), 903–922.
- Järvelin, M. R., Sovio, U., King, V., Lauren, L., Xu, B., McCarthy, M. I., Hartikainen, A. L., Laitinen, J., Zitting, P., Rantakallio, P., & Elliott, P. (2004). Early life factors and blood pressure at age 31 years in the 1966 northern Finland birth cohort. *Hypertension*, 44(6), 838–846.
- Johnson, W., & Krueger, R. F. (2005a). Higher perceived life control decreases genetic variance in physical health: Evidence from a national twin study. *Journal of Personality and Social Psychology*, 88(1), 165–173.
- Johnson, W., & Krueger, R. F. (2005b). Predictors of physical health: Toward an integrated model of genetic and environmental antecedents. *Journal of Gerontology: Social Sciences*, 60B(Special Issue 1), 42–52.
- Klinenberg, E. (2002). *Heat wave: A social autopsy of disaster in Chicago*. Chicago: University of Chicago Press.
- Korpimäki, S. K., Sumanen, M. P. T., Sillanmaki, L. H., & Mattila, K. J. (2010). Cancer in working-age is not associated with childhood adversities. *Acta Oncologica*, 49(4), 436–440.
- Kuh, D., & Ben-Shlomo, Y. (1997). Introduction: A life course approach to the aetiology of adult chronic disease. In D. Kuh & Y. Ben-Shlomo (Eds.), *A life course approach to chronic disease epidemiology* (pp. 3–14). New York: Oxford University Press.

- Latham, K. (2014). The "long arm" of childhood health: Linking childhood disability to late midlife mental health. *Research on Aging, 37*(1), 82–102.
- Lee, M. A., & Ferraro, K. F. (2007). Neighborhood residential segregation and physical health among Hispanic Americans: Good, bad, or benign? *Journal of Health and Social Behavior, 48*(2), 131–148.
- Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior, 35*(special issue), 80–94.
- Link, B. G., Phelan, J. C., Miech, R., & Westin, E. L. (2008). The resources that matter: Fundamental social causes of health disparities and the challenge of intelligence. *Journal of Health and Social Behavior, 49*(1), 72–91.
- Lynch, S. M. (2003). Cohort and life course patterns in the relationship between education and health. *Demography, 40*(2), 309–331.
- Lynch, J. W., Kaplan, G. A., & Shema, S. J. (1997). Cumulative impact of sustained economic hardship on physical, cognitive, psychological, and social functioning. *New England Journal of Medicine, 337*(26), 1889–1895.
- Manton, K. G. (2008). Recent declines in chronic disability in the elderly U.S. population: Risk factors and future dynamics. *Annual Review of Public Health, 29*, 91–113.
- Manton, K. G., Corder, L. S., & Stallard, E. (1993). Estimates of change in chronic disability and institutional incidence and prevalence rates in the U.S. elderly population from 1982, 1984, and 1989 National Long Term Care Survey. *Journal of Gerontology: Social Sciences, 48*(4), S153–S166.
- Manton, K. G., Gu, X., & Lowrimore, G. R. (2008). Cohort changes in active life expectancy in the U.S. elderly population: Experience from the 1982–2004 National Long-Term Care Survey. *Journal of Gerontology: Social Sciences, 63*(5), S269–S281.
- Marmot, M. (2005). Social determinants of health inequalities. *The Lancet, 365*(9464), 1099–1104.
- Marmot, M. G., Smith, G. D., Stansfeld, S., Patel, C., North, F., Head, J., White, I., Brunner, E., & Feeney, A. (1991). Health inequalities among British civil servants: The Whitehall II study. *The Lancet, 337*(8754), 1387–1393.
- Marshall, V. W. (1975). Socialization for impending death in a retirement village. *American Journal of Sociology, 80*(5), 1124–1144.
- Martin, L. G., Freedman, V. A., Schoeni, R. F., & Andreski, P. M. (2009). Health and functioning among baby boomers approaching 60. *Journal of Gerontology: Social Sciences, 64B*(3), 369–377.
- McDade, T. W., Metzger, M. W., Chyu, L., Duncan, G. J., Garfield, C., & Adam, E. K. (2014). Long-term effects of birth weight and breastfeeding duration on inflammation in early adulthood. *Proceedings of the Royal Society B: Biological Sciences, 281*(1784), 1–9.
- Morton, P. M., Schafer, M. H., & Ferraro, K. F. (2012). Does childhood misfortune increase cancer risk in adulthood? *Journal of Aging and Health, 24*(6), 948–984.
- Morton, P. M., Mustillo, S. A., & Ferraro, K. F. (2014). Does childhood misfortune raise the risk of acute myocardial infarction in adulthood? *Social Science & Medicine, 104*, 133–141.
- Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: Analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology, 115*(3), 616–623.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA, 295*(13), 1549–1555.
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011–2012. *Journal of the American Medical Association, 311*(8), 806–814.
- O'Rand, A. M., & Hamil-Luker, J. (2005). Processes of cumulative adversity: Childhood disadvantage and increased risk of heart attack across the life course. *Journal of Gerontology: Social Sciences, 60B*(Special issue 2), S117–S124.
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior, 30*(3), 241–256.
- Pearlin, L. I. (2010). The life course and the stress process: Some conceptual comparisons. *Journal of Gerontology: Social Sciences, 65B*(2), S207–S215.
- Perls, T. T., & Silver, M. H. (1999). *Living to 100*. New York: Basic Books.
- Pudrovska, T., & Anikputa, B. (2014). Early-life socioeconomic status and mortality in later life: An integration of four life-course mechanisms. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(3), 451–460.
- Quesnel-Vallée, A., & Taylor, M. (2012). Socioeconomic pathways to depressive symptoms in adulthood: Evidence from the National Longitudinal Survey of youth 1979. *Social Science & Medicine, 74*(5), 734–743.
- Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*(2), 330–366.
- Ridker, P. M., Buring, J. E., Shih, J., Matias, M., & Hennekens, C. H. (1998). Prospective study of C-reactive protein and the risk of future cardiovascular events among apparently healthy women. *Circulation, 98*(8), 731–733.
- Schafer, M. H., & Ferraro, K. F. (2012). Childhood misfortune as a threat to successful aging: Avoiding disease. *The Gerontologist, 52*(1), 111–120.
- Schafer, M. H., Ferraro, K. F., & Mustillo, S. A. (2011). Children of misfortune: Early adversity and cumulative inequality in perceived life trajectories. *American Journal of Sociology, 116*(4), 1053–1091.
- Schafer, M. H., Wilkinson, L. R., & Ferraro, K. F. (2013). Childhood (mis) fortune, educational attainment, and

- adult health: Contingent benefits of a college degree? *Social Forces*, 91(3), 1007–1034.
- Shryer, E., & Ross, M. (2014). Does the age-related positivity effect in autobiographical recall reflect differences in appraisal or memory? *Journal of Gerontology: Psychological Sciences*, 69(4), 548–556.
- Sebastiani, P., & Perls, T. T. (2012). The genetics of extreme longevity: Lessons from the New England centenarian study. *Frontiers in Genetics*, 3(277), 1–7.
- Seeman, T. E., Singer, B. H., Ryff, C. D., Love, G. D., & Levy-Storms, L. (2002). Social relationships, gender, and allostatic load across two age cohorts. *Psychosomatic Medicine*, 64(3), 395–406.
- Seplaki, C. L., Goldman, N., Weinstein, M., & Lin, Y.-H. (2004). How are biomarkers related to physical and mental well-being? *Journal of Gerontology: Biological Sciences*, 59A(3), 201–217.
- Sesso, H. D., Buring, J. E., Rifai, N., Blake, G. J., Gaziano, J. M., & Ridker, P. M. (2003). C-reactive protein and the risk of developing hypertension. *Journal of the American Medical Association*, 290(22), 2945–2951.
- Shanahan, M. J., & Hofer, S. M. (2005). Social context in gene–environment interactions: Retrospect and prospect. *Journal of Gerontology: Social Sciences*, 60(Special Issue 1), 65–76.
- Shanahan, M. J., & Hofer, S. M. (2011). Molecular genetics, aging, and well-being: Sensitive period, accumulation, and pathway models. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (7th ed., pp. 135–147). San Diego: Elsevier.
- Shanahan, M. J., Vaisey, S., Erickson, L. D., & Smolen, A. (2008). Environmental contingencies and genetic propensities: Social capital, educational continuation, and dopamine receptor gene DRD21. *American Journal of Sociology*, 114(S1), S260–S286.
- Shippee, T. P., Wilkinson, L. R., & Ferraro, K. F. (2012). Accumulated financial strain and women’s health over three decades. *Journal of Gerontology: Social Sciences*, 67(5), 585–594.
- Shuey, K. M., & Willson, A. E. (2014). Economic hardship in childhood and adult health trajectories: An alternative approach to investigating life-course processes. *Advances in Life Course Research*, 22, 49–61.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal analysis: Modeling change and event occurrence*. New York: Oxford University Press.
- Snelgrove, J. W., Pikhart, H., & Stafford, M. (2009). A multilevel analysis of social capital and self-rated health: Evidence from the British Household Panel survey. *Social Science & Medicine*, 68(11), 1993–2001.
- Springer, K. W. (2009). Childhood physical abuse and midlife physical health: Testing multi-pathway life course model. *Social Science & Medicine*, 69(1), 138–146.
- Stathakos, D., Pratsinis, H., Zachos, I., Vlahaki, I., Gianakopoulou, A., Zianni, D., & Kletsas, D. (2005). Greek centenarians: Assessment of functional health status and life-style characteristics. *Experimental Gerontology*, 40(6), 512–518.
- Stein, D. J., Scott, K., Abad, J. M. H., Aguilar-Gaxiola, S., Alonso, J., Angermeyer, M., ... Von Korff, M. (2010). Early childhood adversity and later hypertension: Data from the World Mental Health Survey. *Annals of Clinical Psychiatry*, 22(1), 19–28.
- Verbrugge, L. M. (1986). From sneezes to adieux: Stages of health for American men and women. *Social Science and Medicine*, 22(11), 1195–1212.
- Verbrugge, L. M., & Jette, A. M. (1994). The disablement process. *Social Science and Medicine*, 38(1), 1–14.
- Vuolo, M., Ferraro, K. F., Morton, P. M., & Yang, T.-Y. (2014). Why do older people change their ratings of childhood health? *Demography*, 51(6), 1999–2023.
- Wadsworth, M., Kuh, D., Richards, M., & Hardy, R. (2006). Cohort profile: The 1946 National Birth Cohort (MRC National Survey of Health and Development). *International Journal of Epidemiology*, 35(1), 49–54.
- Wheaton, B., & Clarke, P. (2003). Space meets time: Integrating temporal and contextual influences on mental health in early adulthood. *American Sociological Review*, 68(5), 680–706.
- Wickrama, K. A., Conger, R. D., Wallace, L. E., & Elder, G. H., Jr. (1999). The intergenerational transmission of health-risk behaviors: Adolescent lifestyles and gender moderating effects. *Journal of Health and Social Behavior*, 40(3), 58–272.
- Wickrama, K. A. S., Conger, R. D., & Abraham, W. T. (2005). Early adversity and later health: The intergenerational transmission of adversity through mental disorder and physical illness. *Journal of Gerontology: Social Sciences*, 60(Special Issue 2), S125–S129.
- Willcox, D. C., Willcox, B. J., & Poon, L. W. (2010). Centenarian studies: Important contributors to our understanding of the aging process and longevity. *Current Gerontology and Geriatrics Research*, 484529, 1–6.
- Williamson, D. F., Thompson, T. J., Anda, R. F., Dietz, W. H., & Felitti, V. (2002). Body weight and obesity in adults and self-reported abuse in childhood. *International Journal of Obesity and Related Metabolic Disorders*, 26(8), 1075–1082.
- Wink, P., Ciciolla, L., Dillon, M., & Tracy, A. (2007). Religiousness, spiritual seeking, and personality: Findings from a longitudinal study. *Journal of Personality*, 75(5), 1051–1070.

Mental Health

William R. Avison

A fundamental premise of the sociology of mental health is that the social distribution of psychological distress and mental disorder is not uniform – that there is a social gradient of mental health and disorder. Over the past six decades, a substantial body of research has documented differences in the prevalence of mental health problems by social characteristics such as gender, education, race/ethnicity, income, socioeconomic status, employment status, marital status, family structure, and other social statuses and roles. This body of scientific knowledge has been exceptionally well-characterized in a recent compendium (Ansehensel et al. 2013).

One of the most important developments in the sociology of mental health has been its synthesis with the life course perspective. Linda George (2013), one of the foremost proponents of life course research in mental health and illness, has pointed out that this synthesis has been

relatively recent with the vast majority of work in this area having been produced over the past 15 years.

In this chapter, I first present a selective review of the significant scientific advances that have emerged from the synthesis of the life course perspective with the sociology of mental health. In particular, I focus on Leonard Pearlin's well-known synthesis of the stress process with the life course perspective. I also examine a number of important currents in life course research in mental health.

For the past decade, life course research in mental health has embraced a number of conceptual and methodological approaches that have emphasized trajectories of mental health over the life course. In the second section of this chapter, I will raise some challenges that confront this line of investigation and suggest some new directions that might stimulate fresh ways of conducting such research.

The third broad topic to be considered in this chapter concerns the intersection of physiological processes with socio-environmental influences on mental illness. In recent years, the developmental origins of health and disease (DOHaD) has become a focus for many researchers interested in the ways in which fetal and early postnatal health may be associated with adult health outcomes, including mental health. Other researchers have focused on the role of social experiences in childhood in stimulating

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pro-inflammatory responses in individuals that ultimately manifest themselves in elevated risk for symptoms of mental health problems. Still others researchers have considered the roles of gene-environment interactions and correlations and the ways in which gene-environment processes may play out across the life course. All of these models are essentially life course models, but the sociology of the life course and the sociology of mental health have largely been absent from these considerations.

1 The Stress Process in Life Course Context

Over three decades ago, Leonard Pearlin and his colleagues (1981) described a conceptual model that has continued to stimulate research in the sociology of mental health. The introductory paragraph of this article is a succinct summary of the stress process:

The process of social stress can be seen as combining three major conceptual domains: the sources of stress, the mediators of stress, and the manifestations of stress. Each of these extended domains subsumes a variety of subparts that have been intensively studied in recent years. Thus, in the search for sources of stress, considerable interest has been directed to life events and to chronic life strains, especially the former; in work concerned with conditions capable of mediating the impact of stressful circumstances, coping and social supports have had a rather dramatic rise to prominence; and as for stress and its symptomatic manifestations, the expanding volume of research ranges from the microbiological substrates of stress to its overt emotional and behavioural expressions (p. 337).

In his reconsiderations of the stress process, Pearlin (1989, 1999) further elaborated the paradigm to take into account the social context in which the stress process occurs and to add other features into the model. According to Pearlin, the foundation of the stress process rests on three key assumptions. First, the process is a dense causal web that involves dynamic interconnections among the components of the model. Changes in one set of factors produce changes in others. Second, social stress is a typical experience of ordinary life; it is not unusual or abnormal. As

Pearlin notes, this idea is consistent with both Durkheim's view of suicide as a nature consequence of social attachments and Merton's idea that anomie is a normative result of the disjunction between aspirations and access to opportunities. It is also consistent with Selye's (1956) classic statement about stress as a "normal" experience. Third, the origins of stress are essentially social in nature: stressors emerge out of social experience. This directs sociological stress researchers toward more proximal than distal sources of social stress and to a greater emphasis on social context than on history or biology. As we shall see, recent developments that have incorporated life course principles as well as the consideration of biological and physiological mechanisms have drawn some stress researchers' attention to new directions in stress research that consider more distal processes.

Pearlin's model of the stress process contains four major components. *Sources of stress* include stressful life events as well as other dimensions such as role-related strains, daily hassles, and life traumas. These sources of stress are potentially interactive in their effects on health outcomes; that is, life events can intensify or exacerbate existing strains and vice versa. In addition, stressful life experiences can create new role strains and, conversely, role strains can generate new stressful life events.

Manifestations of stress include an array of possible health outcomes. Sociologists have tended to focus on symptoms of mental illness or measures of psychological distress. These measures typically include symptoms of depressive illness; however, some sociologists have examined the effects of stressors on diagnosable disorders (Avison 2001; Brown and Harris 1978; Turner et al. 1995) and others have extended the study of stress to include alcohol consumption and drug dependence (Aneshensel et al. 1991; Turner et al. 2006a), and physical illness (Brown and Harris 1989).

The third component of the stress process model, *mediators of stress*, refers to a broad range of factors including social support, psychosocial resources such as mastery, self-esteem, mattering, interpersonal dependency, and coping

strategies. These mediators are hypothesized to function as pathways that connect exposure to stress to its manifestations. So, for example, individuals exposed to stress experience the erosion of their sense of control over their lives. In turn, this decline in mastery manifests itself in symptoms of distress or depression.

These mediating factors may also operate as *moderators* of the stress-distress relationship. The classic examples are those in which the impact of stress on mental health outcomes is reduced in the presence of higher levels of psychosocial resources, social support, or coping resources. These moderating effects, often referred to as stress-buffering effects, typically reflect processes in which the consequences of stress are mitigated by individuals' abilities to cope or otherwise deal with stress (Avison and Cairney 2003; Thoits 2010; Turner and Turner 2013; Wheaton 1985).

The interplay among sources of stress, mediators and moderators of stress, and outcomes all occurs in a social context that is defined by the social and economic statuses and roles that individuals occupy.

Another important elaboration emerged when Pearlin and Skaff (1996) suggested a number of ways in which principles central to the life course perspective could be integrated with key elements of the stress process to examine how individuals' exposure to stressors changes as people move through the life course, and their lives are restructured. As their statuses and roles change, so too do the stressors they encounter and the mediating resources to which they have access. So, for example, the stressors that young people experience in school give way to stressors associated with marriage, parenting, and their work roles as they move through the life course. These, in turn, may be replaced by the stress of retirement or of caregiving for a spouse with a chronic illness. As Pearlin (1983) points out, the different roles that we occupy expose us to different role tasks, to the possibility of interpersonal conflicts, role conflicts, role captivity, and role restructuring.

The possibility that principles of the life course perspective could be integrated with core

ideas from the stress process paradigm was also recognized by Elder et al. (1996). They systematically explore these possibilities and lay out a number of possibilities for life course research in the stress process that complement the position advocated by Pearlin.

These ideas have been elaborated further. Pearlin et al. (2005) specify elements of the stress process that may affect stress and health across the life course. These include the effects of economic strains and discriminatory experiences, stress proliferation, and the intersection of status attainment and stress exposure. This synthesis of the stress process with the life course has been stimulating to research in the sociology of mental health (Wheaton 2010).

There is now a growing body of theoretical ideas on stress and the life course (George 2007, 2013; McLeod and Pavalko 2008) and a tremendous increase in the number of empirical investigations of these ideas. Recently, Turner and Schieman (2008) assembled a wide-ranging set of papers that explores the interface of the stress process with the life course. The theoretical richness and empirical rigor of this work make it clear that sociologists of mental health have embarked on some very ambitious programs of research to examine how the stress process unfolds across the life course.

To date, much of the research in the sociology of mental health that incorporates a life course perspective has focused on turning points or transitions in individuals' lives in adulthood. Life course research on stress and mental health has provided innumerable insights into issues such as transitions from adolescence to adulthood (Conger et al. 1992; Gore and Aseltine 2003; Wickrama et al. 2008a), family transitions and family structure (Avison 2010; Avison and Davies 2005; Avison et al. 2008), the intersection of work and family (Menaghan 1997; Menaghan and Parcel 1995), and aging and mental health (Schieman et al. 2001).

There have also been significant sociological studies of stress and mental health in childhood (see Menaghan 2009, for a review). These include studies of trajectories of poverty and children's mental health (McLeod and Edwards 1995;

McLeod and Shanahan 1993, 1996; Reiss 2013; Strohschein 2005); Menaghan and Parcel's (1994, 1995) research on parental occupational circumstances and children's mental health; Avison and McAlpine's (1992) exploration of gender, stress, and mental health in adolescence; Umberson et al. (2005) work on stress in childhood and adulthood; and the body of research on the effects of neighborhoods on children's and adolescents' mental health (Aneshensel and Sucoff 1996; Wheaton and Clarke 2003). These investigations confirm that children's stressful experiences arise out of the social context of everyday life.

1.1 Research Dividends from the Synthesis of the Stress Process with Life Course Principles

There have been several clear advances in research on mental health that are direct consequences of Pearlin's synthesis of the stress process with ideas from the life course perspective. Although space does not permit a detailed discussion of these dividends, they deserve a brief comment.

Foremost among these advances has been the realization that the "long arm of childhood" (Hayward and Gorman 2004; see also Ferraro, chapter "Life Course Lens on Aging and Health" this volume; Hayward and Sheehan, chapter "Does the Body Forget? Adult Health, Life Course Dynamics, and Social Change" this volume) extends its reach to mental health. It is now clear that adversities and traumas in childhood have consequences for mental health in adulthood. Adversities such as parental divorce (Harris et al. 1986, 1990; McLeod 1991; Ross and Mirowsky 1999), growing up in a single-parent family (Barrett and Turner 2005), and experiencing poverty in childhood (Gibb et al. 2012; Luo and Waite 2005; Wheaton and Clarke 2003) are all significantly associated with the risk of a variety of mental disorders as well as elevated symptoms and psychological distress. The effects on adult mental health of traumatic experiences such

as child abuse or neglect (Horwitz et al. 2001; Kessler and Magee 1994), childhood sexual assault (Winfield et al. 1990), and witnessing violence as a child (Kessler and Magee 1993) have also been documented.

Turner and Lloyd (1995) and Turner and Turner (2005) have described how traumatic experiences and adversities in childhood and adolescence, together with stressful experiences in adulthood, constitute a *cumulative burden of adversity* that exerts powerful influences on individuals' mental health. It seems clear that the experiences of childhood, adolescence, and early adulthood are formative for adult mental health.

There is substantial evidence that these patterns are observable across different societies. In their analyses of the 1946 British birth cohort in the National Survey of Health and Development, Colman et al. (2014) document how adversities as early as those originating in the first years of life are associated with symptoms of depression in adolescence and over 50 years later in mid-adulthood. In the same cohort, Kuh et al. (2002) find that women in midlife with trajectories of increasing symptoms of mental health problems were more likely to have a history of adversities and mental health problems across their earlier life courses. Slopan et al. (2010) analyzed data from the South Africa Stress and Health Study and report that childhood adversities were significantly associated with the onset of anxiety disorders but not mood disorders. Lee et al. (2011) also find that family childhood adversities are significantly related to the onset of an array of psychiatric disorders among a sample of over 5,000 adults living in Beijing or Shanghai.

Hatch and Dohrenwend (2007) report that the prevalence of many of these adversities declines with age. This suggests that a comprehensive understanding of mental health in adulthood will benefit significantly from stress process analyses that take a life course perspective by incorporating experiences from childhood and adolescence.

From a life course perspective, these various patterns may be studied as pathways or trajectories that link early adversities to subsequent mental health problems in adulthood. For example, in

a study of single and married mothers, Davies et al. (1997) have argued that childhood adversities contribute to early onset of depression that is associated with a higher risk of separation and divorce among these women. In turn, single mothers' greater exposure to stressors in their lives increased their risk of recurrence of major depressive disorder.

For life course researchers, the challenge is to identify the mediating processes that link early experiences with later mental health. Some researchers conclude that children who have lost a parent experience subsequent difficulties in developing supportive, close attachments with their own spouses (McLeod 1991). Others argue that parental divorce impedes educational attainment which in turn contributes to economic hardship, unhappy personal relationships, and feelings of mistrust. All of these contribute to elevated levels of psychological distress.

A related theme concerns the *impact of early mental illness* on subsequent mental health. We have known for some time that most mental disorders have a relatively early age of onset (Kessler et al. 2005) and that early onset is associated with elevated risk of disorder in adulthood (McGue and Iacono 2005; Rutter et al. 2006). Moreover, early mental illness also has negative consequences for educational attainment (Chen and Kaplan 2003; McLeod and Fettes 2007) and early age of marriage and parenthood (Forthofer et al. 1996; Wade and Pevalin 2004). Thus, from a life course perspective, experiences of adversity or trauma in childhood or the early onset of mental health problems may set in motion a series of socio-economic, intrapsychic, and social psychological processes that influence subsequent mental health in adulthood.

A third dividend that has emerged from the synthesis of the stress process with life course principles concerns *the relationship between physical health and mental health*. Two independent studies set the groundwork for research in this area. In a four-wave study over the course of one year, Aneshensel et al. (1984) documented the reciprocal influences of physical illness and depressive symptoms on one another. In a related vein, Turner and Noh (1988) employed a stress

process framework to examine how the experience of physical disabilities (as manifest in activity limitations and pain) exerted a substantial impact of individuals' levels of psychological distress and that constructs central to the stress process – mastery, social support, and stressful life events – played important roles in predicting levels of depression among individuals with physical disabilities. The importance of both of these studies for life course research relates to the well-known association of age with physical illness and disability. Subsequent research (Bierman and Pearlin 2011; Meeks et al. 2000; Miech and Shanahan 2000; Turner et al. 2006b; Yang 2004; Yang and George 2005) has explored the relationship between physical disability and symptoms of depression across different age groups.

A central idea in the life course perspective is that individuals are socially imbedded in a web of relationships. This notion of *linked lives* presupposes that any individual's life experiences are importantly influenced by the social networks in which they participate. For the stress process paradigm, this has been most clearly articulated by Aneshensel and Pearlin's program of research on the caregiving role. In a series of important papers (Aneshensel et al. 1993, 2005; Pearlin et al. 1997) and a research monograph (Aneshensel et al. 1995), they described how the unexpected role of caregiver exposed individuals to elevated levels of stressors and how this exposure was patterned by the life course. This research provided a model for incorporating the concept of linked lives in stress process research on mental health.

2 Trajectories of Mental Health and Illness

Leonard Pearlin's synthesis of the life course perspective with the stress process paradigm stands as a significant turning point in the sociology of mental health. His thinking fundamentally altered the way that stress process researchers think about mental health over the life course. One consequence of this has been the burgeoning interest in both role trajectories as well as trajectories of mental health over the life course.

Macmillan and Copher (2005: 859) argue that "...role trajectories take place over an extended period of time and index temporal involvement in major institutions through schooling, paid employment, marriage, and parenthood. Trajectories are marked at the beginning and end by transitions." Sociologists of mental health have been interested in role trajectories, but they have also examined trajectories of mental health. These trajectories refer either to temporal patterns of diagnosed disorder or, more commonly, to levels of psychological distress or symptoms of mental health problems over time.

In the area of stress and mental health, one of the first comprehensive considerations of trajectories can be found in Gotlib and Wheaton's (1997) edited collection of studies on the experience of stress over the life course and their effects on mental health outcomes. They focus on the ways in which trajectories of stressors or other social experiences and turning points in individuals' lives influence their mental health outcomes. Wheaton et al. (1997) document how various childhood adversities may accumulate over time and how such trajectories contribute to psychological distress later in the life course. Menaghan (1997) shows how the relatively stable, unchanging trajectories of paid work in many families have important consequences for children's emotional well-being. Where parents have stressful work lives for extended periods of time, children's educational performance and emotional well-being may suffer. These studies built the foundation for subsequent life course research in the sociology of mental health.

Other researchers have expanded the consideration of trajectories to include intrapsychic factors. So, for example, Barrett and White (2002) describe how increasing perceptions or feelings of masculinity over time appear to decrease depressive symptoms in early adulthood among both males and females. They argue that these increasing trajectories of masculinity protect both young men and young women from feelings of depression. In this sense, social psychological processes are seen to be core elements of a life course approach to the study of mental health (McLeod 2012).

More recent life course studies of mental health have constructed trajectories of mental health – typically, measures of depressive symptoms or psychological distress across multiple time points – and have identified social conditions and processes that are associated with different trajectories. For example, Wickrama et al. (2008b) document how childhood adversities associated with family socio-economic disadvantage are associated with higher initial levels of depression in adolescence. Early transitions into adult roles further increase levels of depressive symptoms in adulthood among these individuals. Strohschein (2005) reports that household income is associated with trajectories of children's mental health problems.

Spence et al. (2011) examine racial disparities in trajectories of depression among women aged 52–81. Their analyses reveal that African Americans experience higher levels of symptoms than their White counterparts at all ages; that is, there is no apparent convergence in African American and white women's levels of depression in older age. This sustained difference over the life course is attributable to racial differences in socio-economic status and to increasing rates of physical health problems among African American women in older age groups.

Walsemann et al. (2009) find that trajectories of depressive symptoms decline from early adulthood through middle age among Whites, African Americans, and Hispanics. The slopes of these trajectories differ, however, as a function of differential socio-economic disadvantage. By their mid-30s, Hispanics and Whites have similar levels of depressive symptoms that are lower on average than for African Americans.

Johnson et al. (2014) examine how intimate partner violence (IPV) influences trajectories of depressive symptoms. They report that both victimization and perpetration are associated with a trajectory of increasing symptomatology for both men and women. They also find that cumulative exposure to IPV has little discernible influence on trajectories of depressive symptoms, suggesting that there is a recency effect in which feelings of depression are more likely to reflect the recall of the most recent victimization.

Other investigators have concluded from these studies that it is reasonable to expect that trajectories of social experiences, whether socioeconomic factors or various stressors, may influence trajectories of mental health outcomes. So, for example, in a multi-wave study over 7 years, George and Lynch (2003) have documented how trajectories of increasing exposure to stressors are associated with trajectories of growth in depressive symptoms among African American respondents but not whites.

Avison et al. (2008) report that specific trajectories of family structure are associated with trajectories of increasing depressive symptoms among a sample of mothers who were interviewed over a 14-year period. They find that the prolonged experience of single motherhood is associated with growth in depressive symptoms. Re-partnering is related to slightly less pronounced growth in symptoms, but these women still have more pronounced trajectories of increasing symptoms than do mothers who were partnered over the course of the study.

These examples of the analyses of trajectories associated with mental health are illustrative but by no means exhaustive of the work that has been produced in this area of research. They reveal the complexities involved in taking into account change over time, both in terms of the social conditions of people's lives and the stressors and adversities that they encounter, and in terms of their expressions of psychological distress and mental health problems.

2.1 Cautions About Research on Trajectories

Despite the important advances that have been made in studying mental health across the life course, there remain several limitations to this work that require some fresh thinking to stimulate new ways of studying mental health across the life course. Some of these limitations are methodological; others are more conceptual.

First, the span of most data sets available to study mental health across the life course is relatively limited (see also Johnson et al., chapter

“Education, Health, and Historical Change” this volume). Although there are several studies that follow children for several waves over 10–15 years, there are few large scale studies with credible measures of mental health that follow children well into adulthood. The most notable exception is the well-known Dunedin Multidisciplinary Health and Development Study (commonly known as the Dunedin Longitudinal Study) which has followed a cohort of 1,037 babies born in New Zealand between April 1, 1972, and March 31, 1973, over 12 assessments spanning 40 years. Most impressively, the study has maintained a retention rate of 96 % over this time, thus avoiding many of the typical problems associated with differential attrition bias. The Dunedin Longitudinal Study includes a rich array of demographic and socio-economic data as well as a broad range of measures of physical health and functioning. It has also routinely included a battery of psychometrically sound measures of mental health.

Longitudinal studies of mental health like the Dunedin Study are rare. The feasibility of such projects in countries with much larger geographic areas and more heterogeneous populations is an open question. Although so-called “conception to death” studies have been discussed in North America, the financial and logistical challenges to mounting such a massive investigation are substantial.

Second, many studies of trajectories of mental health report that large proportions of the samples studied display relatively unchanging levels of mental health problems, psychological distress or depressive symptoms over time (for example, Avison et al. 2008; Broidy et al. 2003; McLeod and Fettes 2007; Moffitt et al. 1996) and that the proportions of samples with stable, high levels of problems typically exceed those with increasing or decreasing levels over time. This constitutes a challenge to researchers because these smaller subsamples threaten the statistical power of these research designs. Accordingly, it is often difficult to find statistically significant risk and protective factors that differentiate among these trajectories.

A third challenge to life course research is more conceptual in nature. Some researchers

have argued that social conditions are predictive of certain kinds of subsequent mental health trajectories. For example, Meadows (2009) has documented how differences in family structure among men in the *Fragile Families and Child Wellbeing Study* appear to have consequences for their trajectories of mental health. Others have argued that trajectories of social experience are associated with mental health outcomes measured subsequently. Thus, McLeod and Shanahan (1993) demonstrate that the persistence of poverty predicts children's symptoms of depression and anxiety over and above the effect of current poverty. Still other investigators have suggested that trajectories of social experience may influence trajectories of mental health outcomes. McLeod and Shanahan (1996) extended their earlier work to show how children's experience of persistent poverty is associated with increased antisocial behavior over the same period of time. Avison et al. (2008) have documented the association of patterns of stability and change in family structure over a 14-year period are correlated with mothers' trajectories of psychological distress.

These examples point to a very complex relationship between social experience and mental health over the life course. The challenge for life course researchers is to unravel this complexity. Presumably, some of the association between trajectories that characterize individuals' position in the social structure and trajectories of mental health represents classic social causation processes and some will reflect social selection effects. To date, life course investigators have not developed specific conceptual frameworks that allow us to draw firm conclusions about the relative impact of selection and causation in influencing these trajectories.

The dense causal webs that connect various social experiences with mental health at various points in the life course highlight the challenges of specifying causal pathways in life course research on mental health. There have been divergent responses to this complexity. George (2013, 2014) has argued that the concepts of social selection and social causation are not especially meaningful to life course researchers when they

trace the patterns of adversity and mental health over long periods of time. Nevertheless, she also points out that there several quantitative analytic techniques that are useful in estimating reciprocal pathways among socio-economic factors, stressful experiences, and mental health.

Other researchers have employed natural experiments to generate causal evidence that social experiences affect mental health outcomes (see also Johnson et al., chapter "Education, Health, and Historical Change" this volume). A notable example of this is Costello and colleagues' (Costello et al. 2003) Great Smokey Mountains Study of a sample of American Indian and white children. During the course of this study, a casino was opened on an Indian reservation and every American Indian received an income supplement with an annual increase. Costello et al. report that the income intervention that moved families out of poverty was responsible for a significant decline in conduct and oppositional disorder among children, but no significant improvement in anxiety or depression.

Huang et al. (2013) have described a natural experiment in China in which exposure to the 1959–1961 Chinese Famine in utero or in the early post-natal period was examined for its effects on mental health some 40 years later. They conclude that such early adversities increased the risk of mental illness among women but decreased the risk among men. They attribute this gender difference to selection effects in utero that favor survival only among the most robust males.

These two examples highlight both the potential of natural experiments to test causal hypotheses as well as the particular challenges to them. Even when it appears that the "assignment" of subjects to the exposed and non-exposed conditions is random, certain systematic selection effects may compromise these natural experiments. Nevertheless, these two studies provide excellent examples of the utility of such designs in life course research in mental health.

Still other researchers have tried to unravel the complexity that is inherent in the study of the pathways among social experiences, stressors,

mediators and moderators, and mental health outcomes by employing new analytic techniques. An interesting example of this is Longest and Thoits' (2012) use of a configurational approach to examine the multiple contingent pathways within the stress process. They demonstrate how Fuzzy Set Qualitative Comparative Analysis (fsQCA) is able to identify complex models that capture the complicated patterns that are characteristic of the interplay of key elements of the stress process.

There is another issue concerning trajectories of mental health outcomes that deserves attention. The vast majority of studies on trajectories that has emanated from the sociology of mental health has employed continuous measures of psychological distress or indices of symptomatology. Primarily, this has been a methodological rather than a substantive decision. In survey research, collection of data sufficient to generate diagnoses of specific psychiatric disorder is costly and time consuming for the researcher and may be burdensome to respondents. Accordingly, we have few life course studies that consider trajectories of psychiatric illness.

In a 23-year prospective study, Eaton et al. (2008) report that approximately half of individuals who experience their first depressive episode recover and suffer no further depression; another 35 % experience at least one recurrent episode, and 15 % report unremitting, continuous depression. It is noteworthy that these results were based on interviews with 92 of 1071 participants in the 1993 Epidemiologic Catchment Area survey in Baltimore. Thus, less than 10 % of the survey sample had a first episode. This highlights the methodological challenge of constructing trajectories of mental disorder: the incidence of first onset of disorder is low and the patterns of recurrence seem either to be episodic or constant. Thus, the "sparseness" of data on the course of major depression does not lend it itself particularly well to analyses of trajectories.

There are, however, important ways in which a life course approach to diagnosed psychiatric disorder can be undertaken. Aneshensel (2013) provides a very interesting analysis of mental illness as a career to highlight how the course of

psychiatric disorder has a cumulative effect on individuals' lives. George's (2013, 2014) thinking has also been very influential in developing a life course approach to diagnosed disorder. She argues that episodes of mental illness connect with individuals' trajectories of work and family experiences. These experiences may be important influences on patterns of remission and recurrence.

2.2 New Directions in the Study of Trajectories of Mental Health

If we think about the many developments in research on the stress process and the progress that has been made in examining trajectories of mental health, a number of new directions for future investigation arise. Most of these reflect conceptual developments that can be easily synthesized with current theory in life course research in the sociology of mental health.

It seems clear that adolescence and early adulthood are segments of the life course where levels of psychological distress or psychiatric symptomatology are especially elevated. There is general agreement that children's experiences may be important, not only for creating set points for trajectories of mental health, but also for influencing the arc of these trajectories. If we accept this, then a life course analysis of mental health ought to consider the social and social psychological conditions of children, the stressful experiences that arise out of these conditions, and the processes that mediate and moderate the stress process in childhood (Avison 2010). The relevant social and social psychological conditions of childhood include family structure, race and ethnicity, and parental socio-economic status, among others. Of course, these conditions intersect and have complex effects on children's lives. Increasing heterogeneity of family structure in terms of the different kinds of family types (married parents with children, cohabiting parents with children, blended families, single-parent families, etc.) and increasing cultural and ethnic diversity in modern societies suggest that

the effects of structural characteristics on children's exposure to stress and their subsequent mental health will be contingent on one another.

At the same time, it seems clear that children's neighborhood environments affect their exposure to stress and their emotional well-being. Aneshensel and Sucoff (1996) have documented how neighborhoods are critical environments for children and adolescents. Wheaton and Clarke (2003) extend these ideas to incorporate life course elements by demonstrating that the neighborhoods in which children grow up have consequences for child and adolescent mental health which manifests itself further along the life course in terms of psychological distress in adulthood.

One of most important developments in stress has been the specification of the vast array of different kinds of stressors to which individuals are exposed. Pearlin's observation that social stress involves more than stressful life events and ought to include other dimensions such as role related and ambient strains set stress research on this path. Wheaton's (1994) concept of a stress universe – the idea that individuals may be exposed to a large number of different kinds of stressful experience – has been a hallmark of this perspective. Turner et al. (1995) demonstrated the value of including multiple dimensions of stress to account for social differences in mental health outcomes. Turner and Avison (2003) extended this line of work to show how a more comprehensive estimate of stress, including measures of traumatic experiences and personal adversities as well as indicators of discrimination stress, was a much more powerful explanation of differences in psychological distress associated with racial/ethnic, social class, and to a lesser extent, gender than was a simple checklist measure of stressful life events.

Stress researchers have continued to expand this universe by developing inventories to index adversities and significant stressful experiences in childhood and adolescence. Although we now have evidence that stressors experienced early in the life course have consequences for psychological distress in adulthood, there is still much work

to be done in developing a stress universe for children (see Avison 2010).

At the same time, stress researchers have also acknowledged that the meaning of stressful experience is an important factor that influences any particular stressor's impact on an individual. McLeod (2012) has argued that the cultural and structural conditions in which people live influence their experiences of stressors. She also suggests that the ways in which individuals make sense of their stressful experiences occurs in the context of meaning negotiations with other people in their lives. Thus, the importance of linked lives for the negotiation of meaning may have implications for life course studies of stress and mental health.

The meaning of stressors has also been addressed from a somewhat different perspective. Turner and Avison (1992) and Reynolds and Turner (2008) have employed crisis theory to demonstrate that the impact of stressors on individuals' mental health is influenced by whether such events are perceived to be crisis experiences. In addition, they find some support for the idea that events that are successfully resolved in the minds of individuals have less effect on subsequent psychological distress.

As work progresses in this area, there is also a conceptual challenge to life course researchers. To date, most models of trajectories of stress accumulation over the life course tend to be more strongly driven by methodological considerations than by any conceptual model of stress accumulation. The idea of cumulative adversity has much to recommend itself as a way of thinking about the experience of stress over the life course, but relatively little work has focused on what form such accumulation might take. For example, we do not know whether stressors "build up" as a linear, additive function or whether they do so exponentially. Moreover, although we have evidence that the impact of stressful life events on psychological distress deteriorates with the passage of time (Avison and Turner 1988), we do not have any systematic, corresponding knowledge about traumatic stressors or childhood adversities. This seems to have limited the ways in which we con-

sider trajectories of stress accumulation across the life course.

DiPrete and Eirich (2006) have provided a comprehensive review of the ways in which the concept of cumulative advantage have been employed in sociological research. They also describe in some detail the statistical models that can be used to estimate cumulative advantage in a number of different contexts. These models appear to have considerable potential for better specifying processes of stress accumulation over the life course.

A third opportunity for life course research on trajectories of mental health has emerged with the expanded knowledge that we have about the link between physical health and mental health. For decades, sociologists of mental health have known of the interplay between physical and mental health (Aneshensel et al. 1984; Turner and Noh 1988). There is now a substantial body of research that has examined the important effects of physical illness on depressive symptoms in older age (Gayman et al. 2008; Schieman and Plickert 1997; Yang 2006). Bierman and Pearlin (2011) examine the ways in which trajectories of physical limitations influence levels of psychological distress in later life. Their results point to the important roles that mobility and functional limitations play in mediating the relationship between SES and psychological distress in later life. Although they do not examine how trajectories of limitations are related to trajectories of mental health because of the complexity of such analyses, they clearly suggest that this is a next step in this line of inquiry.

Other opportunities for integrating important life course concepts into the sociology of mental health have presented themselves in recent years. If we think about trajectories of mental health over the life course, it seems reasonable to expect that there may be certain *turning points* or *milestones* along these trajectories that are important to identify and understand. George (2014) has provided some interesting insights into these events or experiences that alter life trajectories. She argues that certain experiences alter the direction of an existing trajectory in a permanent

manner. These turning points or milestones significantly change the course and sequelae of mental illness for individuals. One of the most influential turning points or milestones is early onset of psychiatric disorder.

Research in mental health has clearly documented how the early onset of a psychiatric disorder is associated with poorer prognosis, including more frequent recurrence, longer durations of episodes (Harrington et al. 1990; Lewinsohn et al. 1994). Turnbull et al. (1990) document lower levels of socioeconomic attainment and higher rates of separation and divorce. These patterns have also been reported by Wade and Pevalin (2004) for subsequent divorce, Davies et al. (1997) for single parenthood, and McLeod and Fettes (2007) for educational attainment. Thus, the experience of a mental health problem early in one's life may constitute a turning point or milestone that significantly alters one's life chances.

Another central principle of the life course perspective is the concept of *linked lives*, the idea that individuals' lives are interconnected and that one person's life experiences have consequences for others. Using this concept as an organizing principle, Avison and Comeau (2013) have reviewed two distinct bodies of literature related to the consequences of mental illness for families. The first concerns the intergenerational transmission of mental illness; the second focuses on the mental health of individuals who provide care to family members who have chronic illness.

There is substantial evidence of a significant correlation between parental mental illness and children's emotional and behavioral problems. Although much of the research in this area has been conducted by developmentalists and psychiatrists, it seems clear that there are numerous opportunities for life course researchers in mental health to examine this relationship. Avison and Comeau's review is organized around the mediating and moderating mechanisms that have been described by Goodman and Gotlib (2002) in their Integrative Model for the Transmission of Risk. This model identifies four sets of mediators

that link parental mental disorder with children's mental health problems: (1) heritability; (2) innate dysfunctional neuroregulation; (3) exposure to maladaptive maternal behaviors and cognitions; and (4) elevated exposure to stressors.

Although there is ample evidence of *genetic sources* of familial aggregation of mental disorder, the identification of candidate genes has been a relatively slow process. Goodman and Gotlib suggest that *innate dysfunctional neuroregulatory processes* may also link maternal and child depression. Goodman (2007) has reviewed a substantial body of research documenting how elevated neuroendocrine secretions during pregnancy among anxious or depressed mothers may expose their children prenatally to elevated risks for neurodevelopmental challenges. The third class of mediators consists of *qualities of parenting* that may elevate children's risk of depression (see Dix and Meunier 2009, for a review) as a result of lower levels of competence in parenting including parental withdrawal, emotional negativity toward children, and ineffective discipline. The fourth group of mediators consists of *stressors*. These mediators include marital or family discord (Cummings et al. 2005; Papp 2010; Whisman and Kaiser 2008) as well as acute and chronic stressors reported by children (Grant et al. 2003; Hammen et al. 2003).

The second area that Avison and Comeau (2013) survey concerns the mental health of individuals providing care to family members who suffer from chronic illness. There is a long history in the sociology of mental health of studying the families of individuals with psychiatric disorders (Clausen and Yarrow 1955; Greenberg et al. 1997; Noh and Avison 1988; Noh and Turner 1987). More recent studies have explicitly adopted a stress process framework that is consistent with the life course perspective (Awad and Voruganti 2008; Townsend et al. 2006).

Perhaps the most impressive advances in life course approaches to caregiving have emerged from programs of research on individuals providing care to family members with Alzheimer's disease and other late-life dementias (Aneshensel et al. 1995; Pearlin et al. 2001) and studies of caregiving to individuals with AIDS (Moskowitz

et al. 1996; Pearlin et al. 1997; Turner and Catania 1997). All of these studies reinforce the idea that there is much that a life course perspective can bring to the study of the linked lives of individuals with chronic illnesses.

3 Mental Health, Biology, Social Experience, and the Life Course

In the sociology of mental health, there has always been a certain tension concerning the roles that biological or physiological processes might play in explaining social disparities in mental health outcomes. It is one thing to assert that there are biological determinants of mental illness; it is quite another thing to argue that biological processes account for social differences in the prevalence of mental illness.

Recently, there have been at least three developments which suggest mechanisms that at least partially explain how biological processes may mediate the association between social status and mental health outcomes: (1) the developmental origins of health and disease; (2) childhood adversity and proinflammatory response; and (3) genetics and epigenetics. Because these processes unfold over time, the importance of understanding them as life course phenomena is critical.

3.1 The Barker Hypothesis and the Developmental Origins of Health and Disease

Over the past two decades, there has been an exponential growth in the body of research that focuses on the developmental origins of health and disease (DOHaD). Much of this is research that links low birth weight (LBW) or births small for gestational age (SGA) to subsequent elevated risk of various diseases in adulthood. The developmental hypothesis or the Barker hypothesis, as it has become known, proposes that fetal malnutrition (and perhaps fetal oxygen deprivation) results in changes in fetal growth, metabolism,

and vasculature that adversely affect renal, pancreatic, and cardiac development in utero and in infancy as well as subsequent changes to the hypothalamic-pituitary-adrenal (HPA) axis. All of these early consequences of fetal growth restriction are known precursors of hypertension, renal failure, and insulin resistance (elements of the metabolic syndrome), and coronary heart disease (Barker 1995, 1998, 2006; Hales and Barker 2001).

Barker (2006) gives three reasons why individuals born small are vulnerable to disease in later life. Fetal growth restriction results in limited functional capacity of critical organs such as the kidneys and heart. Second, abnormal fetal/childhood hormonal and metabolic levels maximize blood glucose concentrations for the brain at the cost of limiting such transport into muscles and muscle growth. Third, individuals born SGA may be vulnerable to environmental adversities across the life course.

Although much of Barker's formulation clearly implicates processes that play out across the life course, this last point is especially important to sociologists because it highlights potential interactive effects of LBW and socio-economic influences on subsequent adult disease. Barker et al. (2005) have demonstrated with data from a birth cohort from Helsinki that the inverse association between household income in adulthood and coronary heart disease was limited to men who were small at birth. The Whitehall studies (Marmot and Wilkinson 2001) have suggested that lower socio-economic status may expose individuals to ongoing stress that elevates serum cortisol and creates changes in neuroendocrine and HPA pathways that are linked to coronary heart disease and the metabolic syndrome.

There is a large literature that documents higher rates of intrauterine growth restriction (IUGR) among infants born to mothers with lower income, lower SES, or lower education (see Kramer et al. 2000, for a review). In an attempt to identify the important mediators of the SES-IUGR relationship, Kramer et al. (2000) conclude that the factors that mediate this relationship between SES and IUGR are smoking during pregnancy, low gestational weight gain,

and short maternal stature. For life course researchers, the Barker hypothesis has substantial significance because it suggests that there are important social structural factors that may contribute to restricted fetal growth that in turn manifests itself in disease in adulthood.

It may also have implications for life course research on mental health. Thompson et al. (2001) analyzed data from a sample of individuals born in Hertfordshire county in England in the 1920s who were reinterviewed in their 60s or 70s. Current social class, class at birth, recent loss of a loved one, and current experience of an illness causing pain or limiting activities were all significant predictors of depression among this sample. After controlling for these factors, low birth weight was a significant predictor of depression among men but not women. This association is consistent with the Barker hypothesis, at least for men, although it is unclear why there was a gender difference. In an earlier study of the same cohort, Barker et al. (1995) report higher rates of suicide among individuals born small, a finding that again seems to support the hypothesis about the developmental origins of mental health problems.

Other studies have reported similar findings. Brown and colleagues (1995, 2002) document elevated rates of affective disorder in adulthood among children whose mothers were exposed to the Dutch Hunger Winter of 1944–1945 during their second trimester. Among a cohort born in Helsinki between 1934 and 1944, Raikkonen et al. (2007) report significant associations between gestational age at birth and scores on the Beck Depression Inventory at mean age 61 and Center for Epidemiologic Studies-Depression scores at mean age 63. These associations remained significant after controlling for social class at birth, educational attainment, gender, birth weight, and body mass index as an adult.

Other studies have shown that trajectories of symptoms of depression and anxiety over the life course are associated with birth weight. With data from the British National Survey of Health and Development, Colman et al. (2007) examined trajectories of symptoms of depression and

anxiety among a cohort of babies born in 1946 and followed over 53 years. They find that lower birth weight and delays in early development are associated with higher levels of symptoms in middle age.

Some caution is necessary in interpreting these findings. First, it is unclear whether the modest controls for mother's socio-economic status at birth and in adulthood are sufficient to explain away the life course effects of SES on mental health. It seems unlikely that these statistical controls can capture all the social structural influences in an individual's life. As Link and Phelan (1995) and Phelan and Link (2005) have so clearly demonstrated in their explication of fundamental causes, the effects of social class on health may be pervasive and operate along a dense series of causal pathways. Accordingly, controlling for only one or two dimensions of social structure at selected points in the life course is unlikely to be a convincing demonstration that the effect of birth weight on adult mental health is not a function of the persistent influence of SES on pregnancy, childhood, adolescence, and adulthood.

There is some evidence from studies of infant mortality that low birth weight is a correlate of adverse birth outcomes, but it is not on the causal pathway to infant mortality. This argument is referred to as the Wilcox-Russell hypothesis (Wilcox 2001; Wilcox and Russell 1983a, b). Essentially, this challenge to the Barker hypothesis suggests that certain risk factors (such as maternal age, maternal smoking) may influence *both* birthweight and infant mortality, but there is scant evidence that population shifts in birthweight produce concomitant changes in infant mortality (Gage et al. 2009). This suggests the need to test thoroughly for the possibility that social disadvantage may produce disparities in birthweight and, later, disparities in health across the life course. The same argument might well apply to other outcomes such as mental health. Thapar and Rutter (2009) have urged caution in interpreting the correlation of prenatal risk factors with adult psychiatric disorders as a causal pathway. Clearly, this represents an interesting opportunity for future research.

Thus far, tests of the Barker hypothesis have not fully considered the possibility that the focal relationship between SGA or IUGR and adult disease may reflect a linked series of social causation and social selection processes beginning in utero and unfolding across the life course. Given that babies of small gestation age or low birthweight are more likely to be born to lower SES mothers, it seems likely that the child's experience of social disadvantage throughout childhood and adolescence may expose him/her to a variety of stressors that contribute to poor physical and mental health. This is certainly consistent with recent work on cumulative disadvantage (Hayward and Gorman 2004; O'Rand and Hamill-Luker 2005) that describes processes that might well specify the mediating pathways that connect intrauterine growth restriction to adult mental health. McLeod and Pavalko (2008) have described how children's mental health problems may have consequences for school failure and George (2007) has suggested how early mental illness has consequences for achievement in adulthood and for adult mental illness. It is a reasonable hypothesis that the connections between IUGR and adult mental health might better be characterized as the interplay of social experiences and physiological processes across the life course. This is consistent with Avison's (2010) description of the social and mental health experiences of single mothers as *chains of adversity*. This is not to deny the Barker hypothesis, but rather to suggest that there are other pathways connecting SGA and IUGR to adult mental health status.

It may be, then, that children born small may be at risk of emotional and behavioral problems as a function of psychophysiological processes associated with the HPA system *and* family environments that are not conducive to healthy emotional development. These problems manifest themselves in academic challenges and failures that create trajectories of low achievement in adulthood that, in turn, contribute to elevated symptoms of psychiatric disorder or psychological distress. Life course researchers of mental health have important roles to play in unraveling these complex pathways.

3.2 Understanding How Social Experience “Gets Under the Skin”

The stress process paradigm has made an enormous contribution to our understanding of how individuals' locations in the social structure of society exposes them to more or less stress and how that stress is manifest as psychological distress or mental disorder. The synthesis of the stress process model with the life course perspective has contributed to increased interest in the ways that adversities and stressors in earlier life have consequences over the life course. For many scientists, what has been missing from these models is the specification of a biologically plausible set of pathways that connect socioeconomic status and stress exposure to subsequent mental health outcomes (see also Ferraro, chapter “[Life Course Lens on Aging and Health](#)” this volume).

Miller et al. (2011) have been at the forefront of research that links stress in childhood to chronic diseases in aging. In their comprehensive review of the literature on this issue, they develop a biological embedding model in which childhood stress results in proinflammatory responses as a result of various molecular biological processes. Over the life course, these inflammatory responses are exacerbated by behavioral tendencies including hypersensitivity to threat, mistrust of others, and conflictual social relationships, all of which contribute to emotional and behavioral problems over the life course.

Chen and Miller (2013) and Miller and Chen (2013) have written extensively on how socioeconomic status patterns the association between stressors and inflammatory processes. They argue that social disadvantage exposes individuals to the dynamic interplay of an array of stressors at the neighborhood level (exposure to violence, deficits in social capital), the family level (parenting problems, family conflict, the absence or disruption of routine), and the individual level (risky health behaviors, mistrust). These stressors contribute to elevated inflammatory response through processes described earlier.

Although much of Miller and Chen's work has been focused on physical health, the relevance of

these processes for mental health has been established by a substantial body of research documenting how inflammation and depression cluster in individuals who have experienced childhood adversities or traumas (Danese et al. 2008; Miller and Cole 2012).

In this context, one other development may also have important implications for life course approaches to research on mental health. The accumulated research on the effects of the social environment on inflammation has given rise to the field of human social genomics (Cole 2009, 2014). The central feature of this field is the hypothesis that everyday life experiences affect gene expression.

Shanahan (2014) has provided a provocative discussion of the opportunities for researchers who are interested in health across the life course. Essentially, he argues that progress in understanding how environmental stressors affect gene transcription can provide unique insights into the ways in which socioeconomic disadvantage translates into ill health through a series of genetic processes. He describes how complex, multilevel research designs incorporating peripheral blood sampling and longitudinal data collection about socio-environmental could be employed to examine various life course models of health outcomes.

Although his proposal focuses largely on physical health, there seems to be no reason that mental health outcomes would be excluded. After all, both the DOHaD hypothesis and the idea of proinflammatory responses to the social environment have been linked to mental health outcomes.

All of this research has important implications for life course studies of mental health. First, the experience of childhood adversity appears to be a turning point that sets in motion these physiological processes that culminate in the coupling of inflammatory responses and symptoms of depression. Second, this process takes time: it plays out over the life course. Third, the process seems to be influenced importantly by individuals' relationships with others (their parents, their spouses, the quality of their social relationships). Thus, the importance of linked lives seems to be highlighted in these processes.

For life course researchers in mental health, this current of research offers a number of interesting opportunities. For example, the association of inflammatory response with depression (Pace et al. 2006) may provide insights into the important relationship between some kinds of physical disability and depression in older age. Since many chronic diseases have a strong inflammatory component, there may be reason to explore how early adversity may exacerbate the link between physical disability and mental health problems.

As Cohen et al. (2010) have argued, the association between childhood SES and physical illness in adulthood has a number of alternative explanations. The correlation could be a function of the aggregation of “risky” genes in select families that elevates their risk of both poverty and poor health. It could be a function of the accumulation of adversity over the life course. It might also be the result of adversity in childhood that sets off recurrent chains of physiological processes as described by Miller and Chen. These same alternative explanations also seem plausible for understanding childhood disadvantage and adult mental health. For life course researchers, these possibilities generate a windfall of research questions that need to be addressed.

3.3 Genes, Epigenetic Processes, and Social Genomics

Research on the influence of genes on mental health outcomes has a long scientific history, but the modern era of investigation of this topic seems to have begun with the report by Caspi et al. (2003) in *Science* of a gene-environment interaction ($G \times E$) in which a variant in the serotonin transporter gene (5-HTTLPR) exacerbated the effects of child maltreatment and life events on depression. Since then, a number of papers have replicated this finding (for reviews, see Shanahan and Hoffer 2011; Uher 2014). These findings have set in motion a series of studies and discussions about the relative influences on mental health of genes, environments, their interactions and correlations. The complexity of

the interplay between the genome and social experience has been discussed widely in recent years (Kendler et al. 2011; Rutter 2007; Seabrook and Avison 2010; Shanahan and Hofer 2005).

There appear to be some important implications of this work for thinking about mental health in life course perspective. Shanahan and Hofer (2011) provide a very informative discussion of how one can think about models that incorporate sensitive periods, the accumulation of stress or the erosion of social capital, or pathways. Studies that report a $G \times E$ interaction where the environmental factor is a measure of life stress in childhood have been interpreted by some as examples of models invoking a sensitive period. A question that flows logically from these investigations of sensitive periods is whether the same $G \times E$ interaction can be observed among individuals for stressors that occur later in the life course. Uher (2014) has concluded that the weight of evidence suggests that the $G \times E$ interaction involving 5-HTTLPR “... is specific to the timing and type of adversity (childhood maltreatment vs. adulthood life events) and outcome (persistent depression rather than single time-limited depressive episodes) and depends on high-quality epidemiological methodology, including a detailed objective assessment of environmental exposures” (p. 6).

This clearly seems to specify an important role for life course researchers as we continue to unravel the complex interplay of the roles of social experiences and molecular genetics in shaping mental health outcomes. It suggests that there is a specificity to gene-environment interactions that requires testing over the life course.

To these considerations, one must consider the potential impact of epigenetic processes. The relatively recent recognition that epigenetic processes play important roles with respect to gene expression has revolutionized the way in which we think about genes and the environment. Epigenetic processes are alterations to DNA that activate or silence the DNA sequence. In lay terms, epigenetic processes switch genes off or on. Most importantly, these processes seem to be affected by environmental exposures such as toxins, pollutants, diet, and perhaps even social experience.

Although research on epigenetic processes is almost exclusively based on experiments with animal models, one of the most provocative findings has been that rat pups raised by more nurturant mothers are less responsive to stressors in later life and that these patterns may be heritable (Cameron et al. 2005; Meaney and Szyf 2005). The heritability of this lower responsiveness to stress implies that the nurturing behaviors may have produced epigenetic changes that influence subsequent generations.

Uher (2011) has proposed a life course model of the epidemiology and treatment of depression that hypothesizes the concurrent processes of genetic DNA sequences, epigenetic modifications, and social experience. For life course researchers, this offers a range on intriguing research questions to be pursued.

At the same time, some caution seems warranted in any uncritical race to incorporate the Barker hypothesis, inflammatory response models, social genomics, or genetic and epigenetics into life course studies of mental health. As Schnittker (2014) has noted with regard to social genomics, the field has been far more genomic than social. The ways in which social environments influence physiological processes may be extremely nuanced and may require considerably more input from social and behavioral scientists than has been the case thus far.

4 Which Way Forward?

It seems clear that there is an enormous number of opportunities for life course researchers interested in studying mental health. The first half of this chapter identified a series of important research questions that has arisen out of the synthesis of the stress process paradigm with the life course perspective. These questions have as their primary focus the relationship between social disparities and mental health outcomes.

The second half of this chapter has briefly reviewed new developments in the biological and life sciences that enable us to understand the physiological pathways and processes that translate social experiences into biological processes

that ultimately produce symptoms of mental health problems.

Whether one chooses to investigate the social and social psychological complexities that describe mental health across the life course or whether one incorporates features from bioscience into such studies ought to depend on the questions asked. Consistent with Shanahan and Hofer (2011), the review of the literature presented here clearly suggests that strictly socio-behavioral studies of mental health and the life course will answer questions that are just as pressing and important as those asked by molecular geneticists or physiological psychologists with training in genomics or cell biology.

For social scientists, the focus remains on understanding the complexities underling the links among social disparities, exposure to stress, and the experience of mental health across the life course. These questions can be answered without reference to molecular genetics or physiology.

For some social scientists and most bioscientists, the pressing questions concern the micro-processes that translate social experience into physiological processes and how these processes affect mental health across the life course. To answer these questions, a full array of scientists from diverse disciplines will need to collaborate to tell the full story about mental health across the life course.

Regardless of the particular focus that researchers select, there is a rich set of opportunities for life course research on mental health. All of this work will require careful conceptualizations of the research questions, rigorous yet inventive research designs, and sophisticated data analytic strategies.

References

- Aneshensel, C. S. (2013). Mental illness as a career: Sociological perspectives. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2nd ed., pp. 603–620). New York: Springer.
- Aneshensel, C. S., & Sucoff, C. A. (1996). The neighborhood context of adolescent mental health. *Journal of Health and Social Behavior*, 37, 293–301.

- Aneshensel, C. S., Frerichs, R. R., & Huba, G. J. (1984). Depression and physical illness – A multiwave, non-recursive causal model. *Journal of Health and Social Behavior*, 25, 350–371.
- Aneshensel, C. S., Rutter, C. M., & Lachenbruch, P. A. (1991). Competing conceptual and analytic models: Social structure, stress, and mental health. *American Sociological Review*, 56, 166–178.
- Aneshensel, C. S., Pearlin, L. I., & Schuler, R. H. (1993). Stress, role captivity, and the cessation of caregiving. *Journal of Health and Social Behavior*, 34, 54–70.
- Aneshensel, C. S., Pearlin, L. I., Mullan, J. T., Zarit, S. H., & Whitlach, C. J. (1995). *Profiles in caregiving: The unexpected career*. San Diego: Academic.
- Aneshensel, C. S., Botticello, A. L., & Yamamoto-Mitani, N. (2005). When caregiving ends: The course of depressive symptoms after bereavement. *Journal of Health and Social Behavior*, 45, 422–440.
- Aneshensel, C. S., Phelan, J. C., & Bierman, A. (Eds.). (2013). *Handbook of the sociology of mental health* (2nd ed.). New York: Springer.
- Avison, W. R. (2001). Unemployment and its consequences for mental health. In V. W. Marshall, W. Heinz, H. Krueger, & A. Verma (Eds.), *Restructuring work and the life course* (pp. 177–200). Toronto: University of Toronto Press.
- Avison, W. R. (2010). Family structure and women's lives: A life course perspective. In W. R. Avison, C. S. Aneshensel, S. Schieman, & B. Wheaton (Eds.), *Advances in the conceptualization of the stress process: Essays in honor of Leonard I. Pearlin* (pp. 71–92). New York: Springer.
- Avison, W. R., & Cairney, J. (2003). Social structure, stress, and personal control. In S. H. Zarit, L. I. Pearlin, & K. W. Schaie (Eds.), *Personal control in social and life contexts* (pp. 127–164). New York: Springer.
- Avison, W. R., & Comeau, J. (2013). The impact of mental illness on the family. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2nd ed., pp. 543–564). New York: Springer.
- Avison, W. R., & Davies, L. (2005). Family structure, gender, and health in the context of the life course. *Journals of Gerontology: Series B Psychological Sciences and Social Sciences*, 60B, S113–S116.
- Avison, W. R., & McAlpine, D. D. (1992). Gender differences in symptoms of depression among adolescents. *Journal of Health and Social Behavior*, 33, 77–96.
- Avison, W. R., & Turner, R. J. (1988). Stressful life events and depressive symptoms: Disaggregating the effects of chronic strains and eventful stressors. *Journal of Health and Social Behavior*, 29, 253–264.
- Avison, W. R., Davies, L., Willson, A., & Shuey, K. (2008). Family structure and mothers' mental health: A life course perspective on stability and change. In H. A. Turner & S. Schieman (Eds.), *Stress processes across the life course: Advances in life course research* (Vol. 13, pp. 233–255). New York: Elsevier.
- Awad, A. G., & Voruganti, L. N. P. (2008). The burden of schizophrenia on caregivers: A review. *PharmacoEconomics*, 26, 149–162.
- Barker, D. J. P. (1995). Fetal origins of coronary heart disease. *British Medical Journal*, 310, 171–174.
- Barker, D. J. P. (1998). *Mothers, babies and health in life* (2nd ed.). Edinburgh: Churchill Livingstone.
- Barker, D. J. P. (2006). Birth weight and hypertension. *Hypertension*, 48, 357–358.
- Barker, D. J. P., Osmond, C., Rodin, I., Fall, C. H. D., & Winter, P. D. (1995). Low-weight gain in infancy and suicide in adult life. *British Medical Journal*, 311, 1203.
- Barker, D. J. P., Osmond, C., Forsén, T. J., Kajantie, E., & Eriksson, J. G. (2005). Trajectories of growth among children who have coronary events as adults. *New England Journal of Medicine*, 353, 1802–1809.
- Barrett, A. E., & White, H. R. (2002). Trajectories of gender role orientations in adolescence and early adulthood: A prospective study of the mental health effects of masculinity and femininity. *Journal of Health and Social Behavior*, 43, 451–468.
- Barrett, A. E., & Turner, R. J. (2005). Family structure and mental health: The mediating effects of socioeconomic status, family process, and social stress. *Journal of Health and Social Behavior*, 46, 156–169.
- Bierman, A., & Pearlin, L. I. (2011). SES, trajectories of physical limitations, and change in depression in late life. *Society and Mental Health*, 1, 139–152.
- Broidy, L. M., Nagin, D. S., Tremblay, R. E., et al. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology*, 39, 222–245.
- Brown, G. W., & Harris, T. O. (1978). *Social origins of depression*. New York: Free Press.
- Brown, G. W., & Harris, T. O. (1989). *Life events and illness*. New York: Guilford Press.
- Brown, A. S., Susser, E. S., Lin, S. P., Neugebauer, R., & Gorman, J. M. (1995). Increased risk of affective disorders in males after second trimester prenatal exposure to the Dutch Hunger Winter of 1944–45. *British Journal of Psychiatry*, 161, 601–606.
- Brown, A. S., van Os, J., Driessens, C., Hoek, H. W., & Susser, E. S. (2002). Further evidence of relation between prenatal famine and major affective disorder. *American Journal of Psychiatry*, 157, 190–195.
- Cameron, N. M., Champagne, F. A., Parent, C., Fish, E. W., Ozaki-Kuroda, K., & Meaney, M. J. (2005). The programming of individual differences in defensive responses and reproductive strategies in the rat through variations in maternal care. *Neuroscience and Biobehavioral Reviews*, 29, 843–865.
- Caspi, A., Sugden, K., Moffitt, T. E., et al. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science*, 301, 386–389.

- Chen, Z. Y., & Kaplan, H. B. (2003). School failure in early adolescence and status attainment in middle adulthood: A longitudinal study. *Sociology of Education, 76*, 110–127.
- Chen, E., & Miller, G. E. (2013). Socioeconomic status and health mediating and moderating factors. *Annual Review of Clinical Psychology, 9*, 723–749.
- Clausen, J. A., & Yarrow, M. R. (1955). Introduction: Mental illness and the family. *Journal of Social Issues, 11*, 3–5.
- Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. *Annals of the New York Academy of Sciences, 1186*, 37–55.
- Cole, S. W. (2009). Social regulation of human gene expression. *Current Directions in Psychological Science, 18*, 132–137.
- Cole, S. W. (2014). Human social genomics. *PLoS Genetics, 10*, 1–7.
- Colman, I., Ploubidis, G. B., Wadsworth, M. E. J., Jones, P. B., & Croudace, T. J. (2007). A longitudinal typology of symptoms of depression and anxiety over the life course. *Biological Psychiatry, 62*, 1265–1271.
- Colman, I., Jones, P. B., Kuh, D., Weeks, M., Naicker, K., Richards, M., & Croudace, T. J. (2014). Early development, stress and depression across the life course: Pathways to depression in a national British cohort. *Psychological Medicine, 44*, 2845–2854.
- Conger, R. D., Conger, K. J., Elder, G. H., Jr., Lorenz, F. O., Simons, R. L., & Whitbeck, L. B. (1992). A family process model of economic hardship and adjustment of early adolescent boys. *Child Development, 63*, 526–541.
- Costello, E. J., Compton, S. N., Keeler, G., & Angold, A. (2003). Relationships between poverty and psychopathology: A natural experiment. *Journal of the American Medical Association, 290*, 2023–2029.
- Cummings, E. M., Keller, P. S., & Davies, P. (2005). Towards a family process model of maternal and paternal depressive symptoms: Exploring multiple relationships with child and family functioning. *Journal of Child Psychology and Psychiatry, 46*, 479–489.
- Danese, A., Moffitt, T. E., Pariante, C. M., Ambler, A., Poulton, R., & Caspi, A. (2008). Elevated inflammation levels in depressed adults with a history of childhood maltreatment. *Archives of General Psychiatry, 65*, 409–415.
- Davies, L., Avison, W. R., & McAlpine, D. D. (1997). Significant life experiences and depression among single and married mothers. *Journal of Marriage and the Family, 59*, 294–308.
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology, 32*, 271–297.
- Dix, T., & Meunier, L. N. (2009). Depressive symptoms and parenting competence: An analysis of 13 regulatory processes. *Developmental Review, 29*, 45–68.
- Eaton, W. W., Shao, H., Nestadt, G., Lee, B. H., Bienvenu, O. J., & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives of General Psychiatry, 65*, 513–520.
- Elder, G. H., Jr., George, L. K., & Shanahan, M. J. (1996). Psychosocial stress over the life course. In H. B. Kapan (Ed.), *Psychosocial stress: Perspectives on structure, theory, life-course, and methods* (pp. 247–292). New York: Academic.
- Forthofer, M. S., Kessler, R. C., Story, A. L., & Gotlib, I. H. (1996). The effects of psychiatric disorders on the probability and timing of first marriage. *Journal of Health and Social Behavior, 37*, 121–132.
- Gage, T. B., Fang, F., O'Neill, E., & Stratton, H. (2009). Maternal age and infant mortality: A test of the Wilcoxon-Russell hypothesis. *American Journal of Epidemiology, 169*, 294–303.
- Gayman, M. D., Turner, R. J., & Cui, M. (2008). Physical limitations and depressive symptoms. *Journal of Gerontology: Social Sciences, 63B*, S219–S228.
- George, L. K. (2007). Life course perspectives on social factors and mental illness. In W. R. Avison, J. D. McLeod, & B. A. Pescosolido (Eds.), *Mental health, social mirror* (pp. 191–218). New York: Springer.
- George, L. K. (2013). Life-course perspectives on mental health. In C. S. Anshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2nd ed., pp. 585–602). New York: Springer.
- George, L. K. (2014). Taking time seriously: A call to action in mental health research. *Journal of Health and Social Behavior, 55*, 251–264.
- George, L. K., & Lynch, S. M. (2003). Race differences in depressive symptoms: A dynamic perspective on stress exposure and vulnerability. *Journal of Health and Social Behavior, 44*, 353–369.
- Gibb, S. J., Fergusson, D. M., & Horwood, L. J. (2012). Childhood family income and life outcomes in adulthood: Findings from a 30-year longitudinal study in New Zealand. *Social Science & Medicine, 74*, 1979–1986.
- Goodman, S. H. (2007). Depression in mothers. *Annual Review of Clinical Psychology, 3*, 107–135.
- Goodman, S. H., & Gotlib, I. H. (Eds.). (2002). *Children of depressed parents: Mechanisms of risk and implications for treatment*. Washington, DC: American Psychological Association.
- Gore, S., & Aseltine, R., Jr. (2003). Race and ethnic differences in depressed mood following the transition out of high school. *Journal of Health and Social Behavior, 44*, 370–389.
- Gotlib, I. H., & Wheaton, B. (Eds.). (1997). *Stress and adversity over the life course: Trajectories and turning points*. Cambridge: Cambridge University Press.
- Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin, 129*, 447–466.

- Greenberg, J. S., Kim, H. W., & Greenley, J. R. (1997). Factors associated with subjective burden in siblings of adults with severe mental illness. *American Journal of Orthopsychiatry*, *67*, 231–241.
- Hales, N. C., & Barker, D. J. P. (2001). The thrifty phenotype hypothesis. *British Medical Bulletin*, *60*, 5–20.
- Hammen, C., Shih, J., Altman, T., & Brennan, P. A. (2003). Interpersonal impairment and the prediction of depressive symptoms in adolescent children of depressed and nondepressed mothers. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*, 571–577.
- Harrington, R., Fudge, H., Rutter, M., Pickles, A., & Hill, J. (1990). Adult outcomes of child and adolescent depression: I. psychiatric status. *Archives of General Psychiatry*, *47*, 465–473.
- Harris, T. O., Brown, G. W., & Bifulco, A. (1986). Loss of parent in childhood and adult psychiatric disorder: Role of lack of adequate parental care. *Psychological Medicine*, *16*, 641–659.
- Harris, T. O., Brown, G. W., & Bifulco, A. T. (1990). Depression and situational helplessness/mastery in a sample selected to study childhood parental loss. *Journal of Affective Disorders*, *20*, 27–41.
- Hatch, S. L., & Dohrenwend, B. P. (2007). Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES and age: A review of the research. *American Journal of Community Psychology*, *40*, 313–332.
- Hayward, M. D., & Gorman, B. K. (2004). The long arm of childhood: The influence of early-life social conditions on men's mortality. *Demography*, *41*, 87–107.
- Horwitz, A. V., Widom, C. S., McLaughlin, J., & White, H. R. (2001). The impact of childhood abuse and neglect on adult mental health: A prospective study. *Journal of Health and Social Behavior*, *42*, 184–201.
- Huang, C., Phillips, M. R., Zhang, Y., Zhang, J., Shi, Q., Song, Z., Ding, Z., Pang, S., & Martorell, R. (2013). Malnutrition in early life and adult mental health: Evidence from a natural experiment. *Social Science & Medicine*, *97*, 259–266.
- Johnson, W. L., Giordano, P. C., Longmore, M. A., & Manning, W. D. (2014). Intimate partner violence and depressive symptoms during adolescence and young adulthood. *Journal of Health and Social Behavior*, *55*, 39–55.
- Kendler, K., Jaffee, S., & Romer, D. (Eds.). (2011). *The dynamic genome and mental health: The role of genes and environments in mental health*. New York: Oxford University Press.
- Kessler, R. C., & Magee, W. J. (1993). Childhood adversities and adult depression: Basic patterns of association in a U. S. national survey. *Psychological Medicine*, *23*, 679–690.
- Kessler, R. C., & Magee, W. J. (1994). Childhood family violence and adult recurrent depression. *Journal of Health and Social Behavior*, *35*, 13–27.
- Kessler, R. C., Berglund, P., Demier, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 593–602.
- Kramer, M. S., Seguin, L., Lydon, J., & Goulet, L. (2000). Socio-economic disparities in pregnancy outcome: Why do the poor fare so poorly? *Paediatric and Perinatal Epidemiology*, *14*, 194–210.
- Kuh, D., Hardy, R., Rodgers, B., & Wadsworth, M. E. J. (2002). Lifetime risk factors for women's psychological distress in midlife. *Social Science & Medicine*, *55*, 1957–1973.
- Lee, S., Guo, W. J., Tsang, A., He, Y. L., Zhang, M. Y., Shan, Y. C., & Kessler, R. C. (2011). The prevalence of family childhood adversities and their association with first onset of DSM-IV disorders in metropolitan China. *Psychological Medicine*, *41*, 85–96.
- Lewinsohn, P. M., Clarke, G. N., Seeley, J. R., & Rohde, P. (1994). Major depression in community adolescents – Age at onset, episode duration, and time to recurrence. *Journal of the American Academy of Child and Adolescent Psychiatry*, *33*, 809–818.
- Link, B. G., & Phelan, J. C. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior*, *36*, Extra Issue, 80–94.
- Longest, K. C., & Thoits, P. A. (2012). Gender, the stress process, and health: A configurational approach. *Society and Mental Health*, *2*, 187–206.
- Luo, Y., & Waite, L. J. (2005). The impact of childhood and adult SES on physical, mental, and cognitive well-being in later life. *Journals of Gerontology Series B Psychological and Social Sciences*, *60*, S93–S101.
- Macmillan, R., & Copher, R. (2005). Families in the life course: Interdependency of roles, role configurations, and pathways. *Journal of Marriage and the Family*, *67*, 858–879.
- Marmot, M. G., & Wilkinson, R. G. (2001). Psychosocial and material pathways in the relation between income and health: A response to Lynch et al. *British Medical Journal*, *322*, 1233–1236.
- McGue, M., & Iacono, W. G. (2005). The association of early adolescent problem behavior with adult psychopathology. *American Journal of Psychiatry*, *162*, 1118–1124.
- McLeod, J. D. (1991). Childhood parental loss and adult depression. *Journal of Health and Social Behavior*, *32*, 205–220.
- McLeod, J. D. (2012). The meanings of stress: Expanding the stress process model. *Society and Mental Health*, *3*, 172–186.
- McLeod, J. D., & Edwards, K. (1995). Contextual determinants of children's responses to poverty. *Social Forces*, *73*, 1487–1516.
- McLeod, J. R., & Fettes, D. L. (2007). Trajectories of failure: The educational careers of children with mental health problems. *American Journal of Sociology*, *113*, 653–701.
- McLeod, J. D., & Pavalko, E. K. (2008). Selection and the stress process: What does attention to the life course

- offer? In H. A. Turner & S. Schieman (Eds.), *Stress processes across the life course: Advances in life course research* (Vol. 13, pp. 75–104). Oxford: Elsevier.
- McLeod, J. D., & Shanahan, M. (1993). Poverty, parenting, and children's mental health. *American Sociological Review*, *58*, 351–366.
- McLeod, J. D., & Shanahan, M. (1996). Trajectories of poverty and children's mental health. *Journal of Health and Social Behavior*, *37*, 207–220.
- Meadows, S. O. (2009). Family structure and fathers' well-being: Trajectories of mental health and self-rated health. *Journal of Health and Social Behavior*, *50*, 115–131.
- Meaney, M. J., & Szyf, M. (2005). Environmental programming of stress responses through DNA methylation: Life at the interface between a dynamic environment and a fixed genome. *Dialogues in Clinical Neurosciences*, *7*, 103–123.
- Meeks, S., Murrell, S. A., & Mehl, R. C. (2000). Longitudinal relationships between depressive symptoms and health in normal older and middle-aged adults. *Psychology and Aging*, *15*, 100–109.
- Menaghan, E. G. (1997). Intergenerational consequences of social stressors: Effects of occupational and family conditions on young mothers and their children. In I. H. Gotlib & B. Wheaton (Eds.), *Stress and adversity over the life course: Trajectories and turning points* (pp. 114–196). New York: Cambridge University Press.
- Menaghan, E. G. (2009). Stress and distress in childhood and adolescence. In T. L. Scheid & T. N. Brown (Eds.), *A handbook for the study of the sociology of mental health* (2nd ed., pp. 321–333). New York: Cambridge University Press.
- Menaghan, E. G., & Parcel, T. L. (1994). *Parents' jobs and children's lives*. New York: Aldine de Gruyter.
- Menaghan, E. G., & Parcel, T. L. (1995). Social sources of change in children's home environments: The effects of parental occupational experiences and family conditions. *Journal of Marriage and the Family*, *57*, 69–84.
- Miech, R. A., & Shanahan, M. J. (2000). Socioeconomic status and depression over the life course. *Journal of Health and Social Behavior*, *41*, 162–176.
- Miller, G. E., & Chen, E. (2013). The biological residue of poverty. *Child Development Perspectives*, *7*, 67–73.
- Miller, G. E., & Cole, S. W. (2012). Clustering of depression and inflammation in adolescents previously exposed to childhood adversity. *Biological Psychiatry*, *72*, 34–40.
- Miller, G. E., Chen, E., & Parker, K. J. (2011). Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving toward a model of behavioral and biological mechanisms. *Psychological Bulletin*, *137*, 959–997.
- Moffitt, T. E., Caspi, A., Dickson, N., et al. (1996). Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3 to 18 years. *Developmental Psychopathology*, *8*, 399–424.
- Moskowitz, J. T., Folkman, S., Collette, L., & Vittinghoff, E. (1996). Coping and mood during AIDS-related caregiving and bereavement. *Annals of Behavioral Medicine*, *18*, 49–57.
- Noh, S., & Avison, W. R. (1988). Spouses of discharged psychiatric patients: Factors associated with their experiences of burden. *Journal of Marriage and the Family*, *50*, 377–389.
- Noh, S., & Turner, R. J. (1987). Living with psychiatric patients: Implications for the mental health of family members. *Social Science and Medicine*, *25*, 263–271.
- O'Rand, A. M., & Hamil-Luker, J. (2005). Processes of cumulative adversity: Childhood disadvantage and increased risk of heart attack across the life course. *Journals of Gerontology Series B Psychological Sciences and Social Sciences*, *60*, S117–S124.
- Pace, T. W. W., Mletzko, T. C., Algabe, O., et al. (2006). Increased stress-induced inflammatory responses in male patients with major depression and increased early life stress. *American Journal of Psychiatry*, *163*, 1630–1633.
- Papp, L. M. (2010). The course and quality of intimate relationships among psychologically distressed mothers. *American Journal of Orthopsychiatry*, *89*, 71–79.
- Pearlin, L. I. (1983). Role strains and personal stress. In H. B. Kaplan (Ed.), *Psychosocial stress: Trends in theory and research* (pp. 3–32). New York: Academic.
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior*, *30*, 241–256.
- Pearlin, L. I. (1999). The stress concept revisited: Reflections on concepts and their interrelationships. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the sociology of mental health* (pp. 395–415). New York: Plenum.
- Pearlin, L. I., & Skaff, M. M. (1996). Stress and the life course: A paradigmatic alliance. *Gerontologist*, *36*, 239–247.
- Pearlin, L. I., Lieberman, M. A., Menaghan, E. G., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior*, *22*, 337–356.
- Pearlin, L. I., Aneshensel, C. S., & LeBlanc, A. J. (1997). The forms and mechanisms of stress proliferation: The case of AIDS caregivers. *Journal of Health and Social Behavior*, *38*, 223–236.
- Pearlin, L. I., Pioli, M., & McLaughlin, A. (2001). Role disruption and distress among caregivers to parents with Alzheimer's disease. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (5th ed., pp. 238–254). New York: Academic.
- Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, *46*, 205–219.
- Phelan, J. C., & Link, B. G. (2005). Controlling disease and creating disparities: A fundamental cause perspective. *Journals of Gerontology Series B Psychological Sciences and Social Sciences*, *60*, S27–S33.

- Raikkonen, K., Personen, A.-K., Kajantie, E., Heinonen, K., Forsen, T., Phillips, D. I. W., Osmond, C., Barker, D. J. P., & Eriksson, J. G. (2007). Length of gestation and depressive symptoms at age 60 years. *British Journal of Psychiatry*, *190*, 469–474.
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, *90*, 24–31.
- Reynolds, J. R., & Turner, R. J. (2008). Major life events: Their personal meaning, resolution, and mental health significance. *Journal of Health and Social Behavior*, *49*, 223–237.
- Ross, C. E., & Mirowsky, J. (1999). Parental divorce, life-course disruption, and adult depression. *Journal of Marriage and the Family*, *61*, 1034–1045.
- Rutter, M. (2007). Gene-environment interdependence. *Developmental Science*, *10*, 12–18.
- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, *47*, 276–295.
- Schieman, S., & Plickert, G. (1997). Functional limitations and changes in levels of depression among older adults: A multiple-hierarchy stratification perspective. *Journal of Gerontology: Social Sciences*, *62B*, S36–S42.
- Schieman, S., Van Gundy, K., & Taylor, J. (2001). The relationship between age and depressive symptoms: A test of competing explanatory and suppression influences. *Journal of Health and Aging*, *14*, 260–285.
- Schnittker, J. (2014). The challenge of social genomics: A commentary on “Social genomics and the life course: Opportunities and challenges for multilevel population research”. In L. J. Waite & T. J. Plewes (Eds.), *New directions in the sociology of aging* (pp. 277–283). Washington, DC: National Academies Press.
- Seabrook, J. A., & Avison, W. R. (2010). Genotype-environment interaction and sociology: Contributions and complexities. *Social Science & Medicine*, *70*, 1277–1284.
- Selye, H. (1956). *The stress of life*. New York: McGraw-Hill.
- Shanahan, M. J. (2014). Social genomics and the life course: Opportunities and challenges for multilevel population research. In L. J. Waite & T. J. Plewes (Eds.), *New directions in the sociology of aging* (pp. 255–276). Washington, DC: National Academies Press.
- Shanahan, M. J., & Hofer, S. M. (2005). Social context in gene-environment interactions: Retrospect and prospect. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *60*, 65–76.
- Shanahan, M. J., & Hoffer, S. M. (2011). Molecular genetics, aging, and well-being: Sensitive period, accumulation, and pathway models. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 135–147). New York: Elsevier.
- Slopan, N., Williams, D. R., Seedat, S., Moomal, H., Herman, A., & Stein, D. J. (2010). Adversities in childhood and adulthood psychopathology in the south Africa stress and health study: Associations with first-onset DSM-IV disorders. *Social Science & Medicine*, *71*, 1847–1854.
- Spence, N. J., Adkins, D. E., & Dupre, M. E. (2011). Racial differences in depression trajectories among older women: Socioeconomic, family, and health influences. *Journal of Health and Social Behavior*, *52*, 444–459.
- Strohschein, L. (2005). Household income histories and child mental health trajectories. *Journal of Health and Social Behavior*, *46*, 359–375.
- Thapar, A., & Rutter, M. (2009). Do prenatal risk factors cause psychiatric disorder? Be wary of causal claims. *British Journal of Psychiatry*, *195*, 100–101.
- Thoits, P. A. (2010). Stress and health: Major findings and policy implications. *Journal of Health and Social Behavior*, *51*, S41–S53.
- Thompson, C., Syddall, H., Rodin, I., Osmond, C., & Baker, D. J. P. (2001). Birth weight and the risk of depressive disorder in late life. *British Journal of Psychiatry*, *179*, 150–155.
- Townsend, A. L., Biegel, D. E., Ishler, K. J., Wieder, B., & Rini, A. (2006). Families of persons with substance use and mental disorder: A literature review and conceptual model. *Family Relations*, *55*, 473–486.
- Turnbull, J. E., George, L. K., Landerman, R., et al. (1990). Social outcomes related to age of onset among psychiatric disorders. *Journal of Consulting and Clinical Psychology*, *58*, 832–839.
- Turner, R. J., & Avison, W. R. (1992). Innovations in the measurement of life stress: Crisis theory and the significance of event resolution. *Journal of Health and Social Behavior*, *33*, 36–50.
- Turner, R. J., & Avison, W. R. (2003). Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of Health and Social Behavior*, *44*, 488–505.
- Turner, H. A., & Catania, J. A. (1997). Informal caregiving to persons with AIDS in the United States: Caregiver burden among central cities residents eighteen to forty-nine years old. *American Journal of Community Psychology*, *25*, 35–59.
- Turner, R. J., & Lloyd, D. A. (1995). Lifetime traumas and mental health: The significance of cumulative adversity. *Journal of Health and Social Behavior*, *36*, 360–376.
- Turner, R. J., & Noh, S. (1988). Physical disability and depression: A longitudinal analysis. *Journal of Health and Social Behavior*, *29*, 23–37.
- Turner, H. A., & Schieman, S. (Eds.). (2008). *Stress processes across the life course* (H. A. Turner, & S. Schieman Eds.). New York: Elsevier.
- Turner, H. A., & Turner, R. J. (2005). Understanding variations in exposure to social stress. *Health*, *9*, 209–240.
- Turner, J. B., & Turner, R. J. (2013). Social relations, social integration, and social support. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.),

- Handbook of the sociology of mental health* (pp. 341–356). New York: Springer.
- Turner, R. J., Wheaton, B., & Lloyd, D. A. (1995). The epidemiology of social stress. *American Sociological Review*, *60*, 104–125.
- Turner, R. J., Lloyd, D. A., & Taylor, J. (2006a). Stress burden, drug dependence and the nativity paradox among U.S. Hispanics. *Drug and Alcohol Dependence*, *83*, 79–89.
- Turner, R. J., Lloyd, D. A., & Taylor, J. (2006b). Physical disability and mental health: An epidemiology of psychiatric and substance disorders. *Rehabilitation Psychology*, *51*, 214–233.
- Uher, R. (2011). Genes, environment, and individual differences in responding to treatment for depression. *Harvard Review of Psychiatry*, *19*, 109–124.
- Uher, R. (2014). Gene-environment interactions in common mental disorders: An update and strategy for a genome-wide search. *Social Psychiatry and Psychiatric Epidemiology*, *49*, 3–14.
- Umberson, D., Williams, K., Powers, D. A., Liu, H., & Needham, B. (2005). Stress in childhood and adulthood: Effects on marital quality over time. *Journal of Marriage and the Family*, *67*, 1332–1347.
- Wade, T. J., & Pevalin. (2004). Marital transitions and mental health. *Journal of Health and Social Behavior*, *45*, 155–170.
- Walsermann, K. M., Gee, G. C., & Geronimus, A. T. (2009). Ethnic differences in trajectories of depressive symptoms: Disadvantage in family background, high school experiences, and adult characteristics. *Journal of Health and Social Behavior*, *50*, 82–98.
- Wheaton, B. (1985). Models for the stress-buffering functions of coping resources. *Journal of Health and Social Behavior*, *26*, 352–365.
- Wheaton, B. (1994). Sampling the stress universe. In W. R. Avison & I. H. Gotlib (Eds.), *Stress and mental health: Contemporary issues and prospects for the future* (pp. 77–114). New York: Plenum Press.
- Wheaton, B. (2010). The stress process as a successful paradigm. In W. R. Avison, C. S. Aneshensel, S. Schieman, & B. Wheaton (Eds.), *Advances in the conceptualization of the stress process: Essays in honor of Leonard I. Pearlin* (pp. 231–252). New York: Springer.
- Wheaton, B., & Clarke, P. (2003). Space meets time: Integrating temporal and contextual influences on mental health in early adulthood. *American Sociological Review*, *68*, 680–706.
- Wheaton, B., Roszell, P., & Hall, K. (1997). The impact of twenty childhood and adult traumatic stressors on the risk of psychiatric disorder. In I. H. Gotlib & B. Wheaton (Eds.), *Stress and adversity over the life course: Trajectories and turning points* (pp. 50–72). Cambridge: Cambridge University Press.
- Whisman, M. A., & Kaiser, R. (2008). Marriage and relationship issues. In K. S. Dobson & D. J. A. Dozois (Eds.), *Risk factors in depression* (pp. 363–384). Oxford: Elsevier.
- Wickrama, K. A. S., Conger, R. D., & Abraham, T. W. (2008a). Early family adversity, youth depressive symptom trajectories, and young adult socioeconomic attainment: A latent trajectory class analysis. In H. A. Turner & S. Schieman (Eds.), *Stress processes across the life course: Advances in life course research* (Vol. 13, pp. 161–192). Oxford: Elsevier.
- Wickrama, K. A. S., Conger, R. D., Lorenz, F. O., & Jung, T. (2008b). Family antecedents and consequences of trajectories of depressive symptoms from adolescence to young adulthood: A life course investigation. *Journal of Health and Social Behavior*, *49*, 468–483.
- Wilcox, A. J. (2001). On the importance – and unimportance – of birthweight. *International Journal of Epidemiology*, *30*, 1233–1241.
- Wilcox, A. J., & Russell, I. T. (1983a). Birthweight and perinatal mortality: I. On the frequency distribution of birthweight. *International Journal of Epidemiology*, *12*, 314–318.
- Wilcox, A. J., & Russell, I. T. (1983b). Perinatal mortality: Standardizing for birthweight is biased. *American Journal of Epidemiology*, *118*, 857–864.
- Winfield, J., George, L. K., Swartz, M., & Blazer, D. G. (1990). Sexual assault and psychiatric disorders among a community sample of women. *American Journal of Psychiatry*, *147*, 335–341.
- Yang, Y. (2004). How does functional disability affect depression in late life: The roles of social support and personal resources. *Gerontologist*, *44*, 373–384.
- Yang, Y. (2006). How does functional disability affect depressive symptoms in late life? The role of perceived social support and psychological distress. *Journal of Health and Social Behavior*, *47*, 355–372.
- Yang, Y., & George, L. K. (2005). Functional disability, disability transitions, and depressive symptoms in late life. *Journal of Aging and Health*, *17*, 263–292.

Agency Across the Life Course

Steven Hitlin and Hye Won Kwon

Life course studies have moved beyond the abstract “agency vs. structure” debates that were commonplace in sociology over the past decades, moving the focus away from the “timeless realm of the abstract” (Nisbet 1969) and into the empirical domain. Accordingly, “agency,” is less a matter of philosophical exploration and more so a construct needing scientific specification and exploration across societal forms and human development. Although agency is not a problematic construct in many social science fields, it is contested in sociology, a discipline that largely focuses on the nature of social forces that shape, direct, constrain, and enable individual lives. In sociology – unlike much of psychology, economics, and political science – individual volition is often of secondary concern and even the subject of doubt (Fuchs 2001; Loyal and Barnes 2001; Meyer and Jepperson 2000).

Developing a sense of agency appears to be part of human development across cultures (Scholz et al. 2002; You et al. 2011) and the capacity for people to influence their own lives is a fundamental tenet of life course research (Elder 1998). For life course scholars, debating agency’s existential nature is less important than exploring its facets and mechanisms, how cultural and structural factors shape it, and in what circum-

stances having a sense of agency explains behavior and life course outcomes. Within the study of the life course, agency is fundamental to understanding structurally bounded human beings who age within structural and cohort influences. Its existence is not problematic within life course studies, rather the focus is on its constitution and relative influence on social outcomes.

While many aspects of agency-and-structure have seen advancements, there are some notable directions for future inquiry that we will discuss, below. Scholars have largely measured agency as a subjective sense of control, and this conception has proven fruitful across a number of domains. Yet, we argue, there are additional aspects of agency that need to be conceptualized and measured, and its links to structure have largely been established within Western cohorts and societies, but with little attention to other times and places. The bulk of research on agency equates it with concepts like efficacy and personal control. We suggest, however, that other aspects, as captured in constructs like optimism, expectations, and self-identification boundaries, are less theorized and empirically linked with agency. We suggest that many of the pieces of an influential life course understanding of agency exist across disciplines and subdisciplines, though not enough work has explored its constituent parts across cultures. Life course studies hold many of the pieces for an eventual synthesis, given its fundamentally interdisciplinary approach (Elder et al. 2003).

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This Handbook comes at a propitious time for the field, and our contribution attempts a global view of agency in order to identify past successes and future opportunities for linking individuals with a proper longitudinal understanding of their development and societal change. We suggest that exploring agency with a cross-cultural lens helps to identify those theoretical claims about the topic that are most useful for motivating future research. We build on the tenet (Elder 1998) that individuals make choices in life, though such choices are quite bounded (Shanahan and Hood 1998). While some of these debates range into the abstract (Hitlin and Elder 2007b), this chapter promotes an empirically anchored discussion, drawing on important social psychological treatments of this core, multifaceted construct and offering some direction for the next stage of exploration.

1 Agency: Influential Definitions

Any discussion of agency should begin with a key distinction between its objective and subjective dimensions (Hitlin and Long 2009). Sociological treatments focus less directly on ‘objective’ agency, which would consist of actual skills and resources (Clausen 1991; Sewell 1992) that an individual possesses. Some people have more economic, social, or psychological resources for encountering life’s vicissitudes and thus possess more options to deal with potential setbacks. A greater amount of empirical work expressly on agency highlights its ‘subjective’ aspects, people’s internal sense that they can influence their lives. In theory, one’s subjective sense of agency is linked to the objective skills and resources they possess, but in practice this is not a perfect correlation. Men, for example, appear to develop attribution patterns that motivate persistence in the face of failure more than women (Correll 2001), meaning that failures are perceived as surmountable obstacles, rather than evidence of personal failings. This subjective sense of agency has a number of overlapping conceptualizations we will discuss, in constructs such as personal control, mastery, and self-efficacy.

Hitlin and Long (2009) suggest that this distinction between subjective and objective agency is important; children are socialized to learn a sense of control over their surroundings, but likely their subjective sense outweighs (for a time) their actual capacities to influence the world. That subjective sense likely reflects broader structural forces and social locations beyond the child’s control: they cannot affect their parents’ occupation, their location, or the legal systems in which the family is embedded. Recent psychological work suggests that aspects of this subjective sense, as well as some attendant skills like delaying gratification, can be taught (Duckworth et al. 2011); it is easier for educators to influence subjective agency, rather than larger social or cultural resources. The study of the life course is, in part, the study of how these subjective and objective factors interact to shape that child’s future opportunities and outcomes.

An early statement on the nature of agency was issued by Sewell (1992) in his attempt to restore a notion of agency as contrasted with influential theories of social structure. Responding to Giddens’ (1984) notion that structure and agency presuppose each other and that structure both constrains and enables the individual actor, Sewell highlights that being an agent “means to be capable of exerting some degree of control over the social relations in which one is enmeshed... Agency arises from the actor’s knowledge of schemas, which means the ability to apply them to new contexts” (p. 20). This enterprise was part of a general trend to counter sociological notions that reduced human actors to unrecognizable simplifications (Kohn 1989), and even those aspects of sociology aimed at linking the individual to social structure – the Social Structure and Personality tradition (McLeod and Lively 2003) – which were seen as overly deterministic (Elder and Johnson 2002). There is a theoretical debate over whether agency and structure should be considered as discrete, de-coupled concepts (Archer 2006; Emirbayer and Mische 1998), or largely as two intertwined sides of the same social process (Cockerham 2005; Hays 1994).

Perhaps the preeminent theoretical statement of the nature of agency (Emirbayer and Mische 1998) holds that agency is “a temporally embedded process of social engagement, informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualize past habits and future projects within the contingencies of the moment)” (p. 963). This model is especially important for life course theory, given the importance of temporality as a basic component of agency. Hitlin and Elder (2007a, b) build on this by anchoring agency within social psychological understandings of the self, suggesting that different temporal foci lead to four analytical types of agency (“existential”, “identity”, “pragmatic” and “life course”), the last being the most anchored within empirical studies of agentic beliefs across the life course, discussed below. They suggest that only the last three types of agency are sociologically meaningful. The first, ‘existential’ agency, involves the most basic sense of free will and is thus sociologically banal. ‘Identity’ agency captures the large literature on situational action (e.g., Burke and Stets 2009) that focuses on how people interpret and enact important identities and roles. Even this set of behaviors, which sociologists often consider as a fixed, structural pattern, involves agentic, self-directed action. Relatedly, ‘pragmatic’ agency deals with those aspects of the person that necessarily act when the previous form of routine situations break down (e.g., Gross 2009). ‘Life course’ agency draws on the large empirical literature we discuss in this chapter, the notion that subjective beliefs at one point in time influence later trajectories and life course outcomes.

This conceptualization of temporality is gaining currency in current theorizing, notably with Mische’s (2009) idea of the importance of futures for determining social action, and Frye’s (2012) discussion of how optimistic views of the future can help determine positive social outcomes within challenging circumstances. This body of work is especially relevant to life course theorizing, contrasting with classic models of the self that focus only on its existence within situations. Instead, this work draws on a less commonly

used theoretical tradition that conceptualizes the self as transcending situations and thus includes a temporal element (Flaherty and Fine 2001; Mead 1932). Recently, Hitlin and Johnson (2015) demonstrated that empirical models incorporating a future-oriented aspect of agentic beliefs provide additional purchase in predicting life course outcomes beyond earlier, atemporal, measures. Thus, our understanding of agency would benefit from empirical exploration that incorporates actors who utilize beliefs and feelings about the future while acting in the present, especially for actions with potential life course influences.

Ultimately, we suggest that agency has served as a popular and useful theoretical construct due in part to its slippery nature (see discussions of other complicated terms like ‘identity’ (Brubaker and Cooper 2000) or ‘dignity’ (Miształ 2013), which allows it to serve as a placeholder for scholars interested in carving out room for individual volition within a range of social forces (see the discussion by Marshall 2000). We focus largely on agency as a variable, not an existential capacity to act (e.g., Hitlin and Elder 2007b). As a variable, agency captures an individual’s ability to shape their behavior in novel, routine, or life course relevant situations. The subjective sense of agency changes, though to what extent remains an empirical question, in light of individual development, structural location, cultural beliefs, and individual outcomes. Some work, discussed below, has attempted to instantiate some of these influential notions of agency – from Sewell (1992) and Giddens (1984) – through testing claims with relevant social psychological measures and samples. We encourage more of this within the field.

2 Agency as an Empirical Construct: Synonyms and Future Opportunities

A range of constructs have appeared in the literature in the last half century that purports to deal with individual volition, broadly understood. In addition to the constructs most influential to the study of the life course, discussed in this section,

aspects of agency appear in ideas like self-direction (Kohn and Schooler 1982), personal autonomy (Seeman and Seeman 1983), and internal locus of control (Rotter 1966; see Haidt and Rodin 1999 for a psychologically focused overview of some of these constructs). Our discussion will focus more depth on those constructs most tied to life course issues, primarily mastery (Pearlin et al. 1981), self-efficacy (Bandura 1982, 1997; Gecas 1989), personal control (Mirowsky and Ross 1998), and planful competence (Clausen 1991, 1993). In general, differences in these measures involve methodological tweaks, that we discuss in turn, but many reviews (Gecas 2003; Haidt and Rodin 1999) treat them as largely equivalent.

Work on agency often has a cognitive focus, in part due to its measurement through survey items that involve conscious reporting of one's subjective beliefs. It is likely that not all aspects of subjective agency occur consciously. Influential notions of how non-conscious processes guide interaction, whether linked to structure (Bourdieu 1977, 1984) or to cultural repertoires (Vaisey 2009), are undoubtedly at play. This is an arena for future inquiry, the extent that measures of agency capture non-conscious outlooks, expectations, and feelings.

Mastery. Mastery is one of the older sociological attempts to render subjective agency as a measurable construct. It refers to the extent that an individual believes she can control her life chances, rather than having them predetermined (Pearlin and Schooler 1978). Most often employed within the stress literature, mastery is an important buffer between external stressors and individual health (Pearlin et al. 1981).

Mastery generally increases across the life course, until older age (Pearlin and Schooler 1978). With age, people achieve more physical and social mastery over their lives, net of social class. Mastery is influenced by both social structural realities, and the social psychological perception of those realities (Christie-Mizell and Erickson 2007). In later life, the decline of physical skills, cognitive functioning, as well as the loss of social status and significant others, is

associated with declines in mastery (Pearlin et al. 2007; Schieman and Turner 1998). For some people, mastery beliefs in older age are linked to the perception that one has managed their life effectively, suggesting that the internal standards for establishing a sense of agency may shift across the life course (Pearlin et al. 2007).

Self-Efficacy. Self-efficacy is one of the most commonly utilized constructs referring to agency. Developed by Albert Bandura (1986, 1992, 1997), self-efficacy beliefs focus on the notion a person possesses that she has an ability to take actions that generate expected outcomes. It measures domain-specific cognitive beliefs about one's ability to organize and execute courses of action required to produce certain achievements (Bandura 1982). Bandura argues that self-efficacy is best measured in specific domains (e.g., singing self-efficacy, academic self-efficacy), though there are later general self-efficacy scales that profess to measure this as a global orientation (Chen et al. 2001; Sherer et al. 1982). Evidence suggests that developing a greater sense of economic self-efficacy, a core self-domain within the stratification system, predicts educational attainment (Grabowski et al. 2001) as well as socioeconomic achievement into adulthood (Lee and Mortimer 2009). Yet it is less often a focus of life course study (though see Gecas 2003 for a review).

Personal Control. Personal control is perhaps the most commonly used construct within life course studies. The sense of control involves the belief that a person can control her life outcomes (Mirowsky and Ross 1998; Ross and Mirowsky 2013). Individuals with a sense of control feel responsible for their successes and failures and do not attribute those outcomes to external factors. The sense of control indicates a generalized belief by an individual about her power over life outcomes, and is more global than the largely domain-specific construct of self-efficacy. Personal control is beneficial to the individual, helping her address difficult life situations (Conger et al. 2009; Wheaton 1980; Berrenberg 1987).

Personal control is a generalized, learned trait, measured through an 8 item-scale, comprising

positive and negative subscales asking about feeling control over good and bad outcomes. The scale includes items such as “I am responsible for my own successes,” “I can do just about anything I really set my mind to,” “My misfortunes are the result of mistakes I have made,” and “I am responsible for my failures.” This construct was developed to empirically improve upon the self-efficacy scale as well as the locus of control measure. Those other measures possessed agreement bias, and were more likely to obtain positive responses from older adults and the less educated (Mirowsky and Ross 2007). Personal control is acquired and becomes part of one’s self-concept, but it reflects life circumstances; repeated difficult life events, for example, can wear away at this sense of self (Wolinsky et al. 2003). This sense helps people persevere in the face of hardships (Trommsdorff 1994), especially when linked to positive views of the future.

In practice, the sense of control is the construct most commonly linked with stratification and life course outcomes; mastery, for example, is most commonly found within the aging literature. Its popularity stems from its empirical utility. Having a sense of control allows individuals to build different life paths compared with others with a lack of personal control: individuals with a higher sense of control typically evidence higher levels of achievement, like higher high school and college GPAs (Gifford et al. 2006; Perry et al. 2001; You et al. 2011), and better educational and occupational attainment (Wang et al. 1999). The sense of control is especially linked to education, and this in turn contributes to better health as the educated pursue healthier lifestyles and seek information that improves life chances (Mirowsky and Ross 1998). In addition, a sense of control motivates effort and work engagement, which also translate into better life outcomes (Mirowsky and Ross 2007).

The sense of control has a well-established strong relationship with social class position: higher class people tend to have a stronger sense of control than those in lower classes (Kraus et al. 2009; Mirowsky and Ross 1998; Ross and Van Willigen 1997; Ross and Mirowsky 2002).

Lachman and Weaver (1998) find that those with lower incomes report a lower sense of control. Most commonly, a sense of control is strongly positively linked with education (Mirowsky and Ross 2007; Ross and Mirowsky 2013; Schieman 2001; Schieman and Plickert 2007). The rationale for this lies in the content of education, which helps people develop useful skills and resources, also leading to better job positions that can, in turn, increase the sense of personal control (Ross 2000). Obtaining more education, due to its strong links with income, means that people have more resources with which to face adversity and potentially bad outcomes that would, in turn, harm a sense of self control (Mirowsky and Ross 1998; Ross and Van Willigen 1997). The literature strongly suggests that this belief is one factor in reproducing the class structure over time, as individual agentic decisions reflect greater or lesser beliefs in one’s capacity to make potentially advantageous changes in one’s life trajectories. Future work should focus on disentangling the sense of control from related issues – actual capacities, beliefs about the future – that also comprise agency as it affects individual and structural stratification.

Future Orientations and Planful Competences. Theoretical treatments of agency (Emirbayer and Mische 1998; Hitlin and Elder 2007b) have begun to incorporate temporality as fundamental to a notion of agency (Pickering 1993), while Hitlin and Johnson (2015) have begun to test these ideas empirically. Future orientation (Lewin 1948; Yowell 2000), in general, has recently been highlighted as important for understanding social actors (Frye 2012; Mische 2009; Tavory and Eliasoph 2013), in that it motivates and guides action. This orientation can be linked to the notion of ‘life projects’ (Archer 2003; McAdams 2013; Taylor 1989), the ongoing stories that people develop to make sense of their lives that, in many ways, guide interpretation and intentions for future activity. Forethought is a core aspect of human agency, understood through a psychological lens (Bandura 2001), with the notion of looking ahead being an important force in human cognition (Seligman et al. 2013). This forward-looking

orientation contains an emotional element and a set of cognitive appraisals. Having a positive outlook, a sense of optimism for the future, has beneficial effects on one's life course (Frye 2012; Peterson 2000), and can also serve to buffer individuals from setbacks (Oyserman et al. 2004).

In sociology, aspects of looking forward have been captured somewhat in the literature on expectations and aspirations (Morgan 2006), though this literature is rarely linked to life course notions of agency (but see Rudd and Evans 1998). Having higher educational expectations in adolescence is associated with advantaged life course outcomes (Andrew and Hauser 2011; Bozick et al. 2010). These and other expectations involve cognitive appraisals of the conditions that a person grew up within (Hallerod 2011; Reynolds and Johnson 2011), yet shift in line with life course achievements or failures (Mortimer et al. 2002; Reynolds and Baird 2010). Mentally healthy people tend to be positively biased in their expectations (Taylor and Brown 1988), and this optimism has beneficial effects on social life (Andersson 2012b), mental and physical well-being (Carver et al. 2010), and labor market successes (Vuolo et al. 2012). Optimism in the health domain, what Hitlin et al. (forthcoming) term 'health agency', captures a sense of one's capacity to handle and recover from illness, and has longitudinally advantageous life course outcomes across a range of mental and physical health domains.

Beliefs about one's future are theoretically and empirically distinct from beliefs about personal control (Epel et al. 1999; Trommsdorff 1994). Structural conditions, for example, might foster a sense of hopelessness even as an individual feels a personal sense of efficacy (Young 2004). Aspirations are likely to change in response to experiences during life transitions as people assess opportunities and results, with a general trend toward increasing realism (Heinz 2014). Recent work (Hitlin and Johnson 2015) suggests that adolescent life expectations are as strong predictors of a range of later life outcomes as the more commonly employed subjective notion of mastery, demonstrating the utility of an expanded notion of agency.

Classically, the primary life course rendering of agency-as-forward-oriented was found in Clausen's (1991, 1993) planful competence. Clausen drew on a set of classic longitudinal studies (including the Berkeley Growth Study and the Oakland study), developing a measure based on scales and Q-sort techniques to develop three aspects of planful competence: dependability, self-reflexivity, and self-confidence. These external evaluations of abilities and skills, once the gold-standard for psychological measurement, differ from the self-reported beliefs that comprise the bulk of current research; personality psychologists suggest that we do not know ourselves as well as others know us. Planful competence is not fully an objective measure, but it foregoes the subjectivity most common in those studies linking individual functioning with larger social structures.

What is notable is that this measure performs well as a predictor of later life outcomes (Clausen 1991, 1993). An adolescent with more planful competence makes more advantageous life-decisions and sticks to advantageous trajectories. This construct anchors the capacity for making advantageous long-term plans (Shanahan et al. 2003), and was a good predictor of adolescents who had more stable life courses (e.g., marriages, occupational stability). Historical circumstances are important, however; planfulness was an important life outcome predictor for men who came of age during the Great Depression, as compared to men who grew up a few years earlier where this skill had little consequence for outcomes (Shanahan et al. 1997).

Psychological Cognates. Agency is largely problematic only in structurally oriented disciplines. In those that begin at the level of the individual, notably psychology, agentic capacity has largely been taken for granted, though recent discoveries of dual-system psychology (Gilbert 2006; Kahneman 2011; Wilson 2002) have rendered conscious knowledge of our actions more problematic. Work on agency has not directly engaged dual-system psychology, the idea that we have a conscious and automatic pair of related brain systems. This view, currently ascendant within psychology, holds that we have more

capacity to control the conscious system, while we are also motivated by an implicit set of understandings, beliefs, fears, and emotions that often shape our conscious perception (Haidt 2001). Work in this vein is filtering into sociology (Firat and Hitlin 2012; Hitlin 2008; Massey 2002; Vaisey 2009), and has implications for understandings of agency that have not been fully articulated.

That said, a few psychological constructs overlap with the general sense of agency we have discussed. Grit is a newly developed construct used to predict achievement (Duckworth et al. 2007; Duckworth and Quinn 2009; Reed et al. 2013; Singh and Jha 2008; Von Culin et al. 2014). Qualitative and quantitative studies have examined this trait that is found in high achieving individuals, defined as “passion and perseverance for a long term goal” (Duckworth et al. 2007, p. 1087). Grit contains two components, consistency of interest and perseverance of effort; grit encourages people to maintain a constant focus and work hard to complete a goal, what its progenitors argue is distinct from the self-regulatory aspects of the previously discussed life course constructs (Duckworth and Gross 2014). Individuals high in grit can maintain their determination, interest, and effort despite failures or adversities, something that seems to develop as people age (Duckworth et al. 2007), and is linked to achievement through the amount of deliberate practice that people engage in (Duckworth et al. 2011).

The practice of goal-setting, itself, has an extensive literature and is relevant to the actual capacity to achieve life aspirations. Carver and Scheier (1998) conceptualize this as self-regulation, the capacity to maintain focus on particular goals. They argue that human beings are motivated toward goal representations captured within mental constructs, and are learned from one’s culture and social networks. Motivation (Turner 1987) is something captured implicitly with the focus on future orientation, discussed above, but needs a great deal of work before it is a useful life course construct. Finally, work on the Big Five personality typology (Costa and

McRae 1985) suggests that one core component, conscientiousness, might be an individual-level aspect of agency given its focus on goal-direction, focus, persistence and industriousness (Reed et al. 2013).

3 Subjective Agency and the Life Course: What We Know and What We Need to Know

Understanding agency allows life course scholars the capacity to circumscribe conditions under which individual-level factors shape meaningful social outcomes. Traditionally, life course studies explore issues of mental and physical health, occupational and educational attainment, family formation and the intergenerational transmission of advantage or disadvantage. Versions of agency are thought to be core for reproducing and generating inequality (Grabowski et al. 2001; Shanahan and Bauer 2004; Wolinsky et al. 2003). Some aspect of the trajectories that connect early life with these later outcomes is thought to be captured under the umbrella of agency; how much can we credit people with successful outcomes, or hold them accountable for less advantageous outcomes? Some people feel a greater sense of control or efficacy, and this sense may simply reproduce class advantages, or it may represent an individual’s motivation for shifting away from disadvantaged social locations. We know a decent amount about how subjective agency (as captured in efficacy, personal control and mastery) is shaped and influences later outcomes within Western contexts; we know much less about other subjective aspects of agency, such as optimism and expectations, or how wider cultural forces moderate the relationship between structure and individual social psychology.

Social class influences normative expectations for what agentic choices ‘mean’ to people making choices. For example, Stephens et al. (2007) find that people from middle class backgrounds make choices that distinguish themselves from others more often than those from working class

backgrounds, who exhibit a preference for highlighting similarity with those around them. Classic social psychological results suggest that parents' occupational position leads to value socialization in line with these patterns, with working class children taught to value conformity and middle class children taught a focus on autonomy (Kasser et al. 2002; Kohn 1969, 1977; Kohn and Schooler 1983; Schooler et al. 2004), even into adolescence (Kasser et al. 2002). Social class influences intertwine with education, the primary mechanism through which class advantages translate into individual senses of control. Obtaining higher socioeconomic status, along with higher education, may offer a smoother life path, reducing a person's exposure to adversities in her life that may hurt her beliefs of personal control (Mirowsky and Ross 2007).

Gender and race, core sociological areas of study, have less global influence on agency than one might suspect. Females have a lower sense of control than males (Ross and Mirowsky 2013; Slagsvold and Sørensen 2008) although often this difference turns out to be statistically insignificant (Mirowsky and Ross 2013). Women's sense of control declines more than men's as they age, showing a gender gap in the sense of control that increases with age (Ross and Mirowsky 2002). Further, this growing gender gap in the sense of control is greater for older cohorts than for younger cohorts (Ross and Mirowsky 2002), suggesting that cohort differences in work experience contribute to this observed gap. If so, we may continue to see change in this pattern in future cohorts. Blacks in the United States report a lower sense of control than their white counterparts in every age group, net of other socioeconomic factors (Bruce and Thornton 2004; Shaw and Krause 2001). Pearlin et al. (2007) suggest that race effects disappear, however, when controlling for education. This suggests that agency, as currently measured, is not a key factor explaining some of sociology's major culprits for transmitting inequality across the life course.

Family is one of the most important developmental loci for developing one's volition, agency, or self-direction (Gecas 1989). Family size, as well as parents' educational level and self-

efficacy, along with parenting behaviors have been proposed as crucial factors affecting children's agency development. Family size has a negative effect on developing self-efficacy. Socioeconomic resources are less available and events are more unpredictable for children from large families compared to children from smaller families (Gecas 1989). Rodin (1976) finds that children from large families tend to report lower levels of feeling of choice and perceived control.

Parents' education also influences children's levels of sense of control. Higher class parents transmit dispositions, competences, and knowledge that help children to obtain advantages (Calarco 2011; Lareau 2003). Parents with a higher education also encourage children to develop abilities and habits (Mirowsky and Ross 1998). Lewis et al. (1999) find that adolescent sense of control is positively associated with parents' levels of education. Well-educated parents have a greater sense of personal control and their children are affected by such beliefs. Parental efficacy about influencing children's academic performance increases academic aspirations and self-efficacy (Bandura et al. 2001). Parents' beliefs that they can successfully carry out child-rearing activities can also affect children's self-efficacy by shaping actual parenting practices (Schneewind 1995). In addition, better-educated parents tend to focus more on children's independence, self-direction, and personal responsibility while less-educated working class parents tend to emphasize conformity and obedience (Lewis et al. 1999; Pearlin and Kohn 1966). In accordance with this tendency, well-educated parents transmit these attitudes regarding agency to their children (Lewis et al. 1999). At least within a Western context, the family, as a prime socialization agent, is a fundamental link in shaping subjective agency that partially serves to reproduce social structural advantage.

Close friends also have a significant influence on one's development of agency (e.g., Adler and Alder 1998). Adolescents tend to be friends with those who are similar to them (Ryan 2000), and students who observe similar friends' achievement have stronger beliefs that they can also achieve (Deci et al. 2006; Schunk and Meece

2006). In contrast, experiences of peer pressure are negatively associated with self-efficacy among adolescents (Kiran-Esen 2012).

School experiences help adolescents establish beliefs about their agency (Schunk and Meece 2006). Formal educational institutions are places where socially desirable and legitimate cultural knowledge about attitudes and behaviors are transmitted (Bourdieu 1984; Calarco 2014; Gordon 1989; Pollack and Thoits 1989). Children not only learn how to critically and logically think and solve problems, but also develop attitudes and skills to face problems with confidence and perseverance through diverse activities in schools (Mirowsky and Ross 1998). The learning sequence of the school environment makes children face progressively challenging sets of problems and, step-by-step, children learn that things that look initially difficult can be construed and learned via practicing. This training and experience of accomplishment help them to build a sense of control over their lives (Ross and Mirowsky 2007). Lewis, Ross, and Mirowsky (1999) report that dropping out of high school has a significant, negative effect on a person's sense of control, controlling for their initial levels, demonstrating the negative importance of this potential life course transition.

Schooling further encourages people to acquire strong beliefs that they can achieve better outcomes by using their capacities and resources (Ross and Mirowsky 2013; Schieman and Plickert 2007). School is not the only force increasing a sense of control, but it is vital. Mirowsky (2013) modified his original notion of agency as 'built up in school, used up in old age' (p. 415) to encompass a growing set of findings that personal control increases across early adulthood and middle-age, regardless of additional schooling. Educational institutions teach valuable skills and abilities beneficial for yielding better achievement in later life, but aging, itself, contributes to people obtaining a sense of control in life until older age. Schooling, however, provides a focused location enabling individuals to obtain useful resources and socioeconomic positions in society.

Work and occupational characteristics, often correlated with education, provide crucial settings that influence one's sense of agency. Building on the well-established positive relationship between education and agency, researchers have also focused on employment as the underlying mechanism that connects education and personal control (Ross and Van Willigen 1997; Schieman and Plickert 2007). Individuals with higher education levels tend to participate in the labor force and obtain higher status occupations (Blau and Duncan 1967; Grusky and DiPrete 1990; Schieman and Plickert 2007; Warren et al. 2002), that, in turn, tend to provide greater job authority, employment security, and flexibility in schedule, creativity and autonomy (Ross 2000; Ross and Mirowsky 1992; Ross and Van Willigen 1997; Schieman and Plickert 2007). Drawing on Marx's notion of workers' alienation, researchers find that individuals with non-routine, autonomous, creative, and problem-solving work develop greater senses of agency over their lives (Ross 2000; Ross and Mirowsky 1992; Schieman and Plickert 2007). Causality is difficult to disentangle, as these higher status occupations also offer better economic rewards, thereby reducing exposure to adversities that can challenge personal control beliefs (Mirowsky and Ross 2007). Class influences on the intergenerational shaping of attitudes, as mentioned previously, lead working class parents to be more likely to teach conformity as opposed to autonomy taught by parents who themselves have greater occupational autonomy, a finding with cross-cultural evidence (Kohn and Schooler 1983; Kohn and Schoenbach 1993; Kohn et al. 1986).

Culture is a crucial factor that influences individuals' senses of agency. The majority of agency studies have focused on the United States specifically, or Western nations generally, extrapolating issues of the nature of the person from an admittedly narrow, privileged sample (Henrich et al. 2010a, b). Building on the classic distinction between collectivistic and individualistic culture, cross-psychological approaches typically suggest understanding Western cultures as individual-focused cultures, with a focus on the self as independent from others (Kondo

1990). East Asian cultures are generally considered collectivistic cultures, in which individuals see themselves as interdependent with other people (Cross and Gore 2012; Markus and Kitayama 1991; Matsumoto et al. 2008; Snibbe and Markus 2005; Triandis 1995). A sense of agency is much more intertwined with what Elder (1994, 1998) refers to as 'linked lives'; to be an agent is to take important others into account as an aspect of the self. Because of the emphasis on collectivistic culture in East Asian nations, the concept of individual agency has received less attention among researchers; delimiting the possibility that agency is fundamentally experienced differently.

A great deal of cross-cultural research in East Asian countries has reaffirmed the link between Western cultures and individualistic orientations versus East Asian cultures and collectivistic orientations. Several studies have found that East Asians have a lower sense of control than Westerners, and therefore linked low sense of control among Asians with collectivistic cultures generally (O'Conner and Shimizu 2002; Smith et al. 1995; You et al. 2011). In a review of cross-cultural studies of the locus of control, Smith et al. (1995) conclude that East Asians, particularly Japanese, tend to report lower sense of control compared to others. You et al. (2011) report Asian-American students show lower senses of control compared to American students from non-Asian groups.

Although these cross-cultural studies have illuminated the important role of culture in shaping agency, they have not yet provided a useful correction to the western bias that suffuses much sociological discussion of the topic. Cross-cultural research often accepts this individualistic-collectivistic dichotomy at face value, suggesting that it is a universal categorization of societies, and thus becomes a source for explaining cultural differences in perceived agency. This simple cultural dichotomy, however, has come up against criticism in recent years. Cross-cultural research tends to largely presuppose an internally consistent societal

culture, obscuring important variation by class, race, religion, and other factors that might plausibly contribute to people within a particular society developing different subjective orientations. Relying on the East/West simple dualism may obscure within-culture variation, and thus lead researchers to focus too much on between-society differences and less on within-society patterns (see Kwon 2013). Complicating this dichotomy, Vandello and Cohen (1999) show the United States, perhaps the paradigmatic example of an individualistic nation and thus lauding agency's importance, has extensive intra-national variations in individualistic orientations. Yamawaki (2012) also finds that individuals who reside in larger Japanese cities such as Tokyo report a lower collectivistic orientation when compared to residents in rural Japanese regions. Researchers find that younger Koreans diverge from collectivistic orientations of the older generation, reporting more individualistic orientations (Cha 1994; Hyun 2001). These studies suggest that overlooking variation within cultures to conform to one index within individualism or collectivism may obscure within-cultural variation critical to understanding the role of agency, and how changing global forces contribute to changing cohort beliefs in the importance of subjective control over one's life. We do not know enough about how much subjective agency's contribution to later life outcomes is moderated by the cultural systems of belief surrounding those individual subjective appraisals, nor how subjective agency, itself, differs across nations and cultural forms. Nor do we have a great deal of confidence that our measures capture agency well for those who conceptualize the self differently. Future research would benefit life course studies by exploring longitudinal data on the sense of control in different countries, and specifying measurement to include issues like expectations and aspirations as core agency components. The study of such cultural differences might draw on improved methodology that can better distinguish age, period, and cohort effects (Zheng et al. 2011).

While cultures differ on the relative importance they extend toward the construct of agency, it appears that even ‘collectivist’ cultures still produce people who claim a sense of agency (Li 2006). Counter to prevalent notions about a low sense of agency among East Asian population, Li (2006) finds Chinese adolescents have particularly high senses of agency in the domain of learning. Using Pearlin’s 7-item Mastery Scale, Jang et al. (2009) explore a sense of mastery in Korean American elders and find financial insecurity hurts their feelings of mastery. While East Asian populations have received less attention by researchers, even these ‘so-called’ collectivistic cultures in which individuals’ independence and autonomy are assumed to be less socially valued, findings are in line with studies on non-Asian populations. Culture, age and historical cohort intersect to shape subjective senses of agency, yet research on these linkages is in its infancy.

In addition, structure interacts with culture even in Western nations to shape agency; analyzing a Norwegian adult sample, Slagsvold and Sørensen (2013) suggest that age-related losses in mastery are influenced by cultural and structural differences across countries. Whereas previous studies in the United States found that the sense of control declines around age 60 (Mirowsky and Ross 2007), Slagsvold and Sørensen show that the decline in the sense of control begins around age 75 in Norway. They argue that differences can be attributed to different welfare systems between the two countries, implying that more generous welfare provisions in Norway reduce elders’ uncertainty and provide greater predictability about their future lives. This in turn protects a sense of mastery. A provocative thesis worth pursuing would be that ‘culture’ is becoming less influential in shaping subjective agency as national economic systems develop, such that structural influences might become the dominant forces shaping perceptions of agency.

Aging, itself, offers complication in understanding general principles about the development and loss of agency. We know less about how agentic beliefs are shaped in adolescence (Conger et al. 2009), and whether it is age, itself, or other

factors that contribute to the generally accepted inverted U-curve, with agentic beliefs increasing through adulthood and declining in older age. Influential longitudinal work suggests that much of the cross-sectional association between age and the sense of personal control is, in fact, due to cohort differences in education levels (Ross and Mirowsky 2013; Schieman 2001; Wolinsky and Stump 1996). That is, lower levels of personal control in older age are in part due to lower levels of education in earlier cohorts (Wolinsky and Stump 1996; see Ross and Mirowsky 2013 for further discussion). Slagsvold and Sørensen (2013) also distinguish between aging and cohort effects using data from two waves (collected in 2002–2003 and 2007–2008) of The Norwegian study of Life course, Aging, and Generation (NorLAG), and conclude that the observed distribution of the sense of control by age “should be attributed to cohort effects and not to aging effects (p. 302).” Beyond education, however, there are several important factors that show aging influencing the sense of control: impact of physical impairment, retirement, loss of partner, etc (Mirowsky and Ross 1998, 2007; Rodin 1986; Schieman 2001). Future work should attempt to further disentangle these issues, and adjudicate how much of the general inverted U-shaped curve of increasing agency through adulthood until a noticeable drop in older age is shaped by cultural and structural factors, and how much simply occurs through the biological aging process.

4 Conclusion: General Conclusions and Some Continuing Holes in Knowledge

Agency is considered a core sociological construct and one of the main principles of life course studies (Elder 1994). Its existence is likely more problematic within sociology than within most other academic disciplines, or the wider popular consciousness, as American society is largely defined by the ideology that hard work will pay off, and that everybody has a fair chance to achieve the American Dream. Specifying agency

has fueled decades of theoretical discussions and arguments, with various positions assigning more or less agency on the part of individuals acting within a web of social structures and forces. Understanding the relationship between an individual and the structured life course pathways that are presented to her within a given society makes getting an empirical handle on agency important, if not fully successful, within the field of life course studies.

We focus here primarily on the subjective sense of agency that people develop, and how that influences their life courses. In general, having more of a sense of agency appears to be beneficial for mental and physical health (Gecas 1989; Mirowsky and Ross 1989; Wheaton 1980). Having a sense of control over one's life is a positive force on well-being, though, as we suggest in this chapter, having that subjective sense does not necessarily mean that a person actually has more agentic capacity. In this sense, agency can be a positive illusion (Taylor and Brown 1988, 1994), contributing to optimistic outlooks that, in turn, are positive for life outcomes (Andersson 2012a, b; Hitlin and Elder 2007a; Peterson 2000). Subjective agency, measured with a range of constructs reviewed here, appears to buffer the influence of various life course stressors.

Measuring objective agency, the actual skills and capacities that contribute to advantaged social achievement, points to a potentially important area for future inquiry. Value judgments about particular traits and skills that might improve outcomes can quickly bump up against issues that were once captured within the 'culture of poverty' debate, with a concern about blaming the victim. The concern is that pointing out distinct skills that lead to advantageous outcomes, such as Clausen's underutilized treatment of planful competence, holds those who achieve lower stratification outcomes as responsible for their own disadvantage. Sometimes discussions of the ways lower SES leads to different skills/orientations has been interpreted as holding people in these circumstances causally culpable for their stratification position. We advocate cautious engagement with those psychological profiles,

and socially shaped skill-sets, that are linked with higher achievement, better mental and physical health, and optimal functioning (Vaillant 2012). Sociologists are often more comfortable discussing social problems than making prescriptions for what the alternative might be, including positive aspects of human functioning that psychology has embraced much more fully (Dahlsgaard et al. 2005; Haidt 2006) in the recent past. As a field, we might focus more directly on optimal levels of agency, both subjective and objective, that might serve to inform policy makers to a greater extent.

Beyond this general thesis, that having more of a sense of agency is associated with positive outcomes – we do not know if, like self-esteem (Baumeister et al. 1996), there can be a 'dark side' to having too much agency. There are a great deal of questions remaining specifying agency's contours, development, and specific contribution across social domains. Contentiousness, perhaps related to aspects of subjective agency, are largely positive for life course outcomes (Shanahan et al. 2014), but also can have a 'dark side' when people high in this orientation encounter failure. This is an underexplored aspect; Alexander (1993) suggests we too often focus on agency's 'heroic' aspects.

A primary issue to be resolved involves the nature of the subjective construct, itself. For the purposes of this review (see also Gecas 2003), we collapse different traditions into the general sense that people have that they can exert influence on their lives. This treats the construct as a global, cross-situational sense that is in many ways at odds with Bandura's (1997) domain-specific notion of self-efficacy. Some scholars suggest that it makes sense to talk about 'agency', or their preferred indicator of this concept, as something that transcends the various roles and identities they play. The psychological cognate, self-efficacy, is most accurately assigned to specific tasks, roles, and outcomes. Just because somebody has an exceedingly high sense of self-efficacy as a singer or a programmer does not necessarily mean they will have confidence in other domains.

In addition, agency is sometimes discussed as a motivational force, other times as a dependent indicator of status, other times as a buffer from social stresses; across studies, then, agency operates like another multi-faceted construct, self-esteem (Cast and Burke 2002). As a result, agency has been used variously as a cause, an effect, a mediator and a moderator. While there may never be exact agreement over its properties, we do suggest researchers be clear about how they are using their indicators, a problem made even more complicated by the fact that many of the scholars cited here might be surprised to know their work has been subsumed under the umbrella of 'agency'. We follow Ross and Mirowsky's (2013) suggestions that more work using representative samples is needed to disentangle a number of issues relating to aging, gender, and the sense of control, as well as issues of racial difference. They also call for more exploration on the relationship of personal control, their measure of subjective agency, and anxiety and anger.

Its subjective nature, as we outline here, suggests a variety of questions about how agency is formed and maintained across situations, relationships, and the life course. Sociological treatments of cognition (Howard and Renfrow 2003) and emotion (Stets 2003; Turner and Stets 2006) are likely implicated, as well as the psychology of cognitive processing, biases, and illusions. To the extent that one's beliefs about themselves and their futures are important, the nature of these beliefs, their cultural content, and their influence over situated action is an open question. Hitlin and Elder (2007b) suggest, for example, that the form of agency present in maintaining an established social identity differs from the sort of agency referred to at key potential turning points in the life course. While life course researchers have accomplished a good deal explicating various facets of this construct that influence individual life outcomes, there is a good deal of bridge-building to be accomplished with psychological theories that might spell out more completely how and when these senses develop and influence action. A large enough body of work has been developed such that stronger claims about the interaction of situation, life course

stage, general structure, and facets of individual functioning can start to be developed. For example, Shanahan et al. (2014) offer the Life Course of Personality Model, offering theoretical specificity about when and how personality traits interact with structural advantages at different periods of the life course, intersecting with linked lives and situational contexts to influence particular outcomes. Future work can move beyond their focus on health to a range of stratification outcomes to demonstrate the conditions under which agency is particularly influential in helping individuals shape their life courses.

Bibliography

- Adler, P. A., & Adler, P. (1998). *Peer power: Preadolescent culture and identity*. New Brunswick: Rutgers University Press.
- Alexander, J. C. (1993). More notes on the problem of agency: A reply. *Schweizerische Zeitschrift für Soziologie/Revue suisse de sociologie*, 19, 501–506.
- Andersson, M. (2012a). Dispositional optimism and the emergence of social network diversity. *Sociological Quarterly*, 53(1), 92–115.
- Andersson, M. A. (2012b). Identity crises in love and at work: Dispositional optimism as a durable personal resource. *Social Psychology Quarterly*, 75(4), 290–309.
- Andrew, M., & Hauser, R. M. (2011). Adoption? Adaptation? Evaluating the formation of educational expectations. *Social Forces*, 90(2), 497–520.
- Archer, M. S. (2003). *Structure, agency, and the internal conversation*. Cambridge: Cambridge University Press.
- Archer, M. (2006). *Making our way through the world: Human reflexivity and social mobility*. Cambridge: Cambridge University Press.
- Bandura, A. (1982). The self and mechanisms of agency. In J. Suls (Ed.), *Psychological perspectives on the self* (pp. 3–40). Hillsdale: Lawrence Erlbaum.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs: Prentice Hall.
- Bandura, A. (1992). Exercise of personal agency through the self-efficacy mechanism. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 3–38). Washington: Hemisphere Publishing Corporation.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26.
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development*, 72(1), 187–206.

- Baumeister, R. F., Smart, L., & Boden, J. M. (1996). The relation of threatened egotism to violence and aggression: The dark side of self-esteem. *Psychological Review*, 103(1), 5–33.
- Berrenberg, J. L. (1987). The belief in personal control scale: A measure of God-mediated and exaggerated control. *Journal of Personality Assessment*, 51(2), 194–206.
- Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure*. New York: Wiley.
- Bourdieu, P. (Ed.). (1977). *Outline of a theory of practice*. Cambridge: Cambridge University Press.
- Bourdieu, P. (Ed.). (1984). *Distinction: A social critique of the judgement of taste*. London: Routledge.
- Boyce, C. J., Wood, A. M., & Brown, G. D. A. (2010). The dark side of conscientiousness: Conscientious people experience greater drops in life satisfaction following employment. *Journal of Research in Personality*, 44, 535–539.
- Bozick, R., Alexander, K., Entwisle, D., Dauber, S., & Kerr, K. (2010). Framing the future: Revisiting the place of educational expectations in status attainment. *Social Forces*, 88(5), 2027–2052.
- Brubaker, R., & Cooper, F. (2000). Beyond 'Identity'. *Theory and Society*, 29(1), 1–47.
- Bruce, M. A., & Thornton, M. C. (2004). It's my world? Exploring black and white perceptions of personal control. *The Sociological Quarterly*, 45(3), 597–612.
- Burke, P. J., & Stets, J. E. (2009). *Identity theory*. New York: Oxford University Press.
- Cahill, S. E. (1998). Toward a sociology of the person. *Sociological Theory*, 16(2), 131–148.
- Calarco, J. M. C. (2011). "I Need Help!" social class and children's help-seeking in elementary school. *American Sociological Review*, 76(6), 862–882.
- Calarco, J. M. C. (2014). Coached for the classroom parents' cultural transmission and children's reproduction of educational inequalities. *American Sociological Review*, 79(5), 1015–1037.
- Carver, C. S., & Scheier, M. (1998). *On the self-regulation of behavior*. Cambridge: Cambridge University Press.
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30(7), 879–889.
- Cast, A. D., & Burke, P. (2002). A theory of self-esteem. *Social Forces*, 80(3), 1041–1068.
- Cha, J.-H. (1994). Aspects of individualism and collectivism in Korea. In U. Kim, H. C. Triandis, C. Kagitcibasi, S.-C. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory, method, and applications* (pp. 157–174). Thousand Oaks: Sage.
- Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods*, 4(1), 62–83.
- Christie-Mizell, C. A., & Erickson, R. J. (2007). Mothers and mastery: The consequences of perceived neighborhood disorder. *Social Psychology Quarterly*, 70(4), 340–365.
- Clausen, J. A. (1991). Adolescent competence and the shaping of the life course. *American Journal of Sociology*, 96, 805–842.
- Clausen, J. A. (1993). *American lives: Looking back at children of the great depression*. New York: Free Press.
- Cockerham, W. C. (2005). Health lifestyle theory and the convergence of agency and structure. *Journal of Health and Social Behavior*, 46, 51–67.
- Collins, R. (2004). *Interaction ritual chains*. Princeton: Princeton University Press.
- Conger, K. J., Williams, S. T., Little, W. M., Masyn, K. E., & Sheblowski, B. (2009). Development of mastery during adolescence: The role of family problem-solving. *Journal of Health and Social Behavior*, 50(1), 99–114.
- Correll, S. J. (2001). Gender and the career choice process: The role of biased self-assessments. *American Journal of Sociology*, 106(6), 1691–1730.
- Costa, P. T., & McCrae, R. R. (1985). NEO personality inventory – Form R.
- Cross, S. E., & Gore, J. S. (2012). Cultural models of the self. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (2nd ed., pp. 587–614). New York: Guilford Press.
- Dahlsgaard, K., Peterson, C., & Seligman, M. E. P. (2005). Shared virtue: The convergence of valued human strengths across culture and history. *Review of General Psychology*, 9(3), 203–213.
- Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the benefits of giving as well as receiving autonomy support: Mutuality in close friendships. *Personality and Social Psychology Bulletin*, 32(3), 313–327.
- Duckworth, A., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science*, 23(5), 319–325.
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (GRIT-S). *Journal of Personality Assessment*, 91(2), 166–174.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101.
- Duckworth, A. L., Kirby, T. A., Tsukayama, E., Berstein, H., & Ericsson, K. A. (2011). Deliberate practice spells success why grittier competitors triumph at the national spelling bee. *Social Psychological and Personality Science*, 2(2), 174–181.
- Dunn, R. G. (1997). Self, identity, and difference: Mead and the poststructuralists. *The Sociological Quarterly*, 38(4), 687–705.
- Elder, G. H., Jr. (1994). Time, human agency, and social change: Perspectives on the life course. *Social Psychology Quarterly*, 57(1), 4–15.
- Elder, G. H., Jr. (1998). The life course and human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology* (Theoretical Models of Human Development, Vol. 1, pp. 939–991). New York: Wiley.

- Elder, G. H., Jr., & Johnson, M. K. (2002). The life course and aging: Challenges, lessons, and new directions. In R. A. Settersten Jr. (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 49–81). Amityville: Baywood.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer.
- Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology*, *103*(4), 962–1023.
- Epel, E. S., Bandura, A., & Zimbardo, P. G. (1999). Escaping homelessness: The influences of self-efficacy and time perspective on coping with Homelessness. *Journal of Applied Social Psychology*, *29*(3), 575–596.
- Firat, R., & Hitlin, S. (2012). Morally bonded and bounded: A sociological introduction to neurology. *Advances in Group Processes*, *29*, 165–199.
- Flaherty, M., & Fine, G. A. (2001). Present, past, and future: Conjugating George Herbert Mead's perspective on time. *Time & Society*, *10*(2–3), 147–161.
- Franzese, A. T. (2013). Motivation, motives, and individual agency. In J. Delamater & A. Ward (Eds.), *Handbook of social psychology* (pp. 281–318). New York: Springer.
- Frye, M. T. (2012). Bright futures in Malawi's New dawn: Educational aspirations as assertions of identity. *American Journal of Sociology*, *117*(6), 1565–1624.
- Fuchs, S. (2001). Beyond agency. *Sociological Theory*, *19*(1), 24–40.
- Gecas, V. (1989). The social psychology of self-efficacy. *Annual Review of Sociology*, *15*, 291–316.
- Gecas, V. (2003). Self-agency and the life course. In J. T. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 369–388). New York: Kluwer.
- Giddens, A. (Ed.). (1984). *The constitution of society: Introduction of the theory of structuration*. Berkeley: University of California Press.
- Gifford, D. D., Briceno-Perriott, J., & Mianzo, F. (2006). Locus of control: Academic achievement and retention in a sample of university first-year students. *Journal of College Admission*, *191*, 18–25.
- Gilbert, D. (2006). *Stumbling on happiness*. New York: Alfred A. Knopf.
- Gordon, S. (1989). Socialization of children's emotions: Toward a social constructionist theory. In C. Saarni & P. Harris (Eds.), *Children's understanding of emotion* (pp. 38–57). Cambridge: Cambridge University Press.
- Grabowski, L. J. S., Call, K. T., & Mortimer, J. T. (2001). Global and economic self-efficacy in the educational attainment process. *Social Psychology Quarterly*, *64*(2), 164–179.
- Gross, N. (2009). A pragmatist theory of social mechanisms. *American Sociological Review*, *74*(3), 358–379.
- Grusky, D. B., & DiPrete, T. A. (1990). Recent trends in the process of stratification. *Demography*, *27*(4), 617–637.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgement. *Psychological Review*, *108*(4), 814–834.
- Haidt, J. (2006). *The happiness hypothesis: Finding modern truth in ancient wisdom*. New York: Basic Books.
- Haidt, J., & Rodin, J. (1999). Control and efficacy as interdisciplinary bridges. *Review of General Psychology*, *3*(4), 317–337.
- Hallerod, B. (2011). What do children know about their futures: Do children's expectations predict outcomes in middle age? *Social Forces*, *90*(1), 65–84.
- Hays, S. (1994). Structure and agency and the sticky problem of culture. *Sociological Theory*, *12*(1), 57–72.
- Heinz, W. (2014). Did the great recession affect young people's aspirations and reinforce social inequality? *Longitudinal and Life Course Studies*, *5*(2), 189–198.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010a). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*(2/3), 1–75.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010b). Most people are not WEIRD. *Nature*, *466*(7302), 29–29.
- Hitlin, S. (2008). *Moral selves, evil selves: The social psychology of conscience*. New York: Palgrave Macmillan.
- Hitlin, S., & Elder, G. H., Jr. (2007a). Agency: An empirical model of an abstract concept. In R. Macmillan (Ed.), *Advances in life course research: Constructing adulthood: Agency and subjectivity in adolescence and adulthood* (pp. 33–67). Amsterdam: Elsevier/JAI Press.
- Hitlin, S., & Elder, G. H., Jr. (2007b). Understanding 'Agency': Clarifying a curiously abstract concept. *Sociological Theory*, *25*(2), 170–191.
- Hitlin, S. & Johnson, M. K. (2015). Reconceptualizing agency within the life course: The power of looking ahead. *American Journal of Sociology* *120*(5), 1429–1472.
- Hitlin, S., & Long, C. (2009). Agency as a sociological variable: A preliminary model of individuals, situations, and the life course. *Sociology Compass*, *3*(1), 137–160.
- Hitlin, S., Erickson L., & Brown J. S. (forthcoming). Agency and mental health: A transition to adulthood paradox. *Society and Mental Health*.
- Holstein, J. A., & Gubrium, J. F. (Eds.). (2000). *The self we live by narrative identity in a postmodern world*. New York: Oxford University Press.
- Howard, J. A., & Renfrow, D. G. (2003). Social cognition. In J. Delamater (Ed.), *Handbook of social psychology* (pp. 259–282). New York: Kluwer.
- Hyun, K. J. (2001). Sociocultural change and traditional values: Confucian values among Koreans and Korean American. *International Journal of Intercultural Relations*, *25*, 203–229.
- Jang, Y., Chiriboga, D. A., Lee, J., & Cho, S. (2009). Determinants of a sense of mastery in Korean American elders: A longitudinal assessment. *Aging & Mental Health*, *13*(1), 99–105.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus, and Giroux.

- Kasser, T., Koestner, R., & Lekes, N. (2002). Early family experiences and adult values: A 26 year prospective longitudinal study. *Personality and Social Psychology Bulletin*, 28(6), 826–835.
- Kiran-Esen, B. (2012). Analyzing peer pressure and self-efficacy expectations among adolescents. *Social Behavior and Personality: An International Journal*, 40(8), 1301–1309.
- Kohn, M. L. (1969). *Class and conformity*. Homewood: Dorsey.
- Kohn, M. L. (1977). *Class and conformity: A study in values, with a reassessment*. Chicago: University of Chicago Press.
- Kohn, M. L. (1989). Social structure and personality: A quintessentially sociological approach to social psychology. *Social Forces*, 68(1), 26–33.
- Kohn, M. L., & Schoenbach, C. (1993). Social stratification, parents' values and children's values. In D. Krebs & P. Schmidt (Eds.), *New directions in attitude measurement* (pp. 118–151). New York: Walter de Gruyter.
- Kohn, M. L., & Schooler, C. (1982). Job conditions and personality: A longitudinal assessment of their reciprocal effects. *American Journal of Sociology*, 87(6), 1257–1286.
- Kohn, M. L., & Schooler, C. (Eds.). (1983). *Work and personality: An inquiry into the impact of social stratification*. Norwood: Ablex Pub. Corp.
- Kohn, M. L., Slomczynski, K. M., & Schoenbach, C. (1986). Social stratification and the transmission of values in the family: A cross-national assessment. *Sociological Forum*, 1, 73–102.
- Kondo, D. (1990). *Crafting selves: Power, gender, and discourses of identity in a Japanese workplace*. Chicago: University of Chicago Press.
- Kraus, M. W., Piff, P. K., & Keltner, D. (2009). Social class, sense of control, and social explanation. *Journal of Personality and Social Psychology*, 97(6), 992–1004.
- Kwon, H. W. (2013). *Bridging social stratification and cross-cultural approaches to the sense of control: Effect of age and social class in the United States and South Korea*. Master's thesis, Department of Sociology, University of Iowa, IA.
- Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, 74(3), 763–773.
- Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. Berkeley: University of California Press.
- Laub, J. H., & Sampson, R. J. (2005). Human agency in the criminal careers of 500 Boston Men, circa 1925–1995. In *Agency and human development under conditions of social change*. Jena, Germany
- Lee, J. C., & Mortimer, J. T. (2009). Family socialization, economic self-efficacy, and the attainment of financial independence in early adulthood. *Longitudinal and Life Course Studies*, 1(1), 45–62.
- Lewin, K. (1948). *Resolving social conflicts; selected papers on group dynamics*. Oxford: Harper.
- Lewis, S. K., Ross, C. E., & Mirowsky, J. (1999). Establishing a sense of personal control in the transition to adulthood. *Social Forces*, 77(4), 1573–1599.
- Li, J. (2006). Self in learning: Chinese adolescents' goals and sense of agency. *Child Development*, 77(2), 482–501.
- Loyal, S., & Barnes, B. (2001). "Agency" as a Red Herring. *Philosophy of the Social Sciences*, 31(4), 507–524.
- Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224–253.
- Marshall, V. W. (2000). Agency, structure, and the life course in the era of reflexive modernization. In *The life course in the 21st century*. Washington, DC.
- Marshall, V. W. (2005). Agency, events, and structure at the end of the life course. *Advances in Life Course Research*, 10, 57–91.
- Massey, D. S. (2002). A brief history of human society: The origin and role of emotion in social life. *American Sociological Review*, 67(1), 1–29.
- Matsumoto, D., Yoo, S. H., & Fontaine, J. (2008). Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology*, 39(1), 55–74.
- McAdams, D. P. (2013). The psychological self as actor, agent, and author. *Perspectives on Psychological Science*, 8(3), 272–295.
- McLeod, J. D., & Lively, K. J. (2003). Social structure and personality. In J. DeLamater (Ed.), *Handbook of social psychology* (pp. 77–102). New York: Kluwer.
- Mead, G. H. (Ed.). (1932). *The philosophy of the present*. Chicago: Open Court Publishing.
- Meyer, J. W., & Jepperson, R. L. (2000). The "Actors" of modern society: The cultural construction of social agency. *Sociological Theory*, 18(1), 100–120.
- Mirowsky, J. (2013). Depression and the sense of control: Aging vectors, trajectories, and trends. *Journal of Health and Social Behavior*, 54(4), 407–425.
- Mirowsky, J., & Ross, C. E. (1989). *Social causes of psychological distress*. New York: Aldine de Gruyter.
- Mirowsky, J., & Ross, C. E. (1998). Education, personal control, lifestyle and health: A human capital hypothesis. *Research on Aging*, 20(4), 415–449.
- Mirowsky, J., & Ross, C. E. (2007). Life course trajectories of perceived control and their relationship to education. *American Journal of Sociology*, 112(5), 1339–1382.
- Mische, A. (2009). Projects and possibilities: Researching futures in action. *Sociological Forum*, 24(3), 694–704.
- Misztal, B. A. (2013). The idea of dignity: Its modern significance. *European Journal of Social Theory*, 16(1), 101–121.
- Morgan, S. L. (2006). Expectations and aspirations. In G. Ritzer (Ed.), *The Blackwell encyclopedia of sociology* (pp. 1528–1531). New York: Wiley-Blackwell.

- Mortimer, J. T., Zimmer-Gembeck, M. J., Holmes, M., & Shanahan, M. J. (2002). The process of occupational decision making: Patterns during the transition to adulthood. *Journal of Vocational Behavior, 61*(3), 439–465.
- Nisbet, R. A. (1969). *Social change and history: Aspects of the western theory of development*. New York: Oxford University Press.
- O'Connor, D. B., & Shimizu, M. (2002). Sense of personal control, stress, and coping style: A cross-cultural study. *Stress and Health, 18*, 173–183.
- Oyserman, D., Bybee, D., Terry, K., & Hart-Johnson, T. (2004). Possible selves as roadmaps. *Journal of Research in Personality, 38*(2), 130–149.
- Pearlin, L. I., & Kohn, M. L. (1966). Social class, occupation, and parental values: A cross-national study. *American Sociological Review, 31*(4), 466–479.
- Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*(1), 2–21.
- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior, 22*(4), 337–356.
- Pearlin, L. I., Nguyen, K. B., Schieman, S., & Milkie, M. A. (2007). The life-course origins of mastery among older people. *Journal of Health and Social Behavior, 48*(2), 164–179.
- Perry, R. P., Hladkyj, S., Pekrun, R. H., & Pelletier, S. T. (2001). Academic control and action control in the achievement of college students: A longitudinal field study. *Journal of Educational Psychology, 93*(4), 776–789.
- Peterson, C. (2000). The future of optimism. *American Psychologist, 55*(1), 44–55.
- Pickering, A. (1993). The mangle of practice: Agency and emergence in the sociology of science. *American Journal of Sociology, 99*(3), 559–589.
- Pollack, L. H., & Thoits, P. (1989). Processes in emotional socialization. *Social Psychology Quarterly, 54*, 22–34.
- Reed, J., Pritschet, B. L., & Cutton, D. M. (2013). Grit, conscientiousness, and the transtheoretical model of change for exercise behavior. *Journal of Health Psychology, 18*(5), 612–619.
- Reynolds, J. R., & Baird, C. L. (2010). Is there a downside to shooting for the stars? Unrealized educational expectations and symptoms of depression. *American Sociological Review, 75*(1), 151–172.
- Reynolds, J. R., & Johnson, M. K. (2011). Change in the stratification of educational expectations and their realization. *Social Forces, 90*(1), 85–110.
- Rodin, J. (1976). Density, perceived choice, and response to controllable and uncontrollable outcomes. *Journal of Experimental Social Psychology, 12*(6), 564–578.
- Rodin, J. (1986). Aging and health: Effects of the sense of control. *Science, 233*(4770), 1271–1276.
- Ross, C. E. (2000). Occupations, jobs, and the sense of control. *Sociological Focus, 33*(4), 409–420.
- Ross, C. E., & Mirowsky, J. (1992). Households, employment, and the sense of control. *Social Psychology Quarterly, 55*(3), 217–235.
- Ross, C. E., & Mirowsky, J. (2002). Age and the gender gap in the sense of personal control. *Social Psychology Quarterly, 65*(2), 125–145.
- Ross, C. E., & Mirowsky, J. (2013). The sense of personal control: Social structural causes and emotional consequences. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *The handbook of the sociology of mental health* (2nd ed., pp. 379–402). New York: Springer.
- Ross, C. E., & Van Willigen, M. (1997). Education and the subjective quality of life. *Journal of Health and Social Behavior, 38*, 275–297.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*(1), 1–28.
- Rudd, P., & Evans, K. (1998). Structure and agency in youth transitions: Student experiences of vocational further education. *Journal of Youth Studies, 1*(1), 39–62.
- Ryan, A. M. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development, 72*(4), 1135–1150.
- Schieman, S. (2001). Age, education, and the sense of control: A test of the cumulative advantage hypothesis. *Research on Aging, 23*(2), 153–178.
- Schieman, S., & Plickert, G. (2007). Functional limitations and changes in levels of depression among older adults: A multiple-hierarchy stratification perspective. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 62*(1), S36–S42.
- Schieman, S., & Turner, H. A. (1998). Age, disability, and the sense of mastery. *Journal of Health and Social Behavior, 39*, 169–186.
- Schneewind, K. A. (1995). Impact of family processes on control beliefs. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 114–148). NY: Cambridge University Press.
- Scholz, U., Doña, B. G., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment, 18*(3), 242–251.
- Schooler, C., Mulatu, M. S., & Oates, G. (2004). Occupational self-direction, intellectual functioning, and self-directed orientation in older workers: Findings and implications for individuals and societies. *American Journal of Sociology, 110*(1), 161–197.
- Schunk, D. H., & Meece, J. L. (2006). Self-efficacy development in adolescences. In F. Pajares & T. C. Urdan (Eds.), *Adolescence and education: Self-efficacy and adolescents* (pp. 71–96). Charlotte: Information Age Publishing.
- Seeman, M., & Seeman, T. E. (1983). Health behavior and personal autonomy: A longitudinal study of the sense of control in illness. *Journal of Health and Social Behavior, 24*, 144–160.
- Seligman, M. E. P., Railton, P., Baumeister, R. F., & Sripada, C. (2013). Navigating into the future or driven by the past. *Perspectives on Psychological Science, 8*(2), 119–141.

- Sewell, W. H., Jr. (1992). A theory of structure: Duality, agency, and transformation. *American Journal of Sociology*, 98, 1–29.
- Shanahan, M. J., & Bauer, D. J. (2004). Developmental properties of transactional models: The case of life events and mastery from adolescence to young adulthood. *Development and Psychopathology*, 16, 1095–1117.
- Shanahan, M. J., & Hood, K. E. (1998). Adolescents in changing social structures: Bounded agency in life course perspective. In R. Silbereisen & E. Crockett (Eds.), *Negotiating adolescence in times of social change: Cross-national perspectives on developmental processes and social intervention* (pp. 123–134). Cambridge: Cambridge University Press.
- Shanahan, M. J., Elder, G. H., Jr., & Miech, R. A. (1997). History and agency in men's lives: Pathways to achievement in cohort perspective. *Sociology of Education*, 70(1), 54–67.
- Shanahan, M. J., Hofer, S. M., & Miech, R. A. (2003). Planful competence, the life course, and aging: Retrospect and prospect. In S. H. Zarit, L. I. Pearlin, & K. W. Schaie (Eds.), *Personal control in social and life course contexts* (pp. 189–211). New York: Springer.
- Shanahan, M. J., Hill, P. L., Roberts, B. W., Eccles, J., & Friedman, H. S. (2014). Conscientiousness, health and aging: The life course of personality model. *Developmental Psychology*, 50(5), 1407–1425.
- Shaw, B. A., & Krause, N. (2001). Exploring race variations in aging and personal control. *Journal of Gerontology: Social Science*, 56B(2), 119–124.
- Sherer, M., Maddux, J. E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogers, R. W. (1982). The self-efficacy scale: Construction and validation. *Psychological Reports*, 51(2), 663–671.
- Singh, K., & Duggal Jha, S. (2008). Positive and negative affect, and grit as predictors of happiness and life satisfaction. *Journal of the Indian Academy of Applied Psychology*, 34(40–45), 40–45.
- Slagsvold, B., & Sørensen, A. (2008). Age, education, and the gender gap in the sense of control. *The International Journal of Aging and Human Development*, 67(1), 25–42.
- Slagsvold, B., & Sørensen, A. (2013). Changes in sense of control in the second half of life: Results from a 5-year panel study. *The International Journal of Aging and Human Development*, 77(4), 289–308.
- Smith, P. B., Trompenaars, F., & Dugan, S. (1995). The rotter locus of control scale in 43 countries: A test of cultural relativity. *International Journal of Psychology*, 30(3), 377–400.
- Snibbe, A. C., & Markus, H. R. (2005). You can't always get what you want: Educational attainment, agency, and choice. *Journal of Personality and Social Psychology*, 88, 703–720.
- Stephens, N. M., Markus, H. R., & Townsend, S. S. M. (2007). Choice as an act of meaning: The case of social class. *Journal of Personality and Social Psychology*, 93(5), 814–830.
- Stets, J. E. (2003). In J. Delamater (Ed.), *Handbook of social psychology* (pp. 309–335). New York: Kluwer.
- Tavory, I., & Eliasoph, N. (2013). Coordinating futures: Toward a theory of anticipation. *American Journal of Sociology*, 118(4), 908–942.
- Taylor, C. (Ed.). (1989). *Sources of the self: The making of the modern identity*. Cambridge, MA: Harvard University Press.
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103(2), 193–210.
- Taylor, S. E., & Brown, J. D. (1994). Positive illusions and well-being revisited: Separating fact from fiction. *Psychological Bulletin*, 116(1), 21–27.
- Triandis, H. C. (1995). *Individualism and collectivism*. Boulder: Westview.
- Trommsdorff, G. (1994). Future time perspective and control orientation: Social conditions and consequences. In *Psychology of future orientation*. 20–616 (pp. 39–62). Lublin: Wydawnictwo Towarzystwa Naukowego Katolickiego Uniwersytetu Lubelskiego.
- Turner, J. H. (1987). Toward a sociological theory of motivation. *American Journal of Sociology*, 52, 15–27.
- Turner, J. H., & Stets, J. E. (2006). Sociological theories of human emotions. *Annual Review of Sociology*, 32, 25–52.
- Vaillant, G. E. (2012). *Triumphs of experience*. Cambridge, MA: Harvard University Press.
- Vaisey, S. (2009). Motivation and justification: A dual-process model of culture in action. *American Journal of Sociology*, 114(6), 1675–1715.
- Vandello, J. A., & Cohen, D. (1999). Patterns of individualism and collectivism across the United States. *Journal of Personality and Social Psychology*, 77(2), 279–292.
- Von Culin, K. R., Tsukayama, E., & Duckworth, A. L. (2014). Unpacking grit: Motivational correlates of perseverance and passion for long-term goals. *The Journal of Positive Psychology*, 9(4), 306–312.
- Vuolo, M., Staff, J., & Mortimer, J. T. (2012). Weathering the great recession: Psychological and behavioral trajectories in the transition from school to work. *Developmental Psychology*, 48(6), 1759–1773.
- Wang, L.-Y., Kick, E., Fraser, J., & Burns, T. J. (1999). Status attainment in America: The roles of locus of control and self-esteem in educational and occupational outcomes. *Sociological Spectrum*, 19(3), 281–298.
- Warren, R., Hauser, R., & Sheridan, J. (2002). Occupational stratification across the life course: Evidence from the Wisconsin longitudinal study. *American Sociological Review*, 67, 323–346.
- Wheaton, B. (1980). The sociogenesis of psychological disorder: An attributional theory. *Journal of Health and Social Behavior*, 21, 100–124.
- Wilson, T. D. (2002). *Strangers to ourselves: Discovering the adaptive unconscious*. Cambridge, MA: Belknap Press of Harvard University Press.

- Wolinsky, F. D., & Stump, T. E. (1996). Age and the sense of control among older adults. *The Journals of Gerontology, 51B*(4), S217–S220.
- Wolinsky, F. D., Wyrwich, K. W., Kroenke, K., Babu, A. N., & Tierney, W. M. (2003). 9-11, personal stress, mental health, and sense of control among older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 58*(3), S146–S150.
- Yamawaki, N. (2012). Within-culture variations of collectivism in Japan. *Journal of Cross-Cultural Psychology, 43*(8), 1191–1204.
- You, S., Hong, S., & Ho, H.-z. (2011). Longitudinal effects of perceived control on academic achievement. *The Journal of Educational Research, 104*(4), 253–266.
- Young, A. A. (2004). *The minds of marginalized black men: Making sense of mobility, opportunity, and future life chances*. Princeton: Princeton University Press.
- Yowell, C. M. (2000). Possible selves and future orientation: Exploring hopes and fears of Latino boys and girls. *The Journal of Early Adolescence, 20*(3), 245–280.
- Zheng, H., Yang, Y., & Land, K. C. (2011). Variance function regression in hierarchical age-period-cohort models. *American Sociological Review, 76*(6), 955–983.

Cognitive Development and the Life Course: Growth, Stability and Decline

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1 Introduction

Life course theorists have persuasively argued that the life course perspective is useful for the study of human development over the entire life span (e.g., Elder 1997a, b; Elder and Shanahan 2006). Yet, there are actually very few studies that take the “long view” and look at human development over the entire life span using the concepts, premises and principles of the life course perspective.¹ This chapter focuses on *a set of key human factors* important in the study of human lives—the domain of *cognitive function* (CF)—across the entire life span, from early to later life experiences, using a life course perspective. Life span theorists have focused on the development, maintenance, and decline in CF over the entire life span, and have made substantial contributions (e.g., Baltes et al. 1999). Here we add importantly to this work by conceptual-

izing the interplay between these developmental processes and what we take to be the institutionalized life course, that is, the normative structures that move human lives through a sequence of positions, activities, and roles, around which people’s lives are constructed (Kohli 2007). Although life course theorists often speak about “human development” in the abstract, they rarely focus on the ways in which life course events, transitions, and trajectories actually impinge on and are affected by developmental outcomes over the life span. In this chapter we focus specifically on cognitive function (CF)—also known as intelligence, intellectual abilities, cognitive development, or just cognition—a multidimensional array of abilities that are examined at various life stages in diverse literatures.

A significant degree of recent attention has been paid to CF by the National Research Council, among other government agencies, attending equally to *cognitive development* in early life—(see the NRC report titled *Neurons and Neighborhoods*, edited by Shonkoff and Phillips 2000)—and *cognitive aging* in later life (see the NRC report titled *The Aging Mind*, edited by Stern and Carstensen 2000). The purpose of this chapter is to provide a conceptual framework based in the life course perspective that integrates the consideration of *within-person change* in CF over the entire life span with an understanding of the role of the institutionalized life course in affecting that change. This exercise necessitates

¹One exception is Newcomb’s Bennington studies (see Alwin et al. 1991), which studied political attitudes over nearly 50 years in the lives of their respondents. Another exception is the Terman study of gifted children (Friedman and Kern 2014; Kern and Friedman 2008).

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knowledge of multiple literatures that speak to these issues, including child development, education, social stratification, demography, social gerontology, and aging, in order to illuminate the social pathways for cognitive development across the entire life span.

The chapter is organized into three parts. First, we introduce our understanding of the life course perspective and how it may improve on the life-span developmental approach to the study of CF. Second, we provide a foundational framework for conceptualizing the concept of within-person change using a latent variable approach, and how the life course perspective can be used to develop event-centered models for understanding the heterogeneity of within-person change. Specifically, we emphasize the relevance of *latent difference score* models as an embodiment of the study of the growth, maintenance, and decline in CF over the life span, and discuss how this approach can be integrated with the life course analyst's interest in events, transitions, and changes in the social environment. The third major section of the chapter considers four major areas where our approach to the study of within-person change can be applied in understanding the nature of the social processes surrounding life course transitions and human development: (1) early child cognitive development and the transition to school, focusing on factors that contribute to successful transitions, and how transitions themselves contribute to further change; (2) the transition to adulthood and midlife, in which CF in adolescence leads to major influences on educational achievement, occupational success and CF in adulthood; (3) the potential for changes in CF during midlife; and (4) the applicability of a life course framework in the study of transitions in later life and how theoretically CF has a role to play as both consequence and cause of these transitions.

2 The Life Course

We begin by clarifying what the *life course* is (and is not). First, it is important to note that the concept of life course does not have the same

meaning as the concepts of *life span*, *life cycle*, or *life history*, and should be kept distinct (Elder 2000; Alwin 2012). The life course consists of a complex set of *interlocking trajectories*, or *pathways*, over the life span that are marked by sequences of *events*, *transitions* and *exposures* across several biologically- and socially-defined life stages (or phases) that impact upon the development of individual lives (see Featherman 1983; Elder et al. 2003; Alwin 2012). Such life course processes are defined by institutional frameworks—referred to here as the *institutionalized life course* (see Kohli 2007)—that define the transition from one life stage to the next, e.g. the transition to full-time school attendance (e.g., Entwistle et al. 2003), or the transition from school to work (e.g., Hogan 1981; Hogan and Astone 1986; Shanahan 2000), or the transition to retirement (e.g., Henretta 2003). Life course analysis typically focuses on the nature and determinants of those transitions, their timing, links to events and exposures in other life stages, and consequences of specific pathways for outcomes of human development (e.g. CF). The life course perspective assumes that the social pathways marked by these transitions and the social processes that surround them occur across specific life stages that define the entire life span and are embedded in social institutions and subject to historical variation and change.

As argued by Elder (1975, 1985) and others, an understanding of the life course builds on (but does not replace) several strong theoretical traditions that help give it meaning: (1) the life-span developmental approach (e.g., Baltes 1987, 1997); (2) the understanding of the human life cycle, and its biological underpinnings (e.g. Hogan 2000; Carey 2003); and (3) the sociological study of age stratification and the institutionalized life course (Riley 1987; Kohli 2007). We take full advantage of the theoretical richness offered by these foundational literatures and rely on an integrated framework that permits us to acknowledge the roles of both ontogenesis (biological development) and sociogenesis (environment influences) in cognitive change over the life span (Featherman and Lerner 1985).

A key element offered by the life course perspective, which gives it a unique place in the theoretical panoply of developmental theories, is its emphasis on institutionalized age-graded transitions, which shape sequences of roles, activities, and social pathways across the life span. The focus on social pathways allows research to concentrate on certain transition points between life cycle stages, such as the transition to school, the transition to adulthood, or the transition to retirement in older age. The study of the interplay between the institutionalization of life stages and human development of cognitive capacities offers a unique opportunity to take seriously a comprehension of the life course that ignores *neither* the ontogeny of development *nor* the institutionalization of life stages (aka the “age grading” of experiences), as articulated in the work of life course theorists. The life course conception of an age-graded sequence of statuses implies the existence of resources and opportunities that inhere in making the transitions, and one important individual resource worthy of the serious attention we intend to give it, is cognitive or intellectual functioning. We focus here on the interplay between life course transitions and the continuity and change in CF. The approach we propose for the study of CF can be applied in the study of other developmental trajectories where social context is relevant.

3 The Development of Cognitive Function

The primary focus of this chapter is on cognitive function (CF), considered broadly to refer to *the human ability to manipulate the environment in such ways as to solve both simple and complex problems posed by that (primarily external) environment*, and specifically *within-person change* in CF across biographical/historical time. This concept of *within-person change* is called by a variety of names—aging, human development, maturation, gains/losses—but the essential feature is that changes occur within persons over biographical/historical time. [Note that for a given person, the demographic reality is that bio-

graphical and historical time are completely confounded, and are inseparable, i.e. within-person change is both a reflection of history and biography.] We focus on the analysis of within-person change and on the processes that determine its direction and its rate, and how these serve as both causes and consequences of life course transitions. Specifically, we raise the issue of whether research has effectively addressed these matters. On the latter point, we believe there is too little research that addresses cognitive development within a life course framework. Baltes (1987, p. 613) does make an effort to address contextual and structural factors in CF, in his consideration of contextual and historical influences; unfortunately, these attempts do not adequately address the conceptual and methodological frameworks needed to analyze within-person change over time.

We focus on cognitive function in a broad and multidimensional manner, based on Cattell’s (1963, 1971a) and Wechsler’s (1952, 1958) work from the 1950s and 1960s that distinguished two inter-related components of CF—*fluid and crystallized* abilities. This distinction is important for two key reasons: (1) each has a potentially different relationship to age; and (2) each has a different connection to the schooling process. Fluid intelligence is conceptualized as “*the capacity for insight into complex relations ... independent of the sensory or cultural area in which the tests are expressed*” (emphasis in the original). Crystallized intelligence has its origins in experience but is not expected to be independent of other capacities because it “arises as the result of the investment of fluid intelligence, over the years, in whatever higher-level cultural skills the individual is exposed to” (Cattell 1971a, p. 13; see also Cattell 1971b; Denny 1982; Horn 1968, 1976, 1994; Horn and Cattell 1967; Horn and Donaldson 1980). The distinctions drawn by Cattell have subsequently been mentioned by others using somewhat different terminology, which attests in part to their importance. Baltes (1987) used the terms “mechanics” and “pragmatics” to refer to fluid and crystallized abilities (see also Salthouse 1991, p. 34; see also Salthouse 1999). Contemporary models of intelligence now

include a more complex set of domains (see Carroll 1996, 1998; Woodcock 1994), but the fundamental distinction between fluid and crystallized intelligence continues to guide current thinking (see Flanagan et al. 2000; McGrew 1997; McGrew and Flanagan 1998). For this reason, any argument concerning the development of cognitive function must take seriously the role of education and schooling, which is largely ignored in Baltes (1987, 1997), but which a life course perspective can add.

A life course perspective on cognitive development across the life span—in early childhood, late adolescence, midlife, retirement and older age—must consider the “master” processes of educational achievement, work and retirement, about which much has been written. For our present purposes, we arbitrarily break the institutionalized life course into four distinct age-graded periods of life: (1) preparation for school (across all stages of schooling); (2) preparation for work life, which includes the transition to adulthood (Shanahan 2000); (3) development of a work career (Schooler 1987); and (4) retirement and older age (Henretta 2003). The consideration of these transitions is reinforced by the technological and institutional factors that govern the educational and occupational systems, shape the pursuits of individuals, and constrain the opportunities and resources inhering in the connections of individual lives to these organizational structures. With the premises of the life course perspective in hand (see Alwin 2012), we believe we can develop a useful framework for investigating the interplay between human abilities (CF) and the life course.

With regard to the average trajectory of cognitive abilities, early life is marked by a period of growth, up until growth peaks, and patterns then level off (Cattell 1971a, b). Subsequently, fluid abilities decline systematically with age, and crystallized abilities increase slightly or otherwise remains relatively stable with age (see Horn and Cattell 1967). The available literature on cognitive aging generally confirms Cattell’s model. Research shows that there are significant cognitive declines in fluid or process-based abilities (e.g., memory) well past age 65 (Hertzog and

Schaie 1988), and that the declines increase even more rapidly after age 80 (Scherr et al. 1988). In contrast, measures of crystallized or education-based abilities, such as vocabulary recognition or verbal reasoning, decline later and less predictably (Park 1999; Park et al. 1996; Alwin and McCammon 1999, 2001).

Most people agree that there are no pure measures of either CF component and that any given measure may constitute some combination of both. To the extent that available cognitive measures depend on education, there may be a confounding of age-related trajectories with schooling, given the well-known pattern of inter-cohort differences in levels of schooling. Note that Cattell’s classic prediction about the age-related patterns of fluid and crystallized abilities is about levels and trajectories of cognitive function; however, it does not address the question of the relationship between environmental change and individual change.

4 Principles of Life Span Development

There are several highly-influential and widely-cited theoretical statements about human cognitive development in adulthood that stress the multi-causal nature of development (e.g., Baltes 1987, 1997; Baltes et al. 1999; Baltes and Mayer 1999; Featherman and Lerner 1985; Schaie 2005). Development is embedded in multiple contexts in which the ontogeny of development interacts with the social environment, within a set of interconnected social and cultural settings (e.g., Bronfenbrenner 1979). In the past 30 years, the sub-discipline of human development became aware of the importance of the “life span developmental” perspective, and this work has guided substantial amounts of research on cognitive change in the older years. Thus, human development across the entire life span is conceptualized as multi-causal, multi-dimensional, and multi-directional change.

The main theoretical argument resulting from this perspective can be found in Baltes’ 1996 address to the American Psychological Association,

in which he draws upon both evolutionary and ontogenetic ideas about development, and theorizes about the contribution of biological-genetic factors and the social-cultural arrangements to human development (Baltes 1997). He posits “three foundational (constraining) principles of the life span architecture of human ontogeny,” which can be applied to the phenomenon of cognitive development. He first argues that there is a negative relationship between the benefits resulting from evolutionary selection and chronological age. Evolutionary pressures have emphasized reproduction rather than longevity (e.g., Finch and Kirkwood 2000). Humans have evolved to reproduce themselves, and experience the greatest protection from their biological and genetic architecture in the younger years. Consequently, the human genome in older ages contains “an increasingly larger number of deleterious genes and dysfunctional gene expressions” (Baltes 1997, p. 367) compared to younger ages. In short, “reproduction fitness” trumps “longevity fitness.” The existence of the dementias, such as Alzheimer’s Disease, illustrate his point (see Martin et al. 1996), where the chronic condition does not manifest itself until age 70 and prevalence rates increase exponentially thereafter (see Brookmeyer and Gray 2000; Brookmeyer et al. 1998; Kawas and Brookmeyer 2001). Reproductive fitness, in the broad evolutionary schema, is neutral with respect to the diseases of old age.

In addition to the adaptive conditions afforded humans by the realities occasioned by their evolutionary circumstances, humans also experience the phenomena associated with biological (or ontological) processes of aging, which produce a number of age-associated mechanisms involving biological loss. As Baltes noted, “evolution and biology are not good friends of old age” (Baltes 1997, p. 368)—biological losses amplify the “evolutionary neglect of old age.” Further, an “unfinished architecture” of life span development is created by the course of evolutionary selection and biological ontogeny. These processes work together to produce a parallel phenomenon, “the second cornerstone of a life span architecture of human ontogenesis (or development),” namely “an age-related increase in the

need or demand for culture” (Baltes 1997, p. 368). By “culture,” Baltes refers to “the entirety of psychological, social, material, and symbolic (knowledge-based) resources” that promote human development. In the case of cognitive functioning, this refers to the set of factors we discuss below under the headings of “social environment” and “social structure” and all of the factors contained therein (e.g. social resources, social capital, and social status). The argument is that with age, largely due to principles of evolutionary and biological ontogeny, there is an increased demand or need for culture to play a role. Social environmental resources play an increasingly important role in cognitive functioning in older age (see, e.g. Rowe and Kahn 1998; Baltes and Baltes 1990). As evidence of this need, one can point to improvements in life expectancy in industrialized societies over the twentieth century.

Finally, the third foundational principle of life span development is that over the course of time, “there is an age-related loss in the effectiveness or efficiency of cultural factors and resources,” largely conditioned by the “negative biological trajectory of the life course” (Baltes 1997, p. 368). Further, there continues to be a great deal of flexibility or plasticity in development in older age, and the extent of this potential for change may in fact be greater than normally believed, but the “scope of plasticity of the human organism declines with age” (Baltes 1997, p. 368). He uses cognitive learning in old age as an example of this phenomenon. He cites the common finding of declining speed of processing in older age, (e.g. Salthouse 1996), which strongly suggests that when it comes to high levels of performance, older adults may never be able to reach the same levels of functioning as younger adults even after extensive training (Baltes 1997, pp. 368–369). We discuss the differing degrees of stability or plasticity in cognitive functioning in a later section.

These considerations lead to three major issues drawn from the life-span developmental perspective: (1) the treatment of CF across the life span in terms of successive periods of growth, maintenance, and decline; (2) the role of the

environment in promoting cognitive change during these periods; and (3) the degree of stability or plasticity of CF over these periods. We take up each one of these topics in the following sections.

4.1 The Architecture of Development: From the Ground Up

Baltes' (1997) architecture of the life span dynamics between biology and culture forms a general framework within which human development is embedded and the contours for his "selective optimization with compensation" (SOC) model (see Baltes and Baltes 1980, 1990; Staudinger et al. 1995). SOC involves three general functions or outcomes of development: (1) growth, (2) maintenance, and (3) regulation of loss. According to Baltes and his colleagues, a systematic shift in the relative allocation of resources to these three functions occurs over the lifespan. In his words:

In childhood, the primary allocation is directed toward growth; during adulthood, the predominant allocation is toward maintenance and recovery (resilience). In old age, more and more resources are directed toward regulation or management of loss. ... (Note) that the reallocation of resources toward maintenance of functioning and regulation of loss is facilitated by the tendency of individuals to prefer avoidance of loss over enhancement of gains. (Baltes 1997, p. 370)

We do not dwell on the intricacies of Baltes' SOC framework here, as that is stated eloquently in the above citations, except to note that the theory is not accompanied by the specification of methods for studying the joint influences of maturational and environmental factors in cognitive function across the life span. At a general level, the SOC framework is useful in terms of orienting one to the general considerations necessary for studying cognitive aging as an adaptive process involving cognitive, neural, and environmental resources. It lacks specificity, however, regarding research strategies for studying the changing role of the social environment in the development, maintenance and decline in cognitive functioning across the life span.

Our interest here is in developing this model within a framework of within-person change and specify it as a growth model that can be theoretically formulated across the entire life span within a life course perspective. At the early stages of the life span, the environment promotes change, and differences in the experience with the environment are most potent in terms of producing individual differences during the period of rapid changes at the maturational level. In Fig. 2 we depict Bloom's (1964) empirically-based developmental curve that specifies the nature of aggregate growth trajectories, but the limits of environmental impact as well. This goes beyond the baseline model shown earlier (see Fig. 1) in that it explicitly includes the role of the environment. The gradually rising curve of the level of development that changes as a function of age in Fig. 2 is intended to represent the average trajectory of the development of cognitive function. This curve exhibits its highest rates of change at the youngest ages and as depicted here the rate of change slows as age increases. The shaded area surrounding this curve is intended to represent the potential for differences in environments to affect the rate of change. The theoretical potential for the influence of environmental factors is represented by the wideness of the shaded area in the figure, which in this case narrows with increasing age. The greater the potential for environmental effects, the less stable are the individual differences in the attributes of individuals; whereas the less potential for environmental change, the more highly stable are individual differences.

In Bloom's (1964, p. vii) words, "(v)ariations in the environment have greatest quantitative effect on a characteristic at its most rapid period of change and least effect on the characteristic during the least rapid period of change." This picture of development in the early years is assumed in Bloom's scheme to be very general, in the sense that it applies to aspects of physical development, e.g. height and weight, as well as cognitive abilities and personality. Bloom's curve is also consistent with the models of growth presented in Fig. 1, including Cattell's (1963) two inter-related components of cognitive function—*fluid and crystallized* abilities.

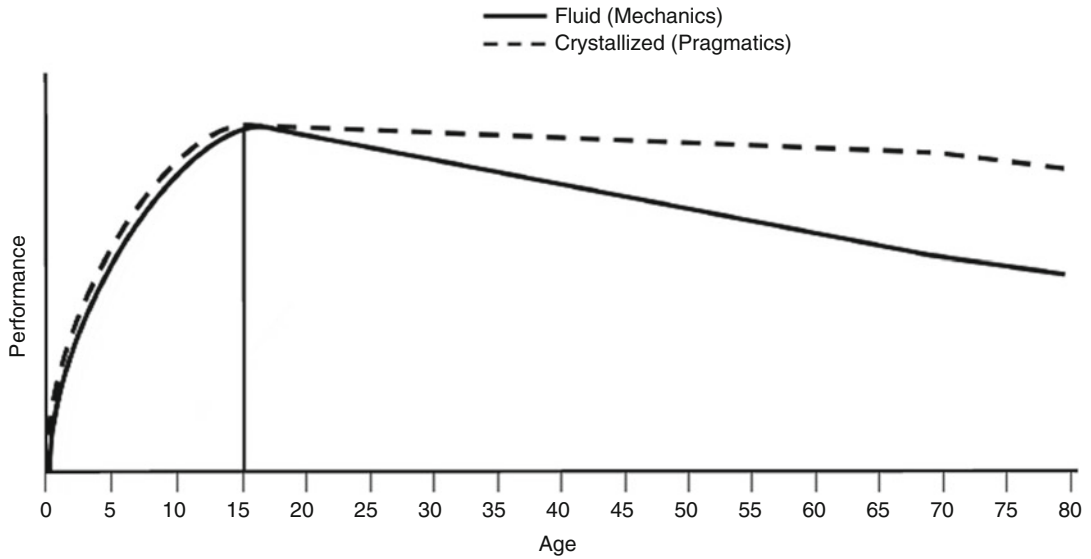
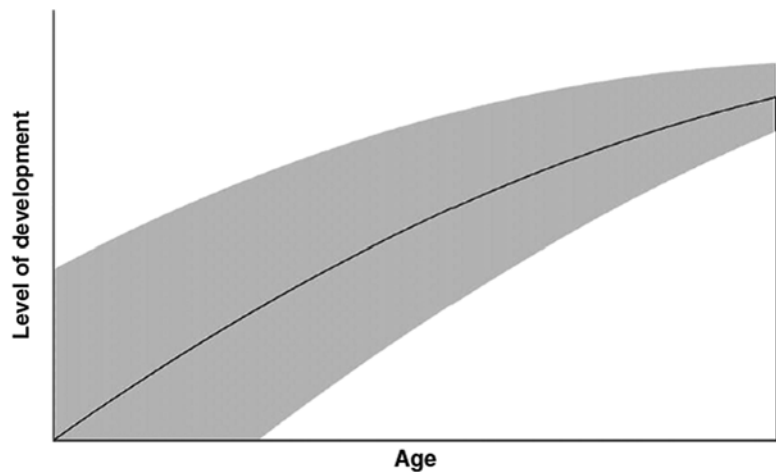


Fig. 1 Aggregate patterns of change in fluid (mechanics) and crystallized (pragmatics) cognitive function over the life span (Adapted from Cattell 1971b, p. 12)

Fig. 2 Developmental curve and the limits of environmental influence (From Bloom 1964)



Bloom's (1964) empirical work does not go beyond age 18, but he speculated that for most models of cognitive development, in terms an absolute scale, "it is assumed that intelligence remains constant after about age 20," but he conceded that at the time he did his study there was very little evidence available on adult intelligence (1964, p. 80). He speculated that the environments in which people live after young adulthood would likely determine the nature of further intellectual development. He suggested that further

development is possible if the forces reflecting environmental change are powerful enough to produce cognitive change, although he surmised from the available evidence that during most of adult life environments are decidedly static and that massive levels of intellectual stability is typical (pp. 80–90). Ultimately, this pattern is not necessarily normal, or inevitable, since the level of stability is a reflection of the relationship of the person and the environment (Ryder 1965; Alwin 1994, pp. 146–147).

There are three ways in which environments can influence cognitive development via life course processes: via its influence on *levels of cognitive functioning*, *trajectories of change*, and its influence on *rates of within-person cognitive change* (see Fig. 2). A *trajectory* of development is involved as one traces levels of functioning through time, and it is therefore linked to within-person change. The vast majority of the research literature on the life course and cognitive function has focused on levels rather than on trajectories and rates of change. In the present essay, we argue that in order to understand the nature of the relationship between social structure, and life-span changes in cognitive function, it is important to be highly sensitive to this distinction between average trajectories and average rates of change over the life span. Indeed, we argue that it is because of the earliest influences of social structural factors on cognitive functioning, there may be considerably less of a role on cognitive change later in life (see below).

From a descriptive point of view, cognitive change is typically inferred from either repeated cross-sectional (between-persons) or panel (within person) data. It is important to bear in mind that cross-sectional age-related differences

reflect the net effects of *within-person change*, but they do not directly measure within-person change (see Alwin and McCammon 1999, 2001). In the case of longitudinal designs, the focus is on gross age-related changes, where the hypothesis of aging may be only one possible interpretation of net levels of age-related within-person change. Generally speaking, neither design can by itself address the foundational assumption of an interaction between the environment and human development, but most people agree that there is a substantial degree of heterogeneity in the nature and degree of cognitive change which is better studied in a longitudinal design. If there were no heterogeneity in age-related levels, trajectories and levels of stability in cognitive functioning over most of the life span, there would be little need to provide the careful investigation of the influences of environmental change on changes in individual growth trajectories.

As depicted in Fig. 3, at the early stages of the life span, the environment promotes change. Rates of change are highest early in life, and following Bloom's (1964) line of argument, differences in the experience with the environment are most potent during rapid changes at the maturational or growth level. Variations in the environ-

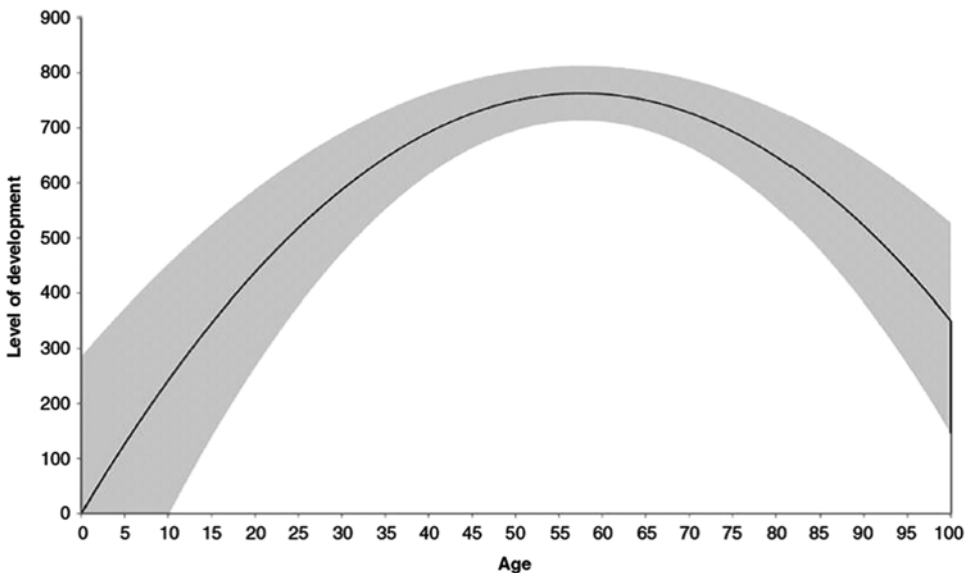


Fig. 3 Developmental curve and changes in the limits of environmental influence across the life span (From Alwin 2010)

ment have greatest quantitative effect on a characteristic at its most rapid period of change and least effect on the characteristic during the least rapid period of change (Bloom 1964, p. vii). Later on in midlife, the environment may act to promote stability rather than change, and due to the increasingly stable properties of the environment (Ryder 1965), efforts aimed at changing individuals through environment change may be doomed to failure (see Musgrove 1977). These ideas are consistent with Baltes (1997) ideas that the challenges of midlife focus on maintenance, rather than gains or losses. Finally, in older age the experience of the individual may again parallel that of childhood and youth—and the environmental influences may regain their importance as factors linked to cognitive change, in part due to increasing rates of change/decline in older age as in Fig. 3 (see Alwin 2010).

4.2 The Role of the Environment: Advantage vs. Disadvantage

The complexities of the environment become incorporated into the cognitive function of the individual through a sequence of increasingly complex activities, interpersonal structures, and linked micro-settings (i.e., meso-environments) (see Bronfenbrenner 1979, pp. 56–65; Bronfenbrenner and Ceci 1994). Clearly, the study of the linkage between these complexities of “mind” and environmental structures is necessary if we are to understand the nature of cognitive development across the entire life span. It is the role of the family (and other social institutions) in structuring the nature of the complexity of the environment that has been of interest to child developmentalists, especially those interested in documenting the role in early environments in producing individual differences in cognitive outcomes.

It has long been held that the early years of a child’s development are the most important, laying the groundwork for later experiences, and that effective parenting associated with class or socioeconomic differences is an important component of those critical experiences. Social stratification has always been an important area in research on

the family, and there is a great deal of agreement among social scientists concerning the importance of the family of origin for a multitude of individual outcomes, from academic performance and achievement test scores to social and economic attainments in adulthood. The systematic and persistent advantages enjoyed by individuals born to socioeconomically successful parents have been thoroughly documented in the literature over more than a half-century using a variety of data sets representative of the U.S. population (e.g., Alwin and Thornton 1984; Blau and Duncan 1967; Bowles et al. 2005; Duncan et al. 1972, 2005; Lareau and Conley 2008; Morgan et al. 2006; Sewell and Hauser 1975; Smith et al. 1997). Although achievement and other child outcomes are malleable over the child’s life span, it is important to recognize that the child’s early years are almost entirely monopolized by his or her family, and that it is during these early years that basic language, academic and social skills are developed. These initial opportunities and constraints serve as important factors in the development of the child (e.g., Hart and Risley 1995).

The idea that parental inputs to early childhood experiences are important to later development is not new; and despite the widely shared view that parents are important for development, some have criticized that thesis. In a popular book, *The Nurture Assumption: Why Children Turn Out the Way They Do*, Judith Harris (1998) argued that “very, very bad parents can cause irremediable harm to their children” (p. 390) but in the main how parents raise their children—their child-rearing practices—have little if any effect on how their children turn out. She bases her argument on a number of powerful pieces of evidence, including a famous review of the parental socialization literature from the early 1980s by Maccoby and Martin (1983) that reviewed intra-familial correlations in personality characteristics among both biologically-related and—unrelated siblings. Their conclusion was that parental behaviors on the whole had no bearing on child outcomes (see also Maccoby 1992; Scarr 1992, 1995; Harris 1995; Rowe 1994; Loehlin 1997; Pinker 2002).

Contrasting evidence exists in the behavioral genetics literature for a role of both environment and genetics (see Plomin 1994, 1999; Rowe 1994; Rowe and Teachman 2001; Scarr 1995; Shanahan et al. 2003). The claim is that individual differences in developmental outcomes arise, not from family differences in access to opportunities, nor from differences in socialization approaches, but from genetically-variable attributes of families. The behavioral genetics literature on cognitive abilities is extensive, and we do not attempt to review it here. We limit ourselves to Rowe's (1994) assessment with respect to cognitive function, in which he reviewed the available behavioral genetics studies of cognitive abilities, indicating that "heritability estimates ranged from 40 % to 70 %, indicating that substantial variation in intellectual ability has substantial genetic basis" (p. 105). There is also some initial support for the possibility that child-rearing experiences may combine additively with inherited advantage to account for individual difference; after further examination of a range of studies; however, he concluded that the existing data fail to demonstrate that child rearing environments influence cognitive function once children are older (Rowe 1994, p. 113).

One of the timeworn hypotheses in the literature on social stratification, but one that is not often tested empirically, is that the consequences of early socioeconomic differences in the lives of individuals are accentuated over time. Using the metaphor of the *parable of the talents*, dubbed the "Matthew Effect" in Robert Merton's (1968) famous paper in *Science* about inequalities in the reward systems governing credit in scientific authorship, quoted the following Biblical passage: "unto everyone that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath." In short, Merton suggested that "the rich get richer and the poor get poorer," or in other words, that advantage and disadvantage cumulate over time. Few would doubt Merton's observation that the social environment is structured in such a way as to promote the accrual of greater resources to those who already have them—or, cumulative advantage—and the withholding of resources from those who begin with less—or cumulative disadvantage.

The question raised in this chapter is whether the development of cognitive resources and the accrual of "cognitive reserve" (see Stern 2007) follows the same pattern, as Merton suggests it does in other realms. Few doubt that the socio-economic environment is an important element in cognitive development—it is a well-accepted fact that cognitive function is shaped by differences in structural opportunities and other factors; theoretically, greater opportunities promote the investment in activities that lead to greater cognitive development. In fact, one of the prevailing assumptions is that early and later environments during childhood contribute independently to the development of intellectual resources later on (see Alwin and Thornton 1984).

The argument is typically extended to suggest there is a further compounding or accentuation, of the influences of the social environment over time, but this has not been closely examined in the realm of cognitive functioning. Not only do socio-environmental inequalities impact upon individual differences at multiple time points over the life span, there is considerable theory suggesting that the residues of these influences in individual differences cumulate over time. Hence, there is a literature that has developed under the topic of "cumulative advantage / disadvantage theory" (O'Rand 1996; Dannefer 2003; DiPrete and Eirich 2006; Ferraro and Shippee 2009; see also Ferraro, chapter "Life Course Lens on Aging and Health" this volume, for a review).

It is widely believed that children from different family backgrounds enter schooling with differing levels of cognitive skills that differentially prepare them for the development of academic skills and that these differences grow over time. Potter and Roksa's (2013) recent research using reading and math test scores from the Early Childhood Longitudinal Study—Kindergarten cohort (ECLS-K) shows that cumulative family experiences account for most of the growing inequality in academic achievement between children from different social class backgrounds over time (Baumert et al. 2012; Potter and Roksa 2013; see also Potter et al. 2013). These findings support claims from the cumulative advantage perspective that cognitive score differences

among children from different family backgrounds enter schooling with different levels of academic skills, and such test score differences grow over time.

Few researchers have applied the hypothesis of cumulative advantage/disadvantage to cognitive functioning in adulthood (but see Alwin 2010). One related body of work concerns research on the relationship of social status factors and physical health, which consistently finds inequalities in health across the life span. Cognitive function and indicators of physical health would presumably operate in similar ways; despite this persistence and posited increasing strength of the relationship between social status and health with increasing age; however, a growing body of research indicates that the association is generally strongest at the “older working ages,” and subsequently diminishes later in life (e.g. Crimmins 2001, 2005; Crimmins et al. 2004; Hayward et al. 2000; House et al. 1992, 1994, 2005; Kunst and Mackenbach 1994; Lynch 2003; Marmot and Shipley 1996; Molla et al. 2004; Robert and House 1996). These researches have consistently found a declining role of social status factors in older age, despite the parallel findings of the declining significance of genetic differences in affecting health outcomes and cognition in older age (see Rowe and Kahn 1998; Pedersen and Lichtenstein 1997). Moreover, unless one factors in the effects of selective mortality, such findings are hard to account for based on the premises of cumulative advantage/disadvantage theory, in that one would expect the socio-economic gradient to become steeper with time—i.e., “the rich get richer and the poor get poorer.” One would expect that those higher in status (i.e., more highly educated), who are also more cognitively advantaged, would actually increase their advantage over time, although as far as we can tell, there is hardly any evidence for it (see Alwin 2010).

4.3 Stability and Change in Cognitive Function over the Life Span

The developmental literature on this subject uses the term “plasticity” to refer to this “intra-

individual” or “within-person” malleability in development over time (see, e.g., Baltes et al. 1999, pp. 480–481; Baltes and Baltes 1980). The strong concern of lifespan researchers with intra-individual plasticity (malleability) highlights the search for the potentialities of development, including its upper and lower boundary conditions. Implied by the idea of plasticity is that any given developmental outcome is but one of numerous possible outcomes, and that the search for the conditions and range of ontogenetic plasticity, including age-associated changes, is fundamental to the study of development. At the same time, there is a great deal of evidence that cognitive test scores are quite stable (in contrast to plastic or flexible) over rather lengthy periods of the life span (see Baltes et al. 1999; see also, Alwin 1994).

This is a direct consequence of declining amounts of change in growth patterns in young persons after the early 20s. Growing evidence from MRI studies of children and adolescents suggests that the growth in the development of structural changes in the brain peaks in late adolescence (e.g., Lebel and Beaulieu 2011; Giedd 2008; Giedd et al. 1999; Johnson et al. 2009; Paus et al. 1999). As is the case with many human traits that reflect both maturational and environmental influences, individual differences in test scores are relatively less stable in childhood and early adolescence, but with age the differences among persons tend to stabilize, at least through midlife (see Alwin 1994, 2008, 2009, 2010). Here we examine how much flexibility (or plasticity) there is in cognitive abilities.

There is no question that environment plays an important role in cognitive development, and it also has a role in the maintenance of individual differences over the life span. No one would likely dispute the possibility that major environmental inputs can contribute to a flexibility and change in older age in a range of abilities, but the findings we introduce here strongly suggests a picture of high degrees of stability in cognitive functioning from midlife into old age. It is well-known that individual differences in cognitive abilities are one of the most stable components of human behavior that has been studied. Where the stability of individual differences in human abilities has been taken as problematic, measures of

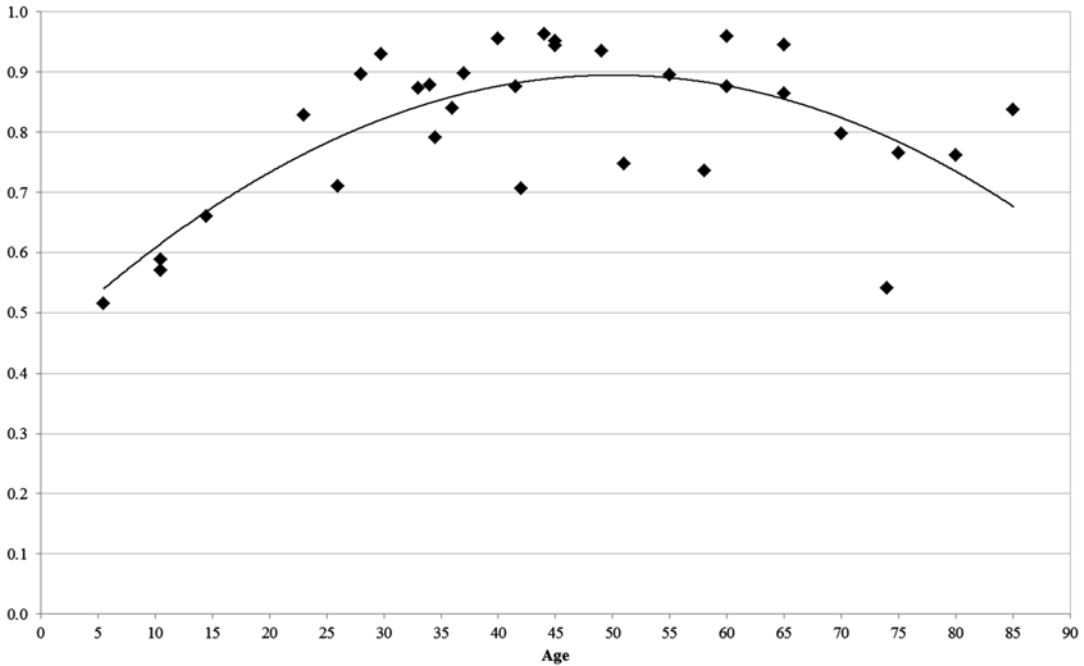


Fig. 4 Molar stability estimates for cognitive function from 22 longitudinal studies spanning various ages (From Alwin, unpublished findings)

intellective variables are highly stable over most of the adult life span. In Fig. 4, we present a summary of estimates of molar stability (using a molar index of 8 years) from 24 longitudinal studies of cognitive functioning spanning a variety of ages (from Alwin and others *n.d.*).² These results show that, as predicted on the basis of Bloom's (1964) work, the levels of molar stability are relatively low in the childhood years and increase with age. In Fig. 4 we have superim-

²The *molar stability* coefficient is an estimate of the persistence of behavior or behavioral orientations as expressed in age-homogenous rates of change over specified periods of time. The concept was introduced as a means of organizing empirical information on human constancy and change, and of comparing raw stability estimates across studies having different re-measurement intervals and across different concepts (see Alwin 1994, pp. 155–158; Alwin 1995, pp. 233–238). As distinct from other concepts of stability (see Alwin 1994), molar stability is defined as β^{jk} where β is the cohort-specific or age-homogenous stability estimate observed empirically, k is the number of years over which raw stability is assessed, and j is the number of years selected to express molar stability. In the examples used in this chapter, $j=8$.

posed a best fitting curve that is described by a polynomial function of the second order.

Stability results for the adult years show there is very little change in the distributional placement of individuals relative to others after the age of 20. For example, the Seattle Longitudinal Study reflects the typical pattern—Hertzog and Schaie's (1986) estimate of the stability of the common factor underlying individual differences in a version of Thurstone's Primary Mental Abilities is .92 over a 14-year period. They also showed that levels of stability increase with age. Similarly, Kohn and Schooler (1978) find a normative stability value of .93 for their concept of "intellectual flexibility" assessed over a 10-year period. Across the entire range of studies indicates that stability grows in magnitude from adolescence onward and from the age of 40 the typical "molar stability" of intellectual ability is roughly .900.³

³In this discussion *normative stability* refers to the preservation of individual differences in a quality within a constant population over a specified amount of time, whereas

These results may seem to pose a serious threat to some interpretations arguing that socialization or learning affects basic intellectual abilities well into adulthood. Obviously, some openness to change is possible during adulthood, but if we understand that stability is a function of constancies of person-situation or person-structural linkages, then continuities over time may be viewed as reflections of the stability of socially structured experience, and the proper adjudication of the issue of whether a socio-environmental interpretation exists for the stability of cognitive abilities would have to focus on the segment of the population that experiences change in social locations at different points in the life cycle, e.g. persons who make the transition to retirement, so that life-course linkages to changes in socially-structured experiences could be determined. We return to a discussion of this issue when we take up the topic of cognitive change in adulthood and older age.

5 Latent Change Models

Contemporary growth models for CF are rooted in the historical concerns of educational and psychological researchers with the measurement and analysis of change (Harris 1963). Early fixed-effects ANOVA models were formulated for repeated measures designs involving two or more groups of different subjects in which each subject had measurements on two or more occasions (Lindquist 1953). These early statistical models focused explicitly on *within-person change*, although notions of individual differences in growth or development were fairly primitive in these early statistical treatments. Early methodological contributions concentrated primarily on the problems and limitations of “difference scores” for assessing change (Lord 1963;

molar stability refers to the persistence of a quality as expressed in the rate of change for an age-homogenous cohort over a specified period of time. As used here, the term normative stability simply refers to molar stability in the entire population, not broken down by cohort (see Alwin 1994, p. 139).

Cronbach and Furby 1970). More recently, modern statistical models for the analysis of growth (and decline) were stimulated in part by early applications of growth curve analysis to the measurement of change (Rogosa et al. 1982) and later developments (see Curran and Bollen 2001; Bollen and Curran 2006). A somewhat parallel literature involving the analysis of change using causal models of change in panel data (Heise 1970; Jöreskog 1974; Alwin 1988), and present-day models incorporate both inter-individual differences and intra-individual (or within-person) change (see Curran and Bollen 2001).

5.1 Latent Difference Scores

The latent difference score model is an advantageous approach to the study of within-person (intra-individual) change (see Alwin 1988, pp. 137–139; Steyer et al. 1997; McArdle 2001; McArdle and Hamagami 2001), and it fits nicely with current latent growth models. Building upon the idea of latent difference scores, latent growth curve (LGC) models are well-suited to the study of CF because they focus on continuous processes of change and can allow for measurement errors in the variables assessed over time.⁴ There are some difficulties with the interpretation of measurement errors in these models because the errors on the indicators represent both measurement error and the lack of fit of the growth function to the individual’s observed score at time t , but we do not dwell on these matters here (see Willett and Sayer 1994; Singer and Willett 2003).

All growth models begin with the specification of a within-person (i.e. intra-individual) model for individual change over the period of measurement—these are often referred to as

⁴Because of the limitations on space, we do not discuss these models in detail here and introduce them primarily to provide a conceptual orientation to the study of within-person change, the central concept used throughout this chapter. Further discussion of these models for those uninitiated into the study of within-person change and the SEM approach may wish to consult introductory material on change models (see, e.g. Alwin n.d.).

time-based or *occasion-based* models, although for a given individual measured longitudinally, there is a perfect correlation between time of measurement and age. In the multi-level framework, the intra-individual growth model is sometimes called a *level-1* model. Once this model is formulated and estimated, one can examine a *level-2* model for explaining inter-individual differences in levels (intercepts) and rates of change (slopes) in the *level-1* model (see Willett and Sayer 1994, pp. 363–64). Although we do not represent them here, one of the purposes of the *level-2* model is to include covariates to account for variation in the intercepts and slopes. These are often referred to as random coefficients models, since the groups (individuals) are conceptualized as, and in many cases, are in fact, a sample from some larger population. Of particular interest here is the inclusion of covariates that represent some function of time—either historical or biographical time—to account for levels (intercepts) and the rates of change of the dependent variable of interest. Such a latent growth curve model is statistically equivalent to a random coefficients model for change over time when time values are discrete across occasions for all or most individuals. The multilevel approach permits more flexible specification of time in that values can be different for each individual at each occasion (see Hox 2002).

There are several alternate ways to construct individual latent growth models (e.g., Willett and Sayer 1994; McArdle and Bell 2000; Meredith and Tisak 1990). One common approach is to conceptualize the models within a SEM framework, but there is an equally common (and formally equivalent) approach in the multilevel regression analysis tradition (see Macmillan and Furstenberg, chapter “[The Logic and Practice of Growth Curve Analysis: Modeling Strategies for Life Course Dynamics](#)” this volume). The growth model for *within-person change* in the generic case expresses change as a function of time, where an individual’s score at a given point in time is a function of an intercept (or level) parameter, a linear slope parameter, and possibly a parameter expressing some curvature.

Models based on time in study will include covariates such as chronological age and other covariates to account for the heterogeneity in individual differences in level and change. Age-based models, on the other hand, model age-differences and age-changes as average or fixed effects but will often include other covariates as well. Alternatively, event-centered time structures can be used to account for heterogeneity in initial status and rate of change in terms of common patterns of change that occur prior to or following a discrete time-based structure or event (see Alwin et al. 2006). Heterogeneity in rates of age-based decline could be explained in terms of the misalignment of individuals with respect to the causal process producing their cognitive gains or losses (dementia). These types of alternative time specifications will lead to different interpretations of the same data. In non-informative time metrics (e.g., time in study), the heterogeneity of initial status and change (random effects) is accounted for by covariates whereas in models with informative time metrics, the heterogeneity is accounted for by the alignment of individuals with the explanation of the time-based process focused on the average or fixed effects in accounting for heterogeneity in change.

It is not possible to summarize all of the current research studies of CF that have formulated developmental change in terms of latent curve models. We provide one example from the work of Farkas and Beron (2004), who analyzed vocabulary data (the Peabody Picture Vocabulary Score) from the Children of the NLSY79 (CNLSY) collected at two or more observations at different time points for many children in the sample. As Farkas and Beron (2004, p. 466) note, most researchers analyzing the CNLSY treat the data in what is essentially cross-sectional form, taking a particular year and an age-homogenous set of children, and analyzing the determinants of CF scores. By contrast, Farkas and Beron (2004) estimate multilevel random coefficient growth curve models in which intercept and slope (including a quadratic specification) were permitted to depend on race, class and gender. The data analyzed by Farkas and Beron (2004, p. 447) are shown in Fig. 5, which depicts the average oral

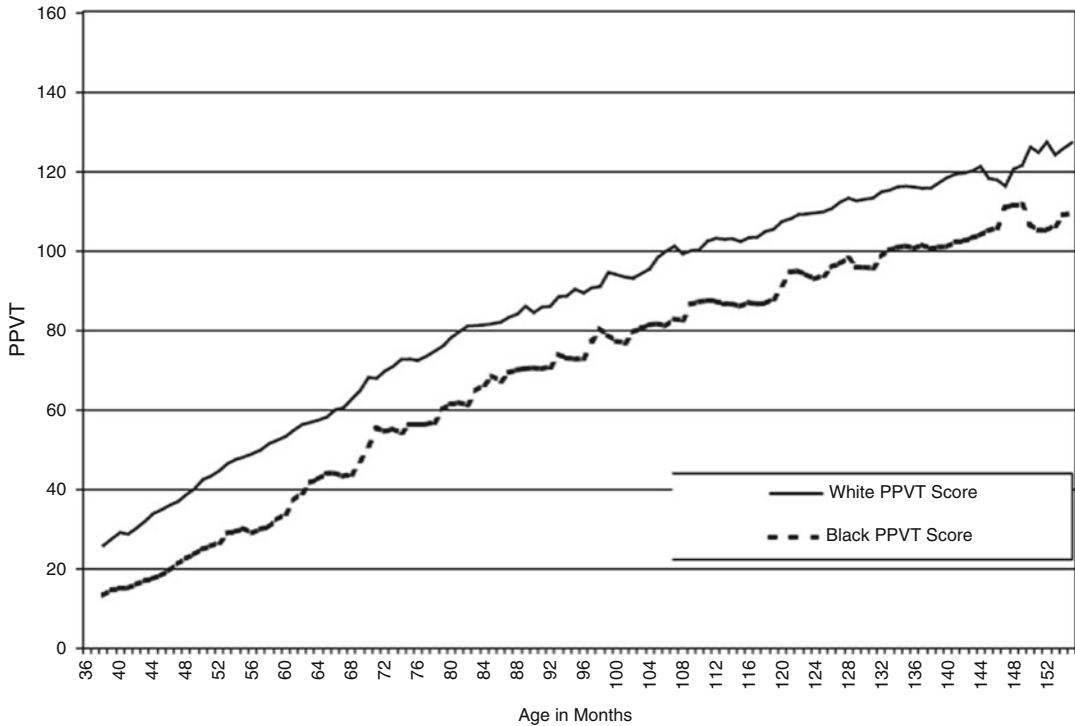


Fig. 5 Raw PPVT average scores by race (3 month moving average)—from Farkas and Beron (2004) (Reproduced with permission)

vocabulary (PPVT) scores by single month of age, separately for African-Americans and Whites. These data show that over the span of 10 years, from 36 to 156 months of age (ages 3–13) “children’s oral vocabulary scores grew from approximately 20 words identified correctly to approximately 120 words identified correctly, and for each group the trend was generally upward over these ages” (Farkas and Beron 2004, p. 477).

5.2 Event-Centered Latent Change Models

The model we wish to draw attention to in the present context is the class of event-centered growth models, where within-person change is assessed relative to some event or transition, and we illustrate these models with respect to the example given above from the Farkas and Beron (2004) analysis of vocabulary knowledge in 3–13

year olds. An event-centered approach is a natural model for life course analysts who study the interplay between human development and life course events. Given an event of substantive interest it may be of value to describe processes of change that precede or follow the event, regardless of the age of the individual. These event-centered strategies permit a potentially more nuanced version of within-person change than that which might be captured by relying on *time in study* or *age* as the metric used for time (see discussion in Alwin et al. 2006, pp. 31–32). For example, one might define time of entry to school as a transition for pre-school children and study within-person change before and/or after the transition. In this case, growth is assessed from the time of the event rather than from birth. Or, taking another example, one might define widowhood as an event, studying patterns of depression or other measures of psychological well-being as a function of time since the event. There are a number of process-based time

structures and event-centered approaches that have been investigated which provide exemplars of the fruitfulness of the approach (e.g., time to death; time to dementia diagnosis).

In the Farkas and Beron (2004) model above, children’s test scores are centered on chronological age, that is, time is measured from birth. In a life course event-centered approach, the analysis might be centered instead on time of entry into school. In this case, the units of time would be months prior to entry into school and/or months following entry into school. This would necessitate measuring cognitive scores at time before/ since the event, rather than at time since birth. In Fig. 6, we depict what a set of generic event-centered growth curve models would look like for three groups, A, B and C, where t denotes the time of the event (e.g. entry to school, or entry to preschool), and the groups may be racial, class or gender groups. In this case, the event at time- t has no apparent effect of the trajectories of growth for the three groups, although as in the Farkas and Beron (2004) example, there is a main effect separating three groups.

In the hypothetical shown in Figs. 7 and 8, we depict what a set of generic event-centered growth curve models where there is an effect of the event considered. Again time- t denotes the time of the event (e.g. entry to school, or entry to preschool), and the groups may be defined as above. In the case of Fig. 9b, there is a divergence in the growth trajectories among the three groups, whereas in Fig. 9c there is a convergence in growth trajectories.

One example of divergence conditioned by an event is the interesting discovery by Canadian psychologist Roger Barnsley, who first drew attention to the phenomenon called *relative age* (Musch and Grondin 2001). While watching a hockey match with his wife and two sons, they noticed from the roster that a large majority of the players from both teams were born in January, February or March. After reflecting on the social circumstances that might have produced this correlation, the explanation was obvious: the junior league cut-off for accepting young players in Canada was January 1, which means that selection favors size advantages, which are very

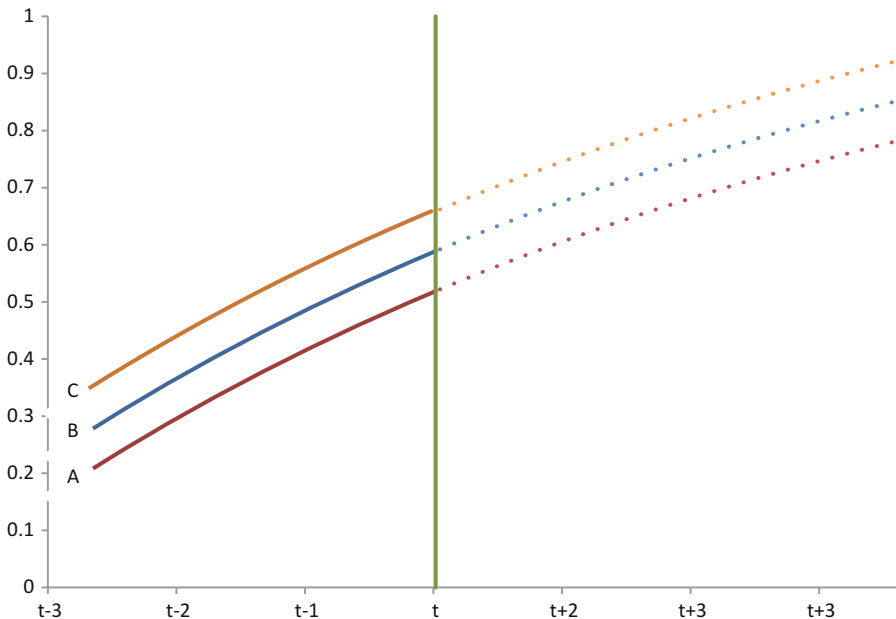


Fig. 6 Depiction of event-centered growth curve models for three groups where there are no differences in the growth functions for the groups

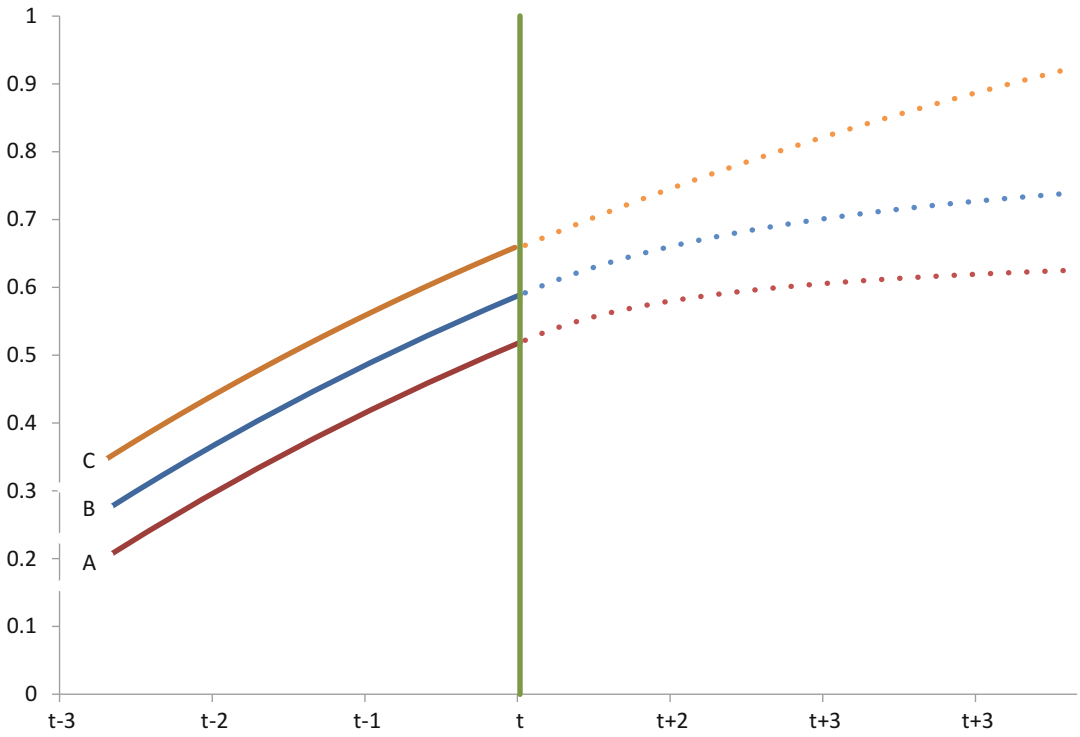


Fig. 7 Depiction of event-centered growth curve models for three groups showing an example of a divergence in growth patterns following the event

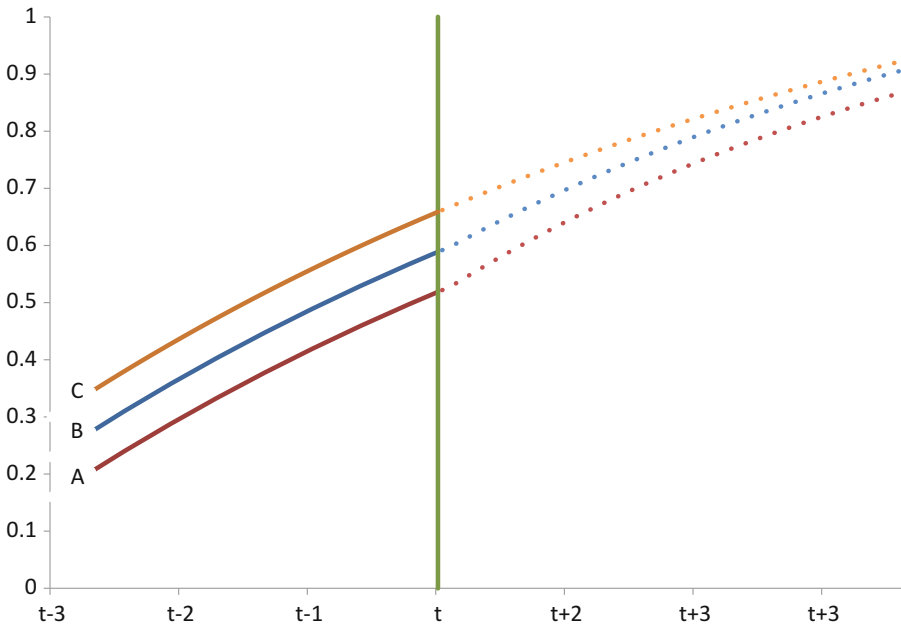


Fig. 8 Depiction of event-centered growth curve models for three groups showing a convergence in growth patterns following the event

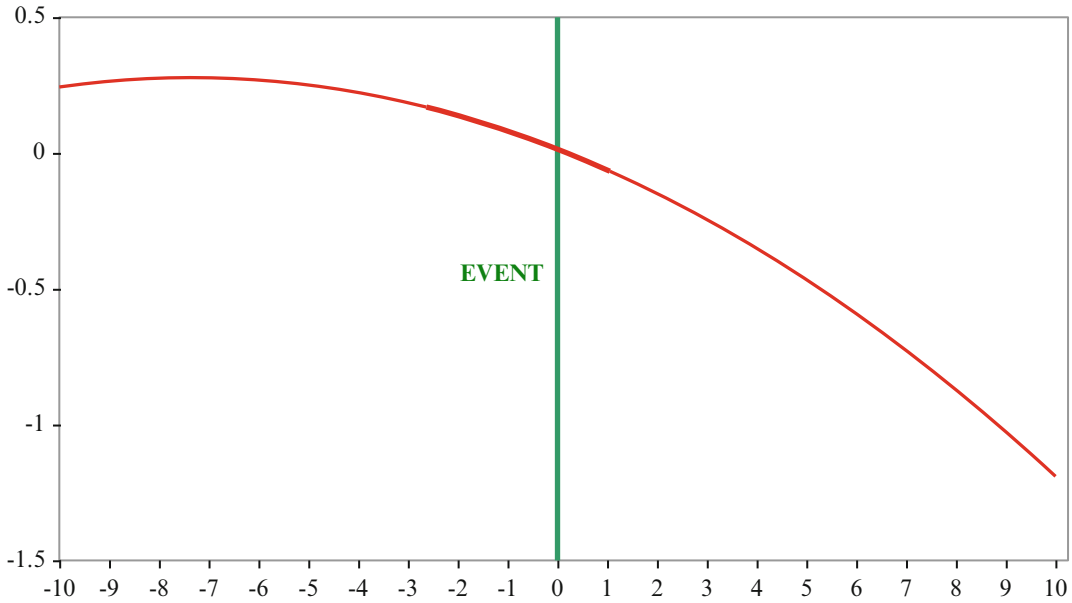


Fig. 9 A framework for studying growth trajectories using event-centered latent change models, where the time-metric is centered on the event

important among young boys. To those born immediately after the cut-off there were a number of advantages related to their relative size. An imaginative social psychologist can specify the processes implicated by Barnsley and others in accounting these effects: involving “selection,” “streaming” and “differentiated experience” (see Barnsley et al. 1985; Barnsley and Thompson 1988). We do not go into the details of these processes here—they are written about extensively in the literature—but note that the phenomenon is not unique to hockey. Malcolm Gladwell (2008) describes a similar phenomenon with soccer in England—the best players are those born immediately after the cut-off date.

The conclusion is obvious: if one wants to raise a star hockey or soccer player, one would be smart to find out the junior league eligibility cut-off dates, and engage in some family planning. The question for the development of CF with respect to the relative age effect might be posed in terms of the event-centered models proposed above, that is, are there advantages that derive from school entry (or pre-school entry) when prospective students are older relative to time of entry. We know of no research that has posed

such a question, but it could be answered using the test score data from the CNLSY employed by Farkas and Beron (2004). We know of no examples of the convergence hypothesis either, but it, too, could be addressed using the CNLSY data.

6 Cognitive Development in Childhood

Evolutionary anthropologists and biodemographers have argued that humans have evolved a life cycle that requires a prolonged period of child dependence on adults in order to insure post-natal brain development (e.g., Kaplan et al. 2000; Carey 2003). At the same time, developmental psychologists have emphasized both the innate genetic capacity for learning, as well as the prenatal environment during infancy. One example of the latter is the hypothesized effect of low birth weight on subsequent brain development (e.g., Barker 1998; de Kieviet et al. 2012). Mechanisms connected with innate structures and abilities raise the issue of the relevance of other developmental factors that occur before the child begins interacting with the social world.

Still, it is during these early phases of social life that cognitive abilities are developed; and while social scientists are primarily concerned with differences in the social environment, it should be clear that species-level genetic material and, perhaps more importantly, gene-environment interactions, also play an indispensable role in early development.

The important advances in the science of early childhood development over the last century were recently documented by the National Research Council and Institute of Medicine report titled *From Neurons to Neighborhoods* (Shonkoff and Phillips 2000). As indicated in that report, much of the contemporary field of the study of early childhood cognitive development has been shaped by the revolutionary thinking of Jean Piaget (1952) and Noam Chomsky (1965). These ideas celebrated the active role of young children in their own development and attributed early skill acquisition to the universal emergence of innate cognitive and linguistic structures (Shonkoff and Phillips 2000, p. 58). Piaget's work stressed the importance of development (ontogeny) versus learning—the former is a more general process that explains or causes the latter, as opposed to the idea that the accumulation of learning leads to developmental progress. A second key idea of Piaget is the idea of *cognitive operations*—having an understanding of an object that enables one to perform action (e.g., classifying, organizing/ordering, counting, measuring) on the object. In Piaget's theory, operations link together to form a larger complex of knowledge, referred to as “structures” or the total structure (Piaget 1965, 1970). Development is the process of building operations, linking them together to form structures, and reconstructing them to account for new information.

Piaget's work emphasized the basic idea of building complexes of understanding and reconstructing them, involving four basic factors, which are useful for identifying potential sources of social differentiation and the beginning of inequality: (1) Maturation, the mechanism through which biological processes (and the social dimensions along which these biological processes are stratified) operate; (2) Experiences

with the physical environment, the mechanism through which economic deprivation operates (e.g., fewer toys, books, and stimulating objects present in the household); (3) Social transmission—language, education, and socialization that structures how a child benefits from “teaching,”—thus, children who have acquired early skills may get more out of the exact same situation, than children lacking a particular skill—which is an influential idea similar to the economic models of human capital accumulation; and (4) Equilibration—when faced with a new piece of evidence, or something that the child is not able to accommodate within their existing structure of knowledge (Piaget 1985).

More recent advances in developmental theory make an argument that has some parallels to Piaget's equilibration mechanism, but the proponents criticize Piaget's understanding of infants as having very limited cognitive capacities. Through innovations in experimental techniques with infants, there is increasing evidence that they lead much more cognitively complex lives than previously thought (Gopnik and Meltzoff 1998; Mandler 2004). The work of Gopnik (2012) and others suggest that very early on children have probabilistic models of the world that allow them to predict, infer, and use their new experiences to update their models of how the world works. In other words, cognitive development is similar to the Bayesian process of updating prior beliefs with new data to arrive at a new (posterior) set of beliefs. While this view of cognitive development does involve the acquisition of new experiences through interaction with the environment, the mechanisms driving change are innate cognitive structures and capacities for change (Gopnik and Meltzoff 1998; Mandler 2004).

Similar arguments point to the complexity of the social world and the need for (domain-specific) constraints to guide cognitive development (Gelman 1990). Evolution has produced these constraints (or internal biases) that enable infants and children to become efficient learners in a world so rich with stimuli. As pointed out by Goldstone and Landy (2010), it is interesting to note how the evolution of thinking on this topic

has shifted to include the idea that individuals can acquire constraints through their interaction with the social world.

Despite the importance of considering the innate potential of infants to learn, early cognitive development obviously does not occur in a social vacuum—it happens within a configuration of opportunities and constraints linked to environmental and institutional arrangements, as well as interpersonal relationships. A key to understanding early cognitive functioning is identifying the mechanisms for change, including life course events and transitions (Siegler 1989; McClelland and Siegler 2001). We focus here on causes of change in cognitive ability because they are sources of disparities between individuals (some individuals grow more, or at a faster rate, than others), and they are crucial for designing teaching strategies and interventions aimed at facilitating cognitive growth. Identifying the mechanisms at work also help illustrate the social context of cognitive change, a topic we address at the end of this section.

6.1 Environmental Factors in Early Cognitive Development

Environments are essential for development to take place—genes cannot find their phenotypic expression without ecological or environmental settings within which to do so. And environments cannot function as facilitators of human behavior without the genetic potential to work with. In a variety of behavioral domains, research on nature (genes) and nurture (environments) is converging (see Shanahan et al. 2003). In focusing on environmental inputs, a distinction is typically made between primary and secondary socialization. Primary socialization happens early in life, mainly in the family and school, whereas secondary socialization involves learning roles relevant to occupation and family. There are obvious connections between cognitive skills captured in early parts of the life span and those required for adult roles, and later in the chapter we explore these linkages. Some sociologists even go so far as to say that the occupational structure defines the key

social roles in which performance is variable, with the quality of cognitive performance being the basis of the assignment of social status (Duncan et al. 1972, pp. 77–79). The criteria being used to test for role performance in the schools at an early age are often linked abstractly to notions of mental or cognitive function associated with the concept of intelligence (or CF). This concept, as well as those that are highly linked to it, such as Schooler's (1987) concept of "intellectual flexibility," or others, are an important component of what students of cognitive aging investigate, although the aging years are often studied separately from child development.

6.2 How Do Families Affect Cognitive Growth?

Some clarification of this may be useful. In order to understand developmental outcomes in children, it is no longer possible to phrase the question of environmental effects as an either-or question. The question is not one of "nature vs. nurture," but one of how genes and environment interact to shape development—one of "nature and nurture." There are three broad categories of possible ways that differences among families—or "between-family" differences—can produce individual differences in child outcomes. By child outcomes, we refer not only to any differences in cognitive function, but also to personality differences, values, preferences, interests, skills, accomplishments, ways of behaving, and the like. These family-specific mechanisms for cognitive change are: (1) families can differ in the opportunities for development of particular outcomes, e.g., in the complexity of the learning environments they provide their children; (2) families can differ in genetic endowments that contribute to the development of particular outcomes; or (3) families can differ in the way in which they nurture or socialize their children (Scarr 1995). These three explanations do not address the possibility that there are "within-family" differences in parenting practices that contribute to child outcomes (e.g., Frijters et al. 2013), a topic which we leave for future discussion.

The first explanation of “between family” differences is the standard sociological explanation for why some children do better in school, or achieve more socio-economic status, than others—their families provide them with specific advantages or different opportunities for learning or success. In practice, these inputs are commonly represented in analytic models through the inclusion of family income, a proxy for economic resources, educational attainment of the parents, or some combination. More specificity is advantageous, since the presence of economic resources does not always translate into using those resources for making child investments. Complicating the task even further is the possibility that investment decisions depend on the demonstrated or perceived ability of the child, as well investments made by teachers, schools, or other sources (Todd and Wolpin 2003). Several studies have sharpened our understanding of this general mechanism by looking at specific examples—including nutrition, stimulating objects (e.g., books, toys, musical instruments), experiences (e.g., visiting museums, traveling to other countries, working with tutors or taking piano lessons), and access to physical environments (e.g., dwellings and neighborhoods) free of developmental stressors or insults (Berger et al. 2009; Bradley and Corwyn 2002; Guo and Harris 2000). Such efforts are useful, though it is worth noting the potential pitfalls of the coveted “kitchen sink” approach when it comes to interpreting results and confounded effects (Todd and Wolpin 2003).⁵ Despite these complications, it seems that the playing field is clearly not level, and children from different families turn out differently as a consequence differential advantage/

disadvantage (Sewell and Hauser 1975; Jencks et al. 1979; Todd and Wolpin 2007).

Those who are skeptical that parental inputs to early childhood experiences are important to later development (e.g., Harris 1998, discussed above) are presumably not disputing that such inequalities in opportunity exist, although some of what has been written could be mistakenly interpreted this way, e.g. when Harris says things like: “the evidence indicates that differences between one home and another, between one set of parents and another, do not have long-term effects on the children who grow up in those homes” (1999, p. 391), this gives the impression that she is including any and all differences among families and not just those having to do with socialization practices. In any event there are a number of other examples, besides those having to do with educational and socio-economic outcomes, which can be given for differential opportunities and child outcomes.

The problem with sorting out these various explanations is that the key explanatory factors highlighted by each category are correlated with one another. If genetic differences occur between families that have educational and socioeconomic consequences for children, then they are likely to be related, for example, to the factors that shape differential opportunity structures, and complicating matters further is the possibility of gene-environment interactions (Turkheimer et al. 2003). Or, as we shall see below, parental socialization practices are linked to family differences in opportunities. They may not be adding anything independent to the explanation of individual differences in developmental outcomes, but their role may be one of mediating the effects of other (genetic and environmental) differences among families. Perhaps the most common examples involve the overlap of family socioeconomic status with positive parental involvement and stress, and the subsequent connections to cognitive development (e.g., Bodovski and Farkas 2008; Davis-Kean 2005; Gershoff et al. 2007). We cannot resolve the intricacies for sorting out the truth or falsity of these various explanations here, but suffice it to say that the complexity of the issues should not prevent us from confronting them head on.

⁵Todd and Wolpin (2003) identify a useful example using a model in which child achievement is regressed on family income, the number of books in the home, and additional covariates. The issue arises with the interpretation of the estimated effects—increasing the number of books, while holding family income constant, implies a reduction in some other area of family consumption which may include child investment (e.g., fewer educational toys; assuming these inputs are purchased). Thus, the estimated effect is potentially confounded with a change in the level of an additional (unobserved) input.

6.3 Event-Centered Models for Educational Transitions

One of the earliest life course milestones to which investigators have paid attention is the transition to school. Indeed, in recent years, life course researchers have established a beachhead in a new understanding of schooling and educational attainment by studying the developmental processes that lead up to school entry. In the first edition of the *Handbook of the Life Course*, Doris Entwisle and her colleagues articulated a core assumption of the life course framework—"that developmental processes and outcomes are shaped by the life trajectories children follow." We would add a corollary to this, which reverses the causal ordering to include the principle that "the life trajectories children follow are shaped by developmental processes and the outcomes they bring to the setting." Social scientists have long appreciated the dual nature of the interplay between developmental inputs to social settings, otherwise referred to using some notion of the concept of "selection," while at the same time postulating a "socialization" effect of the life paths followed by individuals. We suggest that this principle is no less important in early school transitions, and in keeping with these ideas will review both (a) the available literature that has covered the influence of preschool and kindergarten experiences on first-grade performance, as well as (b) literature on some of the longer-term outcomes related to the first-grade transition.

Non-maternal child care is an increasingly common experience among children and has served as an experimental setting for investigating the potential of early interventions (Blau and Currie 2006; Diamond et al. 2007; U.S. Department of Health and Human Services 2010). Early child care has also been the focus of extensive research through the NICHD Study of Early Child Care and Youth Development (NICHD Early Child Care Research Network 2005). This research suggests that early child care provides several benefits for children that include cognitive development and school readiness.

There is also evidence that this experience increases the initial level of academic skills and the subsequent upward trajectories (Aikens and Barbarin 2008; Cheadle 2008; Magnuson et al. 2004, 2007), as well as other longer-term outcomes indicative of cognitive ability (Blau and Currie 2006). Structural characteristics of child care providers (e.g. child-caregiver ratio and caregivers' training) affect the quality of the child-caregiver interactions ("process features") which, in turn, influence cognitive outcomes for children (NICHD Early Child Care Research Network 2002a). While there is little evidence suggesting that the quantity of non-maternal child care affects cognitive outcomes (NICHD ECCRN 2000), there is support for an effect on behavioral measures (NICHD ECCRN 2003). The provision of non-maternal child care may be an important remedy for reducing socioeconomic, racial, and ethnic disparities in school readiness and cognitive trajectories. It is worth noting, however, that the effect sizes of early child-care experiences on cognitive outcomes are smaller than the effects of family factors, such as parenting quality and family socioeconomic status (NICHD ECCRN 2002b). There are, however, concerns that the initial benefits may fade out over time (e.g., Votruba-Drzal et al. 2008), which may be due to characteristics of the school and classrooms attended after child care (Currie and Thomas 1995; Magnusson et al. 2007).

Turning now to longer-term outcomes, an ideal study would measure growth from an early age, and track the nature of the post-event transitions. Such a model would allow a test of the proposition that education is the great equalizer, allowing post-event convergence in growth trajectories. On the other hand, post-event exposures may simply increase the advantage that exists at the time of the transition. This discussion underscores the importance of considering event-centered latent change models for school transitions we considered earlier in the chapter, where we provided examples of latent curve models centered on educational events, for example, on school entry.

The focus of such a model is to examine heterogeneity in growth trajectories (intercepts and

slopes) with respect to the occurrence of an institutionalized event, such as entry to first grade. Unfortunately, we rarely have change data on children prior to the age of 5, when they typically enter school, and we can only predict intercepts at the time of school entry. In the absence of growth data prior to the event of school entry, one can think of post-event within-person change as an extension of earlier developmental patterns. In such a situation, an interesting approach would be to fit a latent growth model, and allow the intercept to correlate with the slope of the developmental trajectory—a positive correlation supporting the cumulative advantage hypothesis described earlier (e.g., Downey et al. 2004).

An important resource for studying early cognitive development which employs such an event-centered approach is the Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999 (ECLS-K), a study of a nationally representative sample with information from a on reading and math scores for children measured in kindergarten, as well as grades 1, 3, 5, and 8. (See Duncan et al. 2007 for an investigation into several additional data sets well-suited for the study of child development.) Downey and colleagues (2004) use these data to analyze cognitive trajectories by relying on models similar to the growth models described earlier. They show that while initial levels of cognitive ability (i.e., intercepts) are negatively correlated with growth (i.e., slopes) in ability during the school year, there is a positive correlation between the intercept and rate of growth during the summer months between the end of kindergarten and the beginning of first grade.

Furthermore, socioeconomic inequality in cognitive growth increases more slowly during the school year compared to summer months, highlighting the importance of this transition. It is important to note, however, that equalizing effects of early schooling do not extend to racial disparities in cognitive growth. Research by Condrón (2009) suggests that school factors (e.g., racially segregated schools, differences in ability grouping, and private vs. public school differences) exacerbate black-white differences in cognitive growth, while non-school factors

(e.g., health, approaches to learning, and reading outside of school) drive socioeconomic disparities. While a considerable amount has been learned about diverging trajectories in cognitive abilities, a substantial proportion of the variability remains unexplained (Downey et al. 2004).

Diverging trajectories in cognitive development are consistent with an economic model of skill acquisition. Through their own work and reliance on previous literature, Cunha and Heckman (2007, 2008) build this model of early development upon two important stilts. The first is the concept of self-productivity, which refers to the notion that capabilities are self-reinforcing in that the development of early abilities serves as the building block for the development of later (more advanced) skills. Learning at young ages (and the successful application of newly acquired skills) embeds in the child the value of learning, which serves as motivation for future skill development. Furthermore, the early mastery of skills increases the efficiency with which skills are acquired at older ages (Knudsen et al. 2006; Heckman 2007). (Footnote: A related concept is cross-fertilization, the idea that capabilities in a certain domain (e.g., communication and language skills) enhance the child's ability to acquire skills from a different domain (say, cognitive skills).) The second leg of the model developed by Cunha and Heckman (2007) is dynamic complementarity, a concept suggesting that the abilities developed at an earlier age increase the productivity of investments made at an older age. Together, these concepts simply imply that skill begets skill (Heckman 2007). The implication of this model is that we should make investments in children early and often to ensure that they are equipped with early cognitive skills that blossom into future cognitive abilities, and so that they (and the rest of the society) can reap the benefits of these early investments (Heckman 2007).

7 The Transition to Adulthood

Given our culture and its history, childhood and youth involve life stages that are relatively dense with respect to the occurrence and frequency of

life course events in the family, school, community, and workplace that shape early outcomes (see, e.g. Rindfuss 1991). These early stages are considered particularly important periods for the formation of cognitive capacities. Based on the foregoing conceptual framework, in this section we argue that (1) differences in individual experiences organized on the basis of institutionalized social structures (experiences involving environmentally-linked access to opportunities and resources) contribute to individual differences in cognitive functioning throughout the life span; (2) the potential for differences in organized experiences to affect individual differences in cognitive functioning is greatest during periods in which change at a developmental level is the greatest; (3) social structural factors not only help put individual differences into place, they also help maintain individual differences throughout most of the adult life span; and (4) the potential for change in cognitive functioning is greatest in the early and late periods of the life span.

One of the longstanding assumptions of the life-span developmental perspective is that individual intellectual development peaks in young adulthood and has major consequences therefrom for the choices of life pathways. Consistent with these notions are the studies of status attainment, e.g., the Wisconsin Model of Status Attainment, based on the Wisconsin Longitudinal Study (WLS), among others (Hauser et al. 1992, 1993; Sewell et al. 2003). Such models posit a strong role played by individual differences in adolescent CF for later educational and occupational achievement. In this section of the chapter we briefly review the relative importance of such cognitive factors relative to non-cognitive and social background factors in educational and occupational pathways, as well as the impact of adolescent cognitive factors on later assessments of CF.

Our own reanalysis of the WLS data permits the assessment of the long-term effects of pre-adult intellectual levels and socioeconomic background on cognitive functioning at midlife (Alwin et al. 2008a). A WAIS score involving ten survey measures of verbal meaning is available in the WLS at age 52, and there is a pre-adult measure of cognitive ability—the Henmon-Nelson

Test of Intelligence—similar to other standardized measures of general ability. The WLS Henmon-Nelson measure has been widely used in predicting early socioeconomic attainments (Sewell and Hauser 1975; Hauser et al. 1983). For our purposes, we assume such tests contain some combination of both fluid and crystallized components. We employed a model, using path analysis conventions, which specifies the roles of family background and pre-adult cognitive levels in shaping educational level and high school academic experiences, all of which, in turn, affect occupational attainment (either directly or indirectly) across the life-span. These early factors all help shape socioeconomic attainments and cognitive developments later in life.⁶

The results of our analysis show that pre-adult cognitive functioning is the most powerful predictor of the WAIS score at age 52. Roughly one-third of the variance in the WAIS score is attributable to the WLS Henmon-Nelson test score, some 35 years later. This is remarkable given the differences between the two tests and the possibility that they are tapping different dimensions of intellectual functioning. In addition, if one considers the fact that only 40 % of the variance in WAIS is predictable variance, given our model, the bulk of the prediction is coming from the Henmon-Nelson score. Even after school success, years of schooling and occupational position variables are included in the model as potential mediating mechanisms, the pre-adult test score continues to have a substantial direct effect; and indeed, the largest direct effect. The direct effect accounts for more than 70 % of the total effect of pre-adult levels on subsequent levels of intellectual ability. The indirect effect operates primarily through school performance and years of schooling.

The findings are consistent an emerging literature on early life experiences and later adult outcomes, which suggests that early cognitive development is predictive of cognitive function

⁶We employ structural equation methods in this analysis, and focus on the total rather than direct effects of variables in a causal model (see Alwin 1988). The details of our treatment of the WLS data, including the measures and modeling strategies used, are given in Alwin et al. (2008a).

and other health outcomes later on in life (e.g., Snowdon et al. 1996; Kuh et al. 2007; Richards and Deary 2005; Gottfredson and Deary 2004; Whalley and Deary 2001). Another important finding is reflected in the fact that family socioeconomic background has an important effect on the WAIS score, its total effect accounting for 10 % of the variance in individual differences in cognitive functioning. These results are consistent with recent research involving nationally representative studies of children, which indicate that oral language development is strongly influenced by family socioeconomic factors from birth through age 3 (Farkas and Beron 2004). Childhood socioeconomic position is known to exercise an effect on later cognitive function in adulthood (see, e.g., Kaplan et al. 2001).

Two additional findings of interest from these results concern the effects of occupational levels on intellectual functioning. This involves, first, the effect of occupational position at age 35, and second, net of this, the effect of occupational position at age 52. The latter coefficient reflects the effects of *occupational change* and speaks directly to the learning generalization hypothesis advanced by Schooler (1987). The first thing to note here is that for males (and not for females) there is a small independent effect of occupational position at age 35 on the WAIS score at age 52, net of pre-adult ability scores, family background, and school experiences. There is no detectable significant effect of occupational level at age 52 on the WAIS score, net of earlier occupation. This finding undermines the argument of Schooler (1987) that changes in the substantive complexity of the job will result in cognitive shifts. There is evidence for a small positive effect, but it does not reach statistical significance.

8 Cognitive Change in Adulthood

Despite the high level of stability in CF in adulthood (i.e. lower levels of change), it is possible that portions of the population that experience change in social locations at different points in

the life cycle, such that life-course linkages to changes in socially-structured experiences could be used as event markers around which to study cognitive change. Schooler's (1987) analysis of the development of intellectual flexibility over the life span through exposure to changes in the complexity of the environment represents one attempt to apply theories of social structure and personality to human development. However, data from this research program have not been adequately organized to reflect life-span variations in stability, nor have these analyses conceptualized within-person change with respect to measured events that have theoretically caused the change. It may be that the greatest change in CF occurs in persons whose environments change most rapidly, rather than in those with stable environments (Musgrove 1977; Alwin et al. 1991). There is no question that environment plays an important role in cognitive development, and it also has a role in the maintenance of individual differences over the life span despite high degrees of stability in CF into older age.

The weakness of the argument that changes in adult intellectual functioning are associated with occupational level and change in adulthood is further addressed by the results from the WLS (see Alwin et al. 2008a). Our analysis further examined the extent to which these results are affected by explicitly controlling for pre-adult levels of intellectual functioning (results not shown). Our results demonstrate that Kohn and his colleagues may have reached an incorrect conclusion about the magnitude of these effects by not having controlled for pre-adult intellectual background in estimating the reciprocal effects of job experiences and cognitive factors (Kohn and Schooler 1978, 1983; Kohn and Slomczynski 1990; Schooler 1984, 1987, 1998). Specifically, if we omit the measure of pre-adult intellectual functioning from the estimated models, we see that a much larger effect—almost twice the magnitude—emerges from the analysis. In this case, both occupational level at age 35, as well as the net effect of occupation at age 52, are highly significant, suggesting to us that Kohn, Schooler and their colleagues may have isolated an effect that was instead partly attributable to pre-adult levels

of intellectual functioning, a variable which was not taken into account in their analysis. To the extent that current job conditions reflect earlier selection processes of the type described above, they may have overestimated the role of changes in environmental conditions in current intellectual functioning by not taking into account selection processes captured by the measure of pre-adult intellectual functioning). In their results, the effects of education are stronger than those of job experiences, clearly reflecting pre-adult differences in cognitive skills: The impact of education may be much more influential in people’s cognitive development than those of occupations.

(see Hofer and Alwin 2008, pp. 122–258, for a review). Although the differences among persons tend to remain stable through midlife, there is a great deal more cognitive change in older age and therefore more room for environmental influences (see Fig. 3 above). The systematic effects of environmental change on aspects of CF underscores the plasticity of the phenomenon, including its age-related changes. There is hardly any disagreement among students of aging and cognition that with age there are systematic declines in cognitive function, but there is an increasing demand placed on research to identify the environmental events and transitions that accompany these declines.

9 Cognitive Change in Older Age

The literature on cognition and aging is enormous. Cognitive function involves many abilities; some, but not all of which, decline in older age—e.g., attention, reaction time, processing speed, learning, memory, language, sensory function, inductive reasoning, and knowledge

9.1 Event-Centered Models for Transitions in Older Age

Event-centered models are appropriate for the interplay between cognitive change and the events of older age—health events, retirement and other transitions in and out of the labor market. Figure 10 presents a general framework for conceptualizing studying growth trajectories using event-

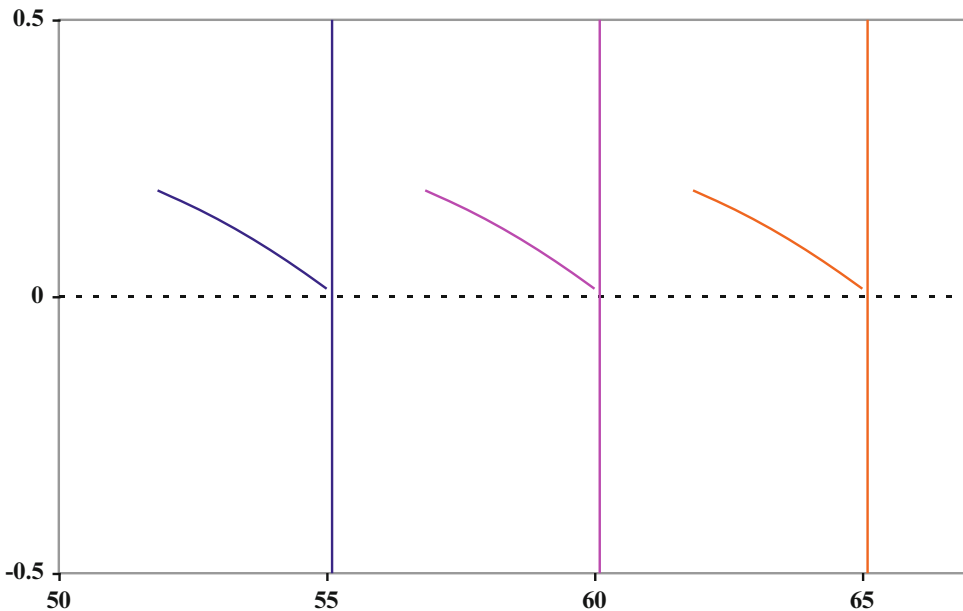


Fig. 10 Event-based growth model formulations for the study of cognitive aging and labor-force transitions

centered latent change models. The purpose of such a framework is to be able to (a) conceptualize patterns of change before and after a life course event, such as a health event, or labor force transitions, (b) to formulate models for the prediction of event occurrences from information contained in the growth/change trajectory, and (c) to formulate models for the prediction of rates of change from knowledge of the prior growth/change trajectory and the event of interest.

The model depicted in Fig. 10 reveals one way to think about event-based growth models using the example of retirement. The pattern of growth (or decline) on the y-axis is intended to represent some predictor of a life course event, say health or some other measure of well-being. For our present purposes, consider the y-dimension to be cognitive function, and the x-dimension is time from the event at $t=0$. We return later to a discussion of one study that used this approach in the study of retirement, calibrating changes in cognitive functioning prior to retirement, centering the measurement of change on the timing of the event. Other examples are possible, but we will not go into them here. In the following brief sections, we review the available literature that has focused on two major life course events—changes in health trajectories and transitions in and out of the labor force, specifically on retirement.

9.2 Cognition and Health

There is a great deal of literature on the connections between cognition, health and aging (see Alwin and Hofer 2011); and there is an emerging consensus that a multidisciplinary theoretical approach is necessary to understand the nature of processes of cognitive aging; however, the implementation of this objective has not been fully achieved. The National Research Council report *The Aging Mind* (Stern and Carstensen 2000), for example, suggested that while “progress is being made by behavioral science, cognitive science and neuroscience researchers in understanding cognitive changes during the aging process ... what is being learned from each research perspective has not fully penetrated the work of

researchers proceeding from other perspectives” (Stern and Carstensen 2000, p. 9).

Consistent with the conclusions of *The Aging Mind*, there is a growing body of research that has raised several hypotheses to explain the apparent decline in cognitive functioning with increased aging, which are often bounded by disciplinary biases. The first of these, which is popular among biological aging specialists, posits that cognitive decline is the result of a more general *process of neurological decline* (a common cause) that affects both cognitive and sensory functioning. Cognitive decline is, thus, simply one manifestation of a more general neurological decline (Stern and Carstensen 2000, p. 10). A second set of explanatory factors involves *overall age-related declines in specific organ function* that lead to increases in the onset of illnesses or impairments, and risks of experiencing multiple illnesses or impairments. Research drawing on this perspective focuses on disease processes per se (e.g. the onset and management of diabetes), and their consequences for CF (Stern and Carstensen 2000, p. 10). Third, cognitive decline may be related directly to other age-related functional limitations, particularly in *sensory function* and physical health.

In contrast to the common cause theories of cognitive aging (mentioned above), there is a great deal more evidence supporting the role of biological factors in cognitive aging. Cognitive change has been linked to a number of chronic disease conditions, including cardiovascular disease (Geroldi et al. 2003; Pavlik et al. 2003), pulmonary function (Anstey et al. 2003), type 2 diabetes (Hassing et al. 2003, 2004a, b; Cosway et al. 2001; Crooks et al. 2003), stroke (Ostir et al. 2003), and depressive symptoms (Wilson et al. 2004). Chronic health conditions reflect serious limitations that may inhibit normal activities that promote the maintenance of cognitive function. Longitudinal data are needed in order to assess the extent to which change in health conditions and disability status are linked to age-related cognitive change. These issues are best investigated using event-centered models of the types discussed here, in which onset of disease is used to investigate pre- and post-event declines in CF.

A 2014 Alzheimer's Disease International Report (2014) provides an excellent summary of meta-analytic evidence to date from cohort studies of the association of cardiovascular factors and cognitive aging. The summary provides information on whether meaningful conclusions could be based on existing cohort studies and differentiates between both distal and proximal early-life, midlife, and later life factors. The conceptual framework for this report coincides with that presented in an intriguing recent paper by Muller and colleagues (2014), in which they proposed a life course model to explain the role of fetal and other early origin factors on later diseases implicated in cognitive aging. In particular, they examined factors related to at the intrauterine environment, placental function, and material nutrition during pregnancy, socioeconomic status and nutrition in childhood and adolescence, and lifestyle factors and CVD risks and disease and, in turn, to brain structure and function later in life. Their analyses showed that small birth size—as an indicator of an adverse intrauterine environment—has lifelong consequences on later exposure to health risks and opportunities, as well as subsequent brain tissues and cognitive function, and that this relationship is particularly strong in people with lower educational levels who may have fewer other social capital resources available to ameliorate the earlier adverse effects.

Expanding on the Muller et al. (2014) framework, the ADI (2014) report used a life course approach to examine early life, midlife, and later life factors that have been hypothesized to affect cognitive decline. Although they found insufficient evidence for meaningful conclusions on many early-life factors and psychological factors in midlife and later life, moderate or robust and consistent evidence was found for some of those factors. Higher levels of education, for example, were consistently associated with lower risk for cognitive aging; and occupational status effects produced similar protective effects, largely working through education. Depression was also strongly associated with cognitive aging—but only in later life—but the causal ordering remains unclear.

9.3 Cognition and the Transition to Retirement

For many years, we have known that the onset of health problems and the adequacy of pension benefits were key factors in the decision to retire (e.g., Bound et al. 1999; Cahill et al. 2006), but that little is known about the non-pecuniary determinants of retirement decisions (Hanushek and Maritato 1996). The lack of information in these spheres has persisted into more recent years. Although these studies have provided important pieces of the health-retirement relationship, few have examined whether other domains of health—in particular, cognitive functioning and psychological well-being—might also affect the retirement decision.

Given the shift toward greater technological sophistication in most industries and the probable need for greater numbers of older workers to remain in their jobs in the future, a broader understanding of the health (and other) factors that push workers into retirement may help inform both employers and policy makers. To date there are no studies assessing the role of cognitive functioning in transitions to retirement; instead, retirement is examined as a precursor to cognitive change. Although these studies have provided important pieces of the health-retirement relationship, none have examined whether other domains of functioning—in particular, cognitive performance—might also affect the retirement decision. However, to our knowledge, no studies to date have examined the relationship between cognitive performance and changes in work status. One can imagine that different cognitive skills might either help or hinder the ability of a worker to perform his/her job at the desired or required level. For example, better memory is likely to help workers manage quickly changing or analytic demands associated with their jobs, and may also compensate for declines in workers' physical health by providing ideas of alternative ways to perform their jobs. In contrast, declines in such skills may foster psychological or physiological vulnerabilities, and, in turn, reduce the effects of job performance that may

impel workers to retire earlier than they might otherwise want or need.

One possible approach to the study of retirement as a developmental process is depicted in Fig. 10. In this case there are three points along the age metric where retirement may occur, age 55, age 60 and age 65. These are completely arbitrary choices, as retirement can obviously happen at any age—these are simply examples. Hence, the model suggests that retirement at any age may be accompanied by the prior within-person pattern of change. If so, then one might think of the event of retirement to structure the analysis, so that rather than chronological age, or time in study, one would measure change on the metric of time to retirement. In an effort to broaden our understanding of the range of factors known to have a bearing in retirement, Wray and colleagues (Wray et al. 2010) investigated the potential impact of one aspect of cognitive functioning—memory performance—on the decision to retire, using such a model. Guided by the event-centered model discussed here, estimated using a combination of latent curve and probit regression models, they examined the effects of the level and change in memory performance as predictors of retirement in the Health and Retirement Study (HRS), where detailed employment histories are available along with overtime measures of cognitive performance. They used six waves of data from the Health and Retirement Study on a sample of men and women age 51–61 in 1992 in order to estimate how two reports of memory performance—objective assessments and perceptions of performance between 1996 and 2000—are linked to the transition from working in 1992 and 1994 to retirement between 2000 and 2002. Their research employed both an objective measure of memory performance and a subjective assessment of memory, within a framework that accounts for their relationship, in our examination of these effects. In sum, the study results relating to memory performance and perceptions of memory performance are intriguing and potentially policy-relevant.

The study results augmented current knowledge by answering questions on the effects of memory performance on exits from paid work to

retirement. The study results were clear and strong: The levels of subjective memory predict retirement in older workers, net of other documented social, health, and economic correlates of retirement. We also hypothesized that increasing rates of decline in either objective or subjective memory performance would impel workers to leave the work force. The study results did not support this hypothesis. Instead, as noted, level of subjective memory appeared to be more important than rates of change in either measure. These results are somewhat surprising given a strong reason for the belief that changes in cognitive status are linked to a disengagement from the labor force. Finally, we posited that the effects of subjective memory would mediate the effects of objective memory performance, and we found that it does not.

One possible explanation for these results may be that the effects on work transitions of levels of or changes in memory (or other cognitive) performance depend on the type of job a person holds and, in particular, on the level of cognitive demands placed by that job. For example, Park (1994) posited that cognitive performance may not readily affect job performance (and, by extension, retirement decisions) in most older workers. They may hold “maintenance jobs” which require no new learning; their job experience, age, and/or tenure may protect them against declines in the abilities needed for their jobs; or they may use environmental supports (e.g., younger colleagues, teamwork, shifting to jobs with different skill sets) to compensate for actual or perceived declines. In contrast, workers whose jobs are characterized by high levels of complexity (e.g., memory skills, abstract thinking) may well be affected by either actual or perceived deficits in their cognition, such that the complexity may slow declines and keep workers performing satisfactorily, or the complexity may outweigh workers’ actual or perceived abilities.

The results indicated that memory performance appears to play a role in transitions to retirement. In particular, high levels of subjective memory (but not objective performance) are associated with a lower likelihood of retirement in this population, net of other relevant predictors.

However, in our results rates of change in memory performance over 4 years do not alter the likelihood of retirement. Poorer health—both physical and cognitive—negatively impacts individuals and society via lost productivity, impaired family and social functioning, and economic well-being. The results of this and future studies may point to areas for policy or workplace interventions that enable workers to remain in their jobs longer than they might otherwise by compensating for either perceived or actual memory deficits.

10 Conclusions

In this chapter, we focused on the importance of considering a life course perspective in understanding the life-span development of cognitive function (CF), considered broadly to refer to *the human ability to manipulate the environment in such ways as to solve both simple and complex problems posed by that (primarily external) environment*. We argued that these processes condition the formation, expression, maintenance and loss of CF across the entire life span. We began by reviewing the best available theoretical models for the life-span development of CF, which stressed the fact that childhood and adolescence are periods of growth, adulthood is a period of maintenance/stability, and older age is a period of decline. In contrast to the dominant literatures on CF, our approach emphasizes the fundamental nature of the structure, sequence and dynamics of life course events and social pathways that are relevant at various life stage phases with respect to cognitive development.

We provide a foundational framework for conceptualizing the concept of within-person change using a latent variable approach, and show how the life course perspective can be used to develop event-centered models for understanding heterogeneity of within-person change. Specifically, we introduced the concept of the *latent difference score* as an embodiment of the study of the growth, maintenance, and decline in CF over the life span, and discuss how this approach can be integrated with the life course analyst's interest in

events, transitions and changes in the social environment.

Finally, our review discussed four major areas where our approach to the study of within-person change can be effectively used in broadening our understanding the nature of the social processes surrounding life course transitions and human development. We described how event-centered latent change models can be applied to early child cognitive development and the transition to school, specifically focusing on the factors that contribute to successful transitions, and how transitions themselves contribute to further change. We then discussed the transition to adulthood and midlife, in which CF in adolescence leads to major influences on educational achievement, occupational success and CF in adulthood. On the basis of several empirical examples, we concluded that potential changes in CF during midlife were minimal. And finally, we considered the applicability of our life course framework to the study of transitions in later life and how theoretically CF has a role to play both as consequence and cause of health-related and labor-force transitions in older age. The approach we propose can be applied in the study of other developmental trajectories where social context is relevant.

References

- Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology, 100*(2), 235–251.
- Alwin, D. F. (1988). Structural equation models in research on human development and aging. In K. W. Schaie, R. T. Campbell, W. Meredith, & S. C. Rawlings (Eds.), *Methodological issues in aging research* (pp. 71–170). New York: Springer.
- Alwin, D. F. (1994). Aging, personality and social change: The stability of individual differences over the adult life-span. In D. L. Featherman, R. M. Lerner, & M. Perlmutter (Eds.), *Life-span development and behavior* (Vol. 12, pp. 135–185). Hillsdale: Lawrence Erlbaum Associates.
- Alwin, D. F. (2008). Social structure and cognitive change. In S. M. Hofer & D. F. Alwin (Eds.), *Handbook of cognitive aging: Interdisciplinary perspectives* (pp. 418–444). Thousand Oaks: Sage Publications.

- Alwin, D. F. (2009). History, Cohorts, and Cognitive Aging. In H. B. Bosworth & C. Hertzog (Eds.), *Aging and cognition: Research methodologies and empirical advances* [Lead chapter in a Festschrift for K. Warner Schaie] (pp. 9–28). Washington, DC: American Psychological Association.
- Alwin, D. F. (2010). Social structure and cognitive ageing. In D. Dannefer & C. Phillipson (Eds.), *International handbook of social gerontology* (pp. 265–279). London: Sage Publications International.
- Alwin, D. F. (2012). Integrating varieties of life course concepts. “Symposium on the Life Course”. *Journals of Gerontology: Psychological Sciences and Social Sciences*, 67B, 1–15.
- Alwin, D. F. (n.d). *A primer in the use of growth models to study within-person change*. Unpublished manuscript. Center for Life Course and Longitudinal Studies, Pennsylvania State University.
- Alwin, D. F., & Hofer, S. M. (2011). Health and cognition in aging research. In D. F., Alwin, & S. M., Hofer (Eds.), *Cognition, health and aging: Integrating perspectives across disciplines*. Supplement to *The Journals of Gerontology: Psychological Sciences and Social Sciences*, 66, 9–16.
- Alwin, D. F., & McCammon, R. J. (1999). Aging vs. cohort interpretations of intercohort differences in GSS verbal scores. *American Sociological Review*, 64, 272–286.
- Alwin, D. F., & McCammon, R. J. (2001). Aging, cohorts, and verbal ability. *Journal of Gerontology: Social Sciences*, 56B, S1–S11.
- Alwin, D. F., & Thornton, A. (1984). Family origins and the schooling process: Early vs. late influence of parental characteristics. *American Sociological Review*, 49, 784–802.
- Alwin, D. F., Cohen, R. L., & Newcomb, T. M. (1991). *Political attitudes over the life span: The Bennington women after fifty years*. Madison: University of Wisconsin Press.
- Alwin, D. F., Hofer, S. M., & McCammon, R. J. (2006). Modeling the effects of time: Integrating demographic and developmental perspectives. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 20–38). New York: Academic.
- Alwin, D. F., Wray, L. A., & McCammon, R. J. (2008a). *What determines individual differences in intellectual functioning in midlife*. Center for Life Course and Longitudinal Studies, Penn State University. Unpublished paper.
- Alwin, D. F., McCammon, R. J., Wray, L. A., & Rodgers, W. L. (2008b). Population processes and cognitive aging. In S. M. Hofer & D. F. Alwin (Eds.), *Handbook of cognitive aging: Interdisciplinary perspectives* (pp. 69–89). Thousand Oaks: Sage Publications.
- Alwin, D. F., & others (n.d). *The stability of individual differences in cognitive functioning over the life span*. Unpublished manuscript. Center for Life Course and Longitudinal Studies, Pennsylvania State University.
- Alzheimer’s Disease International (ADI). (2014). *World Alzheimer’s report 2014: Dementia and risk reduction: An analysis of protective and modifiable risk factors*. London: ADI.
- Anstey, K. J., Hofer, S. M., & Luszcz, M. A. (2003). A latent growth curve analysis of late-life sensory and cognitive function over 8 years: Evidence for specific and common factors underlying change. *Psychology and Aging*, 18, 714–726.
- Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23, 611–626.
- Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization and compensation as the foundation of developmental theory. *American Psychologist*, 52, 366–380.
- Baltes, P. B., & Baltes, M. (1980). Plasticity and variability in psychological aging: Methodological and theoretical issues. In G. E. Gurski (Ed.), *Determining the effects of aging on the central nervous system* (pp. 41–66). Berlin: Schering.
- Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). New York: Cambridge University Press.
- Baltes, P. B., & Mayer, K. U. (1999). *The Berlin aging study: Aging from 70 to 100*. Cambridge, UK: Cambridge University Press.
- Baltes, P. B., Staudinger, U. M., & Lindenberger, U. (1999). Lifespan psychology: Theory and application to intellectual functioning. In *Annual review of psychology*, 50 (pp. 471–507). Palo Alto: Annual Reviews.
- Barker, D. J. P. (1998). *Mothers, babies, and health in later life*. London: Churchill Livingstone.
- Barnsley, R. H., & Thompson, A. H. (1988). Birthdate and success in minor hockey: The key to the NHL. *Canadian Journal of Behavioral Science*, 20, 167–176.
- Barnsley, R. H., Thompson, A. H., & Barnsley, P. E. (1985). Hockey success and birthdate: The relative age effect. *Canadian Association for Health, Physical Education, and Recreation*, 51, 23–28.
- Baumert, J., Nagy, G., & Lehmann, R. (2012). Cumulative advantages and the emergence of social and ethnic inequality: Matthew effects in reading and mathematics development within elementary schools? *Child Development*, 83(4), 1347–1367.
- Berger, L. M., Paxson, C., & Waldfogel, J. (2009). Income and child development. *Child Youth Services Review*, 31(9), 978–989.
- Blau, D., & Currie, J. (2006). Pre-school, day care, and after-school care: Who’s minding the kids? In E. A. Hanushek & F. Welch (Eds.), *Handbook on the economics of education* (Vol. 2). Amsterdam: North Holland.

- Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure*. New York: Wiley.
- Bloom, B. S. (1964). *Stability and change in human characteristics*. New York: Wiley.
- Bodovski, K., & Farkas, G. (2008). 'Concerted cultivation' and unequal achievement in elementary school. *Social Science Research*, 37, 903–919.
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Hoboken: Wiley.
- Bound, J., Schoenbaum, M., Stinebrickner, T. R., & Waidmann, T. (1999). The dynamic effects of health on the labor force transitions of older workers. *Labour Economics*, 6, 179–202.
- Bowles, S., Gintis, H., & Groves, M. O. (2005). *Unequal chances: Family background and economic success*. Princeton: Princeton University Press.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, 53, 371–399.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: A bio-ecological model. *Psychological Review*, 101, 568–586.
- Brookmeyer, R., & Gray, S. (2000). Methods for projecting the incidence and prevalence of chronic diseases in ageing populations: Application to Alzheimer's disease. *Statistics in Medicine*, 19, 1481–1493.
- Brookmeyer, R., Gray, S., & Kawas, C. (1998). Projections of Alzheimer's disease in the United States and the public health impact of delaying disease onset. *American Journal of Public Health*, 88, 1337–1342.
- Cahill, K. E., Giandrea, M. D., & Quinn, J. F. (2006). Retirement patterns from career employment. *The Gerontologist*, 46, 514–523.
- Carey, J. R. (2003). *Longevity: The biology and demography of life span*. Princeton: Princeton University Press.
- Carroll, J. B. (1996). Mathematical abilities: Some results from factor analysis. In R. J. Sternberg & R. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 3–25). Mahwah: Erlbaum.
- Carroll, J. B. (1998). Human cognitive abilities. In J. J. McArdle & R. W. Woodcock (Eds.), *Human cognitive abilities in theory and practice* (pp. 5–24). Mahwah: Erlbaum.
- Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology*, 54, 1–22.
- Cattell, R. B. (1971a). The structure of intelligence in relation to the nature-nurture controversy. In R. Cancro (Ed.), *Intelligence: Genetic and environmental influences* (pp. 3–30). New York: Grune and Stratton.
- Cattell, R. B. (1971b). *Abilities: Their structure, growth and action*. Boston: Houghton-Mifflin.
- Cheadle, J. E. (2008). Educational investment, family context, and children's math and reading growth from kindergarten through the third grade. *Sociology of Education*, 81, 1–31.
- Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.
- Condron, D. J. (2009). Social class, school and non-school environments, and black/white inequalities in children's learning. *American Sociological Review*, 74(5), 683–708.
- Cosway, R., Strachan, M. W. J., Dougall, A., Frier, B. M., & Deary, I. J. (2001). Cognitive function and information processing in type 2 diabetes. *Diabetic Medicine*, 18, 803–810.
- Crimmins, E. M. (2001). Mortality and health in human life spans. *Experimental Gerontology*, 36, 885–897.
- Crimmins, E. M. (2005). Socioeconomic differentials in mortality and health at the older ages. *Genus*, 61, 163–176.
- Crimmins, E. M., Hayward, M. D., & Seeman, T. (2004). Race/ethnicity, socioeconomic status, and health. In N. Anderson, R. Bulatao, & B. Cohen (Eds.), *Critical perspectives on race and ethnic differences in health in later life* (pp. 310–352). Washington, DC: National Academies Press.
- Cronbach, L. J., & Furby, L. (1970). How should we measure "change"? – Or should we? *Psychological Bulletin*, 74, 8–80.
- Crooks, V. C., Buckwalter, J. G., & Petitti, D. B. (2003). Diabetes mellitus and cognitive performance in older women. *Annals of Epidemiology*, 13, 613–619.
- Cunha, F., & Heckman, J. J. (2007). The technology of skill formation. *American Economic Review*, 97, 31–47.
- Cunha, F., & Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. *Journal of Human Resources*, 43, 738–782.
- Curran, P. J., & Bollen, K. A. (2001). The best of both worlds: Combining autoregressive and latent curve models. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 105–135). Washington, DC: American Psychological Association.
- Currie, J., & Thomas, D. (1995). Does head start make a difference? *American Economic Review*, 85, 341–364.
- Dannefer, W. D. (2003). Cumulative advantage/disadvantage and the life course: Cross-fertilizing age and social science theory. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 58, S327–S357.
- Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, 19, 294–304.
- De Kieviet, J. F., Zoetebier, L., Van Elburg, R. M., Vermeulen, R. J., & Oosterlaan, J. (2012). Brain development of very preterm and very Low-birthweight children in childhood and adolescence: A meta-

- analysis. *Developmental Medicine and Child Neurology*, 54, 313–323.
- Denny, N. W. (1982). Aging and cognitive change. In B. B. Wolman (Ed.), *Handbook of developmental psychology: Research and theory* (pp. 807–827). Englewood Cliffs: Prentice-Hall.
- Diamond, A., Barnett, W. S., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, 318, 1387–1388.
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, 32, 271–297.
- Downey, D. B., von Hippel, P. T., & Broh, B. A. (2004). Are schools the great equalizer? Cognitive inequality during the summer months and the school year. *American Sociological Review*, 69(5), 613–635.
- Duncan, O. D., Featherman, D. I., & Duncan, B. (1972). *Socioeconomic background and achievement*. New York: Seminar Press.
- Duncan, G., Kalil, A., Mayer, S. E., Tepper, R., & Payne, M. R. (2005). The apple does not fall far from the tree. In S. Bowles, H. Gintis, & M. O. Groves (Eds.), *Unequal chances: Family background and economic success* (pp. 23–79). New York: Russell Sage Foundation.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Jape, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446.
- Elder, G. H., Jr. (1975). Age differentiation and the life course. *Annual Review of Sociology*, 1, 165–190.
- Elder, G. H., Jr. (1985). Perspectives on the life course. In G. H. Elder Jr. (Ed.), *Life course dynamics: Trajectories and transitions, 1968–1980* (pp. 23–49). Ithaca: Cornell University Press.
- Elder, G. H., Jr. (1997). The life course and human development. In R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (pp. 939–991). New York: Wiley.
- Elder, G. H., Jr. (2000). The life course. In E. F. Borgatta & R. J. V. Montgomery (Eds.), *Encyclopedia of sociology* (2nd ed., Vol. 3, pp. 1614–1622). New York: Macmillan Reference USA.
- Elder, G. H., Jr. (1997a, April 5). The life course as developmental theory. Presidential address, Society for Research on Child Development, Washington, DC.
- Elder, G. H., Jr., & Shanahan, M. J. (2006). The life course and human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (Theoretical models of human development 6th ed., Vol. 1, pp. 665–715). New York: Wiley.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Kluwer Academic/Plenum Publishers.
- Entwistle, D., Alexander, K. L., & Olson, L. S. (2003). The first grade transition in life course perspective. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 229–250). New York: Kluwer Academic/Plenum Publishers.
- Farkas, G., & Beron, K. (2004). The detailed age trajectory of oral vocabulary knowledge: Differences by race and class. *Social Science Research*, 33, 464–497.
- Featherman, D. L. (1983). Life-span perspectives in social science research. In P. B. Baltes & O. G. Brim Jr. (Eds.), *Life-span development and behavior* (Vol. 5, pp. 1–57). New York: Academic.
- Featherman, D. L., & Lerner, R. W. (1985). Ontogenesis and sociogenesis: Problematics for theory and research about development and socialization across the life span. *American Sociological Review*, 50, 659–676.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49, 333–343.
- Finch, C. E., & Kirkwood, T. B. L. (2000). *Chance, development and aging*. Oxford: Oxford University Press.
- Flanagan, D. P., McGrew, K. S., & Ortiz, S. O. (2000). *The Wechsler intelligence scales and Gf-Gc theory: A contemporary approach to interpretation*. Boston: Allyn and Bacon.
- Friedman, H. S., & Kern, M. L. (2014). Personality, well-being, and health. *Annual Review of Psychology*, 65, 719–742.
- Frijters, P., Johnston, D. W., Shah, M., & Shields, M. A. (2013). Intra-household resource allocation: Do parents reduce or reinforce child ability gaps? *Demography*, 50, 2187–2208.
- Gelman, R. (1990). Structural constraints on cognitive development: Introduction to a special issue of cognitive science. *Cognitive Science*, 14, 3–9.
- Geroldi, C., Ferrucci, L., Bendinelli, S., Cavazzini, C., Zanetti, O., Guralnik, J. M., & Frisoni, G. B. (2003). *Journal of the American Geriatrics Society*, 51, 1064–1071.
- Gershoff, E. T., Aber, J. L., Raver, C. C., & Lennon, M. C. (2007). Income is not enough: Incorporating material hardship into models of income associations with parenting and child development. *Child Development*, 78, 70–95.
- Giedd, J. N. (2008). The teen brain: Insights from neuroimaging. *Journal of Adolescent Health*, 42, 335–343.
- Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C., & Rapoport, J. L. (1999). Brain development during childhood and adolescence: A longitudinal MRI study. *Nature Neuroscience*, 2, 861–863.
- Gladwell, M. (2008). *Outliers—the story of success*. New York: Little Brown & Co.
- Goldstone, R. L., & Landy, D. (2010). Domain-creating constraints. *Cognitive Science*, 34, 1357–1377.
- Gopnik, A. (2012). Scientific thinking in young children: Theoretical advances, empirical research, and policy implications. *Science*, 337, 1623–1627.

- Gopnik, A., & Meltzoff, A. N. (1998). *Words, thoughts, and theories*. Cambridge, MA: The MIT University Press.
- Gottfredson, L. S., & Deary, I. J. (2004). Intelligence predicts health and longevity, but why? *Current Directions in Psychological Science*, *13*, 1–4.
- Guo, G., & Harris, K. M. (2000). The mechanisms mediating the effects of poverty on children's intellectual development. *Demography*, *37*(4), 431–447.
- Hanushek, E. A., & Maritato, N. L. (Eds.). (1996). *Assessing knowledge of retirement behavior*. Panel on Retirement Income Modeling. Committee on Statistics. Commission on Behavioral and Social Sciences and Education. National Research Council. Washington, D.C.: National Academy Press.
- Harris, C. W. (1963). *Problems in measuring change*. Madison: The University of Wisconsin Press.
- Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review*, *102*, 458–489.
- Harris, J. R. (1998). *The nurture assumption: Why children turn out the way they do*. New York: Simon & Schuster.
- Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experiences of young American children*. Baltimore: Paul H. Brookes.
- Hassing, L. B., Johansson, B., Pedersen, N. L., Nilsson, S. E., Berg, S., & McClearn, G. (2003). Type 2 diabetes mellitus and cognitive performance in a population-based sample of the oldest old: Impact of comorbid dementia. *Aging, Neuropsychology, & Cognition*, *10*, 99–107.
- Hassing, L. B., Grant, M. D., Hofer, S. M., Pedersen, N. L., Nilsson, S. E., Berg, S., McClearn, G. E., & Johansson, B. (2004a). Type 2 diabetes mellitus contributes to cognitive change in the oldest old: A longitudinal population-based study. *Journal of the International Neuropsychological Society*, *4*, 599–607.
- Hassing, L. B., Hofer, S. M., Nilsson, S. E., Berg, S., Pedersen, N. L., McClearn, G., & Johansson, B. (2004b). Comorbid type 2 diabetes mellitus and hypertension exacerbates cognitive decline: Evidence from a longitudinal study. *Age and Aging*, *33*, 355–361.
- Hauser, R. M., Tsai, S.-L., & Sewell, W. H. (1983). A model of stratification with response error in social and psychological variables. *Sociology of Education*, *56*, 20–46.
- Hauser, R. M., Sewell, W. H., Logan, J. A., Hauser, T. S., Ryff, C., Caspi, A., & MacDonald, M. (1992). The Wisconsin longitudinal study: Adults as parents and children at age 50. *IASSIST Quarterly*, *16*, 23–38.
- Hauser, R. M., Carr, D., Hauser, T. S., Kreckler, M., Kuo, D., Presit, D., Shinberg, D., Sweeney, M., Thompson-Colon, T., & Uhrig, S. C. N. (1993). *The class of 1957 after 35 years: Overview and preliminary findings* (CDE Working Paper 93-17). Madison: University of Wisconsin-Madison.
- Hayward, M. D., Crimmins, E. M., Miles, T., & Yang, Y. (2000). The significance of socio-economic status in explaining the race gap in chronic health. *American Sociological Review*, *65*, 910–930.
- Heckman, J. J. (2007). The economics, technology, and neuroscience of human capability formation. *Proceedings of the National Academy of Sciences*, *104*, 13250–13255.
- Heise, D. R. (1970). Causal inference from panel data. In *Sociological methodology 1970* (pp. 3–27). San Francisco: Jossey-Bass.
- Henretta, J. (2003). The life-course perspective on work and retirement. In R. A. Settersten Jr. (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 85–105). Amityville: Baywood Publishing Company.
- Hertzog, C., & Schaie, K. W. (1986). Stability and change in adult intelligence. 1: Analysis of longitudinal covariance structures. *Psychology and Aging*, *1*, 159–171.
- Hertzog, C., & Schaie, K. W. (1988). Stability and change in adult intelligence: 2. Simultaneous analysis of longitudinal means and covariance structures. *Psychology and Aging*, *3*, 122–130.
- Hofer, S. M., & Alwin, D. F. (2008). *Handbook on cognitive aging: Interdisciplinary perspectives*. Thousand Oaks: Sage Publications.
- Hogan, D. P. (1981). *Transitions and social change: The early lives of American men*. New York: Academic.
- Hogan, D. P. (2000). Life cycle. In E. F. Borgatta & R. J. V. Montgomery (Eds.), *Encyclopedia of sociology* (2nd ed., Vol. 3, pp. 1623–1627). New York: Macmillan Reference USA.
- Hogan, D. P., & Astone, N. M. (1986). The transition to adulthood. *Annual Review of Sociology*, *12*, 109–130.
- Horn, J. L. (1968). Organization of abilities and the development of intelligence. *Psychological Review*, *75*, 242–259.
- Horn, J. L. (1976). Human abilities: A review of research and theory in the early 1970s. *Annual Review of Psychology*, *27*, 437–485.
- Horn, J. L. (1994). Theory of fluid and crystallized intelligence. In R. J. Sternberg (Ed.), *Encyclopedia of human intelligence* (pp. 443–451). New York: Macmillan.
- Horn, J. L., & Cattell, R. B. (1967). Age differences in fluid and crystallized intelligence. *Acta Psychologica*, *26*, 107–129.
- Horn, J. L., & Donaldson, G. (1980). Cognitive development in adulthood. In O. G. Brim Jr. & J. Kagan (Eds.), *Constancy and change in human development* (pp. 445–529). Cambridge, MA: Harvard University.
- House, J. S., Kessler, R. C., Herzog, A. R., Mero, R. P., Kinney, A. M., & Breslow, M. J. (1992). Social stratification, age, and health. In K. W. Schaie, D. Blazer, & J. S. House (Eds.), *Aging, health behaviors and health outcomes* (pp. 1–32). Hillsdale: Erlbaum.
- House, J. S., Lepkowski, J. M., Kinney, A. M., Mero, R. P., Kessler, R. C., & Herzog, A. R. (1994). The

- social stratification of aging and health. *Journal of Health and Social Behavior*, 35, 213–234.
- House, J. S., Lantz, P. M., & Herd, P. (2005). Continuity and change in the social stratification of aging and health over the life course: Evidence from a nationally representative longitudinal study from 1986 to 2001/2002 (Americans' Changing Lives Study). *Journal of Gerontology: Social Science*, 60B(Special Issue II), 15–26.
- Hox, J. J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah: Lawrence Erlbaum.
- Jencks, C. (1979). *Who gets ahead? The determinants of economic success in America*. New York: Basic.
- Johnson, S. B., Blum, R. W., & Giedd, J. N. (2009). Adolescent maturity and the brain: The promise and pitfalls of neuroscience research in adolescent health policy. *Journal of Adolescent Health*, 45, 216–221.
- Jöreskog, K. G. (1974). Analyzing psychological data by structural analysis of covariance matrices. In D. H. Krantz, R. C. Atkinson, R. D. Luce, & P. Suppes (Eds.), *Measurement, psychophysics and neural information processing*. San Francisco: Freeman.
- Kaplan, H., Hill, K., Lancaster, J., & Magdalena Hurtado, A. (2000). A theory of human life history evolution: Diet, intelligence and longevity. *Evolutionary Anthropology*, 9, 1–30.
- Kaplan, G. A., Turrell, G., Lynch, J. W., Everson, S. A., Helkala, E. L., & Salonen, J. T. (2001). Childhood socioeconomic position and cognitive function in adulthood. *International Journal of Epidemiology*, 30, 256–263.
- Kawas, C. H., & Brookmeyer, R. (2001). Editorial—aging and the public health: Effects of dementia. *The New England Journal of Medicine*, 344, 1160–1161.
- Kern, M. L., & Friedman, H. S. (2008). Early educational milestones as predictors of lifelong academic achievement, midlife adjustment, and longevity. *Journal of Applied Developmental Psychology*, 30, 419–430.
- Knudsen, E. I., Heckman, J. J., Cameron, J. L., & Shonkoff, J. P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences*, 103, 10155–10162.
- Kohli, M. (2007). The institutionalization of the life course: Looking back to look ahead. *Research in Human Development*, 4, 253–271.
- Kohn, M. L., & Schooler, C. (1978). The reciprocal effects of the substantive complexity of work and intellectual flexibility: A longitudinal assessment. *American Journal of Sociology*, 84, 24–52.
- Kohn, M. L., & Schooler, C. (1983). *Work and personality: An inquiry into the impact of social stratification*. Norwood: Ablex.
- Kohn, M. L., & Slomczynski, K. M. (1990). *Social structure and self-direction: A comparative analysis of the United States and Poland*. Cambridge, MA: Basil Blackwell.
- Kuh, D., & New Dynamics of Ageing (NDA) Preparatory Network. (2007). A life course approach to healthy aging, frailty, and capability. *Journal of Gerontology: Medical Sciences*, 62A, 717–721.
- Kunst, A. E., & Mackenbach, J. P. (1994). The size of mortality differences associated with education level in nine industrialized countries. *American Journal of Public Health*, 84, 932–937.
- Lareau, A., & Conley, D. (Eds.). (2008). *Social class: How does it work?* New York: Russell Sage Foundation.
- Lebel, C., & Beaulieu, C. (2011). Longitudinal development of human brain wiring continues from childhood into adulthood. *The Journal of Neuroscience*, 31(30), 10937–10947.
- Lindquist, E. F. (1953). *Design and analysis of experiments in psychology and education*. Boston: Houghton Mifflin.
- Loehlin, J. C. (1997). A test of J.R. Harris's theory of peer influences on personality. *Journal of Personality and Social Psychology*, 72, 1197–1201.
- Lord, F. M. (1963). Elementary models for measuring change. In C. W. Harris (Ed.), *Problems in measuring change* (pp. 21–38). Madison: University of Wisconsin Press.
- Lynch, S. M. (2003). Cohort and life-course patterns in the relationship between education and health: A hierarchical approach. *Demography*, 40, 309–331.
- Maccoby, E. E. (1992). The role of parents in the socialization of children: An historical overview. *Developmental Psychology*, 28, 1006–1017.
- Maccoby, E. E., & Martin, J. A. (1983). Socialization and the context of the family: Parent-child interaction. In E. M. Hetherington (Ed.), *Socialization, personality, and social development*. New York: Wiley.
- Magnuson, K. A., Meyers, M. K., Ruhm, C. J., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Educational Research Journal*, 41(1), 115–157.
- Magnuson, K. A., Ruhm, C. J., & Waldfogel, J. (2007). The persistence of preschool effects: Do subsequent classroom experiences matter? *Early Childhood Research Quarterly*, 22, 18–38.
- Mandler, J. M. (2004). *The foundations of mind*. New York: Oxford University Press.
- Marmot, M. G., & Shipley, M. J. (1996). Do socioeconomic differences in mortality persist after retirement? 25 year follow up of civil servants from the first Whitehall Study. *British Medical Journal*, 313, 1177–1180.
- Martin, G. M., Austad, S. N., & Johnson, T. E. (1996). Genetic analysis of ageing: Role of oxidative damage and environmental stresses. *Nature Genetics*, 13, 25–34.
- McArdle, J. J. (2001). A latent difference score approach to longitudinal dynamic structural analyses. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural*

- equation modeling: Present and future* (pp. 342–380). Lincolnwood: Scientific Software International.
- McArdle, J. J., & Bell, R. Q. (2000). An introduction to latent growth models for developmental data analysis. In T. D. Little, K. U. Schnabel, & J. Baumert (Eds.), *Modeling longitudinal and multilevel data: Practical issues, applied approaches and specific examples* (pp. 69–107). Mahwah: Lawrence Erlbaum.
- McArdle, J. J., & Hamagami, F. (2001). Latent difference score structural models for linear dynamic analyses with incomplete longitudinal data. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 137–175). Washington, DC: American Psychological Association.
- McClelland, J. L., & Seigler, R. S. (Eds.). (2001). *Mechanisms of cognitive development: Behavioral and neural perspectives*. Mahwah: Lawrence Erlbaum Associates.
- McGrew, K. S. (1997). Analysis of the major intelligence batteries according to a proposed comprehensive Gf-Gc framework. In D. P. Flanagan, J. L. Genshaft, & P. L. Harrison (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues* (pp. 151–180). New York: Guilford.
- McGrew, K. S., & Flanagan, D. P. (1998). *The intelligence test desk reference (ITDR): Gf-Gc cross-battery assessment*. Boston: Allyn and Bacon.
- Meredith, W., & Tisak, J. (1990). Latent curve analysis. *Psychometrika*, 55, 107–122.
- Merton, R. K. (1968). The Matthew effect in science. *Science*, 159, 56–63.
- Molla, M. T., Madans, J. H., & Wagener, D. K. (2004). Differentials in adult mortality and activity limitation by years of education in the United States at the end of the 1990s. *Population and Development Review*, 30, 625–646.
- Morgan, S. L., Grusky, D. B., & Fields, G. S. (2006). *Mobility and inequality: Frontiers of research in sociology and economics*. Stanford: Stanford University Press.
- Muller, M., Sigurdsson, S., Kjartansson, O., et al. (2014). Birth size and brain function 75 years later. *Pediatrics*, 134, 761–770.
- Musch, J., & Grondin, S. (2001). Unequal competition as an impediment to personal development: A review of the relative age effect in sport. *Developmental Review*, 21, 147–167.
- Musgrove, F. (1977). *Margins of the mind*. London: Methuen.
- NICHD Early Child Care Research Network. (2000). The relation of child care to cognitive and language development. *Child Development*, 71, 960–980.
- NICHD Early Child Care Research Network. (2002a). Child-care structure -> process -> outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science*, 13(3), 199–206.
- NICHD Early Child Care Research Network. (2002b). Early child care and children's development prior to school entry: Results from the NICHD study of early child care. *American Educational Research Journal*, 39, 133–164.
- NICHD Early Child Care Research Network. (2003). Does amount of time spent in child care predict socio-emotional adjustment during the transition to kindergarten. *Child Development*, 74, 976–1005.
- NICHD Early Child Care Research Network. (2005). *Child care and child development: Results from the NICHD study of early child care and youth development*. New York: Guilford Press.
- O'Rand, A. M. (1996). The precious and the precocious: Understanding cumulative disadvantage and cumulative advantage over the life course. *The Gerontologist*, 36, 230–238.
- Ostir, G. V., Maji, M. A., Ottenbacher, K. J., Markides, K. S., & Goodwin, J. S. (2003). Cognitive function and incidence of stroke in older Mexican Americans. *Journal of Gerontology: Medical Sciences*, 58(6), 531–535.
- Park, D.C. (1994). Aging, cognition, and work. *Human Performance*, 7, 181–205
- Park, D. C. (1999). Cognitive aging, processing resources, and self-report. In D. C. Park & N. Schwarz (Eds.), *Cognition, aging, and self-reports* (pp. 45–69). Philadelphia: Taylor and Francis.
- Park, D. C., Smith, A. D., Lautenschlager, G., Earles, J., Frieske, D., Zwahr, M., & Gaines, C. (1996). Mediators of long-term memory performance across the life-span. *Psychology and Aging*, 11, 621–637.
- Paus, T., Zijdenbos, A., Worsley, K., Collins, D. L., Blumenthal, J., Giedd, J. N., Rapoport, J. L., & Evans, A. C. (1999). Structural maturation of neural pathways in children and adolescents: In vivo study. *Science*, 283, 1908–1911.
- Pavlik, V. N., Alves de Moraes, S., Szklo, M., Knipman, D. S., Mosely, T. H., Jr., & Hyman, D. J. (2003). Relation between cognitive function and mortality in middle-aged adults in the atherosclerosis risk in communities study. *American Journal of Epidemiology*, 157, 327–334.
- Pedersen, N. L., & Lichtenstein, P. (1997). Biometric analyses of human abilities. In C. Cooper & V. Varma (Eds.), *Processes in individual differences* (pp. 126–148). New York: Routledge.
- Piaget, J. (1952). *The origins of intelligence in children*. New York: International Universities Press.
- Piaget, J. (1965). Cognitive development in children: Piaget. *Journal of Research in Science Teaching*, 2, 176–186.
- Piaget, J. (1970). Piaget's theory. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (pp. 703–732). New York: Wiley.
- Piaget. (1985). *The equilibration of cognitive structures: The central problem of intellectual development*. Chicago: University of Chicago Press.
- Pinker, S. (2002). *The blank slate: The modern denial of human nature*. New York: Viking.
- Plomin, R. (1994). *Genetics and experience: The interplay between nature and nurture*. Thousand Oaks: Sage Publications.

- Plomin, R. (1999). Behavioral genetics. In M. Bennett (Ed.), *Developmental psychology: Achievements and prospects* (pp. 231–252). Philadelphia: Taylor & Francis.
- Potter, D., & Roksa, J. (2013). Accumulating advantage over time: Family experiences and social class inequality in academic achievement. *Social Science Research, 42*, 1018–1032.
- Potter, D., Mashburn, A., & Grissmer, D. (2013). The family, neuroscience, and academic skills: An interdisciplinary account of social class gaps in children's test scores. *Social Science Research, 42*, 446–464.
- Richards, M., & Deary, I. J. (2005). A life course approach to cognitive reserve: A model for cognitive aging and development? *Annals of Neurology, 58*, 617–622.
- Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review, 52*, 1–14.
- Rindfuss, R. (1991). The young adult years: Diversity, structural change, and fertility. *Demography, 28*, 493–512.
- Robert, S., & House, J. S. (1996). SES differentials in health by age and alternative indicators of SES. *Journal of Aging and Health, 8*, 359–388.
- Rogosa, D. R., Brandt, D., & Zimowski, M. (1982). A growth curve approach to the measurement of change. *Psychological Bulletin, 90*, 726–748.
- Rowe, D. C. (1994). *The limits of family influence: Genes, experience, and behavior*. New York: Guilford.
- Rowe, J. W., & Kahn, R. L. (1998). *Successful aging*. New York: Pantheon.
- Rowe, D. C., & Teachman, J. (2001). Behavioral genetic research designs and social policy studies. In A. Thornton (Ed.), *The well-being of children and families: Research and data needs* (pp. 157–187). Ann Arbor: University of Michigan Press.
- Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review, 30*, 843–861.
- Salthouse, T. A. (1991). *Theoretical perspectives on cognitive aging*. Hillsdale: Lawrence Erlbaum.
- Salthouse, T. A. (1996). The processing-speed theory of adult age differences in cognition. *Psychological Review, 103*, 403–428.
- Salthouse, T. A. (1999). Pressing issues in cognitive aging. In N. Schwarz, D. Park, B. Knäuper, & S. Sudman (Eds.), *Cognition, aging, and self-reports* (pp. 185–198). Philadelphia: Psychology Press.
- Scarr, S. (1992). Developmental theories for the 1990s: Development of individual differences. *Child Development, 63*, 1–19.
- Scarr, S. (1995). How do families affect intelligence? Social environmental and behavior genetic predictions. In J. J. Hox, B. F. van der Meulen, J. M. A. M. Janssens, J. J. F. ter Laak, & L. W. C. Tavecchio (Eds.), *Advances in family research*. Amsterdam: Thesis Publishers.
- Schaie, K. W. (2005). *Developmental influences on adult intelligence: The Seattle longitudinal study*. Oxford: Oxford University Press.
- Scherr, P. A., Albert, M. S., Funkenstein, H. H., Cook, N. R., Hennekens, C. H., Branch, L. G., White, L. R., Taylor, J. O., & Evans, D. A. (1988). Correlates of cognitive function in an elderly community population. *American Journal of Epidemiology, 128*, 1084–1101.
- Schooler, C. (1984). Psychological effects of complex environments during the life span: A review and theory. *Intelligence, 8*, 259–281.
- Schooler, C. (1987). Psychological effects of complex environments during the life span: A review and theory. In C. Schooler & K. W. Schaie (Eds.), *Cognitive functioning and social structure over the lifecourse* (pp. 24–49). Norwood: Ablex.
- Schooler, C. (1998). Environmental complexity and the Flynn effect. In U. Neisser (Ed.), *The rising curve: Long-term gains in IQ and related measures* (pp. 67–79). Washington, DC: American Psychological Association.
- Sewell, W. H., Sr., & Hauser, R. M. (1975). *Education, occupation and earnings achievement in the early career*. New York: Academic.
- Sewell, W. H., Hauser, R. M., Springer, K. W., & Hauser, T. S. (2003). As we age: The Wisconsin longitudinal study, 1957–2001. In K. Leicht (Ed.), *Social stratification and mobility* (Vol. 20, pp. 3–111). London: Elsevier.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology, 26*, 667–692.
- Shanahan, M. J., Hofer, S. M., & Shanahan, L. (2003). Biological models of behavior and the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course*. New York: Kluwer Academic/Plenum Publishers.
- Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early child development*. Washington, DC: National Academy of Sciences.
- Siegler, R. (1989). Mechanisms of cognitive development. *Annual Review of Psychology, 40*, 353–379.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. London: Oxford University Press.
- Smith, J. R., Brooks-Gunn, J., & Klebanov, P. K. (1997). *Consequences of growing up poor, chap. Consequences of living in poverty for young children's cognitive and verbal ability and early school achievement*. New York: Russell Sage Foundation.
- Snowdon, D. A., Kemper, S. J., Mortimer, J. A., Greiner, L. H., Wekstein, D. R., & Markesbery, W. R. (1996). Linguistic ability in early life and cognitive function and Alzheimer's disease in late life: Findings from the Nun Study. *Journal of the American Medical Association, 275*, 528–532.
- Staudinger, U. M., Marsiske, M., & Baltes, P. B. (1995). Resilience and reserve capacity in later adulthood: Potentials and limits of development across the life

- span. In D. Cicchetti & C. Cohen (Eds.), *Developmental psychopathology* (Risk, Disorder, and Adaptation, Vol. 2, pp. 801–847). New York: Wiley.
- Stern, Y. (Ed.). (2007). *Cognitive reserve: Theory and applications*. New York: Taylor & Francis Group.
- Stern, P. C., & Carstensen, L. L. (2000). *The aging mind—Opportunities in cognitive research*. Washington, DC: National Academy of Sciences.
- Steyer, R., Eid, M., & Schwenkmezger, P. (1997). *Methods of Psychological Research Online*, 2(1), 21–33.
- Todd, P. E., & Wolpin, K. I. (2003). On the specification and estimation of the production function for cognitive achievement. *Economic Journal*, 113, F3–F33.
- Todd, P. E., & Wolpin, K. I. (2007). The production of cognitive achievement in children: Home, school, and racial test score gaps. *Journal of Human Resources*, 1, 91–136.
- Turkheimer, E., Haley, A., Waldron, M., D'Onofrio, B., & Gottesman, I. I. (2003). Socioeconomic status modifies heritability of IQ in young children. *Psychological Science*, 14(6), 623–628.
- U.S. Department of Health and Human Services, Administration for Children and Families. (2010). *Head start impact study*. Final report. Washington, DC.
- Votruba-Drzal, E., Li-Grining, C. P., & Maldonado-Carreno, C. (2008). A developmental perspective on full- versus part-day kindergarten and children's academic trajectories through fifth grade. *Child Development*, 79(4), 957–978.
- Wechsler, D. (1952). *The range of human capacities*. Baltimore: The Williams & Wilkins Company.
- Wechsler, D. (1958). *The measurement and appraisal of adult intelligence*. Baltimore: The Williams & Wilkins Company.
- Whalley, L. J., & Deary, I. J. (2001). Longitudinal cohort study of childhood IQ and survival up to age 76. *British Medical Journal*, 322, 1–5.
- Willett, J. B., & Sayer, A. G. (1994). Using covariance structure analysis to detect correlates and predictors of individual change over time. *Psychological Bulletin*, 116, 363–381.
- Wilson, R. S., de Leon Mendes, C. F., Bennett, C., Beenias, J. L., & Evans, D. A. (2004). Depressive symptoms and cognitive decline in a community population of older persons. *Journal of Neurology and Neurosurgical Psychiatry*, 75, 126–129.
- Woodcock, R. W. (1994). Measures of fluid and crystallized intelligence. In R. J. Sternberg (Ed.), *The encyclopedia of intelligence* (pp. 452–456). New York: Macmillan.
- Wray, L. A., Alwin, D. F., Zeiser, K. L., & Hofer, S. M. (2010). *Does memory performance predict retirement in older workers*. Unpublished Paper. Center for Life Course and Longitudinal Studies, Pennsylvania State University.

Part IV

Life Course Research Methodologies

Longitudinal Qualitative Research

Joseph C. Hermanowicz

Although qualitative methods have always availed themselves to longitudinal research, it is only relatively recently that they have begun to be employed in an emerging spectrum of studies. The wedding of qualitative methods to longitudinal investigation combines hallmark concerns that can yield novel ways to examine the social world. On the one hand, the use of qualitative methods marshals an emphasis on *meaning*: it focuses attention on the perspectives and interpretations that people develop about experiences and events. The methods open a window through which others are able to see how people understand themselves and social situations. On the other, a concern with phenomena longitudinally foregrounds the idea of *trajectory*: it focuses attention on the course of experiences and events. That is, people and social situations exist, not statically, but on a path, such that their existence comes to be understood as a function of temporal passage. Combined, longitudinal qualitative research endeavors to understand how people successively make meaning about the trajectories of their lives, or specific conditions of their lives, by following them through time. This type of research offers a way by which to study people's

perspectives on the varieties of situations that characterize their movement in time.

In studying the same people at more than one point in time, longitudinal qualitative research is useful in examining developmental change. It is also a key to understanding how people experience and respond to developmental change. Change may be conceived variously at individual, group, institutional, or societal levels (see Cohler and Hostetler 2003). For example, at an individual level, the researcher might show how the elderly understand changes in their advanced aging that shape interpretations of quality of life. At a group level, such research might study how a category among the aged progresses and copes with a specific disease. At an institutional level, it may be concerned with how the aged fare with care and treatment regimens as found in the culture and structure of specific assisted-living organizations. At a societal level, such research could be directed at how passage in advanced years is differently understood between national contexts. The object of study is not, of course, limited to old age; longitudinal qualitative research is employable at all points in the life course. Further, the methods can address phenomena both that extend *across* life phases (e.g., perspectives on employment experiences across adulthood) and also phenomena that are delimited *within* a phase (e.g., the subjective criminal careers of juveniles). As in the example above, the analytic

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focus shifts from the micro (individual analysis) to the meso (group, institutional analyses) and then to the macro (societal analysis), but in each instance attention is centered on change and how people developmentally understand themselves in response to shifting social (and biological) conditions.

Since longitudinal qualitative research constitutes a relatively new set of methodological tools with which to study social life, there is a need to outline parameters within which it works. The idea in doing so is to sustain the growing interest in longitudinal qualitative research and to encourage its greater use where conceptual dividends can be large. The maturation and integration of longitudinal qualitative research as a set of techniques constitutes a methodological advance for contemporary social science. In this chapter, I codify several of the principles and procedures underlying longitudinal qualitative research. I explicitly draw and expand upon my prior writing about longitudinal qualitative research methods (Hermanowicz 2013) in order to highlight the essential conditions under which longitudinal qualitative data are gathered, analyzed, and presented. In the course of discussion, I provide illustrations from studies noted for their longitudinal qualitative design. I rely centrally on my research and experience studying scientific careers (Hermanowicz 1998, 2009).

The chapter proceeds through three parts. First, I explain the theoretic impetus and importance of conducting qualitative research longitudinally. Second, I briefly summarize the studies of science careers I conducted, which, combined with examples of work on other topics, form a basis of understanding subsequent illustrations. Finally, in the core of the chapter, I account for the conditions essential to conducting longitudinal qualitative research successfully. In doing so, I address central concerns that form three sets of issues: design, execution, and analysis. As will become apparent, many of the parameters within which longitudinal qualitative research succeeds are as applicable to one method of collecting data, such as observational and case study research, as to another, such as interviews. The discussion will underscore the similarities among

types of qualitative methods that may be used for longitudinal research.

1 Theoretic Impetus of Longitudinal Qualitative Research

The theoretic impetus for longitudinal qualitative research is derived from life course sociology more generally. In life course sociology, interest centers both on patterns and on variation in processes of development and aging. Whereas cross-sectional designs in sociological research can examine developmental change through both retrospective and prospective data on life histories, prospective longitudinal designs can capitalize on the examination of change by studying phenomena in “real” time. In doing so, longitudinal design arguably maximizes the likelihood of capturing variation in aging processes. Subjects are followed and the multiple, variable courses of their progression may be observed, together with the nested conditions that are associated with and/or cause the observed variation. As a result, the social underpinnings of human development are poised to be more fully known and articulated.

While these theoretic premises are consistent with a sociological perspective on lives, they have, to be certain, not always carried the day, nor are they yet as fully utilized as their promise holds. As Dannefer (2013, 794) has commented, “The traditional inclination to regard age-related phenomena as largely individual matters governed by the imperatives of biological aging on the one hand and ‘agency’ or choice-making on the other has survived largely unscathed...methodological and analytical progress associated with longitudinal data and cohort analysis [has not been] matched by theoretical advances” (see also Dannefer, this volume). If only to reinforce the theoretic rationale for what longitudinal qualitative design can do for inquiry into the sociology of the life course, we may briefly re-visit the reasons that account for its arrival as an analytical and methodological set of tools.

Sociological perspectives on the life course have often taken psychological approaches to

aging as their counterpoint, largely because the latter so dominated thinking about human development until major sociological contributions to the study of lives were made beginning the 1960s and 1970s. Psychologically oriented approaches to aging conceived of development predominantly in terms of preprogrammed maturation. “The temporally-anchored fact of physical birth is widely assumed to be followed by a set of fixed, organismically driven imperatives of maturation and aging; as a corollary, social life and social structure must accommodate such processes of individual change over the life course. Social scientists’ thinking about aging has developed in the context of such assumptions about the naturalness of aging, pervasive in both popular and scientific thought” (Dannefer 2013, 793).

Psychologically-rooted approaches to aging have partly achieved their notoriety by promulgating “stage theories” of aging in their various forms. The popularity of stage theories, especially outside of the scientific world, is the likely result of rendering complex aging processes into simpler and predicably paths on which people are able to locate themselves amidst similarity, but also notable difference from others. Differences notwithstanding, people can know that they are not alone, that their situations, challenges, goals, and crises may be rendered generic. One can thus recall Erikson’s “eight stages of man,” Levinson’s “seasons of a man’s and of a woman’s life,” and Sheehy’s “passages,” among other stage-like approaches (Erikson 1950; Levinson 1978, 1996; Sheehy 1976). Still earlier formulations confined development to childhood such that adulthood consisted only as a playing-out of developmental imprinting that had taken place by the end of childhood. In their various formulations, stage theories were asserted to be universal, inherent to human aging. But differences do stand and these approaches minimized them. Aging differences gone unexamined represent a serious conceptual and empirical gap, which creates a significant theoretic shortfall in accounting for developmental patterns in human aging. “Deviations from the norm are more than inconvenient life events; they represent patterned variations that can be explained by their relation to forces that produce

them” (Dannefer 1984a, 106). They are, therefore, of keen interest to the social scientist, for they are the manifestations of other patterns and pathways by which people age variously.

Psychologically oriented views of aging were challenged by an onset of a sociology of age and the life course, which sought to demonstrate how age-related patterns were situated in cohort-specific and context-specific experiences. For sociologists, aging has a locatedness in contexts, whether temporally or spatially bound by cohorts on the one hand and/or environments on the other. By this view, contexts serve not merely as a *setting for* development, as earlier approaches held, but as a constituent *force of it*. “Why should a universal pattern have been a theoretically expected or desired claim to make in the first place? What mode of inquiry and what kinds of assumptions would lead one to assume such invariance?” (Dannefer 1984a, 102–103; see also Baltes and Nesselroade 1984; Dannefer 1984b). In this important theoretic sense, different contexts entail systematically distinct consequences for socialization and development throughout the life span (see Hermanowicz 2009, 8–10).

Cohort analysis has typically been used by sociologists and others to understand how people pass through time in socially patterned yet variable ways. In doing so, cohort analysis has sought to avoid an “ontogenetic fallacy”—postulating universality of development—but instead to investigate how groups of individuals age differently. Elder’s work on the life course, for instance, locates individuals in historical times and socioeconomic contexts in order to see how development has transpired differently for cohorts proceeding through time under different environmental conditions. Studying cohorts coming of age during and just after the Great Depression, his work has illustrated the differential force of time and socioeconomic context on development in childhood and in ensuing adulthood (Elder 1974, 1981, 1998).

In different application, Neugarten used cohorts to conduct pioneering studies of the differential meanings of age. Neugarten’s work, and those in its vein, emphasize normative underpinnings of age as a more general component of

culture: people operate with shared, if fluid, understandings about age and the time and sequence of age-related events across life domains such as marriage, family, work, education, and leisure (Neugarten 1968, 1979, 1996; Neugarten and Datan 1973; Neugarten et al. 1965; Settersten 2003; Settersten and Hagestad 1996a, b). The result is an age-graded life course as a durable, but again elastic and flexible, feature of culture.

Sociologically, the elasticity of an age-graded life course is key. An age-graded life course is not tantamount to monolithic stages as characteristic of the psychologically oriented approaches referenced above. Instead, an age-graded life course refers to the idea of a general conception and socially desired unfolding of lives through loosely defined periods of life. Some periods may characterize some individuals and not others. Individuals who enter and leave certain periods may do so at different rates. Some periods may be skipped altogether by some subset of people. The idea of a normative, age-graded life course is meant to more fully allow for the possibility of variation while still attune to the structured, patterned ways that people age and interpret their passage through time.

As a means to emphasize difference in developmental patterns, life course sociology has utilized the idea of cohort (Ryder 1965), and has come to emphasize the concepts of inter-cohort and intra-cohort variation (Dannefer and Kelley-Moore 2009). Inter-cohort differences have emphasized the role of context in shaping aging processes that are historically variable. Elder's (1974) study of how the Great Depression differentially affected cohorts coming of age during and after the event illustrates the significance of inter-cohort variation in development. Intra-cohort differences have also emphasized the role of context, but also inequality and the ways in which processes of cumulative advantage and disadvantage characterize members of the same cohort as they age. Laub and Sampson's (2003) study of criminal careers demonstrates how persistence in and desistance from crime operates in conjunction with the socially controlling effects of marriage, family, employment, and military service. It thereby illustrates the significance of

intra-cohort variation in the development of a cohort of men who, with shared beginnings, experienced the onset of delinquency as juveniles, but then led divergent lives by proceeding along adult pathways made different by their variable exposure to social controls. The concepts of inter- and intra-cohort variation have sought to socially situate the study of human development more firmly. It is against this conceptual backdrop that many sociological studies of the life course have been undertaken, including the ones to which the discussion now turns, which highlight a qualitative methodological means to study the varied conditions and meanings of lives over time.

2 An Example from the Studies of Careers in Science

My studies of careers in academic science illustrate the use, rationale, and utility of longitudinal qualitative research, and they form a basis of subsequent discussion about the conditions under which such research is conducted. By way of background, the studies began in 1994–1995 when I interviewed a sample of 60 scientists about their professional aspirations and perceptions of their unfolding careers. At that time, the subjects were sampled according to two analytic dimensions: *time*, indicated by the year in which the scientists earned their Ph.D.'s, and *place*, indicated by the type of university in which they now worked. The rationale for utilizing these dimensions was to situate careers temporally and contextually in order to see how the experience of work and perceptions of careers vary.

On the time dimension, scientists were sampled and grouped by three cohorts: scientists who received their Ph.D.'s after 1980 which, at the time of the interviews, placed the subjects in early career phases; scientists who received their Ph.D.'s between 1970 and 1980, which drew upon scientists in middle phases of their careers; and finally scientists who received their Ph.D.'s prior to 1970, which captured scientists in late career phases. Hence, temporally, the design operationalized a study of scientists at early, middle, and late career.

On the place dimension, scientists were sampled at a range of university types. The rationale was to maximize the types of academic environments in which scientists work, and to thereby be inclusive of the types of careers found in academic science. The universities, which form a representative continuum, consist of those stressing research in the presence of teaching and other roles, which were termed *elite*. Examples include Harvard University, Cal Tech, and the University of California-Berkeley. Institutions that stress research and teaching as well as other roles were termed *pluralist*. Examples include the University of Kansas, the University of Missouri, and Purdue University. Institutions that stress teaching in the presence of research and other roles were termed *communitarian*. Examples include the University of Tulsa, the University of Louisville, and the University of Toledo.

The design of the study is captured in Table 1. The number of respondents are arrayed by cohort and by the type of institution in which they worked. The full results of this study and broader discussion appear in *The Stars Are Not Enough: Scientists—Their Passions and Professions* (Hermanowicz 1998).

In this baseline work, the subjects discussed their evolving careers, including their past and hoped-for future. In these respects the work constituted a cross-sectional design in which temporality arose by two means: by the three cohorts employed in the design, which enabled a study of meanings assigned to experiences by career phase, and by interview questions that sought data on retrospective and prospective perceptions. This type of design, where retrospection and prospection form key components of cross-

sectional data collection, is a standard of life history research (Scott and Alwin 1998).

I interviewed 55 of the same scientists again in 2004–2005, creating a longitudinal design from which to study how academics, working in a variety of institutions, age in relation to their work. Up to this point, no prior study of the academic profession had followed the same people over time. A unique opportunity was thus created to study the experience, meaning, and interpretation of work in one of the main professions in modern society (Ben-David 1972; Gustin 1973). The 10-year time interval is conceptually significant for the specific occupation studied: it advances the subjects into a subsequent career phase. Consequently, the sequel allowed one to see how academics’ perceptions of work evolve with felt costs and rewards, from early to mid career, from mid to late career, and from late to post career, including the stage of retirement and exit from the career.

In the follow-up work, age and institutional location provide the structure to analyze individual, subjective careers through diachronic change. *Diachronic* refers to change between successive points in time. Longitudinal data add spatial and temporal dimensions to synchronic study. *Synchronic* refers to characteristics and conditions existing at one point in time. In moving from a synchronic to a diachronic perspective, we are consequently in a position to answer the following research questions that were central to the longitudinal study:

- How do academics account for the unfolding of their careers in light of the goals and aspirations that socially situate their profession?
- What continuities and changes—in aspiration, satisfaction, motivation, commitment, and identification with work—mark the careers of academics?
- What knowledge have academics acquired about themselves, their institutions, and the academic profession in 10 years?
- How does this knowledge vary by individual age and type of university?

Table 2 illustrates the evolved design guiding the research in the longitudinal study. Time and

Table 1 Research design and number of scientists in baseline study, by type of institution and cohort

Institution	Cohort (by year of Ph.D.)			Total
	Pre-1970	1970–1980	Post-1980	
Elite	9	6	8	23
Pluralist	6	5	7	18
Communitarian	7	5	7	19
Total	22	16	22	60

Table 2 Research design of longitudinal study, by type of institution and cohort

Cohort/career phase	Elite	Pluralist	Communitarian	Total
Early to mid	8	6	7	21
Mid to late	6	4	5	15
Late to post	9	5	5	19
Total	23	15	17	55

place remain key analytic dimensions, but diachronic analysis is added to what was previously synchronic study. Thus in the follow-up work, time is captured as it was in the baseline work by differences in cohort meanings and by retrospection and prospection, but also by change from one point in time to another. The full results and broader discussion of the longitudinal study appear in *Lives in Science: How Institutions Affect Academic Careers* (Hermanowicz 2009).

Professors from one academic field—physics—composed the studies, but the results are not limited to them. I discuss issues of generalizability elsewhere (Hermanowicz 2009, 252–268). Physicists were selected because in the wider culture they are perceived to embody the scientific discipline *par excellence*. They possess a recognizable genealogy of immortals, such as Kepler, Newton, and Einstein, who promote a heroism and define a paradigmatic life course. Thus if one is interested in seeing how academic aspirations develop and evolve and how careers play out over time, particularly against the backdrop of a field that imposes a paradigmatic template on the passage of time, the field of physics made for an ideal setting.

By virtue of the research designs in both the baseline and longitudinal work, emphasis is placed on inter- and intra-cohort variation and on context, ideas central to life course analysis as discussed in the prior section of the chapter. The incorporation of cohorts allow for a view and treatment of aging in a career as variable, not monolithic or universal to stages. The incorporation of contexts, indicated by the different institutions in which the subjects have worked, opens a way in which to examine how they operate as constituent forces of, as opposed to merely settings for, development. Clearly not all careers in a field are of one kind, nor are people exposed to

the same opportunities and constraints in their occupational (and personal) lives. As analytic resources, cohort and context—time and place—are utilized in these studies, as they may elsewhere, to socially situate the study of developmental change.

3 Conditions of Longitudinal Qualitative Research

We may proceed by posing the question, “How does one do longitudinal qualitative research?” There are three clusters of issues that, in tandem, uniquely situate longitudinal qualitative research, whether involving interviews, observation, case study methods, or other approaches, and which consequently one must take into account when undertaking this type of research in its variety of forms. These issues encompass matters that arise and range in time from the inception of a study to the dissemination of findings. They include: issues of *design*, *execution*, and *analysis*.

3.1 Issues of Design

Three main issues pertain to the design of longitudinal qualitative research: *origination*, which refers to the point at which longitudinal inquiry is conceived; *number and frequency*, which involves the points of contact with research subjects or the setting under study; and *protocol format*, which is key to the use of interviews in longitudinal qualitative research. Each are discussed in turn.

3.1.1 Origination

Longitudinal qualitative research may proceed from two different starting points. It may be

factored into the design at the *outset* of a study, where researchers anticipate and plan in advance the use of serial contact. Alternatively, longitudinal qualitative research may be formulated into a design *after* a study has been completed, when the research is conducive to longitudinal formulation and where the benefits of such work are likely large.

Armstrong and Hamilton's (2013), *Paying for the Party: How College Maintains Inequality*, exemplifies the former approach. That is, the researchers sought at the outset of their work to follow their subjects, who were women college students at a major public university in the United States. The goal of the work was to understand contemporary college culture and its variable influence on the practices, goals, and aspirations of female undergraduates. The researchers studied their sample through a combination of observational and interview work over the course of 5 years. In the first year, alternating members of a research team took turns occupying a room in one of the university's dormitories, which enabled observational work through varied hours of the day. Following the year of observational study, interviews were conducted serially, across the remaining college years and then shortly after college, with a large subset of the 53 women who had lived on the residence hall floor. Armstrong and Hamilton note that the initial year of observational work enabled rapport, which facilitated students' subsequent cooperation in interviews that yielded high rates of response.

Many of the final interviews were conducted around the country as students fanned out from the university to find and take jobs. A portion of these interviews were conducted face-to-face, others via telephone owing to travel and budget constraints. Telephone contact is often not the method of choice in semi-structured interviews because it can compromise rapport and data quality (Hermanowicz 2002). Armstrong and Hamilton noted that telephone interviews, in this instance, went relatively unhampered given the rapport that had already been established over the prior years of contact with the subjects. In ways that may seem ironic, then, longitudinal qualitative research might introduce a degree of latitude

and flexibility in some data gathering by virtue of established relationships that, by turn, are not brought about in cross-sectional inquiry.

In sharp contrast, the baseline study of scientists was conceived and completed in the absence of entertaining a possibility of longitudinal work. The subsequent discovery that such an undertaking would be the first longitudinal study of the academic profession suggested that this might be a profitable new way to examine careers. I began contacting respondents of the original sample in Spring, 2004. I did so by sending them a letter, which for illustration is presented in Fig. 1 (see also Hermanowicz 2009, appendix B). Indicative of the task of contacting respondents after an elapsed period of time and in which there was no indication at the first point of contact that they would be solicited again, the letter sought to accomplish several objectives. It attempted to place the longitudinal study in context by reminding the respondents of their previous participation in the foundational work. It explained what the longitudinal study would seek to accomplish. It informed them about what their continued participation would involve (i.e., the basic subject matter of the interview, the estimated interview length, where interviews would be held, and the like). Finally, the letter made clear some procedures (e.g., the use of a recorder to retain data) and rights of and assurances to the respondents (e.g., voluntariness, anonymity, the use of a human subjects review).

After approximately 10 days from sending the letter, I contacted the respondents by telephone. At this time, I re-introduced myself and the study, asked if they had questions, and attempted to schedule interviews. Any success of the longitudinal study hinged, of course, on respondents electing to participate again in the follow-up work. In this simple regard, as is true in much longitudinal research in which the same subjects are studied, the stakes were high for the ways in which communication was handled with the respondents. The procedures described above generated a response rate of 93 %. (This rate of response also generated a sense of relief for the researcher, in that it meant the work could go forward, and a project could proceed into fruition).

Sample Re-Contact Letter, Study of Scientists' Careers

April 7, 2004

Dr. -----
 Department of Physics

Dear Professor -----:

It has been 10 years since we met. In 1994, I interviewed you for a study of careers in science. Funded by the National Science Foundation, and conducted under the auspices of the University of Chicago, that study explored scientists' aspirations and identities related to their work. The study was based on interviews with scientists across the United States. As the principal investigator of that study, I know very well that you formed a critical part of the sample, and I remember very well how much your participation contributed to the work.

I write to ask for your help. A 10-year follow-up study is being conducted entitled "*Lives of Learning: Continuity and Change in Science Careers*." The study design calls for interviewing the same participants who composed the original work. This is both substantively and historically significant: the study will be the first of its kind to follow professors in their careers. It therefore holds real potential to generate important findings about how careers are experienced and understood by scientists themselves. The study presents the unique opportunity for you as a scientist to convey knowledge about careers and science acquired over the years of your extensive experience in physics.

Your participation would involve an interview, conducted again by myself, that would last approximately an hour. As before, interviews would customarily take place in your office, and I would meet you at an agreed upon time. (If you happen to be one of the several scientists in the sample who has retired, we would make alternative meeting arrangements as necessary and as agreeable to you.) The interview would consist generally of questions about changes and continuities in your career over the past 10 years. Like before, the interview would normally be tape-recorded simply to keep accurate track of information, and subsequently the tape would be destroyed once the study is completed. Participation and all interview material will be strictly confidential. Both personal and institutional identities will be concealed in published work, following standard conventions of work of this kind. Participation is voluntary. Nevertheless, I very much hope you can participate; the success of the work depends on you. All aspects of this project have passed the usual human subjects reviews at the University of Georgia.

I will call you shortly to invite your participation and answer any questions you might have. Please know how greatly I appreciate your time and help with this request.

Yours sincerely,

Joseph C. Hermanowicz
 Assistant Professor

Fig. 1 Sample re-contact letter, study of scientists' careers

An implication posed by *origination* involves *opportunity*. Many opportunities have been missed by failing to see how once cross-sectional studies may be adapted for longitudinal inquiry. Might we have imagined *The Social Order of the Slum* (Suttles 1968), *Habits of the Heart* (Bellah et al. 1985), or *Coming of Age in New Jersey* (Moffatt 1989) 10, 15, or 20 years later? It is not an exaggeration to assert that many, if not most, cross-sectional qualitative studies have been and are amenable to longitudinal work, and that the introduction of diachronic analysis to these studies would altogether change, in a powerful and robust way, the face of social science research.

Where opportunity was seized and longitudinal work accomplished, a different implication arises: what may call *emergence*. In qualitative work, meaning and significance of data emerges over time as researchers grapple with formulating interpretation. This is true in both cross-sectional and longitudinal work. In longitudinal research, however, more time is introduced for ideas to emerge. Specific research emphases, questions, and themes may change over time. In my baseline study of scientists, the research emphasized “ambition” and its role in constructing careers, whereas the longitudinal study emphasized aging and adaptation to work. In the baseline study, “acceleration” and “deceleration” were the major themes in interpreting interview data, whereas in the longitudinal study they were “continuity” and “change.” Thus the baseline study could not have anticipated, or grappled theoretically, with the changed outlooks that prove to mark many careers years later. A conceptual re-tooling was necessary in order to understand lives diachronically. Such change is illustrated in the account provided by a respondent who had passed from early to mid career phases:

I would say...my research career, ten years ago, was at a peak. I was working with two or three graduate students continuously and two or three post-docs continuously...My attitudes about the job, about me, and about the university have undergone tremendous changes in the last ten years. I've gone from having a fairly large amount of [grant] money, especially for the stage of my career, to having my name on a grant, but not taking any money out of it at all. I'm not sure I want to even

submit things to published journals anymore...I'm disgusted by the whole thing...I got tired of getting referee reports [on manuscripts submitted to journals for peer review] that spend a page talking about the bibliography; they were entirely concerned with whether I cited their work or their friends' work, and they hadn't read the paper. I got to the point where at [national] meetings I was telling people, 'Please don't reference my paper, if you don't read it, don't reference it.' It's a game to so many people, and there are many fools. I didn't do this [go into an academic career] to deal with fools. They don't understand basic things...I went from not having tenure to slowly being delighted with tenure because I can do the right thing... There are more important things in life than getting grants from the National Science Foundation, getting Nobel Prizes even or any of that stuff. That's all just a game. I'm interested in solving problems...I am at a crossroad.

Interviewer: Do you see yourself getting back to research?

Respondent: If you mean publishing papers and going to conferences and advising graduate students, no I don't...What do I care for refereed publications?...I'm not angry about it anymore, I just don't care about it...

Interviewer: How would you complete the sentence, 'I am more X and less Y compared to a decade ago'?

Respondent: I would like to say I am wiser and I am less naïve. But it could be just the opposite as far as I know. I really am in a very transitional stage. I'm questioning whether I want to be in physics. I've gone a little bit even beyond that. I'm thinking I probably will not stay in professional physics. I want to do something very different. (Hermanowicz 2009, 105–106)

Because people change over time, newly posed research questions, ideas and themes emerge to grapple analytically with the qualitative complexity in the data. Themes of acceleration and deceleration as initially used are not suitable for an accounting of data 10 years later that speak, for example, of disengagement, frustration, and even exit. This reality imposes significant limitations on the extent to which longitudinal qualitative research can be designed at the outset as fully operational. By circumstance alone, designs will change in such work, and even the best-planned project will not, at the outset, be able to anticipate and accommodate what arises subsequently as newly emphasized areas of interest.

The intensity of emergence as a factor in the research process likely increases as the time interval increases between episodes of data collection. While emergence is always a condition of qualitative work, and while it was by their own accounting a feature in Armstrong and Hamilton's college student study, one can surmise it would figure even more prominently had their interviews been separated by greater lengths of time, giving the objects of interest time to change all that more substantially. Even when their subjects were studied over consecutive years, the researchers state that "Although we followed a general interview schedule each year...the flow of a typical interview was highly informal," indicating that change over time required a flexibility in the researchers to adapt their focus (Armstrong and Hamilton 2013, 271). In these respects, one can see why emergence figures prominently in those studies, such as the ones of scientists', where the time between contact is that much greater.

3.1.2 Number and Frequency

Number refers to the total amount of research episodes, frequency to the periodicity at which they occur. The number and frequency of serial episodes that compose a longitudinal study will depend on how a given research problem is posed, and will thus vary from study to study. Another way of stating this consideration is via the question of how much time should pass before a subsequent round of data are collected (Saldana 2003). The answer is that it should be an amount of time sufficient to examine relevant change from one point to another.

In the follow-up study of scientists, a 10 year interval was used for just a second point of contact. The 10-year interval had both practical and theoretic importance. Practically, the 10-year mark represented a point at which the greatest number of respondents from the original sample would have been available for longitudinal study. A longer time interval would have posed risk of involuntary attrition; one of the respondents had already passed away, others would of course follow in time. A shorter time interval would not have accomplished the work's theoretic objective—to study aging and adaptation in work. A

sufficient amount of time needed to pass in order to track change and continuity in the respondents professional and personal lives.

Theoretically, 10 years of time accomplished a major outcome: it placed all of the original respondents at different phases of their careers. Because the respondents were originally sampled at early, middle, and late career phases, the 10-year interval advanced all of them into the next set of three parallel phases, enabling longitudinal work to capture how people make transitions throughout a career. In using this specific time interval, data combined from the two studies enabled a consideration of careers that spanned from their beginning, for members of the youngest cohort, to their end, for members of the eldest cohort.

Other research problems, however, present different time considerations. It studying how college culture conditions behavior, attitudes, and aspirations, it was incumbent upon Armstrong and Hamilton (2013) to identify and begin studying their respondents upon college entry and then re-visit them across and shortly after the college years, thus creating four waves of contact beyond the initial year of research. Electing to study the students at the beginning and then only at the end of college (i.e., two total points of contact) would in all likelihood have obscured numerous qualitative details necessary to understand variability in identity formation. What is more, another option remains in play: whether to continue following the subjects, and if so, with what frequency, as they navigate the worlds of employment and eventually marriage and family, in order to draw longer arcs of influence between college and adult life. Recalling the discussion above, the option presents an exciting theoretic opportunity in sociological research.

Still other studies illustrate the permutations in the number and frequency of research episodes in longitudinal work. In medical studies with patients, the time interval may be relatively short, and the number of iterations of contact relatively large. In their studies of people with chronic illnesses, Murray et al. (2009) used 3 month intervals to study patients with lung cancer, but 6 month intervals to study patients with

obstructive pulmonary disease, which develops less quickly. Corden and Nice (2007) tracked individuals who participated in employment programs on their journey to employment. The determination of time intervals depended on specific events occurring in respondents' lives, which did not occur at the same rate. The timing of serial contact was contingent upon an event sequence in the research subjects' varied lives in order to establish appropriate parameters in which to assess change.

In studies such as Shaw's (1930) portrayal of Stanley, the delinquent boy whose life story comprises the illustrious sociological work *The Jack-Roller*, subjects may need to be interviewed multiple times in a given iteration. Through interviewing and diary techniques, Shaw obtained data on nearly all facets of Stanley's life: his perceptions about criminal involvement, street life, schooling, work, friends, and courtship. But to do so, Shaw had to meet up and work with Stanley many times for each iteration of study across the 6 years that Shaw followed him. Wide-ranging data on people's lives obtained at numerous points will often compel a multiplicity of research visits. Time intervals vary from one type of group to another, but nevertheless must be considered to design longitudinal inquiry with a theoretic logic.

3.1.3 Protocol Format

When interviews are a chief form of data collection in longitudinal qualitative research, origination, discussed previously, affects the design of protocols. Longitudinal qualitative research designed *in advance* lends itself to protocols containing identical questions posed to respondents at different times in order to assess change. But longitudinal qualitative research, unlike much longitudinal quantitative research, is not restricted to the use of identical questions. We again note Armstrong and Hamilton (2013) whose longitudinal study of college students was projected and well-planned, but whose serial interviews evolved, even across the span of 4 years, such that questions changed from one interview episode to another. What is more, longitudinal qualitative research designed *after* an initial investigation is *even less* likely to avail itself to

identical protocols; instead the questions at subsequent contact are likely different.

The issue presents two means by which to structure interview protocols that undergird longitudinal qualitative work. One consists of posing the *same questions* on the *same themes*. The second consists of posing *different questions* on *selected same and newly emergent themes*. The first means is perhaps more recognizable because it parallels quantitative longitudinal design (Menard 2002; Ruspini 2002; Scott and Alwin 1998). The second means is not found readily in quantitative longitudinal design; it is a strength of qualitative study. It arises in large part because lives change and qualitative methods are attune to emergence, discussed under "origination," wherein the researcher strives to best characterize thematic patterns in development.

In the study of scientists, a preponderance of new questions were used in the longitudinal work. (To compare the longitudinal and baseline interview protocols, see Hermanowicz 2009, appendix A and D.) Many of the questions asked of scientists in the baseline study were time-bound. Consider the following: "How did you come to arrive at this university?" or "What aspirations did you have as a graduate student?" or "You were a graduate student at _____. Is this the type of university where you wanted to end up?" These types of questions had low utility value in being asked again in longitudinal work. Instead in the longitudinal work, one sees questions such as: "In light of the past 10 years, what are your current aspirations?" or "Looking back over the past 10 years, has your career progressed as you expected?" or "If you were starting all over again, what would you do differently, knowing what you know now about your line of work?"

How does one think about comparison of data when different interview questions are posed between research episodes? The *conditions* of research subjects are established from base round data, which may include an account of the setting in which the subjects operate, usually through heavy contextualization. Both qualitative and quantitative evidence may be used to establish and inquire about these conditions, as often found in ethnographic work (e.g., Suttles 1968).

Longitudinal work is then used to examine change, not against responses to identical questions, but against the *themes* that emerged to characterize the conditions of people and their social settings.

Shaw (1930) did not ask Stanley identical questions serially. Instead, Shaw crafted characterizations of Stanley's condition, in conjunction with his milieu, which were then compared and contrasted with characterizations of Stanley at subsequent points in time.

In this format, *questions* do not in and of themselves serve as the baseline of comparison, but rather *characterizations* of people and their situations. Perceptions of crime, work, and courtship, for example, are compared across time, not specific questions about crime, work, or courtship.

This logic is made still more evident when researchers *change the method* of data collection among episodes of research. Armstrong and Hamilton (2013) began by collecting observational data, and then proceeded in all of their subsequent research rounds to semi-structured interviewing. Likewise Lareau (2011) conducted her baseline study through mainly observational work, but in the longitudinal study switched to interviews. It is noteworthy that such flexibility of method is possible in qualitative research designs. It also reinforces the understanding that qualitative researchers undertaking longitudinal work typically craft characterizations and themes to represent the conditions of their subjects at given points in time in order to spell out continuities and changes across time. The result is often a vivid depiction of how lives unfold.

3.2 Issues of Execution

Three sets of issues especially situate the execution of longitudinal qualitative research: *attrition and retention*, or the capacity to keep original subjects in subsequent research rounds; *respondent reaction*, which bears on rapport, relationships, and continuing access to research subjects, and; *ethics*, which involve moral considerations in re-contacting and researching the same people over time.

3.2.1 Attrition and Retention

Because samples in qualitative studies tend to be comparatively small, subject *attrition* is an especially prominent consideration in longitudinal qualitative work. In those studies where longitudinal inquiry is designed in advance, it is likely advantageous to factor attrition into the size of the sample as part of the study design. Thus, in such designs, comparatively small samples will become larger by necessity. In all longitudinal studies, whether implemented in advance of or after initial study, thought ought to be given to the care of respondents, not only to enhance the quality of data collected but also to promote subject *retention*.

I relied exclusively on the rapport established with my scientist respondents 10 years prior to the follow-up contact. Careful and considered framing of written correspondence at the time of follow-up (see Fig. 1) further aided subject retention, including explicit explanation that the success of the work depended crucially on subjects' continued participation, all while also having to make clear that such participation was voluntary. In addition, thought and care should be given to correspondence immediately *following* contact, such as in the use of thank you letters. Thank you letters should *always* be sent to participants in a research study when their identities and addresses are known to the researcher. These letters should have personalized salutations (i.e., *not* "Dear Research Participant..."), their wording and content should reflect genuine (not perfunctory) gratitude, conveying in essence that, were it not for them, there would be no work to be writing about. Such letters might be handwritten as an extended note or on a card; they also can be typed, as were mine, owing mostly to the illegibility of my penmanship. I strongly support mailing such correspondence, not sending it electronically. Taking time to send thankful messages received by mail are more demonstrative of the gratitude they intend to convey. (It is fine, for example, to include one's email address and/or telephone number in the thank you message for purposes of continued contact should respondents desire to be in touch. What is more, I negotiated with my university's human subjects office that their

Thank you Letter, Study of Scientists' Careers

May 15, 2004

Dr. -----
Department of Physics

Dear Professor -----:

Having recently completed our interview, I want to take the opportunity to thank you for all your help. You are most kind and gracious not only in your time, but most especially with your insight about careers in science, and your capacity to communicate some of the meaningful aspects of your life in physics. This means more to me, and to the work it forms, than I can tell.

If you have any questions or want to get in touch with me, you should feel free to do so at any time. My departmental address and telephone number are on this letterhead, and my e-mail address is: jch1@uga.edu.

As you know, this project has passed customary human subjects reviews. Should you have any questions regarding your rights as a research participant, you may contact me or -----, Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, GA 30602-7411; Tel: (706) -----; E-mail: -----.

Please accept my many thanks for all the help you have given, and my very best wishes for the months and years to come.

Yours sincerely,

Joseph C. Hermanowicz
Assistant Professor

Fig. 2 Thank you letter, study of scientists' careers

contact information be included in the thank you letter, since (1) it had to be communicated to the research subjects somehow; (2) this format was less invasive and disruptive to the organic flow of exchange that I sought to establish at the time of the interviews, and; (3) the particular study contained risks that were low so that a rationale could be made in providing this information after contact with subjects. Other studies, involving other types of risks, will, of course, warrant different procedures in communicating the human subjects information that is essential to transmit to research participants.) As an example, I have included the thank you letter I used in the longi-

tudinal study of scientists; it appears in Fig. 2 (see also Hermanowicz 2009, appendix C).

It is likely that ancillary characteristics of the subjects aided retention in my study. In this case, the subjects' lives were oriented to research and teaching, and thus broadly to helping and informing others. This occupational characteristic may have conditioned the subjects' proclivity to assist someone whose own work depended on their involvement.

Other types of studies using different types of participants may not be ordered on such auspicious grounds. Researchers may consider sending birthday cards and holiday notes to

participants, and messages of congratulation on celebratory occasions, such as weddings and births, and messages of condolence in occasions of grief or stress. In her study of families and childrearing, Lareau (2011, 313) notes that she sent holiday cards to the children in the families she studied with a five dollar bill tucked inside. These practices likely help to maintain rapport and cooperation with respondents. These types of practices may carry the further consequence of preserving, if not deepening, relationships such that participants at times of follow-up feel a warmth, security, and openness with a researcher.

In other instances it may be difficult to locate former participants, particularly when a long period of time has elapsed between episodes of contact. This was the case for Laub and Sampson (2003) who attempted to locate and contact male offenders last studied by a different team of researchers decades earlier. The last addresses for the men were 35 years old, few of them had telephone numbers in their case files, and only about 1 in 20 had established a social security number, which otherwise is a key means of tracking people in modern databases (Laub and Sampson 2003, 62). They proceeded by undertaking criminal records searches through both the state of Massachusetts (where the offenders were last located) and the Federal Bureau of Investigation for national records, a process that itself took 18 months, but which yielded information on the vast majority of their sample. In addition, they conducted death record searches through state and federal registries as well as searches through the *Boston Globe*, the newspaper most likely to have published death notices for these particular men. Still other resources were utilized: telephone directories (paper and electronic), motor vehicles searches, voter lists, and, as a last resort, even the Cold Case Squad of the Boston Police Department. These efforts, extensive and time-consuming, yielded a locate rate of 79 % (Laub and Sampson 2003, 72).

In quantitative designs replacement of missing subjects is a customary practice. The technique may be less feasible in qualitative research; there is little in the way of precedent in accounting for the possibility in the research literature. Two

issues are readily apparent. First, the success of replacement is contingent on the number and frequency of research episodes. Replacement may be more feasible when the number and frequency of points of contact is relatively high, though this, too, will depend on the specific research problem. College students under study who come into contact with researchers regularly may be more readily substituted in the event of attrition than career criminals who come into contact with researchers decades apart. In the former instance, key data may be more readily “brought current” by new participants, whereas in the later instance more time has elapsed for data to be comparable across cases. Second, the success of qualitative work is contingent on contextualization. Even if replacements can be matched approximately with the characteristics of lost cases (the procedure followed in quantitative panel studies), the individual narrative will still differ between the case lost and added. Thus, in qualitative work, replacement would only seem feasible when the subsequent number and frequency of points of contact would allow for sufficient intra-comparison of the substituted case over time.

3.2.2 Respondent Reaction

An issue that can interfere with subject retention at its extremes and with their cooperation at its minimum involves the reactions that respondents have to prior findings from the research in which they have participated. The researcher finds him or herself confronted by strong emotions. Respondents may express negative views about the research. They may be offended by particular interpretations or representations of themselves or others. Some may object to particular conclusions. The feelings arise for various reasons: in a researcher’s decision not to reveal plans to publish a piece of work in which subjects are portrayed; in a researcher’s decision to conceal information that subjects believe is important (Lareau 2011); in feeling “used” by a researcher (ten Have 2004); and even in having to leave the field and conclude relationships (Reiss 2005).

From her study of mental illness in rural Ireland, Scheper-Hughes (2000) recounts how the work was promptly made a classic of

anthropology yet simultaneously criticized in the Irish press as an extreme breach of privacy. Her return years later to the village in which she completed the original work resulted in her expulsion. Ellis (1995) tells the tale of the remote fishing communities she studied, where upon her return, residents reacted angrily toward her prior work. From his study of street life, Whyte (1996) reported tense reaction by community members to *Street Corner Society*. Studying class-based parenting patterns, Lareau (2011) reported highly negative responses from several participants, which damaged relationships in some instances and ended others altogether.

One might conclude that a way around this potential dilemma is to decide not to share the published work with participants. This is a possibility, but it does not address fully the issue of informing respondents what will come of the research. Such disclosure—the explicit statement that the researcher intends to publish work based on the research while protecting the anonymity of participants—is often treated as an ethical condition of conducting the work. Nor is a solution necessarily found in giving respondents pre-published work and amending it for publication according to respondent wishes. This is a version of the practice of “respondent validation,” wherein participants are given pieces of writing to affirm or disconfirm the validity of written material and/or to establish the veracity of particular points. The less standard practice of enlisting participants to edit, re-write, or change representation presents perhaps more problems than it resolves. Publication goals of researchers and requirements of publishers for content and style will often diverge from the desires of participants. What is more, researchers surrender their license and mandate as trained professionals while bestowing “expertise” upon others far outside the researcher’s community of professional peer-judges.

Scrutinizing her own experience, Lareau (2011) concluded that there is not an easy solution to this pitfall. By her account, one must clearly inform participants at the outset of their participation about the goals of the work, including its publication plans. Rather than furnish par-

ticipants with an eventual copy of the publication, she advocates instead devising an informative brochure that identifies key points, themes, and conclusions. A letter summarizing results, perhaps including charts and tables, may also be utilized. In this way, the researcher fulfills any obligation to inform participants of results while also creating an opportunity for feedback in a way that protects both the role of the researched and that of the researcher.

Even this approach has limitations. Some participants, in some studies, will be curious enough to find their rightful way to the more complete work. The internet and ready access to it via cellular telephones and mobile devices makes this especially feasible. Studies have yet to document this occurrence and any consequences for the research. Following Lareau, letters and brochures could include statements that “channel” more inquisitive subjects to fuller accounts and to thereby guard against subjects routing themselves to less responsibly gathered or less informed documents that litter various media. In addition, researchers can always make themselves available out of the field via mail or phone to questions from research subjects, and defuse potentially volatile situations (and the possibility of attrition) by personalized communication regarding facets of the work that prove to generate continued interest in participants. In fact, providing contact information to research subjects is a customary, and often mandatory, procedure. Such exchange can benefit all parties: the research subject, who has questions or concerns addressed if not always resolved, and the researcher, who may use feedback to hone analyses, interpretations, or conclusions (Rupp and Taylor 2011).

Upon publication of the baseline study, I sent participants a letter describing the outcome of the work and where the results were published. In returning to the field for the longitudinal study, one of my interviewees took umbrage at the prior publication. That this had occurred 10 years earlier conveys the depth of the respondent’s sentiment. The respondent disputed a specific way in which I had constructed a set of tables (in which he had been able to infer that he was treated as an outlier and excluded from selected computations).

I attempted to explain at the interview the distortions that would arise were this procedure not followed. I explained that, under the specific conditions, this was a standard methodological procedure in my field and practiced widely by others.

I had allotted 2 h for our interview; despite my efforts to address the matter and dispense with it, the discussion consumed 40 min of our time. The respondent, a highly accomplished researcher and teacher, said angrily that he expected me to change the data presentation and if I did not do so, he would consider the present interview a “waste of his time,” “unfair,” a “discredit to his university,” and would not participate in an interview with me again. I told him that I would confer with my colleagues upon my return home. But my responses and gestures were to no avail. A pall clouded the entire meeting. The interview was irreparably marred by the respondent’s opening hostility; it proceeded perfunctorily, and ended sooner than it should have.

In the thank you letter I subsequently sent to this respondent, I might have tailored it to further acknowledge his concerns. But I also knew that I would be unable to accept his conditions and that the change he requested would not be made in the longitudinal work. I elected not to “blow air over a smoldering fire.” This type of experience occurred only once across 55 respondents. But it was surely memorable. I came to the conclusion, however, that I had done all I could, that the respondent had been treated ethically and properly, and that I was simply paying a price for conducting this type of work.

3.2.3 Ethics

Because by its definition longitudinal qualitative research depends on respondents’ continued participation, the research tools utilized in follow-up work may be especially susceptible to problems in the power dynamics between the researcher and the researched. The researcher anticipates in conducting such work that the scholarly pay-off can be large, particularly as this family of methods remains novel. Incentives to complete such work successfully can therefore be substantial. Longitudinal researchers must be recurrently and

deliberately vigilant in how they go about their recruitment and re-recruitment of subjects. As in all research, financial incentives may be sometimes used to constitute samples, but they must be used only as long as the incentives are neither coercive nor binding. That is, all respondents, regardless of any incentive, must voluntarily choose to participate in any and in each successive round of longitudinal research, and their right to withdraw at any time without prejudice to them must be communicated clearly by researchers.

To create and maintain ethical standards of longitudinal research, it should be incumbent upon authors to account in their published work for their research and field procedures. This is notably lacking in much of the published work to-date. Researchers should be able to live up before a community of their professional peers to an accounting and justification of the procedures they followed in handling human subjects and collecting data just as they are expected to account and justify their data analysis, interpretation, research conclusions, and pertinent policy insights or recommendations. By the same token, professional peer reviewers, of article and book manuscripts and of grants proposing longitudinal research, should insist on accounts from authors who can state clearly the procedures followed or to be followed in a piece of work. Such guidelines, for producers and for gate-keepers of longitudinal qualitative research, will help to sustain an ethic for this type of work. The many considerations discussed above, in attempting to prevent subject attrition, in managing respondent reactions, and in working with research subjects ethically, inform the special dynamics that come into play in entering, leaving, and re-entering the field in longitudinal qualitative research (cf. Ellis 1995; Gallmeier 1991; Lawton 2001; Reiss 2005).

3.3 Issues of Analysis

Two predominant ways of analyzing longitudinal qualitative data characterize this type of work. In the first, what may be called an *iterative mode* of

analysis, a researcher emphasizes the characteristics and conditions of subjects at multiple points of contact. In the second, what may be called a *summative mode* of analysis, a researcher emphasizes the *net* characteristics and conditions of subjects seen to be produced over time. Each mode contains elements of the other. While they are not mutually exclusive, the modes stress different temporal avenues along which to see and study subjects.

3.3.1 Iterative Mode

An iterative mode of analyzing longitudinal qualitative data emphasizes the representation and portrayal of the objects of research at each of the points they are studied. Hence if data on a sampling of people were collected over five episodes, there might be five studies, or five renderings in a single study, each presenting and analyzing data for the corresponding and preceding iterations of research. Here, too, however, the researcher confronts important choices.

Data at time 1 + time x can be analyzed *both* cross-sectionally and longitudinally. The data can be analyzed in comparison to time 1 or to any intervening time period where data has been collected. In other words, even in the context of longitudinal design, data may be subject to analysis synchronically and/or diachronically. This presents significant conceptual and analytic challenges. To contend with this situation in my longitudinal study of scientists, I formulated tables to characterize for readers the career conditions obtaining when I first interviewed my subjects. I then used results generated by the longitudinal data to compare characterizations of careers, both among respondents *at time 2* (synchronic analysis) and with respondents *between times 2 and 1* (diachronic analysis). Thus, in the longitudinal work, one table presents “Early Career Patterns” as established by the baseline study and another table presents “Early- to Mid-Career Patterns” as established by the longitudinal data, and likewise for respondents at all other stages in their careers. This arguably helped to eliminate any need for readers to have read or been familiar with the first study in order to understand the second. For illustration on how

such tables and narrative summaries can be crafted, see Hermanowicz (2009, tables 21, 22, 24, 25, 27, 28).

To analyze the scientists’ accounts, specific codes were often adopted to mirror the subjects of the interview questions. For example, “Do you think you are working harder, less hard, or about as hard as you were 10 years ago?” Responses were coded using the same response categories offered in the question. “In learning what you have about academic careers, would you go into an academic career if you were starting all over again?” Responses were coded affirmatively or negatively, and a probe question was analyzed for the explanation provided in the response, using codes such as “funding,” “difficulty,” “lack of reward,” and “freedom.”

In coding and analyzing the longitudinal data, I paid particular attention to how responses coalesced around themes of consistency and change. Following Saldana (2003, 64), I employed a variety of conceptual and thematic questions to help situate data analysis, including:

1. What increases or emerges through time?
2. What is cumulative through time?
3. What kinds of surges occur through time?
4. What decreases or ceases through time?
5. What remains constant or consistent through time?
6. What is idiosyncratic through time?
7. What is missing through time?
8. Which changes interrelate through time?
9. What are participant or conceptual rhythms through time?
10. What is the characterization of across time experience, and how do characterizations differ by sub-groups of the sample?

My intent was to formulate understandings of respondents’ experiences and to derive substantive comparisons and contrasts with respect to the key dimensions of the research design: the institutional contexts in which scientists worked and their career stages. This allowed me to address the guiding question of how scientists age in their work environments. Thus we are placed in a

position to compare how cohorts age in organizations. For illustration, we can compare a scientist's account at an elite research university (scientist 1) with that from a more teaching-oriented institution (scientist 2), to trace the effects of institution on the individual. The illustration depicts intra-cohort variation. Both scientists, in the latter-most phases of their careers at the time of the longitudinal interviews, were born at approximately the same time (in the early 1930s) and earned their doctorates in physics a year apart from each other. Their professional careers were spent in one respective institution; they followed significantly different paths:

Scientist 1: I come in usually around 6:00 a.m., 6:30 a.m., and leave about 5:30 p.m., 5:15 p.m. I'm here [at the university] about half the time [of the year]. December was a light travel month because of the holidays. I only went to one foreign country—Sweden. In January, I had a really big load: Taiwan, UK, and Japan, in that order. It would have been nice to have it more continuous. I was supposed to go to Chile but couldn't fit it in, so it was only a conference call. [Looking ahead], Utah is the first week of the month and from Utah I go to the West Coast—I have a panel review Academy meeting. I have to do some homework for that, get organized. I leave tomorrow. From there, I'm supposed to go to Brazil. When I come back, I have to give a plenary talk at a conference in Florida. Right after that, I go to Arizona. I come back here for three days or two days. I make many trips to New York...If I never wrote another paper, it wouldn't be so bad. But I know I'm going to write many more, because I have many in the pipeline, things that I'm working on. It's hard to imagine a time I won't be doing this. (Hermanowicz 2009, 189)

Scientist 2: ...I had two or three pretty good ideas during the course of my career, and I haven't had any since. I really don't keep up with the literature...I think early on, even though I did some fairly decent work, both as a graduate student and in the beginning of my career, I never was satisfied. I always thought that I could have done better or sooner or more. In more recent years, I have become content, not only with what I was doing, but also how much. I think this is a reflection of my coming to like myself more.

Interviewer: What worries or concerns would you say you have about your career?

Respondent: None, now. My career as a physicist is over I talk to colleagues occasionally. But they've gone on to do other things. The faculty has

either retired or has gone on to try to do something else.

Interviewer: ...Since retiring, what do you miss most about your job?

Respondent: Not a hell of a lot.

Interviewer: Is there anything that you miss?

Respondent: No. Not at all. There are very few people that I really enjoy being around, and none of them are my former colleagues. I find them boring. This one guy was a very, is still a good friend. But, you know, I'm around him for fifteen, twenty minutes, and I'm thinking, I've got to get away. He rattles on and on about the same old things.

Interviewer: ...What has been the best part of retirement?

Respondent: Doing whatever the hell I want. I can get up and go to the [gym] and work out, or ride my bike [downtown] and have coffee, or even go over to the department—I don't do that very much anymore. (Hermanowicz 2009, 207)

I utilized an approach to data analysis most often referred to as “constant comparison,” a component of grounded theorizing (Charmaz 1990, 2001; Glaser and Strauss 1967; Strauss and Corbin 1994). In this approach, a researcher simultaneously collects and analyzes data. In the course of doing so, the researcher pursues emergent themes and begins to discover basic social processes in the data. These themes and processes are elaborated, modified, or qualified through further data collection and analysis. In time, the researcher constructs and refines, inductively, abstract conceptual categories that explain and synthesize these themes and processes. The researcher eventually seeks to integrate categories into a meaningful theoretic framework that specifies conditions and consequences of the studied processes (Charmaz 2007; Charmaz and Mitchell 2001).

In constant-comparative analysis, typical, predominant patterns are gleaned from the data. Thus, for example, the accounts from the two scientists directly above are indicative of modal career patterns found among scientists employed at research-oriented versus teaching-oriented universities. The career patterns are differentiated with respect to key categories, derived from analyzing the data comparatively, including: *work/family focus*, *the attribution of place*, *objects of satisfaction*, *definition of success*, and *whether scientists would seek an academic career*

again. Scientists at research-oriented institutions who are in late career phases tend to focus on work as well as leisure, view their institutions as a “haven” for their work, understand research as the principal object of their satisfaction; utilize external audiences to define and characterize their success, and would readily pursue an academic career again were they to start all over. By contrast, scientists at teaching-oriented institutions who are in late career phases tend to focus on just leisure, view their institutions as “places departed” (i.e., from which they have disengaged), understand retirement as the principal object of their satisfaction, utilize internal means to define and characterize their success through self-crafted measures, and would not pursue an academic career again. These are but 5 of 20 analytic categories that arose in the larger work through constant comparison. For the other 15, and for illustration in how analytic categories can by turn be displayed in tabular form, see Hermanowicz (2009, tables 22, 25, 28).

The task then may turn to “deviating cases,” or what others sometimes call “negative cases,” which one can define as those cases departing from the typical found in any given sub-grouping (Charmaz 2001)—instantiations of inter- and intra-cohort variation. Thus, taking the example above, some individuals do not conform to the patterns indicative of scientists in the respective career stages and institutional types. Small subsets of scientists in late career at research-oriented institutions more closely resemble late career scientists in teaching-oriented institutions, and vice versa. An account from a late career scientist at a teaching-oriented institution illustrates a counter-vailing case:

Without grants, you end up with a nine-month salary, and you have to ask the department chair if you can teach a class during the summer, which takes up your summer. I’ve never taught in the summer. I’ve always been able to fund myself during the summer for the past thirty years. Every month of the summer I’ve been here, I’ve been paid. Not everybody here can say that. There are a lot of people who don’t have money during the summer, so they have to teach a course. (Hermanowicz 2009, 239)

For deviating cases, one can attempt to answer the questions of why and how they have come to depart from the modal pattern. This type of procedure allows the researcher to strengthen assertions and to qualify suggestive conclusions about patterns indicative of groups and sub-groupings in a sample. This analytical strategy serves the goals of discovering and accounting for inter- and intra-cohort differences in development.

To these ends, analysis of qualitative data enables a researcher to arrive at propositions. Owing to the type of data on which they are based, the propositions must be qualified and suggestive such that they are compatible with observations that the data support. Thus, “proposition” may be taken to be a form of “generalization”; the former is more provisional than the latter.

In the longitudinal study of scientists’ careers, I made the goal of deriving propositions an explicit part of my task. I formed propositions from each of the eight sections that composed my concluding chapter, where I brought together the findings about career patterns presented in the preceding chapters. Across the eight sections of the chapter, I derived 30 propositions. To emphasize for the reader, I numbered the propositions where they arose in the concluding chapter and placed the text in *italics*. For additional summary and simplicity, I created an appendix to the book that listed all of the propositions numerically by topic as they appeared in the concluding chapter. To illustrate the creation and usage of propositions in longitudinal qualitative research, I include 4 of the 30 below, identified with the corresponding topic on careers from which they arose.

On Expectations and the Rhythm of Careers:

Proposition 1: One observes notable reversals in outlook and identification with the career. In broad terms, elites enter mid-career highly satisfied only to end them with ambivalence. Communitarians enter mid-career highly dissatisfied and end them with serenity. In the middle, pluralists start on a “high,” proceed to either a low or moderate level of satisfaction, and conclude on another “high.”

On Anomie and Adaptation:

Proposition 3A: At the end of their careers, elites customarily experience the phenomenon known as *anomie*. Communitarians and pluralists experience anomie also, but typically in much earlier phases of their careers, when it is possible for scientists in these worlds of science to realize that their career expectations cannot be realized.

Proposition 3B: The incidence and longevity of anomie among elites is greatest because elites are exposed to the greatest potential for rewards.

On Future Cohorts of Scientists and Contexts of Science:

Proposition 30: Increased emphases on research will be accompanied by increased probabilities of anomie throughout the system of higher education.

For the remaining propositions, and a more extended discussion of the contexts in which they can be made, see Hermanowicz (2009, chapter 5 and appendix G).

As can be inferred from the examples, “Propositions” mean that they can be tested in a wider range of subsequent work; they can be explored using a variety of different empirical methods (and not exclusively qualitative ones); they can be pursued by any assortment of interested researchers; they can be mined by different disciplinary and cross-disciplinary perspectives. The goal of formalizing propositions from longitudinal research is a step one can take toward encouraging others to continue the work, to extend and build upon it, and to thereby sharpen the empirical lessons and theoretical tools available in the study of lives through time.

3.3.2 Summative Mode

In a summative mode of analyzing longitudinal qualitative data, a researcher places stress on the net results of having followed subjects over time as opposed to portraying the objects of research at each research episode. Process, change, and development remain central ideas to the given study, but the emphasis is on *what is produced* by their cumulative effects. In the iterative mode,

analysis focuses on variation *between and among* points in time. By contrast, in the summative mode, analysis focuses on characteristics and conditions that result in variation at a *final* point in time.

Armstrong and Hamilton, in their study of college women, do not portray them at each point the women are studied, and hence we do not have representations of the students as freshmen, sophomores, juniors, seniors, and college graduates. Instead, the researchers follow their subjects and use the accumulation of data from the five points of contact to formulate a discrete study that includes a set of representations of how college ultimately conditions female students. They found that their subjects possessed different resources, embodied different gender styles, and professed different ideas about the purpose of college. Consequently, the women developed, over the course of the college years, varying orientations that characterized their educational and occupational values. Some were “primed to party,” others “cultivated for success,” and others still “motivated for mobility” (Armstrong and Hamilton 2013, 38). In turn, these orientations were found to map onto definable pathways through and beyond college: a “party pathway” built for affluent and socially absorbed students; a “professional pathway” fitted to high-aspiring students from privileged families; and a “mobility pathway” designed for the pragmatic and vocationally oriented. The researchers call upon their longitudinal data to capture the processes by which students develop and align themselves with one of these pathways, and the ways by which institutions correspondingly produce inequalities in aspirations and achievements in education and work.

The tables used to codify data in Armstrong and Hamilton’s work do not aim to compare and contrast their subjects over time (as depicted in the use of tables indicative of the iterative mode described above). Instead, tables are used primarily to summarize (1) how women come to differ along key dimensions of college experience, and (2) outline characteristics of the pathways and post-collegiate trajectories by which the women become aligned (for illustration, see Armstrong

and Hamilton, tables 5.1, 6.1, 6.2, 7.1, 7.2, 8.1, and 8.2). The specific ways by which data are analyzed in a summative mode will often mirror those used to describe the iterative analytical mode: that is, researchers apply conceptual codes to data, constantly compare them, identify and evaluate “negative cases,” and work toward inductively deriving an authentic account of their subject matter. Thus, for instance, the three predominant pathways that guide an essential understanding of Armstrong and Hamilton’s data do not appear “out of thin air”: we can infer that the researchers compared and contrasted the evolving characteristics of their cases over time to gradually codify institutional routes that summatively characterize women’s passage through college. Going to college, even to the same university, results in altogether different outcomes by virtue of ways students become situated institutionally. The result is a rendering of intra-cohort variation in the ways a university—operating as a powerful sociocultural context for development—shapes women’s achievements, aspirations, and identities.

4 Conclusion

The chapter has discussed the parameters that guide the use of qualitative methods in longitudinal research. Specific conditions in three clusters of issues—design, execution, and analysis—frame this type of social scientific inquiry. Design issues are informed by conditions that include the points at which longitudinal study originates, the number and frequency of research episodes, and protocol format. Execution issues are guided by conditions of attrition and retention of research subjects, reactions from respondents, and the ethics of conducting follow-up research with people. Analysis issues are guided by two related but varying modes of thought, iterative and summative, which condition both the researcher’s engagement with longitudinal data and how such data are presented to audiences. All longitudinal qualitative research will by necessity confront these conditions, and the success of the research will depend significantly on how methodically researchers consider and work through them.

Variability of the life course—which involves an analytic capacity to discern similarities and differences by which people make passages through time—is a message as central to the discussion of this chapter as to currents in the continuing development of life course sociology. A concern for inter- and intra-cohort variation, as well as for context, offers substantive theoretic means by which to understand the multiple ways that lives are lived, experienced, and interpreted. This is true as much for lives animating scientific careers as for educational pathways, involvement in crime, family and parenting practices, exposure to serious illness, and participation in welfare, recovery, and employment programs, each examples that have informed the present discussion. In other words, longitudinal qualitative research is amenable to studying a broad spectrum of settings and situations that characterize contemporary social life.

Work has begun to reveal its promise and payoff in these diverse quarters. But longitudinal qualitative research has only begun. A long-standing, well-developed body of such work has yet to come into fruition and a methodological tradition has yet to fully mature. Varieties of topics await to be pursued using these techniques. Equally vital, when we utilize these techniques we need to dedicate more explicit attention to explaining what we have done, how we have done it, and why we did it that way. The articulation of technique will foster methodological maturation, a basis of empirical and theoretic development in future work. An indication of the empirical reach and theoretic power of longitudinal qualitative research will lie in its inspiration for others to follow.

References

- Armstrong, E. A., & Hamilton, L. T. (2013). *Paying for the party: How college maintains inequality*. Cambridge, MA: Harvard University Press.
- Baltes, P. B., & Nesselroade, J. R. (1984). Paradigm lost and paradigm regained: Critique of Dannefer’s portrayal of life-span developmental psychology. *American Sociological Review*, 49, 841–847.
- Bellah, R. N., Madsen, R., Sullivan, W. M., Swidler, A., & Tipton, S. M. (1985). *Habits of the heart: Individualism and commitment in American life*. New York: Harper and Row.

- Ben-David, J. (1972). The profession of science and its powers. *Minerva*, 10, 351–383.
- Charmaz, K. (1990). 'Discovering' chronic illness: Using grounded theory. *Social Science and Medicine*, 30, 1161–1172.
- Charmaz, K. (2001). Qualitative interviewing and grounded theory analysis. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 675–694). Thousand Oaks: Sage.
- Charmaz, K. (2007). Grounded theory. In G. Ritzer (Ed.), *Encyclopedia of sociology* (pp. 2023–2027). Oxford: Blackwell.
- Charmaz, K., & Mitchell, R. G. (2001). Grounded theory in ethnography. In P. Atkinson, A. Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 160–174). Los Angeles: Sage.
- Cohler, B. J., & Hostetler, A. (2003). Linking life course and life story: Social change and the narrative study of lives over time. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 555–576). New York: Kluwer/Plenum.
- Corden, A., & Nice, K. (2007). Qualitative longitudinal analysis for policy: Incapacity benefits recipients taking part in pathways to work. *Social Policy and Society*, 6, 557–569.
- Dannefer, D. (1984a). Adult development and social theory: A paradigmatic reappraisal. *American Sociological Review*, 49, 100–116.
- Dannefer, D. (1984b). The role of the social in life-span developmental psychology, past and future: Rejoinder to Baltes and Nesselroade. *American Sociological Review*, 49, 847–850.
- Dannefer, D. (2013). Age and sociological explanation: Expanding horizons in the study of aging and the life course. *Contemporary Sociology*, 42(6), 793–800.
- Dannefer, D., & Kelley-Moore, J. A. (2009). Theorizing the life course: New twists in the paths. In V. Bengtson, M. Silverstein, & N. Putney (Eds.), *Handbook of theories of aging* (pp. 389–411). New York: Springer.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1981). History and the life course. In D. Bertaux (Ed.), *Biography and society: The life history approach in the social sciences* (pp. 77–115). Newbury Park: Sage.
- Elder, G. H., Jr. (1998). The life course and human development. In R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (pp. 939–991). New York: Wiley.
- Ellis, C. (1995). Emotional and ethical quagmires in returning to the field. *Journal of Contemporary Ethnography*, 24, 68–98.
- Erikson, E. H. (1950). *Childhood and society*. New York: Norton.
- Gallmeier, C. P. (1991). Leaving, revisiting, and staying in touch: Neglected issues in field research. In W. B. Shaffir & R. A. Stebbins (Eds.), *Experiencing fieldwork: An inside view of qualitative research*. Newbury Park: Sage.
- Glaser, B., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine de Gruyter.
- Gustin, B. H. (1973). Charisma, recognition, and the motivation of scientists. *American Journal of Sociology*, 78(5), 1119–1134.
- Hermanowicz, J. C. (1998). *The stars are not enough: Scientists—Their passions and professions*. Chicago: University of Chicago Press.
- Hermanowicz, J. C. (2002). The great interview: 25 strategies for studying people in bed. *Qualitative Sociology*, 25(4), 479–499.
- Hermanowicz, J. C. (2009). *Lives in science: How institutions affect academic careers*. Chicago: University of Chicago Press.
- Hermanowicz, J. C. (2013). The longitudinal qualitative interview. *Qualitative Sociology*, 36, 189–208.
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life* (2nd ed.). Berkeley: University of California Press.
- Laub, J. H., & Sampson, R. J. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge, MA: Harvard University Press.
- Lawton, J. (2001). Gaining and maintaining consent: Ethical concerns raised in a study of dying patients. *Qualitative Health Research*, 11, 693–705.
- Levinson, D. J. (1978). *The seasons of a man's life*. New York: Ballantine.
- Levinson, D. J. (1996). *The seasons of a woman's life*. New York: Alfred A. Knopf.
- Menard, S. (Ed.). (2002). *Longitudinal research* (2nd ed.). Thousand Oaks: Sage.
- Moffatt, M. (1989). *Coming of age in New Jersey: College and American culture*. New Brunswick: Rutgers University Press.
- Murray, S. A., Kendall, M., Carduff, E., Worth, A., Harris, F. M., Lloyd, A., Cavers, D., Grant, L., & Sheikh, A. (2009). Use of serial qualitative interviews to understand patients' evolving experiences. *British Medical Journal*, 339, b3702.
- Neugarten, B. L. (Ed.). (1968). *Middle age and aging: A reader in social psychology*. Chicago: University of Chicago Press.
- Neugarten, B. L. (1979). Time, age, and the life cycle. *American Journal of Psychiatry*, 136, 887–894.
- Neugarten, B. L. (1996). In D. A. Neugarten (Ed.), *The meanings of age: Selected papers of Bernice L. Neugarten*. Chicago: University of Chicago Press.
- Neugarten, B. L., & Danan, N. (1973). Sociological perspectives on the life cycle. In P. B. Baltes & K. W. Schaie (Eds.), *Life-span development psychology: Personality and socialization* (pp. 53–79). New York: Academic.
- Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology*, 70, 710–717.

- Reiss, M. J. (2005). Managing endings in a longitudinal study: Respect for persons. *Research in Science Education, 35*, 123–135.
- Rupp, L. J., & Taylor, V. (2011). Going back and giving back: The ethics of staying in the field. *Qualitative Sociology, 34*, 483–496.
- Ruspini, E. (2002). *Introduction to longitudinal research*. London: Routledge.
- Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review, 30*, 843–861.
- Saldana, J. (2003). *Longitudinal qualitative research: Analyzing change through time*. Walnut Creek: AltaMira.
- Scheper-Hughes, N. (2000). Ire in Ireland. *Ethnography, 1*, 117–140.
- Scott, J., & Alwin, D. (1998). Retrospective versus prospective measurement of life histories in longitudinal research. In J. Z. Giele & G. H. Elder Jr. (Eds.), *Methods of life course research: Qualitative and quantitative approaches* (pp. 98–127). Thousand Oaks: Sage.
- Settersten, R. A., Jr. (2003). Age structuring and the rhythm of the life course. In J. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 81–98). New York: Kluwer Academic/Plenum Publishers.
- Settersten, R. A., Jr., & Hagestad, G. O. (1996a). What's the latest? Cultural age deadlines for family transitions. *Gerontologist, 36*(2), 178–188.
- Settersten, R. A., & Hagestad, G. O. (1996b). What's the latest? II. Cultural age deadlines for educational and work transitions. *Gerontologist, 36*(5), 602–613.
- Shaw, C. R. ([1930] 1966). *The Jack-Roller: A delinquent boy's own story*. Chicago: University of Chicago Press.
- Sheehy, G. (1976). *Passages: Predictable crises of adult life*. New York: Bantam.
- Strauss, A. L., & Corbin, J. (1994). Grounded theory methodology: An overview. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 273–285). Thousand Oaks: Sage.
- Suttles, G. D. (1968). *The social order of the slum: Ethnicity and territory in the inner city*. Chicago: University of Chicago Press.
- ten Have, P. (2004). *Understanding qualitative research and ethnomethodology*. Thousand Oaks: Sage.
- Whyte, W. F. (1996). On the evolution of street corner society. In A. Lareau & J. Schultz (Eds.), *Journeys through ethnography: Realistic accounts of fieldwork* (pp. 9–73). Boulder: Westview.

Causality in Life Course Studies

Ravaris Moore and Jennie E. Brand

1 Introduction

This chapter surveys common methods employed for causal inference in life course research. Cross-sectional data can establish associations between variables, but alone cannot establish causality (Pearl 2009). In the methods described below, causal inference is the result of estimating the conditional change in an outcome associated with changes in an independent variable in a theoretical framework where the identified relationship can be plausibly interpreted as causal. Inferring causality generally rests upon the researcher's ability to complete two objectives: (1) Establish that the relationship between two measures x and y should be interpreted as a change in x initiating a change in y , as opposed to

a change in y initiating a change in x , x and y causing changes in each other simultaneously, or x and y both responding to changes in a third measure z ; and (2) Generate an unbiased estimate of the change in y associated with a change in x . The primary methodological emphasis in this chapter, and indeed in the literature, is on achieving objective (2); objective (1), however, deserves discussion as well.

The most convincing frameworks for facilitating causal inference tend to argue that a process exogenous to the outcome of interest y governed the independent event of interest x and that x occurred chronologically prior to y . An independent variable x can be understood as exogenous to y if the process governing x is independent of y . Exogeneity of x implies the absence of a measure, z , that influences both x and y , while the chronological timing implies that y could not have caused x . This leaves a causal effect of x on y as the plausible interpretation. Beyond experimental or quasi-experimental settings, in which these conditions may be more convincingly satisfied, we often aim to employ conditional independence as a way of limiting potential pathways of causality. Conditional independence implies that although two factors do not in general occur independently, they do occur independently under certain conditions. That is, we assume that after controlling for differences in some set of observables, w , x is governed by a process

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exogenous to y .¹ This assumption of conditional independence, with the continued assumption that x occurred chronologically prior to y , can also be sufficient for causal inference. In practice, this type of argument is employed very often with the caveat that there may be additional excluded observable or unobservable measures that result in a violation of conditional independence and compromise grounds for causal inference.

Below we discuss a number of methods commonly employed to understand the conditional change in an outcome associated with a change in an independent variable. These include multivariate regression, matching models, instrumental variable models, and fixed effects models, all useful approaches for causal inference when estimating effects with data over the life course. We also briefly discuss experimental and quasi-experimental frameworks. To streamline the discussion, several methods were omitted such as structural equation models, growth curve models (see Macmillan and Furstenberg, chapter “[The Logic and Practice of Growth Curve Analysis: Modeling Strategies for Life Course Dynamics](#)” this volume), method of moment estimators, and a large class of non-parametric estimators. For the models discussed below, we aim to give the reader a practical intuition for the usefulness and applicability of each model. In some cases we add heuristic mathematical explanation to illustrate technical points and the benefits and limitations of model assumptions. We also construct simulated data and demonstrate empirical application of the discussed models.

The chapter proceeds as follows. Section 2 describes various causal inference methods and discusses their benefits and limitations in life course research. Section 3 considers causal inference in the presence of heterogeneity, time-variation, and mediation. Section 4

¹For example, displaced workers are likely to have lower wages than non-displaced workers even in the absence of displacement. However, if we were able to specify all the factors that influence the probability a worker was displaced and condition upon those factors, we could then assume conditional independence between displacement and workers’ wages.

describes our simulated data, and the relationship between treatment and outcome. Section 5 compares estimates from various causal inference methods to the true effect estimates and discusses the strengths and weaknesses of each method. Section 6 concludes. With the methods in this chapter and the exercise of studying simulated data, we ultimately find evidence that our most commonly used causal inferences tools are sufficient for understanding key relationships underlying complex data generating processes.

2 Methods for Causal Inference in Life Course Research

This section describes and illustrates the use of several common causal inference approaches. We start each section with a brief statistical presentation of each model and its necessary assumptions, and then discuss some of the strengths and weaknesses of each method.

2.1 Regression Models

Ordinary Least Squares (OLS) regression models are undoubtedly the most heavily employed tool for understanding the relationship between vectors. OLS models the conditional expected value of a measure, y , given a fixed value of, d . δ can be estimated directly as a linear projection. Given $N \times 1$ matrices y and ε , and $N \times K$ matrix X , with the assumed relationship $y = d\delta + \varepsilon$, we can solve for an estimator, $\hat{\delta}_{OLS}$:

$$\hat{\delta}_{OLS} = [d'd]^{-1} d'y$$

To obtain consistent estimates, such that the parameter estimate $\hat{\delta}_{OLS}$ converges to δ as sample size increases, we must meet the following assumptions (Cameron and Trivedi 2005):

- (i) The data are generated by a process that can be accurately modeled as, $y = d\delta + \varepsilon$, where y is a continuous outcome.

- (ii) The $K \times K$ matrix $X'X$ is well behaved such that it approaches a finite, existent, non-singular matrix as N increases.
- (iii) $E[d_i' \varepsilon_i] = \mathbf{0}$, such that x_i and u_i are uncorrelated.
- (iv) The data are independently and identically distributed over $i=1,2 \dots N$ with $E[\varepsilon_i] = 0$, and $Var(\varepsilon_i | d) = \sigma_i^2$.

OLS is limited for evaluating life course causal effects. First, there are a number of ways in which life course processes may violate the assumptions set forth above. While OLS assumes a constant linear relationship between the independent variables and outcome, many life processes may not behave this way. Hungerford and Solon (1987), for example, find evidence that log wages are not a smooth function of education. They report evidence of a “sheepskin” effect where wages increase with the completion of certain educational thresholds. A model that instead assumed a linear relationship between years of completed education and wages would be mis-specified if the data generating process were more reflective of the ‘sheepskin’ process. Processes of cumulative advantage may likewise have a well-defined non-linear growth path [see DiPrete and Eirich (2006) for a review of the sociological literature on cumulative advantage]. Some social processes may follow a pattern such that the return depends upon the stock of a particular type of capital at a moment in time. For example, we may observe noticeable differences in mean account balances over time between two savings accounts with different levels of initial capital, yet still subject to the same compound interests rates. Merton describes a phenomenon where great contributions early in one’s career may help generate resources and that lead to additional contributions and long-term career benefits. The same contribution later in one’s career may not produce the same long-term effect. These types of cumulative advantage processes may generate relationships that cannot be accurately captured with a linear model.

Second, we have limited ability to differentiate between causal and non-causal relationships. Possible correlation between observables and unobservables threatens to bias OLS estimates.

In life course research there are often a range of potentially important factors omitted from a model. A number of factors may enter a model through the error component, such as political or historical contexts, unobserved preferences and/or constraints, and other omitted variables. If these factors influence the outcome of interest, they may also influence values of X , leading to a correlation that violates the key assumption of selection on observables and may produce a biased estimate of β . Nothing in the standard OLS framework implies that the estimated relationship between the independent and dependent variable is causal. OLS offers a way of estimating the conditional change in one measure associated with a change in a related measure. Any attempt to interpret this change as causal is based on a theory of the mechanisms at play, which extends beyond the mathematical properties of OLS.

For binary and categorical outcomes, we turn to binary and discrete choice models for inference. Binary choice models are generally formulated from the conceptual framework of studying a latent variable y^* , using observable

$$y = \begin{cases} 1 & y^* \geq 0 \\ 0 & \text{else} \end{cases}$$

where $y^* = x_i' \beta + \epsilon$. Given this identity, we can write:

$$\begin{aligned} \Pr[y_i = 1 | x_i] &= \Pr(y^* \geq 0) \\ &= \Pr(x_i' \beta + \epsilon \geq 0) \end{aligned}$$

We can transform this into a probit or logit estimator by making appropriate assumptions on the distribution of ϵ . As binary outcome models are essentially a transformation an OLS model, they inherit many of the same limitations faced by OLS models for causal inference over the life course. We face potential uncertainty about the true functional form governing our process of interest, and the uncertainty may increase with binary models based on the assumed structure of a latent variable y^* and its assumed relationship to observed y_i . Most importantly, we face the same uncertainty concerning the assumed independence of observed x_i and unobserved ϵ_i .

Lagged dependent variable models are a variation of OLS or logistic regression models that utilize data over the life course to obtain better estimates of causal effects. Such models include a pre-treatment measure of the outcome as a regressor, and in so doing help control for differences in pre-treatment characteristics that may bias effect estimates. However, we note a few limitations of this approach. First, the approach requires the availability of a pre-treatment outcome measure, which may not be available in some research settings. Second, controlling for pre-treatment differences does not control for other changes that occur between pre-treatment measure and follow-up. This implies a potential need to control for changes that occur in the interim, and to limit the interim time period to the extent possible to limit the likelihood of unobservable changes influencing effect estimates.

2.2 Matching Models

Matching estimators are used to estimate treatment effects by taking the average difference in a selected outcome between individuals with the same pre-treatment observables and different treatment assignments. The fundamental difficulty in estimating treatment effects involves the impossibility of observing the same observation under observed and counterfactual² conditions. Given an outcome y that depends upon observables X , unobservables ε , and treatment status d , we can estimate an average treatment effect by

$$\delta = E[y | X_i, \varepsilon_i, d = 1] - E[y | X_j, \varepsilon_j, d = 0].$$

The above estimates δ by computing the expected difference in outcome value among individuals who differ only by treatment status. Given that

²The counterfactual condition is the outcome that would have resulted had an observation experienced an alternative treatment assignment. For example, suppose we are interested in the labor market effects of college selectivity. We observe the wages of students who attend selective colleges, but we do not observe the wages of students who attend selective college, had they not attended those colleges and instead attended non-selective colleges. This unobserved outcome is the counterfactual.

individuals have identical profiles for observables X , we attribute average differences in values to differences in treatment assignment. This assumes that conditioning on X is sufficient for achieving conditional independence of the outcome and the treatment such that $Pr(d = 1 | X) \perp\!\!\!\perp y$. Matching methods provide a conceptual framework that parallels experimental settings for evaluating estimated effects in observational settings where assignment to treatment is non-random.

Matching estimators may introduce a dimensionality problem that strains available data. Given the need to condition up $X \in R^k$, where R^k denotes the real numbers and k indexes dimensionality, the data need to have a sufficient number of K -dimensional matches to facilitate estimation of an expected difference. If K is relatively large the data may not have the available matches. Even for small values of K where each dimension is continuous, having available matches may be problematic. Rosenbaum and Rubin (1983) recommend propensity score matching to reduce the dimensionality of the matching problem. Given that assignment to treatment depends upon observables W , we model the probability treatment as

$$Pr(d = 1 | X) = F(XT)$$

where $F(\cdot)$ is a cumulative distribution function, and a binary model is estimated, usually probit or logit. Estimating such a model allows the calculation of $Pr(d = 1 | X)$, a one dimensional measure that summarizes one's likelihood of treatment given available observables. We then match treated and untreated observations based on the one-dimensional estimated probability of treatment, instead of matching on K -dimensional observables. See Rosenbaum and Rubin (1983, 1985) for a more formal discussion of the method and Caliendo and Kopeinig (2008), Leuven and Sianesi (2014), and Morgan and Harding (2006) for practical guidance on implementing the method. There are many empirical examples of propensity score matching to estimate treatment effects in social research over the life course. See Brand and Halaby (2006) and Brand et al. (2014) for a few recent examples of research on the effects of higher education on life outcomes.

Matching estimators offer an approach for effect estimation when parametric regressions assumptions may be violated and experimental approaches may be unavailable. However, like regression approaches, matching models are limited. When using a propensity score matching approach (or a regression approach), one needs a model that is fairly successful at predicting whether an observation will be assigned to treatment. With some processes of interest to life course research, it may be extremely difficult to construct a model of exogenous treatment assignment. We must again make assumptions concerning unobservables, ε . Though we often expect individuals with similar observables to have similar unobservables, this may not be the case. Given a life course perspective where ε encompasses all prior characteristics about an observation not captured by X , significant differences between ε_i and ε_j , for $i \neq j$ are typically expected.

2.3 Instrumental Variable Models

In many research situations, OLS effect estimates are biased due to a violation of the ignorability, or selection on observables, assumption. The instrumental variables (IV) estimator aims to produce effect estimates free from the bias generated by violations to the ignorability assumption by identifying a source of exogenous variation (the instrument), and estimating effects based on this exogenous variation. Suppose we wish to estimate the effect of d_i on y_i , given knowledge that an unobservable, z_i , exists that is correlated with d_i and affects y_i . OLS has no way of distinguishing between the effects on d_i on y_i , and the correlated effects of z_i on y_i . IV estimation addresses this limitation of OLS by introducing an instrumental variable, w_i , that is correlated with x_i , but uncorrelated with both w_i and u_i . Mathematically, this implies that assumptions *i* through *iii* above hold. Intuitively, it implies the existence of a measure that shifts d_i independently of both z_i and ε_i , to produce an estimate of δ that is unbiased. The bivariate IV estimator takes the form:

$$\hat{\delta}_{IV} = \frac{\frac{1}{N} \sum_{i=1}^N w_i y_{i=1}}{\frac{1}{N} \sum_{i=1}^N w_i d_{i=1}}$$

The instrumental variable, w_i , satisfies the following assumptions:

- (i) w_i must be correlated with d_i such that $E[x_i z_i] \neq 0$.
- (ii) w_i must be uncorrelated with z_i such that $E[w_i z_i] = 0$.
- (iii) w_i must be uncorrelated with ε_i such that $E[w_i \varepsilon_i] = 0$.

See Cameron and Trivedi (2005, Chap. 4) Greene (2012, chap. 8) and Wooldridge (2010, 2013) for a more general treatment of IV estimators.

In life course research, it is extremely difficult to identify an IV that satisfies the assumptions above. It is typically easy to find a measure that is correlated with the treatment of interest, x_i , but difficult to argue that a potential instrument is uncorrelated with an unobserved confounder, and an instrument with no independent effect on the outcome of interest, y_i , beyond its effect through x_i . Lleras-Muney (2005) offers an example of identification of an IV in life course research. She aims to estimate the causal effect of education on adult mortality using a method that accounts for the likely existence of unobservables that may lead individuals who choose to obtain greater education to make other choices that affect their mortality, a phenomenon that would lead to a bias in the estimated affect of education on mortality. Lleras-Muney (2005) employs an IV approach using changes in compulsory state mandated schooling levels as an instrumental variable. Changes in compulsory education laws increase the education level of students who would have discontinued their education earlier in the absence of the policy constraint. Changes in state laws, discontinuities in federal laws, genetic variation, and other very inventive strategies have been used to identify instruments (e.g., see Black et al. (forthcoming), which uses distance to trains as an instrumental variable to account for propensity to migrate north among southern Blacks in the prediction of mortality).

2.4 Fixed and Random Effects Models

Fixed effects models are useful when data contain repeated observations from a given unit, likely when we estimate effects over the life course. Each unit is expected to have a time invariant value, α_i , that shifts the outcome of interest, y_i in addition to changes in y_i that are correlated with X . In a model:

$$y_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it}$$

where i denotes a unit of observation and t denotes the time period of the observation, OLS leads to biased estimates of our parameter of interest, β , if α_i is correlated with X_{it} such that $E[d'_{it}\alpha_i] \neq 0$. A fixed effects model produces an estimate of β unbiased by α_i . Fixed effects models avoid a bias from α_i by estimating $\hat{\beta}$ using within person-unit variation in X_{it} and y_{it} . We estimate $\hat{\beta}_{FE}$ using an OLS regression of the deviations in X_{it} on the deviations in y_{it} . Since $\overline{y_{it}} = \overline{\alpha_i} + \overline{d_{it}}\beta + \overline{\varepsilon_{it}}$, we can subtract $\overline{y_{it}}$ from both sides of the equation above and rearrange terms to get:

$$\begin{aligned} y_{it} - \overline{y_{it}} &= \alpha_i + X_{it}\beta + \varepsilon_{it} - \overline{y_{it}} \\ y_{it} - \overline{y_{it}} &= \alpha_i - \overline{\alpha_i} + (X_{it} - \overline{X_{it}})\beta + \varepsilon_{it} - \overline{\varepsilon_{it}} \\ \tilde{y}_{it} &= \tilde{X}_{it}\beta + \tilde{\varepsilon}_{it} \end{aligned}$$

Where $\tilde{y}_{it} = y_{it} - \overline{y_{it}}$, $\tilde{X}_{it} = X_{it} - \overline{X_{it}}$, and $\tilde{\varepsilon}_{it} = \varepsilon_{it} - \overline{\varepsilon_{it}}$. Since α_i is time-invariant, $\alpha_i - \overline{\alpha_i} = 0$, which leaves our fixed effects estimate, $\hat{\beta}_{FE}$, α_i free. $\hat{\beta}_{FE}$ is an unbiased estimator of β if \tilde{X}_{it} and $\tilde{\varepsilon}_{it}$ are uncorrelated. Time-varying processes that may threaten the plausibility of the ignorability assumption remain a significant concern.³ Budig and England (2001) offer an example of individual fixed effects models, applied to an analysis of the wage penalty of motherhood. They found a wage penalty of approximately 5%

per child, controlling for marital status and human capital variables.

Sibling fixed effects models are models where fixed effects are assumed to be family specific instead of individual specific. Such models are widely used to understand the effects of life events on children in an analytical framework that controls for differences between children and families that may otherwise bias effect estimates. Currie and Thomas (1995) offer an example of sibling fixed effects models, applied to an analysis of the long-term effects of Head Start on students' academic achievement. They find significant gains in test score and declines in the likelihood students will repeat a grade, where the positive benefits are concentrated among white children. Random effects models have the advantage of greater efficiency and greater statistical power to detect effects relative to fixed effects models, and allow estimation of effects on time invariant measures (Wooldridge 2012). Random effects models, however, assume, oftentimes unrealistically, that α_i is uncorrelated with X_{it} .

Additional restrictions imposed in the usual application of both fixed and random effects models are problematic for life course research. For instance, the models researchers typically estimate assume that the coefficients of the same covariate and the error variances of equations are equal over time. However, if individuals encounter life course transitions over time, the stable effects assumptions could be invalid (Bollen and Brand 2010). Likewise, lagged dependent variables are typically assumed to have no effects on current values. A prior year's employment status, for example, may influence subsequent employment status, even adjusting for control variables. These, and other constraints, can nevertheless be modified to estimate alternative models that relax these restrictions [see Bollen and Brand (2010) for alternative specifications].

Mechanical application of fixed effects models without attention to the underlying causal process can lead to erroneous conclusions. Specifically, a potential concern with fixed effects models, both individual and sibling models, concerns the ambiguity of exactly what is subsumed in the fixed effects parameter. It is not always clear that a fixed effects model is not introducing an

³Lagged dependent variable models and fixed effects model are similar in that they both incorporate repeated measures of an outcome. They differ in that while fixed effects models assign special status to pre-treatment outcomes, by incorporating them into the dependent variable, lagged dependent variable models treat outcome observations from previous period(s) as simply another regressor in explaining the level of the post-treatment outcome.

endogenous selection bias, and possibly dampening the treatment effects of interest. Researchers should carefully consider whether the differencing process undermines the variability they wish to explain, and indeed over controls for potentially omitted variables.

2.5 Experimental and Quasi-Experimental Designs

Experimental research designs help facilitate identification of treatment effects by maintaining full control over the treatment assignment process. Knowledge of the treatment assignment process allows a stronger argument for claiming that treatment is uncorrelated with unobservables that may lead to bias in parameter estimates and that there are no selection effects governing who receives treatment, which implies no systematic differences between the treated and untreated. Randomized Control Trials (RCTs) are the most common type of experiment. In RCTs each unit of study is randomly assigned to either a treatment or control group. While RCTs are highly effective at reaching causal effect estimates, they are often very infeasible in life course research. For many questions concerning life processes, an experiment mandating that individuals endure certain treatments is precluded for both practical and ethical reasons.

Quasi-experiments aim to achieve the benefits of a full experiment in a setting where the researcher does not have full control over the treatment assignment process. One of the most well known experiments in the stratification literature is the Moving to Opportunity (MTO) experiment. This intervention randomly assigned two types of housing vouchers to low income families in order to assess neighborhood effects on family economic, health, and other life course outcomes. One voucher afforded families the option of moving to another low-income neighborhood, and the other offered the option of moving without constraint. For the purpose of understanding the effects of giving families the opportunity to relocate, MTO was a randomized control trial. Some researchers instead wished to use MTO to understand the effects of neighborhood

change for low-income families. In the context of this research question, MTO was quasi-experimental because researchers ultimately had no control over which individuals from the voucher groups exercised their option to move. Each treatment family chose whether or not to exercise their option to move, and this led to selection issues and controversy concerning the internal validity and interpretation of MTO evaluation results [see Goering et al. (2003), Ludwig et al. (2008), and Sanbonmatsu et al. (2011) for further discussion of MTO].

A natural experiment is a type of quasi-experiment where the researcher has no control over the treatment assignment process, but has reason to believe that the process yields a causal relationship that facilitates the estimates of unbiased treatment effects. Sharkey (2010) examines the acute effects of local homicides on cognitive performance of children. He uses the exogeneity between the timing of local homicides and the timing of vocabulary and reading assessments in Chicago schools to craft a natural experiment that gives estimates of the short-term decrease in test scores associated with exposure to local homicide. He finds significant negative effects on tests administered up to 7 days after a local homicide. The acute effect weakens over time and becomes arbitrarily close to zero on after 4 weeks.

3 Causal Inference in the Presence of Heterogeneity, Time-Variation, and Mediation

3.1 Identifying Heterogeneous Causal Effects

If there is treatment effect heterogeneity, average treatment effects can vary widely depending on the population composition of the treated and thus simple averages do not have a straightforward interpretation. Indeed, an important development of the causal inference literature is the recognition that treatment effects are likely to be heterogeneous (Angrist and Krueger 1999; Brand and Simon-Thomas 2013; Heckman et al. 2006; Winship and Morgan 2012; Xie et al. 2011; Xie

2011). This kind of heterogeneity does not merely reflect group differences at the baseline that can be “controlled for” by covariates in regression or matching models, or fixed effects. The recognition that treatment effects may vary by the probability of treatment, beyond response variation by selected covariates like gender or race, has led to new methods of causal inference and to refined interpretations of effect estimates derived from existing methods (Brand and Xie 2010; Winship and Elwert 2010; Morgan and Todd 2008; Morgan and Winship 2012; Xie 2011; Xie et al. 2013). Despite widespread belief by practitioners, traditional regression estimates do not represent straightforward averages of individual-level causal effects if individual-level variation in the causal effect of interest is not random. Instead, they give a weighted average of the heterogeneous individual-level effects, where population composition weights can produce widely different effect estimates depending upon who experiences treatment.

Regression and matching models can, however, be used to recover specific subpopulation treatment effects of interest, including the treatment effect on the treated (*TT*) and the treated effect on the untreated (*TUT*). Let us define the average difference among those individuals who were actually treated, the *TT*:

$$\bar{\delta}_{TT} = E(y^1 - y^0 \mid d = 1),$$

and the average difference among those individuals who were not treated, the *TUT*:

$$\bar{\delta}_{TUT} = E(y^1 - y^0 \mid d = 0).$$

Statistical modeling to explore empirical patterns of effect heterogeneity as a function of the propensity score have also been employed to recover patterns of treatment effect heterogeneity (Brand and Simon Thomas 2014; Xie et al. 2012). Several recent studies have adopted this approach to address questions involving heterogeneous effects of higher education on a range of life course outcomes (Brand 2010; Brand and Davis 2011; Brand et al. 2014; Brand and Xie 2010; Musick et al. 2012). Instrumental variable models,

in the presence of effect heterogeneity, may be interpreted as identifying local average treatment effects (*LATE*), those effects corresponding to subpopulations on the margin of treatment participation induced by the particular instrument under consideration.

3.2 Identifying Causal Effects with Time-Varying Treatments and Time-Varying Outcomes

Life course research often involves the analysis of effects of events that occur over time, which raises complex issues in the estimation of causal effects. Individuals who experience the event of interest early in life may do so for different reasons than those who experience the event later. Researchers must carefully attend to the conceptual and theoretical issues underlying life course treatments. For example, Brand and Simon Thomas (2014) look at the effects of maternal job displacement on educational and social-psychological outcomes of children using propensity score matching. Correcting for selection into displacement requires a reasonably strong model predicting which children are most likely to experience maternal job loss. Models that predict the likelihood of experiencing displacement using only covariates available at or before the child’s birth do a much better job of predicting displacement events that occur in early childhood relative to displacements experienced in middle childhood and adolescence. This illustrates some of the difficulty one may encounter when using one model to explain an occurrence that happens at different times for different reasons. However, Brand and Simon Thomas (2014) also partition maternal displacement into three periods across childhood, and assess effects that occur at varying points in young adulthood, adopting the time-varying conceptual framework of Brand and Xie (2007) we discuss below.

Brand and Xie (2007) discuss some of the conceptual challenges involved with estimating causal effects of non-repeatable and non-reversible treatments that occur at different points in time, and that affect outcomes that are

Table 1 Time-varying treatment exposure and outcome measurement

		Outcome measurement	
		Time-invariant	Time-varying
Treatment exposure	Time-invariant	Case 1	Case 2
		$\delta_i = y_i^{d=1} - y_i^{d>1}$	$\delta_{i,v} = y_{i,v}^{d=1} - y_{i,v}^{d>1}$
	Time-varying	Case 3	Case 4
		$\delta_i^{t,T} = y_i^{d=t} - y_i^{d>T}$	$\delta_{i,v}^{t,T} = y_{i,v}^{d=t} - y_{i,v}^{d>T}$

measured at different points in time. Table 1 shows the possible combinations of time-varying treatments and outcomes. We list the effect of interest in each case for some outcome y_i measured at time v . We operate in an environment where non-repeatable and non-reversible time-varying treatments may occur at multiple times before and after the treatment event of interest. In the table below, we care to study the treatment events that occur at time t , but there may also be observations who experience the event at time t' . Table 1 shows four possible ways in which time-varying treatments and outcomes may interact. Case 1 considers the effects of a time-invariant treatment on a time-invariant outcome. This is the classic assumed two period framework where treatment occurs in some period and an outcome is realized thereafter. Case 2 consider the effect of a time-invariant treatment on a time-varying outcome. This would be useful if we aim to assess how an event affects an outcome measured in repeated future periods. These types of analyses help determine how treatment and time since treatment interact in the determination of causal effects, and offer evidence as to whether effects grow or weaken over time. Case 3 considers a time-varying treatment and time-invariant outcome. This model can shed further light on how processes unfold over time. For example, one could use this approach to understand whether experiencing marital disruption has different implications for a women’s earnings at age 40 depending upon whether she’s in her 20s or 30s when the disruption occurs. Case 4 considers time-varying treatment and time-varying outcomes. For example this set-up could assess the differences in the effects of job loss at age 20 and

age 25 on earnings at age 30 and age 35 relative to the effect of job loss at age 30 and age 35 on earnings at age 40 and age 45. In case 1 the relevant counterfactual to receiving a treatment in period 1 is clearly the subsequent outcome that would occur in the absence of period 1 treatment. The same holds for case 2, except that we can employ measures from different post-treatment periods as our outcomes of interest. The counterfactual becomes slightly more complex in cases 3 and 4. Whereas cases 1 and 2 segment the sample based on single period receipt, cases 3 and 4 must compare a treated group to a counterfactual of not receiving treatment within the data’s observation period and all future periods through outcome measurement.⁴

3.3 Identifying Causal Effects with Mediating Mechanisms

In social research aimed at causal inference over the life course, researchers often aim to assess which mediating mechanisms transmit the effect from treatment to outcome. Too often researchers

⁴Sample and cell size consideration affect the feasibility of producing estimates. Comparisons are made between a subgroup that experience treatment at time t , and the subsample that has not experienced treatment up to time t . This implies that all individuals who experienced treatment before time t are excluded from the stated effect estimate. We thus need enough individuals experiencing treatment within those periods to produce reliable estimates. A wider interval benefits from the inclusion of more observations, which can yield more precise estimates, but means that our pre-treatment covariates have potentially reduced ability to predict the probability of treatment exposure.

simply add an additional intermediary variable to the model, and then assess the degree to which the effect of the treatment on the outcome has changed in response to the inclusion of the additional variable. This type of analysis, even with attention to selection into treatment, often fails to attend to the causal process relating the treatment to the mediating variable or the mediating variable to the outcome. When researchers aim to assess indirect causal effects, they should devote the same attention to causal processes linking the mediating mechanisms as they do to the primary treatment of interest.

Directed acyclic graphs (DAGs) provide a tractable framework for assessing whether a model is identified and the mechanisms that may mediate effects of interest (Elwert 2013; Pearl 2009). Conventions include that an arrow indicates a direct causal effect ($d \rightarrow y$), while a missing arrow indicates no causal effects ($d \not\rightarrow y$). A line indicates two variables are endogenously correlated with no causal direction ($x_1 - x_2$). A causal path from d to y_2 can be depicted by $d \rightarrow y_1 \rightarrow y_2$, while $d \rightarrow y_1 \leftarrow x \rightarrow y_2$ is a non-causal path from d to y_2 . A variable with two arrows along the path pointing to it is a collider. For example, y_1 is a collider along $d \rightarrow y_1 \leftarrow x \rightarrow y_2$. We subject our estimation to endogenous selection bias when conditioning on a collider variable. Encoded within the DAGs are rules for moving from association to causation. Chains represent causal associations ($d \rightarrow y_1 \rightarrow y_2$), forks represent confounding ($d \leftarrow z \rightarrow y_1$) and inverted forks represent endogenous selection ($d \rightarrow y_1 \leftarrow y_2$). We represent the causal process with a DAG for our empirical example below.

4 Simulated Data

4.1 Description of the Simulated Data

For this chapter, we have created simulated longitudinal data that follows adolescents through 4 years of secondary education. The data include two cohorts of young people who enter high school two decades apart. Cohort one begins in 1980 and cohort 2 begins in the year 2000. The

data for each cohort include roughly 5,250 families who have over 7,000 high school aged children. Each family has between one and three children. The data contain standard demographic characteristics for all children and families. Family structure classifications include a child/children living with both parents married, unmarried single mother, or living with an unmarried single mother with a father/father figure. Single father headed households and complex non-traditional household structures were excluded. Parent's education indicates whether each parent's highest achieved education is less than a high school degree, a high school degree, a college degree, or a graduate/professional degree. Families live in one of five neighborhoods that differ in their demographic characteristics and risk rate of exposure to the treatment of interest. For example, respondents in some neighborhoods have a 3 % chance of random exposure to violence, whereas the probability of random exposure in other neighborhoods is as high as 12 %.

The data generating process begins by specifying the demographic traits of a family. For each family, one of four races was randomly assigned to yield a sample that is approximately 11 % Asian, 25 % black, 25 % Hispanic, and 40 % white. Conditional upon race, a household income value is chosen from race specific distributions. The income distribution for the year 2000 cohort was defined to approximate the race specific U.S. income distribution reflected in March 2009 Current Population Survey data. The 1980s income distribution is a transformation of the 2000s distribution. Household structure is randomly assigned according to an income quintile specific distribution. Available structures include (1) married parent household, (2) single mother headed household, (3) cohabiting parent household. In both cohorts, households with higher income are more likely to be led by married parents, while households with lower incomes are more likely to have to have a single head, or cohabiting parent(s). Families from the 1980s cohort are more likely to be married while families in the 2000s have more single mother led households and households with cohabiting parents. Conditional upon race and household structure, each family is randomly assigned

between one and three high school aged children. Parental education takes one of four values (less than high school, high school degree, college degree, and graduate/professional degree), and was assigned based on income draws. This approach creates an expected correlation between parent's education and household income, as well as educational homogamy between parents. Five communities are determined that differ in terms of racial composition and probability of exposure to violence. Community 0 mirrors the sample wide racial composition. All other communities have a proportionally dominant racial group.⁵ The characteristics of families were designed to see correlations between education, income, race, and other measures that obfuscate the direct relationships between demographic measures and an outcome of interest. In collected data with unobserved counterfactuals, we have no way of knowing the extent to which these correlations bias estimates of interest. In these simulated data, we can observe counterfactual outcomes, and thus calculate the difference between regression estimates and actual counterfactual outcomes.

The characteristics described in Table 2 in the two sample periods (1980–1984 and 2000–2004) have notable differences. First, children are more likely to live with two married parents in the 1980s, while mother-headed households and households with cohabiting parents are relatively more common in the 2000s. Mothers, however, are significantly more likely to have a graduate or professional degrees in the 2000s relative to the 1980s. All but one community became less segregated over the 20-year time period with the largest racial group representing a smaller percentage of the population of each community. We have academic data for students for 4 years of high school. Measures include whether the student enrolled in high school during each year, how many credits were earned towards graduation, and whether the student earned enough credits to graduate after 4 years. The data also includes labor market participation for students, including whether students worked in the labor market in a

given year, what proportion of their time was allocated to wage labor, and their wage rate.

4.2 Treatment Specification and Mechanisms

The treatment of interest is exposure to neighborhood gun violence (ETV), and the main outcome of interest is high school completion. Receiving the “treatment” in these data is equivalent to answering the following question affirmatively: In the previous school year, have you seen a shooting, or has anyone close to you been shot or targeted by a gunman? Among those who answer this question affirmatively, it is unknown whether the respondent was exposed to fatal or non-fatal shooting. It is also unknown whether the respondent was exposed to more than one qualifying event. It is, however, known that fatal shootings are rare and exposure to multiple shootings in a given year is uncommon. Patterns of gun violence across neighborhoods have changed very little over the 20-year time period. Incidents are relatively uncommon in neighborhoods one and two, while neighborhoods three through five tend to experience violent occurrences more frequently. Community-level graduation rates are negatively correlated with incidents of gun violence. While this is consistent with an inverse relationship between exposure to violence (ETV) and academic success, there are a range of other differences between communities that could partially or fully explain the differences in graduation rates. These include observable differences in parental education, household income, school quality, and racial composition, and unobservable differences in ability, personal valuations on education, and varying opportunity costs. We aim to assess whether exposure to violence has a causal effect on high school completion and credits earned towards graduation.

The ETV process has modest differences between the earlier and later cohorts. In the 1980s data, exposure rates are neighborhood dependent but otherwise random. Residents of each neighborhood have a fixed year-specific probability of community violence exposure, and individual

⁵ See Appendix A for further details on the constructed data.

Table 2 Descriptive statistics for simulation data

	1980 cohort mean/proportion	2000 cohort mean/proportion
Gender		
Female	49.65	50.76
Male	50.35	49.24
Race/ethnicity		
White	39.5	39.42
Black	25.23	25.31
Asian	10.91	10.9
Hispanic	24.36	24.38
Mother's education		
Less than high school	39.88	29.55
High school degree	36.74	23.71
College degree	14.98	26.71
Graduate/professional degree	8.4	20.04
Father's education		
Less than high school	38.71	29.08
High school degree	38.23	24.81
College degree	15.25	26.18
Graduate/professional degree	7.82	19.94
Household income		
Mean	\$45,702	\$59,709
<\$20,000	21.68	16.52
\$20,000–50,000	37.68	32.45
\$50,000–100,000	29.91	29.98
\$100,000–200,000	10.73	17.2
\$200,000+	0	2.34
Community of residents		
Community 1	20.94	26.16
Community 2	23.46	22.38
Community 3	19.33	17.04
Community 4	14.76	12.62
Community 5	21.51	21.79
Household structure		
Both parents, married	77.05	69.87
Mother headed HH	15.79	22.92
Both parents, cohabiting	7.16	7.2
Model outcomes		
Periods employed	4.00	3.95
Total wage labor over 4 periods	1.23	1.23
Total academic labor over 4 periods	0.79	0.82
Four period graduation rate	0.56	0.59
Total periods enrolled in school	3.38	3.52
N		
Respondents	7,003	7,023
Families	5,250	5,265
Respondents with siblings	3,290	3,296
Families with multiple kids	1,537	1,538

characteristics play no part in determining who experiences the event of interest. The violence exposure in the 2000 cohort is similar, except individuals with a high preference for leisure are more likely to experience exposure. This adds endogeneity to the process governing the receipt of treatment, and this is an issue we often observe in survey data.

Simulated respondents have preferences over consumption (as indicated by wage labor), leisure, and high school completion. In each period they make time allocation decisions that determine their consumption, leisure, and academic credit earned for the period. Exposure to violence (ETV) is a potentially traumatic experience that depresses productivity. The loss of productivity can lower available time to the point that supplying academic labor is no longer feasible or no longer optimal. ETV also lowers the perceived gains to a high school degree by raising the subjective probability that one may not survive to reap the returns to academic labor. Both mechanisms leading to ETV effects can lower educational attainment.

experienced ETV event(s) in exactly one of the 4 year intervals. Of the 1980s (2000s) sample, 6.5 % (9.6 %) experienced ETV event(s) in 2 of the 4 years, and the remaining percentage experienced ETV events in 3 of the 4 years. Figure 1 summarizes the distribution of ETV exposure over simulated high school years. In both samples we observe a saw-tooth pattern, where exposure falls in year 2, rises dramatically in year 3, and then falls slightly in year 4. Overall, exposure rates are uniformly higher in the 2000s data. Table 3 describes exposure probabilities across communities.

The simulated environment allows the estimation of true effects by comparing observed outcomes with observable counterfactual outcomes. For our sample of simulated respondents who were exposed to violence, we calculate the true average effect on an outcome as

$$\Delta y_{ETV} = \bar{y}_{ETV} - \bar{y}_{-ETV}.$$

We also calculate the average percent change in the outcome as

$$\% \Delta y_{ETV} = \frac{\bar{y}_{ETV} - \bar{y}_{-ETV}}{\bar{y}_{-ETV}}.$$

We examine four outcomes: (1) periods employed during high school; (2) total time devoted to wage labor; (3) total time devoted to academic labor; and (4) high school completion.

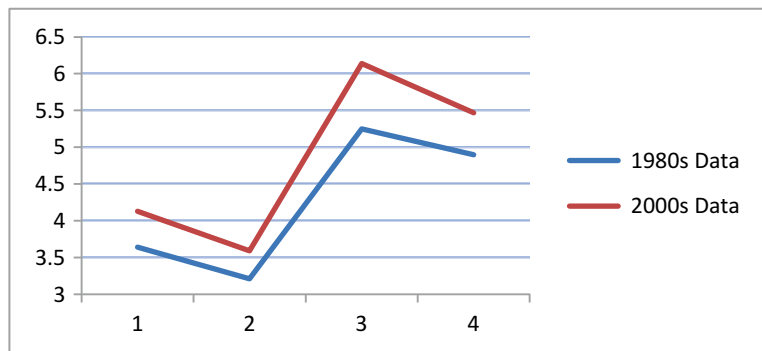
Tables 4 and 5 summarize the calculated effects for both cohorts. In the 2000 cohort data, we observe negative ETV effects on all listed outcomes. ETV leads to a decrease in years of work

5 Empirical Example Effect Estimates

5.1 True Causal Effects

In the 1980s (2000s) data, 15.8 % (17.5 %) of the simulated sample experienced some exposure to violence over the 4-year period. Of those exposed, 93.0 % (89.8 %) of the 1980s (2000s) sample

Fig. 1 Proportion of sample experiencing ETV by year



and hours worked, as well as a decrease in time devoted to academic labor and a lower proportion of students who graduated in 4 years. We see generally similar findings for the 1980s data with some differences. First, the full 1980s cohort

works all 4 years of high school regardless of ETV. This yields no effect on employment. We do, however, see a decrease in hours, implying the sample continues to work, but may supply fewer hours of wage labor given ETV exposure. Relative to the 2000 cohort, ETV leads to a much greater decrease in academic labor hours, and a greater decrease in graduation rates.

Table 3 ETV probabilities

1980s ETV probabilities by community and period						
		Community				
		1	2	3	4	5
Period	1	3	2	2	4	6
	2	3	1	2	4	6
	3	3	2	[4]	[8]	[12]
	4	3	1	[4]	[8]	[12]

2000s ETV probabilities by community and period						
		Community				
		1	2	3	4	5
Period	1	3	2	2	8	12
	2	3	1	2	8	12
	3	3	2	[4]	[4]	[6]
	4	3	1	[4]	[4]	[6]

Brackets indicate periods where a policy was enacted that lead to a sharp change in exposure rates

Simulated individuals compare the expected return of enrolling in school versus not enrolling in school each year, and choose the option with the highest value. Borderline cases will not enroll if they experience ETV in a given period, but will enroll otherwise. Roughly 42 % of the sample falls in the borderline region for the 1980s cohort, while only 23 % of the sample is borderline for the 2000s cohort. In addition to these distributional differences, the 1980s cohort contains a selection issue such that simulated agents who are already at risk of dropping out are roughly 20 % more likely to experience ETV. These differences lead to the noticeable differences in effects between cohorts. The analysis shows

Table 4 Data true effect calculations, 1980s

	Observed mean	Counterfactual mean	ETV effect	Percent change due to treatment
Total years employed during HS	4.000	4.000	0.000	0.000
Total hours devoted to wage labor	1.223	1.253	-0.030	-0.024
Total hours devoted to academic labor	0.602	0.749	-0.147	-0.196
Enrollment by period	0.111	0.802	-0.692	-0.863
Graduated from HS in 4 years	0.321	0.553	-0.232	-0.419

Table 5 Data true effect calculations, 2000s

	Observed mean	Counterfactual mean	ETV effect	Percent change due to treatment
Total years employed during HS	3.914	3.950	-0.036	-0.009
Total hours devoted to wage labor	1.158	1.257	-0.099	-0.078
Total hours devoted to academic labor	0.769	0.790	-0.021	-0.027
Enrollment by Period	0.768	0.860	-0.093	-0.108
Graduated from HS in 4 years	0.545	0.562	-0.018	-0.031

decreases in all outcome measures, with the exception of periods worked for the 1980s cohort. Below we use methods discussed above to attempt to recover the same information disclosed by the causal analysis presented here.

5.2 Causal Effect Estimates

This section employs methods described above to infer the causal effects of ETV. The true counterfactual effects are listed and compared to the effect estimates from various methods. True

counterfactual effects on observables differ between cohorts as a result of differences in the distributions of latent and demographic variables. Tables 6 and 7 show controlled and uncontrolled regression coefficients, whether the true effect falls within the 95 % confidence interval of the effect estimate, and whether the effect estimate has the same sign as the true effect. Controls include mother’s education, father’s education, race, respondent wage offer, household structure, parental income, and community of residence. There is no temporal variation in the control variables.

Table 6 Counterfactual and estimated effects, 1980s

Outcome	Method	True counterfactual effect estimate	Uncontrolled estimate (Std error)		Controlled estimate (Std error)		True estimate within 95 % C.I.	Estimate has the correct sign
Periods employed		0						
	OLS regression		0		0		+	≈
			0		0			
	Propensity score matching				0		+	≈
					0			
Total wage labor		-0.03						
	OLS regression		-0.004		-0.010			≈
			(0.0099)		(0.0072)			
	Fixed effects				0.003			
					(0.0011)			
	Instrumental variables		0.288	***	0.349	***		
			(0.0244)		(0.0237)			
	Propensity score matching		-		-0.047	**	+	≈
			-		(0.0145)			
Total academic labor		-0.147						
	OLS regression		-0.217	***	-0.209	***		≈
			(0.0100)		(0.0085)			
	Fixed effects		-0.176	***	-			≈
			(0.0029)		-			
	Instrumental variables		-0.728	***	-0.388	***		≈
			(0.0378)		(0.0405)			
	Propensity score matching		-		-0.121	***	+	≈
			-		(0.0171)			
Enrollment by period		-0.692						
	OLS regression		-0.673	***	-0.680	***	+	≈
			(0.0067)		(0.0066)			

(continued)

Table 6 (continued)

Outcome	Method	True counterfactual effect estimate	Uncontrolled estimate (Std error)		Controlled estimate (Std error)		True estimate within 95 % C.I.	Estimate has the correct sign
	Fixed effects		-0.653 (0.0068)	***	-			
	Instrumental variables		-3.578 (0.1625)	***	-2.693 (0.1869)	***		≈
	Propensity score matching		-		-0.733 (0.0152)	***		≈
Graduated in 4 years		-0.232						
	OLS regression		-0.295 (0.0159)		-0.286 (0.0154)	***		≈
	Probit		-0.762 (0.0429)		-0.637 (0.0462)	***		≈
	Logit		-1.227 (0.0705)		-1.043 (0.0763)	***		≈
	Instrumental variables		-2.147 (0.1536)		0.000 (0.1797)		+	
	Propensity score matched		-		-0.188 (0.0236)	***	+	≈

Notes: Models include the following control variables: mother’s education, father’s education, race, family structure, household income, community of residence, and simulated respondent wage offers. Asterisks and daggers for p-value significance have the standard meaning: $p < 0.001 = ***$, $p < 0.01 = **$, $p < 0.05 = *$, $p < 0.1 = †$

Estimates from the employed methods generally had the same sign as the true effect. The instrumental variables estimates were the only exception. Four of the eight instrumental variables estimates (where the instrument was an exogenous policy enacted that lead to a sharp increase or decrease in the likelihood of experiencing ETV) were positive when the true effect was negative. There were mixed results concerning the success with which a 95 % confidence interval held the true effect. Regression and propensity score matching estimates appear to be most successful at generating a 95 % confidence interval that held true effect estimates. The point estimates from fixed effects estimates often appeared to be fairly close to the true parameter values, but in this case the smaller standard errors from fixed effects estimation lead to very small confidence intervals that often excluded the true values. In this simulation, instrumental variables estimates were the least accurate, while regression,

propensity score matching, and fixed effects estimates were most successful in approximating true counterfactual effects. Based on these estimates, we conclude that ETV leads to negative shocks to the examined outcomes. In the year following a ETV, simulated respondents are less likely to enroll in school. Over the course of the high school career, ETV is associated with less overall time devoted to academic and wage labor, and a lower probability of completing high school in 4 years. There is no effect of ETV on the number of high school years in which a simulated respondent was employed in the 1980s data, but an apparent negative effect is present in the 2000s simulated data.⁶

⁶For simplicity, we do not consider heterogeneity in effects here. We assume that effects are homogenous. In applied life course, research, however, researchers should routinely question the underlying homogeneity assumption (Brand and Simon Thomas 2013).

Table 7 Counterfactual and estimated effects, 2000s

Outcome	Method	True counterfactual effect estimate	Uncontrolled estimate (Std error)	Controlled estimate (Std error)	True estimate within 95 % C.I.	Estimate has the correct sign
Periods employed		-0.036				
	OLS regression		-0.038 (0.0147)	-0.042 (0.0138)	** +	≈
	Propensity score matching			-0.059 (0.0211)	** +	≈
Total wage labor		-0.099				
	OLS regression		-0.085 (0.0123)	-0.086 (0.0078)	***	≈
	Fixed effects		-	-0.012 (0.0010)	***	≈
	Instrumental variables		0.324 (0.1324)	-0.078 (0.0245)	** +	≈
	Propensity core matching		-	-0.106 (0.0179)	***	≈
Total academic labor		-0.021				
	OLS regression		-0.058 (0.0095)	-0.061 (0.0081)	***	≈
	Fixed effects		-	-0.02645392 0.00288027	*** +	≈
	Instrumental variables		-1.406 (0.3281)	-0.006 (0.0359)	*** +	≈
	Propensity score matching		-	-0.036 (0.0147)	* +	≈
Enrolment by period		-0.093				
	OLS regression		-0.119 (0.0092)	-0.121 (0.0078)	***	≈

(continued)

Table 7 (continued)

Outcome	Method	True counterfactual effect estimate	Uncontrolled estimate (Std error)	Controlled estimate (Std error)	True estimate within 95 % C.I.	Estimate has the correct sign
	Fixed effects		-	-0.081 (0.0061)	***	≈
	Instrumental variables		-7.512 (1.6940)	0.525 (0.1096)	***	
	Propensity score matching		-	-0.109 (0.0158)	*** +	≈
Graduated in 4 years		-0.018				
	OLS regression		-0.057 (0.0158)	-0.057 (0.0152)	***	≈
	Probit		-0.146 (0.0404)	-0.071 (0.0435)	***	≈
	Logit		-0.235 (0.0647)	-0.114 (0.0708)	***	≈
	Instrumental variable		-	0.000 (0.1736)		
	Propensity score matching		-	-0.045 (0.0231)	†	≈

Notes: Models include the following control variables: mother's education, father's education, race, family structure, household income, community of residence, and simulated respondent wage offers. Asterisks and daggers for p-value significance have the standard meaning: p<0.001 = ***, p<0.01 = **, p<0.05 = *, p<0.1 = †

In applied life course research, we generally do not fully understand the role of differences in the distribution of observable and unobservable variables, as well as differences in the treatment selection process over time. There are noticeable differences in the magnitude of true effects on all outcomes between cohorts. It is possible that the distribution of household income and respondent wage offers (which differ across the two cohorts) are largely responsible for differences in the effect of ETV on periods employed. Other differences between the cohorts may be responsible for the difference in estimates. In the 1980s data, ETV is a completely random process that is independent of individual characteristics. In the 2000s data, ETV is slightly more likely to happen to simulated respondents who have a stronger taste for leisure than consumption (i.e. $\beta_i > \alpha_i$). There was also an overall shift in unobservable preference parameters between the periods. The 1980s cohort has a stronger preference for leisure, while the 2000s cohort has a higher preference for consumption. In this model a taste for consumption is more conducive to continued enrollment and eventual graduation. The unobservable shift in personal preferences and the selection mechanism in the 2000s data may explain a large part of the difference in sensitivity of the educational tract to ETV exposure between cohorts.⁷

5.3 Mediating Mechanisms

We often care about both the effect of a treatment and the mechanism mediating that effect. The data were generated such that ETV leads to a lower expected return to education (operationalized as a change in a latent variable denoting the personal valuation placed on graduating), and a decrease in the amount of productive time available for academic and wage labor. A lower valuation on graduation implies a lower likelihood of

enrolling in school in any period, and thus a lower likelihood of graduating in four periods/years. The lost time may have the indirect effect of forcing a simulated respondent to choose between employment and enrollment. In this simulated example, effects are mediated by constraints and latent measures that are unobservable to the researcher. Fully recovering these mechanisms is likely impossible with only the observable measures in the data. It is also often the case in life course research that multiple mechanisms may work independently or jointly to produce a net effect of interest. The causal DAG presented in Fig. 2 depicts the effect of ETV on the probability of high school completion. We enclose unobserved variables in ovals, observed variables in rounded boxes, and treatment and main outcome in rectangles. There is an association between the probability of experiencing ETV and the latent valuation of high school completion, both of which are correlated with socio-demographic characteristics. Conditioning on socio-demographic characteristics implies conditional independence between ETV exposure and latent valuations on high school completion and allows us to identify the causal effect of ETV on enrollment decisions and graduation. This total effect includes the effects of the mediating mechanisms. In these simulated data, we speculate that the mediating mechanisms include a short term drop in productivity that results in a decrease in the amount of time devoted to academic and wage labor, and a lower likelihood of enrolling in school in the coming academic year. As a result of the productivity drop and decreased likelihood of enrolling, youth fall behind in school and many are unable to make up the difference in time to graduate in the 4-year window. This leads to a lower 4-year graduation rate among those who have experienced ETV. Quantitative researchers are often limited as to which mediating mechanisms can be empirically tested. If all variables below were observable, we could decompose the mechanisms mediating ETV effects by determining what proportion of the effect works through the devaluation of education and what portion is attributable to a loss of productivity. However,

⁷We do not assess how exposure to the treatment over time produces variation in individual effects. It is likely that ETV that occurs early in childhood relative to middle childhood or adolescence might influence the effects on our outcomes of interest.

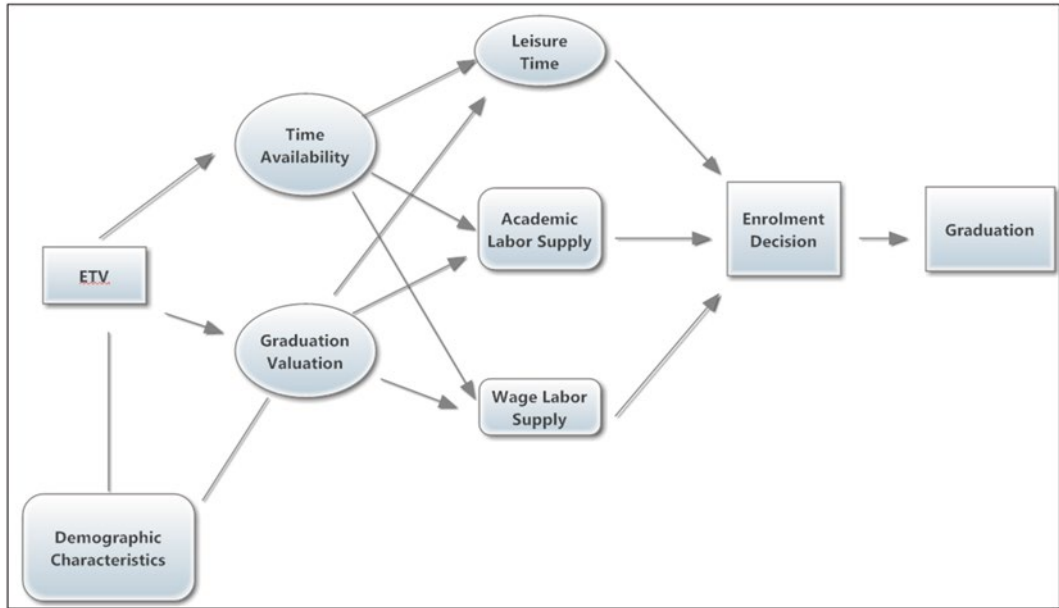


Fig. 2 DAG causal model of effects of ETV on high school graduation

because these values are unobserved we do not have the data one would need to study these mechanisms.

5.4 Summary of the Empirical Example

We construct a process where simulated respondents have unobserved preferences over labor, leisure, and high school completion and varying levels of unobserved academic ability. Simulated respondents are characterized by socio-demographic characteristics such as neighborhood of residence, racial classification, household income, and parental education levels that are correlated with their preferences. In each of the simulated periods, respondents decide whether to work in the labor market full-time, work and go to school, or go to school without working. Supplying sufficient levels of academic labor over the 4-year period results in graduation. Our treatment of interest, exposure to violence (ETV), flags simulated respondents who have seen a person shot or shot at in the previous year.

The treatment has two simulated effects. First, it decreases subjective assessments of personal longevity, which decreases the horizon over which one would expect to reap the returns to education, therefore lowering the overall expected return to education. Second, ETV serves as a traumatic experience that depresses productivity in the short run. This is operationalized as a loss of time that could have otherwise been allocated to leisure, academic labor, or wage labor. The loss of time and devaluation of education together make the choice to enroll in school less likely, which leads to a lower 4-year simulated graduation rate for those who experience ETV. This process was simulated for two cohorts. In one cohort, assignment to treatment has an endogenous aspect where individuals who have a stronger taste for leisure than consumption⁸ are a percentage point more likely to experience treatment above the ETV exposure rates

⁸ See the description of the simulation process in Appendix A. Simulated respondents for whom $\alpha_i > \beta_i$ prefer having more consumption (measured by labor activity) and less leisure, while simulated respondents for whom the opposite is true (i.e. $\alpha_i < \beta_i$) prefer more leisure and less consumption.

defined by their neighborhood of residents. This yields a selection effect where individuals who are already more likely to dropout are also more likely to experience an event that further encourages early school exit. The cohorts also differ along the distribution of demographic variables that govern familial characteristics.

Our analysis suggests that ETV leads to a decrease in high school graduation rates. We also find that ETV is associated with a drop in wage and academic labor supply, which lead to the inference that time may be one of the mediating factors transmitting the effect of ETV on 4-year high school completion. We were unable to uncover the second mechanism, which affects graduation due to a decrease in the personal valuation of high school completion. The respondents' simulated valuation on education is an unobserved variable, and for that reason it could not be included in regression models. Estimates for the effects of ETV differed greatly between cohorts even though the coded effect of ETV was the same in both settings. In both simulations, ETV led to a 3 point decrease in the valuation of education and a 20 % decrease in time available to allocate between labor and leisure. These direct effects lead to very different indirect effects of ETV on labor supplies, per period enrolment, and graduation probabilities. We conclude that differences in the distributions of underlying variables lead ETV to have vastly different effects between cohorts.

This exercise offers an environment where we can assess the performance of some of our most commonly used causal inference effect estimators, and compare the resulting estimates to observed counterfactual outcomes. We use a data generating process (see Appendix A) that includes latent variables, correlated covariates, and endogenous selection in an attempt to capture the challenges we often face with observed data. Overall, the simulation shows that the analytical tools used were sufficient for understanding the key dynamics behind our data generating process. Some estimation techniques performed better than others. This should not be interpreted as evidence of general superiority of some techniques over others. Instead, it should be understood as a particular

analysis in which some methods outperformed others. All techniques are accompanied by a set of assumptions, and these simulated data may accommodate the assumptions of some techniques better than others.

6 Conclusion

This chapter has discussed some of the challenges and strategies underlying life course research aimed at causal inference. Relationships among variables in empirical data alone cannot establish causality. Causal inference requires some knowledge about the data generating process to support an assumption of exogenous variability in our treatment of interest. This may be controlled randomization of the assignment to treatment, exogeneity of a natural treatment assignment process, or conditional independence of treatment assignments after controlling for some set of observables. Research aimed at causal inference often involves trying to understand complex and dynamic processes that depend upon both observed and unobserved factors. We discuss challenges to empirical estimation that arise due to selection effects. We show and discuss how violations of model assumptions may lead to bias in parameter estimates, and discuss common estimation techniques. These include ordinary least squares regression, discrete choice models, propensity score matching models, fixed effects models, and instrumental variable models. Many other potential estimation procedures were omitted from this discussion for simplicity. Additional challenges may include estimating effects with complex counterfactuals and evaluating heterogeneity in effects. Life course research also often involves assessing how effects vary over time, as well as assessment of mechanisms that intervene and help explain associations between treatments and outcomes.

We generate simulated data that models a complex social process over time, and employ the discussed methods to recover the dynamics and effects generated by our constructed process. Our simulated process considers the effect of exposure to gun violence on the outcomes of

simulated respondents. Of the methods employed, OLS regression and propensity score matching most consistently produce results that were close to the true effects calculated through counterfactual simulation. Fixed effects estimates were also reasonably accurate. Instrumental variables models had the weakest performance. We do not take this as a condemnation of IV methodology, but rather as evidence of something we already knew: that the quality of an IV estimate depends heavily on the quality of the IV, and that identification of a valid IV is challenging. The IV measure employed here met the necessary orthogonality restrictions, but it was, as is many times the case, a measure that generated very little variation in the treatment variable.

In our simulation, we found that simple linear methods were useful for understanding the basic dynamics of interest in a highly non-linear model that includes a range of unobserved variables. This lends confidence in our ability to use these tools to discern the effects of complex real-world causal relationships. This exercise may be understood as a case where our most commonly employed linear methods were sufficient for understanding the key components behind a

complicated data generating process governed by non linear relationships, unobserved variables, unknown distributions, and at times, endogeneity. The favorable performance of these estimators in this simulated setting is indicative that they can perform well to understand complex life course processes in real data.

Appendix A: Simulation Process

This section explains the mathematical problem solved by simulated agents in the creation of the test data. Agents have preferences over consumption, leisure, and high school completion. They make choices each period over the allocation of time towards, education, labor or leisure given constraints on time availability and the consumption benefits of wage labor. The sequence of choices determines whether they graduate in four periods. This provides a non-linear data generating process with computable counterfactual outcomes, where we can assess our ability to make correct causal inference using the linear models presented above.

Formally, simulated agent i solve.

$$V(l_{t,i}^a, l_{t,i}^w, x_{t,i}, e_{t,i}, c_{t,i}, a_i) = \underset{\{l_{t,i}^a, l_{t,i}^w, x_{t,i}\}}{\operatorname{argmax}} (x_{t,i})^{\alpha_i} (1 - l_{t,i}^a - l_{t,i}^w)^{\beta_i} + G_{i,t} \cdot \mathbb{1}\left(l_{t,i}^a \geq \frac{c_{t,i}}{a_i}\right) \quad (1)$$

$$\text{subject to : } x_{t,i} \leq l_{t,i}^w w_i + e_i \quad (2)$$

$$0 \leq 1 - l_{t,i}^a - l_{t,i}^w \quad (3)$$

$$x_{t,i} \geq 0, 0 \leq l_{t,i}^w \leq 1, 0 \leq l_{t,i}^a \leq 1, \alpha > 0, \beta > 0 \quad (4)$$

The objective function (1) takes the form of a Cobb-Douglas utility function expressing preferences over consumption, $x_{t,i}$, and leisure, $1 - l_{t,i}^a - l_{t,i}^w$, plus an additional additive compo-

nent capturing gains from graduation. Constraint (2) is a budget constraint limiting present period consumption to what is affordable given endowment e_i and earned income, $l_{t,i}^w w_i$, where w_i is a wage rate.. Endowments are a small but fixed percentage of household income, while wage offers are random. $G_{i,t}$ is the time t value that agent i places on eventual graduation. The indicator function shows that agent i only expects to receive $G_{i,t}$ if he or she supplies some minimum

amount of academic labor. Constraints (3) and (4) stipulate that all time and consumption allocations must be non-negative.

The solution to this problem takes the following form given state $s_{t,i} = \{e_{t,i}, c_{t,i}, a_i, G_{t,i}\}$:

$$l_{t,i}^{a*} = \begin{cases} \frac{c_{t,i}}{a_i} & \text{if } V(l_{t,i}^a = 0, l_{t,i}^{w*}, x_{t,i}^{*}, s_{t,i}) \leq V\left(l_{t,i}^a = \frac{c_{t,i}}{a_i}, l_{t,i}^{w*}, x_{t,i}^{*}, s_{t,i}\right) \text{ and } \frac{c_{t,i}}{a_i} \leq 1 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

$$l_{t,i}^{w*} = \frac{w_i \alpha_i (1 - l_{t,i}^{a*}) - e_i \beta_i}{w_i (\beta_i + \alpha_i)} \quad (6)$$

$$x_{t,i}^* = \alpha_i \left(\frac{w_i (1 - l_{t,i}^{a*}) + e_i}{\beta_i + \alpha_i} \right) \quad (7)$$

The intuition behind this solution is as follows. The return function for academic labor is a non-differentiable step function and requires special care for that reason. There are only three possible optimal values for academic labor. First, one could supply $\frac{c_{t,i}}{a_i}$ units of academic labor, which is just enough to receive the expected return G . Any time committed beyond this amount has no return, and would be better spent towards wage

labor or leisure since $\alpha_i > 0$ and $\beta_i > 0$. If it turns out that the simulated agent cannot feasibly supply the desired amount of academic labor such that

$$\frac{c_{t,i}}{a_i} > 1$$

or that the agent has a higher present period gain if she devotes the time to wage labor or leisure such that

$$V\left(l_{t,i}^a = 0, l_{t,i}^{w*}, x_{t,i}^{*}, s_{t,i}\right) > V\left(l_{t,i}^a = \frac{c_{t,i}}{a_i}, l_{t,i}^{w*}, x_{t,i}^{*}, s_{t,i}\right)$$

then $l_{t,i}^{a*} = 0$ must be the optimal academic labor supply. In this case, any time allocation above 0 has a higher return as wage labor time or leisure time. From here, we utilize the concavity, continuity, and differentiability of the return function in $\{l_{t,i}^w, x_{t,i}\}$ to solve for (6) and (7) in terms of parameters and $l_{t,i}^{a*}$. These formulas are sufficient for calculating the current period return to continuing education, and the current period return to dropping out. Simulated agents choose the option with the highest present period return.

This model adds interesting dynamics to the data. First, individual actions are highly sensitive to specifications of α_i , β_i and $G_{t,i}$ all of which are unobserved by the researcher. Also, these parameters are correlated with familial and community characteristics. Endowments e_i are a function of household income. The dependence of these parameters on family characteristics should lead to an estimable degree of intergenerational transmission of advantage.

References

- Angrist, J. D., & Krueger, A. B. (1999). Empirical strategies in labor economics. In *Handbook of labor economics* 3 (pp. 1277–1366).
- Black, D. A., Sanders, S., & Taylor, E. J. (forthcoming). The great migration and African-American mortality: Evidence from the deep south. *American Economic Review*.
- Bollen, K., & Brand, J. E. (2010). A general panel model with random and fixed effects: A structural equations approach. *Social Forces*, 89(1), 1–34.
- Brand, J. E. (2010). Civic returns to higher education: A note on heterogeneous effects. *Social Forces*, 89(2), 417–433.
- Brand, J. E., & Davis, D. (2011). The impact of college education on fertility: Evidence for heterogeneous effects. *Demography*, 48(3), 863–887.
- Brand, J. E., & Simon Thomas, J. (2013). Causal effect heterogeneity. In *Handbook of causal analysis for social research* (pp. 189–213). Netherlands: Springer.
- Brand, J. E., & Thomas, J. S. (2014). Job displacement among single mothers: Effects on children's outcomes in young adulthood. *American Journal of Sociology*, 119(4), 955–1001.
- Brand, J. E., & Halaby, C. N. (2006). Regression and matching estimates of the effects of elite college attendance on educational and career achievement. *Social Science Research*, 35(3), 749–770.
- Brand, J. E., & Xie, Y. (2007). Identification and estimation of causal effects with time-varying treatments and time-varying outcomes. *Sociological Methodology*, 37(1), 393–434.
- Brand, J. E., & Xie, Y. (2010). Who benefits most from college? Evidence for negative selection in heterogeneous economic returns to higher education. *American Sociological Review*, 75(2), 273–302.
- Brand, J. E., Pfeffer, F. T., & Goldrick-Rab, S. (2014). The community college effect revisited: The importance of attending to heterogeneity and complex counterfactuals. *Sociological Science*, 1, 448–465.
- Budig, & England. (2001). The wage penalty of motherhood. *American Sociological Review*, 66(2), 204–225.
- Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, 22(1), 31–72.
- Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and applications*. New York: Cambridge University Press.
- Currie, J., & Thomas, D. (1995). Does head start make a difference. *American Economic Review*, 85(3), 341–364.
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, 32, 271–297.
- Elwert, F. (2013). Graphical causal models. In *Handbook of causal analysis for social research* (pp. 245–273). Netherlands: Springer.
- Goering, J., Feins, J. D., & Richardson, T. M. (2003). What have we learned about housing mobility and poverty deconcentration. In *Choosing a better life? Evaluating the moving to opportunity social experiment* (pp. 3–36). Washington, D.C.: Urban Institute Press.
- Greene, W. H. (2012). *Econometric analysis* (7th ed.). Upper Saddle River: Prentice Hall.
- Heckman, J. J., Urzua, S., & Vytlacil, E. (2006). Understanding instrumental variables in models with essential heterogeneity. *The Review of Economics and Statistics*, 88(3), 389–432.
- Hungerford, T., & Solon, G. (1987). Sheepskin effects in the returns to education. *The Review of Economics and Statistics*, 69, 175–177.
- Leuven, E., & Sianesi, B. (2014). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. *Statistical Software Components*.
- Lleras-Muney, A. (2005). The relationship between education and adult mortality in the United States. *The Review of Economic Studies*, 72(1), 189–221.
- Ludwig, J., et al. (2008). What can we learn about neighborhood effects from the moving to opportunity experiment. *American Journal of Sociology*, 114(1), 144–188.
- Morgan, S., & Harding, D. (2006). Matching estimators of causal effects: Prospects and pitfalls in theory and practice. *Sociological Methods and Research*, 35(1), 3–60.
- Morgan, S. L., & Todd, J. J. (2008). A diagnostic routine for the detection of consequential heterogeneity of causal effects. *Sociological Methodology*, 38(1), 231–281.
- Morgan, S., & Winship, C. (2012). Brining context and variability back into causal analysis. In *Oxford handbook of the philosophy of the social sciences* (pp. 319–354).
- Musick, K., Brand, J. E., & Davis, D. (2012). Variation in the relationship between education and marriage: Marriage market mismatch? *Journal of Marriage and Family*, 74(1), 53–69.
- Pearl, J. (2009). *Causality: Models reasoning, and inference*. Cambridge: Cambridge University Press.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41–55.
- Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, 39(1), 33–38.

- Sanbonmatsu, L., et al. (2011). *Moving to opportunity for fair housing demonstration program – Final impacts evaluation*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Sharkey, P. (2010). The acute effect of local homicides on children's cognitive performance. *Proceedings of the National Academy of Sciences*, 107, 11733–11738.
- Winship, C., & Elwert, F. (2010). Effect heterogeneity and bias in main-effects-only regression models. In *Heuristics, probability and causality: A tribute to Judea Pearl* (pp. 327–36). London: College Publications.
- Winship, C., & Morgan, S. (2012). Bringing context and variability back in to causal analysis. In H. Kincaid (Ed.), *Oxford handbook of the philosophy of the social sciences*. Oxford: Oxford University Press.
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). Cambridge, MA: MIT Press.
- Wooldridge, J. (2012). *Introductory econometrics: A modern approach*. Mason: Cengage Learning.
- Xie, Y. (2011). *Population heterogeneity and causal inference* (pp. 11–731). University of Michigan Population Studies Center Research Report.
- Xie, Y. (2011). *Population heterogeneity and causal inference* (pp. 11–731). University of Michigan Population Studies Center Research Report.
- Xie, Y. (2013). Population heterogeneity and causal inference. *Proceedings of the National Academy of Sciences*, 110(16), 6262–6268.
- Yu, X., Brand, J. E., & Jann, B. (2012). Estimating heterogeneous treatment effects with observational data. *Sociological Methodology*, 42(1), 314–347.

The Logic and Practice of Growth Curve Analysis: Modeling Strategies for Life Course Dynamics

Ross Macmillan and Frank Furstenberg

1 Introduction

A life course perspective is particularly attentive to the dynamics of time and how time is critical to understanding the meaning of events, experiences, and attainments over the life span. Its roots can be traced to the path breaking work of W.I. Thomas and Znaniecki's (1918–1920) *The Polish Peasant* and C. Wright Mill's (1959) *The Sociological Imagination*. A life course perspective is increasingly the dominant framework for examining the temporal dynamics of human lives: age/aging, period/history, and cohort (unique exposure to historical time), and how these produce unique developmental trajectories for individuals and populations (Elder 1998). Indeed, the key concepts of a life course perspective – including lives in historical times, the timing of lives, linked lives, and human agency – all reflect an underlying concern with time and temporality in the shaping of human experience (Elder 1994; Elder et al. 2003).

Following early attempts to discover and devise unique methods for describing and analyzing the timing of life course events (Elder 1999; Modell et al. 1976), recent decades have seen the development of several methodological strategies that focused explicitly on time. In demography, life tables were elaborated in a number of important ways (Coale and Demeny 1966). In economics, there were significant advances in time-series analysis (Lutkepohl 2007). In epidemiology and biostatistics, event history models became increasingly sophisticated in their ability to capture “time-to-failure” (Petersen 1993). And in psychology, criminology, and educational studies, there were significant developments in the modeling of within-person change on scalar outcomes (Meredith and Tisak 1990; Muthen and Muthen 2000; Nagin 2009; Singer and Willett 2003).

This chapter is organized around the intersection of one such technique and life course conceptions of time and timing. Specifically, it considers and elaborates the expression of key life course concepts in statistical terms and translates them into an approach that has become popular in many of the social sciences – growth curve analysis. Growth curve analyses have particular affinity with a life course perspective: both emphasize stability and change in the unfolding life course with the aim of identifying the origins of developmental pathways and events or conditions that alter probabilistic routes. This

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chapter has five sections. Section 2 discusses a prime example of the utility of growth curve analysis, specifically developmental trends in body mass index (BMI) that operationalize the risk of obesity and consequent health problems across the life course (Harris 2010). We use trajectories of BMI to illustrate how core life course principles can be operationalized and tested. Section 3 identifies four key principles of a life course perspective and describes theoretical expectations within a growth curve analysis context. Section 4 describes the underlying model in formal statistical terms with each conceptual elaboration associated with a statistical elaboration. Section 5 uses data from the National Longitudinal Survey of Youth – 97 to show the practical application of life course concepts within growth curve analysis of BMI trajectories in the transition to adulthood. Section 6 concludes with discussion of issues of estimation and parameterization, as well as evaluation of effect sizes and statistical significance.

2 Body Mass Index, Obesity, and Life Chances in American Society

The latter part of the twentieth century saw a striking change in the weight of populations (Stearns 2002). Beginning first in wealthy northern hemisphere countries but rapidly diffusing across the globe (Swinburn et al. 2011), populations started getting heavier. Why this happened is the subject of much debate, but the actual physiology of weight gain is well understood and quite simple. Weight gain occurs when the intake of calories through food consumption outpaces the “burning” of calories through activity. A complicating factor is recent evidence of a “fat gene,” also known as FTO, which influences the rate at which calories are transformed into fat and is variable across individuals and groups. Yet, even with this complicating factor, the central mechanism of weight gain is a caloric imbalance.

Particularly for large sample or population comparisons, researchers use the body mass index (BMI) as an indicator of weight status,

including excess weight. Also known as the Quetelet index, the simple formula is weight in kilograms divided by height in meters squared (or weight in pounds divided height in inches squared multiplied by 703). In the United States for example, general trends in body mass went virtually unchanged from 1960 to 1980 with 11 % deemed to be obese. In recent decades however, rates of obesity increased markedly, to 23 % through 1990 and to just under 30 % by 2000 (US Department of Health and Human Services 2011). In 2014, it is estimated that almost 35 % of the adult population in the US is obese (Ogden et al. 2014). Ng and colleagues (2014) report similar increases in overweight and obesity across a number of countries over the last 30 years.

Obesity as a social problem reflects its association with a wide array of health limitations (Khaodhiar et al. 1999). Obesity is associated with increased risk of metabolic disorders, including insulin resistance and type 2 diabetes mellitus. There is also increased risk of cardiovascular problems, such as hypertension, dyslipidemia, cardiovascular disease, and stroke. Certain cancers are also associated with obesity, including colorectal and prostate cancer in men and endometrial, breast, and gallbladder cancer in women. Some evidence suggests that obesity is also associated with increased rates of psychological distress, perhaps given the associated stigma of being overweight (Dong et al. 2004). Given the range of comorbidities, there is evidence that excess body weight is also associated with substantial increases in early mortality (Masters et al. 2013). In short, understanding the developmental features of obesity is critical to contemporary public health and a life course perspective offers a uniquely powerful framework for understanding its epidemiology.

3 Life Course Concepts and Implications for Growth Curve Analysis of BMI

Although there are numerous life course concepts that are relevant to an analysis of development (see discussion in Shanahan and Macmillan

2008), we highlight four that have unique relevance to both elaborating the value of a growth curve analytic strategy and shedding light on the developmental structure of body mass. These include (1) *social structure and developmental processes*, (2) *longitudinal associations*, (3) *trajectories, transitions, and turning points*, and (4) *accumulation, accentuation, and leveling over the life course*.

3.1 Social Structure and Development

A central, organizing principle of life course theory and research is the idea that developmental processes are situated within and shaped by social structure. Although notoriously difficult to define, Sewell (1992) defines social structures as the manifestations of interconnected schema (cultural blueprints, values, and norms) and resources (access to material goods, social capital, and power resulting from social position). In a life course perspective, social structures commonly index positions in status hierarchies, ecological context, and historical period (Elder 1994; Elder and Rockwell 1979). Human development over time depends in large measure upon the unique configurations of social structures that are rooted in the social position of family and childhood origins as well as social conditions occurring over the passage of time as reflected in the aging of individuals (Elder 1998).

Using this conceptual underpinning, BMI can be viewed as a probabilistic variation in an individual's starting point at birth (or later on) and changes with advancing age. Both quantities, including the key developmental aspect of change over time, can be understood in reference to social structures that denote positions in status hierarchies (e.g., race, class, gender), ecological context (i.e., neighborhood characteristics, regional location, country), and historical context (i.e., year of birth, period). In recognizing that social structural location implies variation in both schema and resources, one could think about how this might influence mechanisms in the dynamics of BMI over the life course, in particu-

lar how schema and resources are implicated in caloric imbalance.

On the resource side of things, race and social class, for example, imply variation in economic resources that might impact upon one's ability to find and purchase healthier foods. Here, one could imagine that the choice set of foods is simply narrower when one lacks resources and those with less would be more oriented to low cost, higher calorie foods, even when alternatives are available. Yet, alternatives may not actually be available. Nutritional epidemiologists talk of "food deserts" that describe particular neighborhoods or geographies, typically lower income, where available foods are typically "fast food" and pre-prepared, packaged foods that have high sugar contents and where natural or unprocessed foods are rare or difficult to find (Cummins and Macintyre 1999). Similarly, there is an increasing need to "buy" exercise in the form of clubs and gym memberships given the increasingly sedentary character of occupations. Such costs may be outside the option set for low-income people or may not even be available in lower income communities.

On the schema side, one could think of a number of weight related "models" that might come into play. In the realm of diet, there would likely be variation in what constitutes "good" and "bad" food and some people, by virtue of biography and group history, might be more oriented towards "bad" foods. A similar principle could apply to the perceived value or utility of exercise. Anthropologists have also drawn attention to cultural variation in ideal body types with some cultures expressing a preference for heavier types. Thus, one could further think that reference points for optimal weight would be influenced by those in one's immediate environment and this would connote different ideas about body shape and weight. In short, there are a variety of ways in which socio-structural position could connect to the proximal mechanisms of weight gain and ultimately produce variable population weight and variation in trajectories of weight and weight gain over the life course.

Given this framework, one could focus on race as a particularly unique social position that brings

together many of these themes and that has a unique relationship to excess weight. In particular, African-Americans in the US have relatively high levels of poverty that are uniquely concentrated and coupled with high levels of segregation (Massey and Denton 1993; Wilson 1987). As such, one could expect a profound concentration of risks and indeed there is a rich literature that shows both race differences in BMI and important life course contingencies in such differences. With respect to race and sex, Cossrow and Falkner (2004) report that the proportion obese among adult women in the US is 30 % for non-Hispanic Whites, 49.7 % for African Americans, and 39.7 % for Hispanics. Smaller differences are found for adult males, 27 %, 28.1 %, and 28.9 %. Still, there appear to be important life course contingencies at work in that race differences among teenage and childhood males are stark (12.8 %, 20.7 % and 27.5 % for Non-Hispanic whites, African Americans, and Hispanics male children, respectively and 12 %, 17 %, and 27.3 % for Non-Hispanic whites, African Americans, and Hispanics male teens, respectively). Even larger race differences among teenagers and children are found among females. As such information is based on repeated cross-sectional analysis, we can further explore such issues and illustrate the techniques and value of growth curve analysis with specific identification to variation in between- and within-person change.

3.2 Longitudinal Associations

A second key principle of a life course perspective is the idea that events or experiences, even disparate ones, are linked over the life span and that linked experiences often have important long-term outcomes (McLeod and Almazan 2003). Here, much work focuses on links that both cross life stages and that represent either causal or structural relationships. Not surprisingly much of this work focuses on links between childhood and subsequent life stages. In one particularly influential body of work, Sampson and Laub (1995), Laub and Sampson (2009) used reconstructed data from

a sample of Boston children to show continuity and change in life circumstances over several decades. Numerous factors, associated with family disadvantage in the childhood, were either durable predictors of later adult outcomes or were implicated in well-defined causal pathways that produced such outcomes. Elaborating such themes further, Conger et al. (1992) studied farm families under stress from economic decline. The key theme in such work is an emphasis on the fact that human lives do not re-write themselves at each successive stage and instead that the conditions of the past have formative effects on possible futures. Indeed, the central organizing feature of research on social mobility within- and across-generations is the relationship between status origins, typically family socioeconomic status, and status destinations, typically achieved occupational status (Hauser and Warren 1997; see also, chapter “[Three Generation Studies: Methodological Challenges and Problems](#)” by Thornberry, this volume).

Studies of the precursors to obesity in adulthood have focused considerable attention on childhood risk factors. One particularly well-developed area of research shows that body mass in childhood and adolescence is strong predictor of risk of being overweight in mid adulthood (e.g., Guo and Chumlea 1999). In addition, important elements of social structure are implicated in weight gain in later life. Parsons and colleagues (1999) for example show that socioeconomic status of one’s family of origin is consistently correlated with adult obesity, but does not have a strong association with excess weight in childhood (Parsons et al. 1999). Such “*sleeper effects*” are increasingly key aspects of theoretical understanding (Cook et al. 1979). Still other research focuses more on behavioral aspects of childhood and their consequences. Reilly and colleagues (2005), for example, show that excessive hours spent watching television in early childhood is associated with increased risk of childhood obesity. Importantly however, there is not a lot of longer-term longitudinal work that links childhood behaviors and circumstances to obesity risk in adolescence and adulthood.

3.3 Trajectories, Transitions, and Turning Points

Whether and how much past circumstances and behaviors shapes future patterns of behavior (such as obesity) is relevant to another set of concepts in a life course perspective: trajectories, transitions, and turning points. In the earliest formulations, the concept of trajectories referred to temporally defined patterns of behavior, particularly social roles (Elder 1985). Examples abound in social demography such as trajectories of schooling, work, partnership and marriage, and childbearing where theoretical and empirical attention has focused on continuities and discontinuities in both the acquisition of roles and the sequences of roles over time (Hogan 1978; Marini 1984). Importantly, trajectories often have a particular shape or form that indicates a particular pattern of human development over time (Elder 1998).

Transitions are fundamentally connected to trajectories in that they indicate movement into or out of social roles when linked in a sequence over time. Finishing schooling, getting married, getting divorced, starting work, stopping work are all key transitions that given meaning to trajectories by shaping both the timing of transitions and directly influencing the content of human experience and behavior. Importantly, transitions can and typically are bundled together into what has been called *role configurations*. Configurations of roles often represent prescribed packages reflecting social approved trajectories of success (or failure). In this respect, role configurations imply a whole that is greater than the sum of its parts (Macmillan and Eliason 2003). The idea that role configurations and trajectories assume meaning and social significance is nicely illustrated by a disturbing trend in the U.S. referred to as NEETs, young adults not in education, not employed, and not in training (Monaghan 2014). NEETS can be seen as a highly problematic life course trajectory where growing numbers of young adults, especially males are failing to make the transition to adulthood, at least from an economic and social perspective. And, it is likely that these problematic trajectories have

been increasing with successive age cohorts in the U.S.

Trajectories and transitions can combine at particular moments in time to create *turning points* in the life course when former paths of experience or behavior are abruptly truncated and new paths are developed (Laub and Sampson 1993). A very important line of life course research focuses on how trajectories that are redirected by non-normative events or, in some cases, unanticipated transitions. Such effects are seen for desistance from crime (Laub et al. 1998; Nagin et al. 1995), dynamics of health (Bauldry et al. 2012; Ferraro et al. 1997) and mental health (Mirowsky and Ross 2007; Wheaton and Gotlib 1997; McLeod and Shanahan 1996), and the probability of a range of non-normative events (Furstenberg 2003; McLeod and Fettes 2007; Rindfuss et al. 1987). At an individual level, a sudden illness, an encounter with the criminal justice system, or a religious conversion may suddenly redirect a life trajectory in another direction, for better or worse.

To return to our example of obesity, there is not a lot of research that formally or even informally examines trajectories of BMI or weight over the life course and even less that explores how trajectories, once set, are reversed. Still, existing work is provocative. On the general issue of temporal patterns over the life course, Baltrus and colleagues (2005) examined trajectories of weight gain in a multi-cohort sample. Highlighting the importance of social structures, the research shows that race and sex interacted in important ways creating different trajectories for race and gender sub-populations. While Black males had lower initial weights, they had trajectories of growth, around 0.02 kg per year, that were similar to the sample average, Black females had both greater weight at baseline assessment and greater growth in weight, around 0.10 kg per year. This race-sex variation in trajectories of weight gain was largely accounted for by the dynamics of socioeconomic position over the life course (see also Guo et al. 2000). More generally, there is evidence of both defined trajectories in body mass, as well as suggestive evidence of individual

and group heterogeneity in such trajectories. Still, efforts to understand the dynamics of body mass could benefit from further analysis of trajectories of weight gain, particularly with reference to the complex interactions of social structural and social and behavioral risk in early life.

3.4 Accumulation, Accentuation and Leveling

The features of a life course perspective outlined so far ultimately provide the backdrop for a core theoretical principle/debate over the implications of aging for social advantage or disadvantage. Some researchers hypothesize that aging is associated with processes that accumulate advantages taking the form of “path-dependent” trajectories. Often traced to the seminal thesis of Robert Merton (1968), scholars in a variety of fields have offered the thesis that initial (dis)advantages appear to grow exponentially over time, whether one is referencing aging, the progression of careers, the maturation of states, or personal or social development (see chapter “[Life Course Lens on Aging and Health](#)” by Ferraro this volume).

Importantly, scholars have paid considerable attention to the mechanisms that amplify initial differences. In a number of influential articles, Dannefer (1987, 2003) offered a thesis on cumulative advantage/disadvantage that emphasized the role of social structures and social dynamics in producing divergence in given resources (e.g., money, health, status) over time. In what is often termed accentuation, prior advantage offers access to preferred pathways into more advantageous positions. Think, for example, of the enduring power of elite universities both to select and reinforce the socially advantaged. In a complementary way, O’Rand (1996) emphasizes the role of institutions and life course trajectories of schooling, of work, and of family in producing complex patterns of cumulative advantage and disadvantage. One can imagine that people are endowed with different levels of cognitive ability and how these would be magnified over time through different school opportunities, particular forms of employment and the strategic manage-

ment of familial responsibilities. How all this occurs however is obviously complex, and more robust treatments of the multilevel processes in play emphasize interconnections of social structure, opportunities and risks, resources and human agency, temporality and trajectories of social roles, and role-related attainments (Ferraro and Shippee 2009). Such work emphasizes the ways in which institutions structure opportunities and how processes involving selection and allocation of resources are directed to those who have “more to offer.”

A complementary idea emphasizes the notion of accumulation (Caspi et al. 1987). Initial differences across people increase the likelihood of continuity of state or position by virtue of selection or allocation into like circumstances in the future. For example, early exposure to poverty may result in diminished opportunities for education by virtue of geographic isolation and segregation that then translate into limited attainment, poorer employment options, and increased risk of further poverty in later life. From another perspective, the continuity of state may imply accumulation of advantage or disadvantage in that people who are consistently non-poor may have quite different experiences when compared to the sporadically poor or being chronically poor.

An alternative hypothesis about accumulation of (dis)advantage discussed above is the proposition that individual differences become muted over time. Typically associated with studies of health and aging, the leveling hypothesis proposes that biological, psychological, and social differences across people, particularly those associated with socioeconomic stratification, diminish over time (see discussions in Dupre 2007 and Herd 2006). With respect to physiology, it is not unreasonable to assume that differences in robustness may diminish as entire cohorts become progressively frailer with advancing age (Lynch 2008). Similarly, one could imagine that racial, educational and economic gradients in health would shrink as physiological aging and senescence become more pronounced. To date, the literature is mixed, but several studies provide evidence that aging is indeed a leveler (e.g., Dowd and Bengtson 1978).

Still, the existing literature largely encompasses comparisons of different birth cohorts to proxy individual aging and hence does not speak directly to life course concerns about trajectories of within-person change.

Applying these perspectives on change over the life course to questions of BMI and excess weight, there are a number of provocative theses. First, there might be cumulative advantage or disadvantage in weight gain over time. As will be discussed in more detail below, psychometric principles around ceiling and floor effects in measures direct attention to the correlation between the initial level of an outcome of interest such as BMI and subsequent change over time. If range is bounded (and there is some central tendency in direction of change), one might expect a negative correlation. Those who are initially high on some outcome would be expected to show relatively smaller gain over time given the pre-existing ceiling. Those who are low on some outcome will have less room to drop. In the instance of BMI, there is no necessary limit or the limits are determined by functionality and extreme, and hence one could imagine a range of potential growth curves. High BMI in early life may be associated with steeper trajectories of weight gain in subsequent years. This may reflect the self-reinforcing character of weight and caloric intake. Alternatively, it is possible that a leveling process occurs whereby weight gain that is age-driven may mute initial differences.

A second and equally interesting implication is that social gradients in BMI may respond directly to the process of aging. There is good evidence that socioeconomic and racial differences in body mass are apparent in early life, including the preschool years. Whitaker and Orzol (2006) show data indicating that Hispanics have almost twice the rates of obesity as non-Hispanic whites at 3 years of age, while gradients of obesity risk are more or less linear with respect to maternal education and household poverty. Likewise, studies of short-term panel data such as the Early Childhood Longitudinal Study-Birth Cohort (ELCS-B) suggest continuity of risk, but do not allow for further elaboration to other life stages (e.g., Moss and Yeaton

2011). Similar dynamics are suggested by other cross-sectional analyses that show socioeconomic and race differences in BMI and obesity risk present in adulthood (Ogden et al. 2006). Still, without appropriate longitudinal data and analyses of trajectories of BMI with aging, we lack key information about both trends and heterogeneity in trends of BMI over the life course, about potential time-varying dynamics of risk factors, and how these configurations of conditions cohere to explain the dynamic patterns of cumulative advantage or disadvantage and the potential of leveling of life course inequalities with advancing age.

In the remainder of this chapter, we turn to the logic and mechanics of a growth curve analytic strategy that allows researchers to capture such life course dynamics and we turn to data from the National Longitudinal Survey of Youth -1997 and the issue of BMI to provide illustrations of how the key life course analytic concepts can be operationalized within a growth curve framework. Table 1 provides an overview of the relationship between the conceptual issues discussed above and the various analyses, tables, and figures describing the empirical aspects of our work.

4 Growth Curve Analysis and Trajectories of BMI: Data Structure and Statistical Foundations

The basis of growth curve analysis of any sort involves some form of panel data and typically a random-effects statistical framework. In terms of data structure, units are observed at multiple points in time and data is collected repeatedly (e.g., annually) on specific outcomes (e.g., height and weight). Table 2 shows a typical “flat” or “wide” file structure for a fictitious sample of children studied from age 10 to age 14. In these data, each case represents a single individual with time-invariable or stable measures combined with time-varying measures that have some particular variable label that denotes time of measurement (e.g., HEIGHT1).

Most statistical programs for growth curve analysis require that the data be in a person-period format. Here the data are simply reconfigured from the wide format so that each specific period is embedded within a person. The reconfiguration of the same data from Table 2 with the addition of calculated BMI is shown in Table 3. In this example, each respondent contributes five “periods” where the time-invariant factors can vary across respondents but are constant within respondents and the time-varying factors can be variable across both respondents and periods.

An initial starting point for any analysis would be consideration of the individual growth trajectories. Practically, such trajectories show both the initial level of BMI as well as the within-person change over time. The illustrative data from Tables 1 and 2 are portrayed in Fig. 1.

This information is clearly valuable. In this case, there is clear variation in the starting points of observation and clear variation in growth with age such that knowing where someone was at the start of the observation period is of limited value for knowing where they ended up. At the same time, a more formal accounting of the various quantities, incorporation of statistical uncertainty through sampling error, and covariate adjustment to better understand the nature of the sample heterogeneity requires a statistical framework that both accounts for its unique character and yields the quantities of interest. Here, we can turn to the family of random effects models.

Table 1 Overview

Theory	Formulae	Tables	Figures
Social structure and development	3, 4	4, 5, 6, 7	3, 5, 6, 7
Longitudinal associations	6	5, 6, 7	5, 6, 7
Trajectories, transitions, and turning points	5	3, 4, 5, 6	1, 3, 5, 6, 7
Accumulation, accentuation, and leveling		6, 7	5, 6, 7

4.1 The Variance-Components Model

For the following illustrations, we estimate models using the XTMIXED routine in Stata 13.1. Given this, the notation that we adopt parallels that of Rabe-Hesketh and Skrondal (2008) who have produced an excellent text on multilevel and longitudinal modeling using Stata. In general, efforts to understand how outcomes for person *j* at period *i* are determined can usefully turn to a standard regression model:

$$BMI_{ij} = \beta + \zeta_j + \varepsilon_{ij} \tag{1}$$

where the body mass index score for person *j* at time *i* is a function of some sample mean β , a residual component ζ_j that is specific to each individual and constant across periods and a component ε_{ij} that is specific to each subject at each time period. Here the component ζ , often termed the *random intercept*, has a mean of zero and a variance Ψ and indicates the composite deviation of the person’s mean from the overall mean β . The component ε_{ij} is the within-person residual that indicates the period specific deviations off of the person-specific mean. It too has an assumed mean of zero and a variance of θ . A particularly important quantity from such models is the inter-class correlation which assesses the amount of variance that is between subjects and the amount of variance that is within-subjects over time:

$$\rho = \frac{\Psi}{\Psi + \theta} \tag{2}$$

As can be seen, the statistic itself is a ratio of the between cluster variance, Ψ , to the total variance and, as growth curve models involve time ordered observations clustered within individuals, the statistic indicates how much of the variance exists across individuals or within individuals over time. For growth curve analysis, this statistic serves two purposes. First, it tells us whether there is sufficient variance within subjects to even begin growth curve analysis. Second, it provides a quick and informative metric on how much explanatory power exists at each of the different levels.

Table 2 Data in wide file format

ID	Race	Sex	PARED	HEIGHT1	HEIGHT2	HEIGHT3	HEIGHT4	HEIGHT5	WEIGHT1	WEIGHT2	WEIGHT3	WEIGHT4	WEIGHT5
1	NHW	F	LTHS	50	52,2	54,4	56,6	58,8	78	91	104	117	130
2	NHW	M	4YR	57	58	59	60	61	90	102	114	126	138
3	AA	M	HS	50	51,8	53,6	55,4	57,2	75	84	93	102	111
4	AA	F	SC	54	55,1	56,2	57,3	58,4	65	76	87	98	109
5	H	F	HS	58	60	62	64	66	80	91	102	113	124
6	NHW	M	HS	52	53,1	54,2	55,3	56,4	80	86	92	98	104
:	:	:	:	:	:	:	:	:	:	:	:	:	:
K	H	M	2YR	54	54,9	55,8	56,7	57,6	80	95	110	125	140

Table 3 Data in person-period file format

ID	Period	Race	Sex	Pared	Height	Weight	BMI
1	1	NHW	F	LTHS	50	78	21,9
1	2	NHW	F	LTHS	52,2	91	23,5
1	3	NHW	F	LTHS	54,4	104	24,7
1	4	NHW	F	LTHS	56,6	117	25,7
1	5	NHW	F	LTHS	58,8	130	26,4
2	1	NHW	M	4YR	57	90	19,5
2	2	NHW	M	4YR	58	102	21,3
2	3	NHW	M	4YR	59	114	23,0
2	4	NHW	M	4YR	60	126	24,6
2	5	NHW	M	4YR	61	138	26,1
3	1	AA	M	HS	50	75	21,1
3	2	AA	M	HS	51,8	84	22,0
3	3	AA	M	HS	53,6	93	22,8
3	4	AA	M	HS	55,4	102	23,4
3	5	AA	M	HS	57,2	111	23,8
4	1	AA	F	SC	54	65	15,7
4	2	AA	F	SC	55,1	76	17,6
4	3	AA	F	SC	56,2	87	19,4
4	4	AA	F	SC	57,3	98	21,0
4	5	AA	F	SC	58,4	109	22,5
5	1	H	F	HS	58	80	16,7
5	2	H	F	HS	60	91	17,8
5	3	H	F	HS	62	102	18,7
5	4	H	F	HS	64	113	19,4
5	5	H	F	HS	66	124	20,0
6	1	NHW	M	HS	52	80	20,8
6	2	NHW	M	HS	53,1	86	21,4
6	3	NHW	M	HS	54,2	92	22,0
6	4	NHW	M	HS	55,3	98	22,5
6	5	NHW	M	HS	56,4	104	23,0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
K	1	H	M	2YR	54	80	19,3
K	2	H	M	2YR	54,9	95	22,2
K	3	H	M	2YR	55,8	110	24,8
K	4	H	M	2YR	56,7	125	27,3
K	5	H	M	2YR	57,6	140	29,7

To incorporate covariates into the model, the standard model is simply elaborated. For example, if we are interested in knowing whether there are substantive differences by educational attainment on BMI, the resulting model is

$$BMI_{ij} = \beta_0 + \beta_1 education_{1j} + \zeta_j + \varepsilon_{ij} \quad (3)$$

where the β_1 coefficient indicates the degree to which variation in educational attainment shifts, up or down, the predicted value of BMI_{ij} from the population mean β_0 . A graphic representation of this is shown in Fig. 2. This graphic shows how a given individuals growth rate is defined by some average distance between the respondent's time

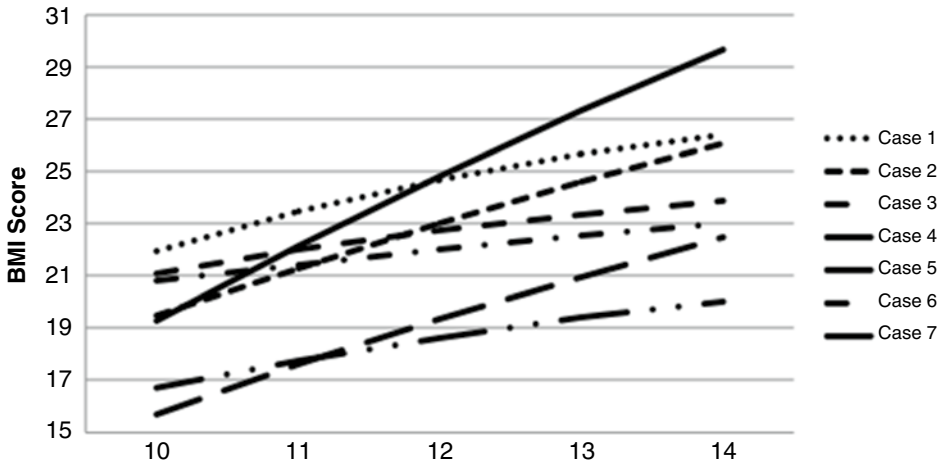


Fig. 1 Hypothetical trajectories of BMI over time

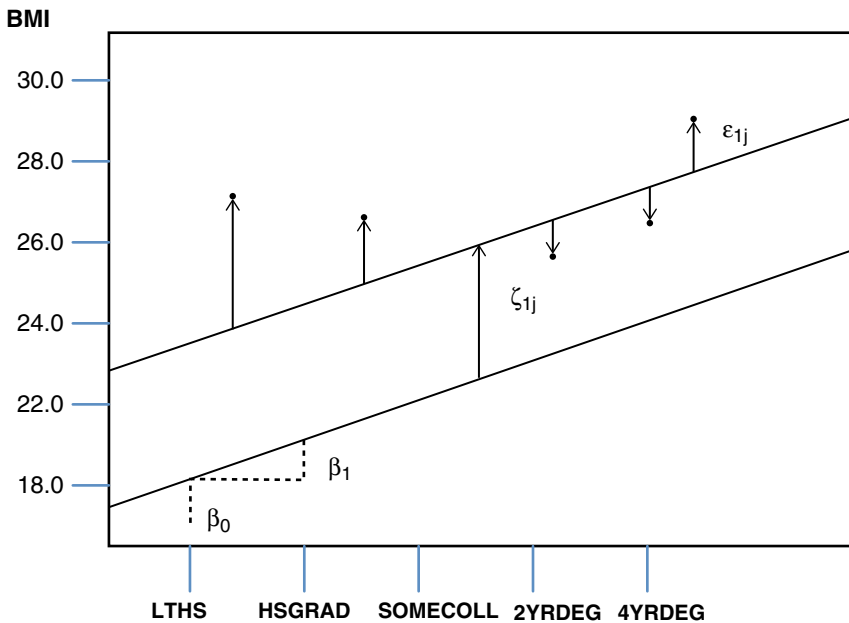


Fig. 2 Illustration of random-intercept model

ordered observations, how the individual specific growth rate varies off of a population average growth rate by the extent ζ_{ij} and how the time-specific observations vary off of the unobserved trajectory by amount ϵ .

The key adaptation that moves one from the standard random-effect framework to a growth curve analysis is the introduction of *random*

coefficients. Random coefficients or random slopes allow the effects of covariates to vary across units. One very simple representation of this is to think of being able to run separate regression analyses for each of the j units in the sample. Each of these regressions would indicate variation in effects across units by virtue of a person-specific intercept and person-specific

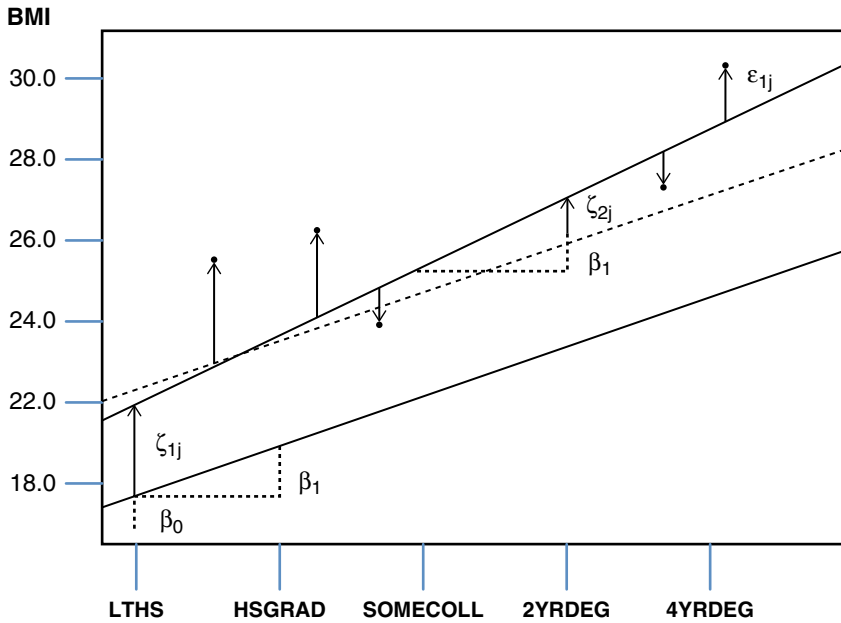


Fig. 3 Random-coefficient representation

slope. Yet to identify the extent or magnitude of variation and statistical significance, it is necessary to formalize the relations within a linear model. Again, consider the example of educational differences in BMI that we encountered earlier. In the previous specification, we simply examined how much person specific BMI shifted depending upon level of educational attainment. In a random coefficient model, the education effect itself is variable and parameterized as such:

$$BMI_{ij} = \beta_0 + \beta_1 education_{1j} + \zeta_{1j} + \zeta_{2j} education + \varepsilon_{ij} \quad (4)$$

where the core parameters are defined as before while ζ_{1j} represents the deviation of person j from the mean intercept β_0 and ζ_{2j} represents the deviation of person j 's slope from the mean slope β_1 . Figure 3 represents this graphically. Again, the ε define the distances between the best fitting slope across levels of education and the actual data points for a given individual. β_0 captures the deviation of the population intercept off of zero, while ζ_{1j} captures the deviation of the referenced individuals intercept off of the population intercept. β_1

indexes the population slope of the change in BMI for unit changes in educational attainment, while ζ_{2j} represents the unique deviation of the referenced individuals slope off the population slope.

To produce a growth curve model within this framework, one simply incorporates some dimension of time as the key random coefficient. Here, one could think of any markers of aging or development, including age, standard time (e.g., days, weeks, months, years), developmental stages (e.g., school grade), or even life stage (e.g., infancy, childhood, the teenage years, early adulthood, mid adulthood, old age). Importantly, the model will accommodate any temporal dimension suitable with the qualification that the research needs to specify appropriate scaling that lends itself to interpretation. So, for a growth curve analysis within a random coefficient framework, one would estimate

$$BMI_{ij} = \alpha + \beta_1 Age_{ij} + \zeta_{1j} + \zeta_{2j} Age_{ij} + \varepsilon_{ij} \quad (5)$$

where BMI for person j at time i is a function of a population mean, denoted α , a regression parameter β_1 that shows the association between

BMI and age for person j at time i , ζ_{1j} is a random intercept, and an idiosyncratic error term ε for person j at time i . The β_1 parameter in this model captures the degree of growth over time as it indexes change in BMI associated with (a one-unit) change in age. Moreover, the second ζ_{1j} parameter specifies a random slope of age that allows for variation in their overall rate of growth over time.

From this initial model, the operationalization of the core life course concepts and principles guides which covariates are added and how the model is structured. Covariates in a growth curve framework are usefully differentiated into those that are time invariant and those that are time-varying. In the former case, values of the covariate are fixed over the entire range of the observation window (i.e., do not change). In the latter case, covariate values can and do change over time. In either case, covariates can simply be added to the part of the model predicting initial level or intercept and/or to the part of the model predicting change over time, although interpretation changes depending upon covariate type and place in the model. For example, if one was interested in knowing whether socioeconomic status in one's family of origin influences trajectories of BMI, and again following the style of Rabe-Hesketh and Skrondal (2008), one would estimate parameters for the following equation:

$$BMI_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 FSES_j + \zeta_{1j} + \zeta_{2j} Age_{ij} + \beta_3 FSES_j * AGE_{ij} + \varepsilon_{ij} \quad (6)$$

The term β_1 captures the rate of change over age which is a random coefficient (due to ζ_{2j}), β_2 captures the effect of time-invariant family socioeconomic status ($FSES_j$) on the initial level of BMI, and β_3 captures the degree to which growth rates vary according to family socioeconomic status. For time-varying covariates, the model set up is the same but interpretation is more nuanced. In the case of effects on the intercept, the interpretation is strongest as the *average level* of the time-varying covariate over the observation window and its *association* with the intercept value as requirements of temporal ordering are violated. In the case of effects on the growth rate, the

best interpretation is how the rate of growth changes by level or value of the covariate. For variables that index states (e.g., married), particularly dummy variables, the interpretation is best seen as how the growth rate changes when one is in a particular state as opposed to not being in a particular state. Importantly, this has considerable affinity with ideas of linked trajectories and transitions and the potential for turning points in the life course. In the case of less discrete measure, the best interpretation is how growth is accelerated or stifled when combined with some of level of some local life circumstance. Horney et al. (1995) for example show how trajectories of offending are influenced by the extent to which one is using drugs.

5 Trajectories of BMI in the National Longitudinal Survey of Youth: 1997 and Their Implications for Life Course Theory and Research

To illustrate the logic and mechanics of this growth curve approach, we examine trajectories of BMI in the NLSY-97 data. A full description of the data and measures is found in the accompanying appendix.

An initial model first evaluates a random-intercept versus a random-coefficient specification of unconditional growth (i.e., no other covariates beyond time). In theoretical terms, this model is simply assessing trajectories of BMI across subjects and adjudicating whether it is reasonable to assume that trajectories have a single form or whether they are multifaceted. Empirically, this model including a single predictor indexing aging and the relevant parameters are shown in Table 4. The table, and all subsequent tables, is partitioned in two: the fixed part shows the relationship between the outcome BMI and the covariates in the model, in the first case aging, while the random part shows the relevant parameters for the variance components.

The initial models provide a wealth of information about the dynamics of BMI from

adolescence to adulthood. First, the intra-class correlations (ρ) show how much of the variance in BMI is across individuals or within-individuals over time. For both models, ρ has a value of 0.77, indicating that 23 % of the variance in BMI is associated with change over time. The intercept value indicates that the average BMI between the ages of 12 and 16 is approximately 22.7 ($22.303 + 0.405 = 22.708$), almost dead center of the normal range (i.e., 20–24.9). Rate of growth is shown by the β coefficients and indicates that on average BMI increases by 0.405 per year, a growth rate that is highly statistically significant. The ρ_{21} parameter incorporates a correlation between the random-intercept and the random-slope terms in model 2 and indicates no significant correlation. Finally, we perform a likelihood-ratio test comparing the random-intercept (model 1) and random-coefficient (model 2) models to see which model “fits” the data better. With two degrees of freedom for the addition of the random-coefficient and for the correlation between random components, the LR test statistic (which is distributed chi-square) has a value of 22,285 that is highly statistically significant and indicates that the random-slope specification provides a much better fit to the data. As an overall summary, the initial models provide strong evidence that the dynamics of BMI have strong temporal components that are highly variable across individuals and hence is usefully understood through a growth curve approach. Importantly, not all data have this quality, in which case a trajectory approach may not be warranted.

With evidence of significant heterogeneity in both intercepts for and growth of BMI, we next examine whether there is social structural variation in initial levels and growth rates with specific attention to race, sex and social class. In model 3 of Table 5, we begin by simply including dummy variables identifying white females, Black males and females, and Hispanic males and females with white males being the reference category. Here, white females have lower initial values of BMI ($22.204 - .946 + 0.409 = 21.667$), while black males ($22.204 + .646 + 0.409 = 23.259$) and females ($22.204 + 1.400 + 0.409 = 24.013$)

Table 4 Unconditional growth model with and without random-slopes

	Model 1		Model 2	
	Random intercept		Random coefficient	
	β	(SE)	β	(SE)
Fixed part				
Aging	0.405	0.002	0.409	0.004
Intercept	22.303	0.058	22.277	0.051
Random part				
$\sqrt{\psi_{11}}$	4.818	0.040	4.215	0.038
$\sqrt{\psi_{22}}$			0.327	0.003
ρ_{21}			-0.015	0.014
$\sqrt{\theta}$	2.561	0.006	2.132	0.005
Log likelihood	-233,226		-223,271	

Table 5 Conditional growth model with random-slopes

	Model 3		Model 4	
	Random coefficient		Random coefficient	
	β	(SE)	β	(SE)
Fixed part				
Aging	0.409	0.004	0.393	0.008
White females	-0.946	0.131	-0.958	0.132
Black males	0.646	0.174	0.690	0.176
Black females	1.400	0.174	1.254	0.176
Hispanic males	0.987	0.179	0.921	0.180
Hispanic females	0.057	0.187	0.020	0.188
<i>Interactions with aging</i>				
White females			0.008	0.011
Black males			-0.029	0.015
Black females			0.093	0.015
Hispanic males			0.043	0.015
Hispanic females			0.025	0.016
Intercept	22.204	0.091	22.229	0.091
Random part				
$\sqrt{\psi_{11}}$	4.146	0.034	4.144	0.037
$\sqrt{\psi_{22}}$	0.327	0.003	0.325	0.003
ρ_{21}	-0.025	0.014	-0.023	0.014
$\sqrt{\theta}$	2.132	0.005	2.132	0.005
Log likelihood	-223,150		-223,120	

and Hispanic males ($22.204 + .987 + 0.409 = 23.600$) have higher BMIs in mid adolescence. As would be expected, the addition of race-sex indicators reduces the random-intercept standard deviation from 4.818 to 4.146. This reduction indicates that different race-sex groups have different “starting points” in adolescence for BMI and illuminates a particular influence of social structural position on life course developmental pathways of BMI.

Perhaps more interesting, model 4 includes the interactions between race and sex and the growth parameter. This model provides a better fit to the data as the -2 log likelihood value is reduced by 30 with 5 degrees of freedom ($p < 0.001$). Here, the growth in BMI over time is substantively similar for white males (0.393), white females ($0.401 = 0.393 + 0.008$), Black males ($0.364 = 0.393 + -0.029$), and Hispanic females ($0.418 = 0.393 + 0.025$) as none of the product terms are statistically significant. In contrast, there are statistically significant, larger growth rates for Black females ($0.486 = 0.393 + 0.093$) and Hispanic males ($0.436 = 0.393 + 0.43$).

Combining the intercept estimates with the growth parameters creates a unique lens on the dynamics of BMI across race and sex (Fig. 4). For example, while the rate of growth is the same, white females have lower initial BMIs in mid adolescence compared to white males while black males have higher initial BMIs. Black females show a different pattern in that their initial level of BMI is substantially (and statistically) higher than all other race-sex groups *and* their rate of growth is the largest. This could be interpreted as a pattern of earlier onset of excess weight given that the initial level of BMI is almost at the threshold for being over weight (≈ 24). Hispanic males also show a similar pattern of earlier onset of high BMI coupled with larger than average growth. In contrast, Hispanic females are within the error-bounds of average for initial BMI but show a slightly accelerated growth rate. Taken as a whole, the accelerated growth of BMI trajectories for Black females and Hispanic males may be seen as an interesting case of cumulative disadvantage as initial differences become accen-

tuated over time. At the same time, there is no clear evidence of attenuation or leveling.

Extending the analysis, we incorporate a measure of social class: father’s educational attainment. Social class is a further indicator of position in social structural position and a key variable that should shape trajectories of experience and state over time. Relevant parameter estimates are shown in Model 5 in Table 6. When father’s education is included in the model as an influence on the random-intercept, two interesting findings emerge. The first is a small, negative effect on initial BMI. Each additional year of a father’s education decreases initial BMI by 0.096 points. Considering that initial BMI has a standard deviation of around 4, a unit change in educational attainment of fathers is equivalent to 1/20th of a standard deviation. Second, the inclusion of father’s educational attainment reduces race-sex differences, particularly for Black males and females and for Hispanic males. In comparison to the coefficient indexing race-sex differences in model 4, the effects shown in model 5 are decreased by 19 %, 9 %, and 34 %, respectively. At the same time, there are strong conditional effects on trajectories of growth. Here, unit increases in father’s education are associated with a 0.009 point decrease in annual change in BMI, independent of the race-sex effects on growth. We also investigated whether effects of father’s education on growth rate was conditional on race and sex and found no convincing evidence. As a result, the estimated model assumes that the effect of father’s education is consistent across race-sex groups.

Given the lack of further moderation, we need to consider race-sex subgroups and father’s education effects simultaneously to identify processes that accentuate or attenuate the trajectory of BMI. In one respect, conditional race-sex differences in growth of BMI are both accentuated and attenuated with the inclusion of father’s education. The latter is seen with respect to Black females (0.093–0.082) and Hispanic males (0.043–0.014). The former is seen for Black males (-0.029 to -0.042). In another respect, the negative effect of father’s educational attainment combines with race-sex effects to produce cumulative patterns of

Table 6 Conditional growth model with random-slopes

	Model 5		Model 6	
	Random coefficient		Random coefficient	
	β	(SE)	β	(SE)
Fixed part				
Aging	0.516	0.021	0.497	0.021
White females	-0.965	0.132	-1.008	0.131
Black males	0.559	0.177	0.580	0.176
Black females	1.146	0.176	1.100	0.176
Hispanic males	0.612	0.188	0.617	0.187
Hispanic females	-0.274	0.195	-0.325	0.194
Father's education	-0.096	0.017	-0.081	0.017
Role transitions				
Marriage			1.178	0.096
Divorce/separation			-0.273	0.246
Enrolled in school			-0.752	0.044
Employed			0.230	0.037
Has child			0.810	0.075
Interactions with age				
White females	0.008	0.011	0.006	-0.011
Black males	-0.042	0.015	-0.046	0.015
Black females	0.082	0.015	0.080	0.015
Hispanic males	0.014	0.016	0.012	0.016
Hispanic females	-0.003	0.016	-0.006	0.016
Father's education	-0.009	0.001	-0.010	0.001
Marriage			-0.075	0.009
Divorce/separation			-0.004	0.021
Enrolled in school			0.093	0.005
Employed			-0.031	0.005
Has child			-0.053	0.008
Intercept	23.532	0.247	23.648	0.008
Random part				
$\sqrt{\psi_{11}}$	4.134	0.037	4.115	0.037
$\sqrt{\psi_{22}}$	0.324	0.003	0.323	0.003
ρ_{21}	-0.029	0.014	-0.024	0.014
$\sqrt{\theta}$	2.132	0.014	2.114	0.014
Log likelihood	-223,078		-222,386	

growth. For example, a one standard deviation (≈ 3) increase in father's education would decrease growth in BMI by 0.027 points. This implies that approximately one-third of the growth disadvantage of Black females ($0.082 + -0.027 = 0.55$) would be offset if father's had higher educational attainment. In contrast, the growth advantage of Black males increases by approximately two-

thirds ($-0.042 + -0.027 = -0.069$) with similar advantages in family background. For the other groups, non-significant differences are simply modified in line with linear increases in father's educational attainment.

The previous analyses have investigated links between social structure and the development of weight gain. But, we can elaborate life course

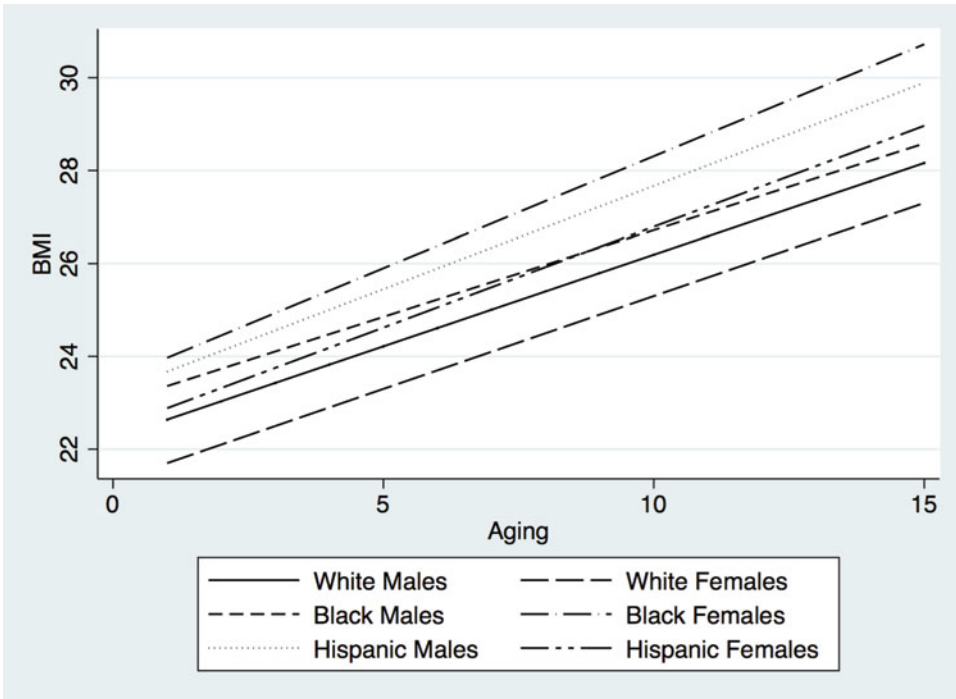


Fig. 4 Trajectories of BMI by race and sex, NLSY-97

theory further by considering life course dynamics in response to particular role transitions. As discussed earlier, role transitions are pivotal components of trajectories with important transformative potential (Shanahan 2000). In extreme cases, transitions can radically alter or wholesale change trajectories and produce turning points in life course trajectories (Sampson and Laub 1995). This notion that a single event can have a radical impact on redirecting the life course may be challenging to demonstrate empirically, but “turning points” that dramatically shift the life course has long been recognized. A sudden illness or accident, an unexpected job opportunity, or a chance encounter are but a few examples of events that constitute “turning points,” reasonably exogenous occurrences that suddenly alter an expected trajectory of behavior. We consider this next by examining the idea that role shedding and acquisition in the transition to adulthood may expose people to new environments, networks, and experiences that may alter their current states of being.

We examine this issue in Model 6 of Table 6 by including specific role transitions in models

predicting BMI. Unlike the previous models, these are *time-varying* variables that index whether someone is or is not in a given state in any given year. Referencing widely accepted markers of the transition to adulthood (Shanahan 2000), we focus attention on *school enrollment*, *full-time employment*, *marriage*, *marital dissolution*, and *parenthood*. Consistent with our earlier descriptions, the model includes effects on both the intercept and the growth parameter yet organizes discussion of interpretation largely on the latter.

As discussed earlier the effects of role transitions on the random-intercept are not particularly interpretable. One cannot say much other than to note that there are large effects on average levels of BMI. Being married, for example, is associated with 1.178 higher BMI. A slightly smaller positive association is seen for parenthood (0.810), while employment also shows a positive association but one that is much smaller (0.230). In contrast, being enrolled in school is associated with 0.752 lower BMI points, while being divorced or separated has no significant

association with average BMI. Effects on growth are much more interpretable and in most cases substantial. For example, when respondents are married, their growth rate for BMI decreases by -0.075 points per year. Growth in BMI is also muted when one is employed or a parent, by -0.031 and -0.053 points per year, respectively.

For purposes of illustration, rather than systematic investigation, we briefly consider the issue of role configurations. Here, we do so by simply estimating whether the effects of marriage and parenthood are conditional on the presence of the other state. As with family social class, there are good reasons to think that the meaning of particular role is shaped by the presence or absence of other roles (Macmillan and Copher 2005). The relevant parameters are again product terms but this time capturing the co-occurrence of time-varying marriage and parenthood. Shown in model 8 of Table 7, neither parameter is statistically significant, indicating that both marriage and parenthood matter for BMI and trajectories of BMI but operate independent of one another.

As a final set of analyses, we try to knit together the various themes by emphasizing life course *longitudinal associations* as further connecting ideas about social structure, transitions and trajectories, and accumulation, accentuation, and leveling over the life course. We do so by including a measure of respondent's educational attainment, as both a direct and conditional effect. An individual's educational attainment is a key indicator of achieved socioeconomic status (Hauser and Warren 1997), and an essential element in models of socioeconomic mobility with fundamental associations with educational attainment and social class position of parents (Blau and Duncan 1967). Educational status, of course, has a wide range of consequences for life chances, including health dynamics (Ross and Wu 1995).

Model 9 in Table 8 includes respondent's educational attainment as a time-varying covariate in the model with effects on both the random-intercept and the random-coefficient indexing heterogeneity in growth over time. There are several important findings. First, educational attainment has countervailing effects on the intercept

or average level of BMI and growth in BMI over time. In the former case, each change in educational attainment is associated with a 0.311 higher average BMI. As before, this parameter is particularly difficult to interpret as educational attainment, both in the data and in general, is sequential and age-graded. As such there are no cases of high educational attainment on the initial intercept. At the same time, the conditional effect of father's educational attainment is -0.103 .

In contrast, effects on growth yield a number of interesting findings that have much clearer interpretation. It is immediately apparent that an individual's educational attainment has large, negative effects on BMI growth ($\beta = -0.043$). In addition to being highly statistically significant, the inclusion of respondent's education substantially increases fit to the data ($\Delta -2LL = 192, 2 df$). This parameter indicates that growth rates decelerate or trajectories are flatter at higher levels of education. Equally important, the inclusion of respondent's educational attainment reduces the effect on growth of father's educational attainment by about 50 % to 0.005 (compare with Model 6 in Table 6). Interestingly, this is the only variable that is substantially mediated: both the race-sex and role transition indicators are largely unchanged from that seen in earlier models.

The relative independence of these factors leads one to further consider accentuation and attenuation associated with combinations of characteristics. As one example, the growth rate for BMI for white males who are still in school and have made none of the role transitions characteristic of the transition to adulthood is 0.667 ($0.573 + 0.094 = 0.667$) indicating that BMI would increase approximately 2 points every 3 years. In contrast, a white male who has left school, is employed, married, and has a child, and has a 4 year college degree would have a growth rate of only 0.122 indicating that BMI could be expected to increase by only 1 point every eight years. In this example, we can see cumulative advantages that accrue from normative role transitions accompanied by high educational attainment and how educational attainment can produce increased variance in trajectories of BMI over time.

Table 7 Conditional growth model with random-slopes

	Model 7		Model 8	
	Random coefficient		Random coefficient	
	β	(SE)	β	(SE)
Fixed part				
Aging	0.523	0.032	0.499	0.022
White females	-1.007	0.131	-1.009	0.131
Black males	0.579	0.176	0.577	0.176
Black females	1.110	0.176	1.092	0.176
Hispanic males	0.620	0.187	0.616	0.187
Hispanic females	-0.327	0.194	-0.327	0.176
Father's education	-0.060	0.022	-0.081	0.169
<i>Role transitions</i>				
Marriage	1.547	0.374	1.299	0.132
Divorce/separation	-0.683	1.148	-0.300	0.247
Enrolled in school	-0.505	0.183	-0.744	0.044
Employed	0.272	0.153	0.229	0.037
Has child	1.058	0.313	0.859	0.082
Married with child			-0.225	0.182
<i>Interactions with father's education</i>				
Marriage	-0.031	0.030		
Divorced/separated	0.034	0.092		
Enrolled in school	-0.020	0.014		
Employed	-0.003	0.012		
Has child	-0.020	0.026		
<i>Interactions with age</i>				
White females	0.006	0.011	0.006	0.011
Black males	-0.046	0.015	-0.045	0.015
Black females	0.080	0.015	0.082	0.015
Hispanic males	0.012	0.016	0.012	0.016
Hispanic females	-0.005	0.016	-0.005	0.016
Father's education	-0.012	0.002	-0.010	0.001
Marriage	-0.038	0.020	-0.087	0.012
Divorce/separation	0.028	0.094	-0.001	0.021
Enrolled in school	0.073	0.022	0.092	0.005
Employed	-0.038	0.020	-0.031	0.005
Has child	-0.085	0.032	-0.060	0.009
Married with child			0.024	0.017
<i>Interactions with father's education</i>				
Married	0.002	0.003		
Divorced/separated	-0.003	0.008		
Enrolled in school	0.002	0.002		
Employed	0.001	0.002		
Has child	0.003	0.003		
Intercept	23.394	0.309		
Random part				
$\sqrt{\psi_{11}}$	4.115	0.037	4.115	0.037
$\sqrt{\psi_{22}}$	0.323	0.003	0.323	0.003
ρ_{21}	-0.024	0.014	-0.024	0.014
$\sqrt{\theta}$	2.114	0.005	2.114	0.005
Log likelihood	-222,383		-222,385	

Before concluding with some summary graphics, we consider a clear example of accentuation as whether advantages of in one’s family of origin are amplified by one’s own status achievements. Such an effect is seen via product terms indexing higher levels of father’s education by higher levels of respondent’s education that are included in model 10 in Table 8. Again, we concentrate on the effects on the growth parameter

and the relevant coefficient is highly statistically significant. There are different ways of interpreting the effects given the nature of the variables, but they are generally complementary. In this illustration, we focus on the degree to which father’s educational attainment conditions the contemporaneous effects of respondent’s educational attainment on trajectories of BMI. This interpretation is conceptually more tractable: the

Table 8 Conditional growth models with random slopes

	Model 9		Model 10	
	Random coefficient		Random coefficient	
	β	(SE)	β	(SE)
Fixed part				
Aging	0.573	0.032	0.424	0.043
White females	-1.043	0.131	-1.040	0.131
Black males	0.605	0.176	0.610	0.176
Black females	1.037	0.176	1.105	0.176
Hispanic males	0.615	0.187	0.601	0.187
Hispanic females	-0.382	0.194	-0.383	0.194
Father’s education	-0.103	0.023	-0.158	0.027
R’s education	0.311	0.019	0.079	0.080
<i>Role transitions</i>				
Marriage	1.499	0.374	1.173	0.378
Divorce/separation	-0.821	1.146	-0.531	1.147
Enrolled in school	-0.694	0.183	-0.868	0.188
Employed	0.200	0.152	0.326	0.154
Has child	0.991	0.312	0.928	0.313
<i>Interactions with father’s education</i>				
Marriage	-0.048	0.030	-0.067	0.030
Divorced/separated	0.024	0.092	0.001	0.092
Enrolled in school	0.014	0.015	0.029	0.015
Employed	-0.008	0.012	-0.018	0.012
Has child	-0.017	0.026	-0.011	0.026
R’s education			0.018	0.006
Interactions with age				
White females	0.013	0.011	0.013	0.011
Black males	-0.052	0.015	-0.054	0.015
Black females	0.091	0.015	0.088	0.015
Hispanic males	0.011	0.016	0.015	0.016
Hispanic females	0.004	0.016	0.005	0.016
Father’s education	-0.005	0.002	0.006	0.003
Marriage	-0.087	0.035	-0.119	0.036
Divorce/separation	0.041	0.093	0.009	0.094
Enrolled in school	0.094	0.022	0.128	0.023
Employed	-0.032	0.020	-0.047	0.020

(continued)

Table 8 (continued)

	Model 9		Model 10	
	Random coefficient		Random coefficient	
	β	(SE)	β	(SE)
Has child	-0.074	0.032	-0.062	0.032
R's education	-0.043	0.002	0.001	0.009
<i>Also by father's education</i>				
Married	0.004	0.003	0.006	0.003
Divorced/separated	-0.001	0.008	0.001	0.008
Enrolled in school	-0.003	0.002	-0.006	0.002
Employed	0.001	0.002	0.002	0.002
Has child	0.002	0.003	0.001	0.003
R's education			-0.003	0.001
Intercept	23.055	0.309	23.758	0.006
Random part				
$\sqrt{\psi_{11}}$	4.118	0.033	4.120	0.033
$\sqrt{\psi_{22}}$	0.321	0.003	0.321	0.004
ρ_{21}	-0.026	0.014	-0.028	0.014
$\sqrt{\theta}$	2.110	0.005	2.111	0.014
Log likelihood	-222,191		-222,177	

most straightforward interpretation of effects on growth with time-varying variables is the degree to which growth rates increase or decrease *when* one is in a given state or at a given level of the moderating factor. From this perspective, a unit change in educational attainment is associated with a -0.019 decrease in growth of BMI when father's educational attainment is low (two standard deviations below the mean). When father's educational attainment is average (≈ 12 years), a unit change in educational attainment is associated with -0.040 decrease in growth of BMI. For those whose fathers who have high levels of educational attainment (two standard deviations above the mean), effect of educational attainment on growth is -0.059. As a simple lens into the implications of such differences, the growth rate for BMI for someone (e.g., white male who is exited school but made no other role transitions) with high educational attainment (i.e., graduate school) but whose fathers had a low level of educational attainment would be 0.291 ($0.424 + [-0.019*7]$) or just over 1 BMI point increase every 4 years. In contrast, a similar indi-

vidual whose father had high educational attainment would see virtually no change in BMI over time ($0.424 + [-0.059*7 = 0.011]$).

We conclude by returning to graphic representations to show how the various estimates combine to produce distinctly different trajectories of BMI illustrating the different types of life course effects we have described. Here, we highlight five dimensions of stratification, race, sex, family SES, achieved education, and role acquisition in the transition to adulthood, and examine their cumulative effects on BMI. We do so by estimating expected values for each year for subgroups identified through the cross-classification of the measures of stratification. For purposes of simple representation, we first contrast two extreme cases. The first comprises black females whose father's had low levels of education (12 years or less), who themselves have low levels of educational attainment (high school graduate or less) and who move into their 20s without employment, marriage, or parenthood. The second comprises white females whose fathers had high educational attainment (16 years or greater), who

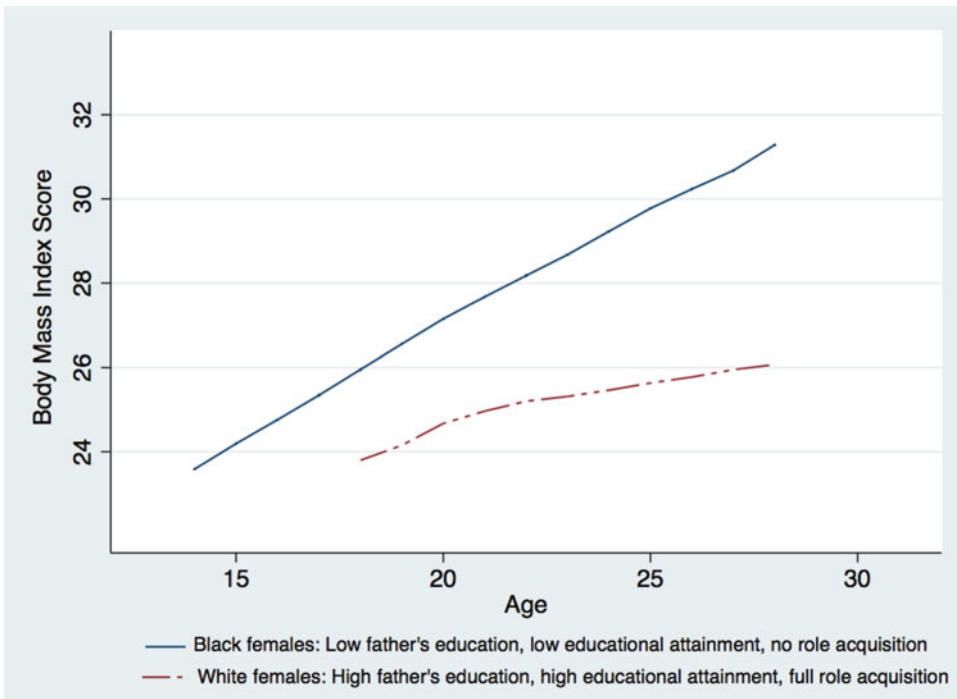


Fig. 5 Predicted values of BMI by age, stratified by race, father's educational attainment, respondent's educational attainment, and role acquisition, NLSY97

themselves had high educational attainment (some college or more) and who were employed, married, and had children in their transition to adulthood. This leads to a second set of analyses where we show the effects of father's education (low versus high), respondent's education (low versus high), and role acquisition ("empty" versus "full") for each of the race-sex groups. In the latter cases, we refer to the first group as "disadvantaged" and the second group as "advantaged."

Figure 5 shows the simulated trajectories based on estimated values of BMI from model 10. There are three interesting elements. First, there is a clear pattern of accentuation in that the BMI differential across groups was only about 2 BMI points in late adolescence, yet grows to over 5 points by the late 20s. Second, the trajectories of BMI growth are dramatically different. For the subgroup of black females, BMI is growing approximately 2 points every 5 years. In contrast, the growth rate for the subgroup of white females is only 1 point every 5 years. Third, and extrapo-

lating from the data, the average white female would fall into the obese range sometime in their late 40s or early 50s, assuming that the trajectory maintains itself. In contrast, the average Black female in that subgroup passes into the obese range at age 25. Because the effects of obesity on a wide range of health liabilities is cumulative (Ferraro and Kelley-Moore 2003), the patterns manifest stark inequalities in health over the life course.

Figure 6 shows the trajectories of BMI for females that are stratified by race and level of advantage or disadvantage. As a reference point, black females have the highest BMI in mid adolescence and show almost perfect linear growth through to the late 20s. Here, BMI increases from 23.5 to 31.5, an 8 point increase. For more advantaged black females, the trajectory of BMI begins at age 19 (when there is variation on accumulated life course role transitions (i.e., employment and marriage and parenthood) and grows approximately 1 BMI point through age 28. In comparative terms, BMI for disadvantaged Black females

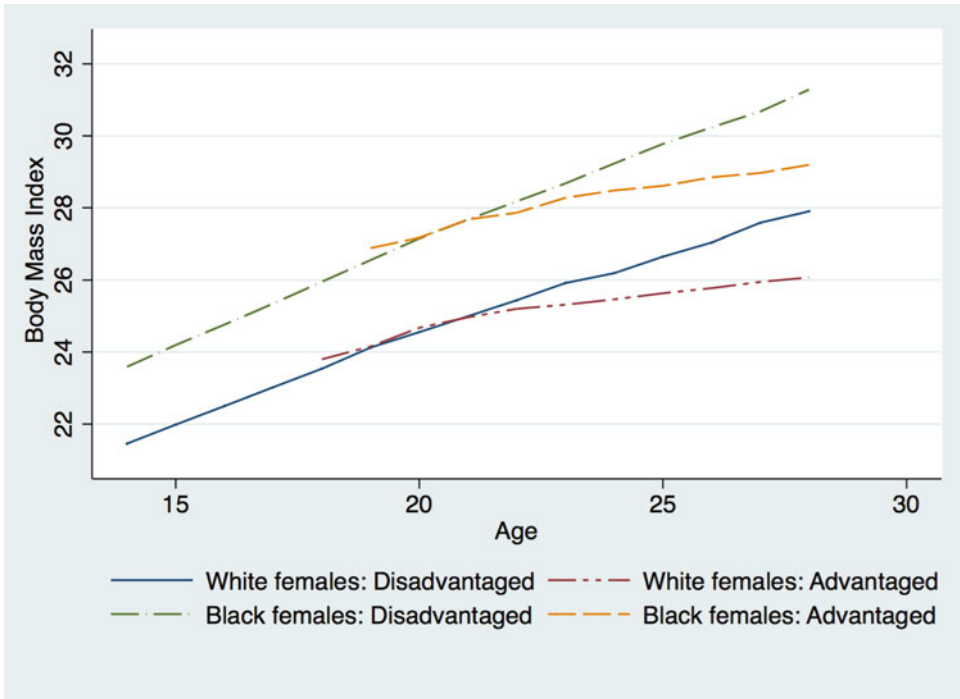


Fig. 6 Predicted values of BMI by age: females stratified by race and (dis)advantage, NLSY97

grew 4 points from age 18 to age 28 while BMI for advantaged Black females grew only 1 point. Given the structure of the model, the same trend gap applies to Hispanic and white females with the important qualification that initial levels differ by approximately 1 BMI point.

Among males we find similar patterns of trajectories of BMI (see Fig. 7). For disadvantaged males, BMI in mid adolescence is greater for Black males, although both intercepts fall within 1 BMI point of one another and are not significantly different from one another. Substantively, both show initial levels that sit at the center of the distribution for the normal range (i.e., 20–24.9). Growth however is quite steep with an increase of approximately 0.5 a BMI point each year. Trajectories for more advantaged groups could hardly be more different. White males, for example, have higher BMI in mid adolescence (25.5 at age 16) but have a relatively flat growth rate. Between age 16 and age 28, BMI only increases by about 1.5 points. Trajectories for advantaged Black males are similar but start later, due to later movement into employment, marriage, and par-

enthood. At the same time, there is significant evidence of accentuation is also present among males. For white males, as indicated, initial differences in BMI actually favor those disadvantaged (≈ 25 versus ≈ 23). By the late 20s, the pattern of advantage has flipped with advantaged white males now having BMIs that are 2 points *lower* than those disadvantaged. For Hispanic and Black males, there are no real differences in BMI in the early 20s (≈ 26.5). However, differences are notable by the late 20s.

6 Further Issues

There are numerous further issues that we have not covered in depth but warrant some discussion. First, growth curve models are analytic strategies that can be implemented in a variety of ways with varying statistical elements. In addition to the random-effects equation approach that we use, there are also structural equation model (SEM) and hierarchical linear model (HLM) approaches. In the former case, the growth rate is

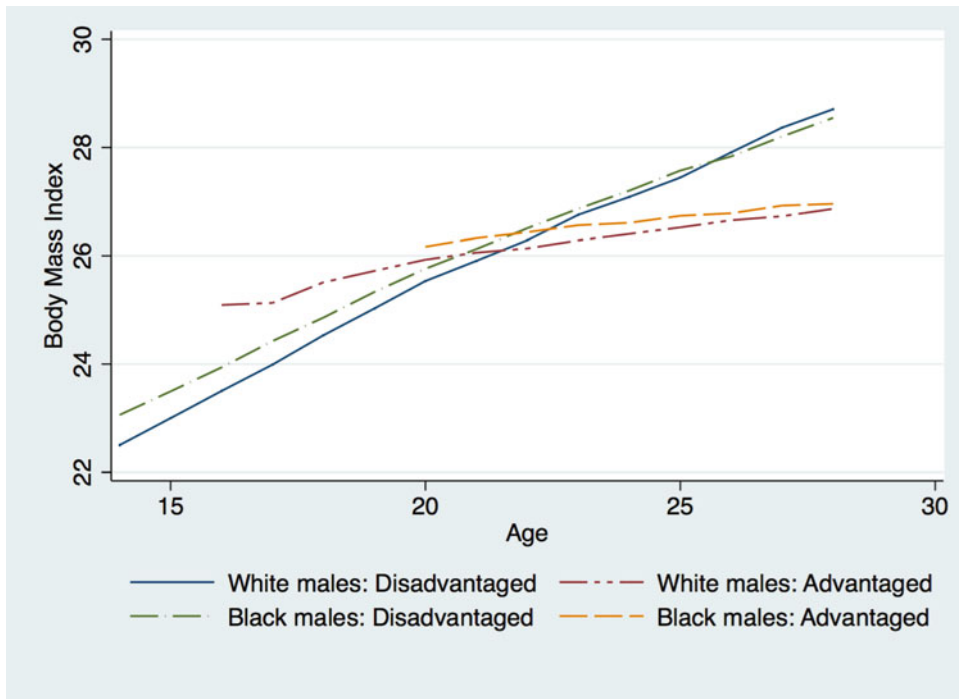


Fig. 7 Predicted values of BMI by age: males stratified by race and (dis)advantage, NLSY97

treated as a latent construct derived from a particular scaling of factor loadings for the time variable. For example, simple linear growth can be estimated by fixing time variables to have equal differences (e.g., time1=1, time2=2, time3=3). Accelerated growth simply involves alternative scaling (e.g., time1=1, time2=4, time3=9). The model is then estimated as a full-information structural equation model with the outcome at time t being a function of a latent intercept with a fixed value and a latent slope with a start value, the outcome at time $t+1$ estimated as a function of the latent intercept with a fixed value and a latent slope with a scaled up value, and so on for all the relevant time period. As with all structural equation models, variances are estimated and covariances, including those among errors, can be estimated if appropriate.

A second alternative strategy is the hierarchical linear model (HLM) approach. Conceptually, this is a two level model, two-stage model (even although all estimation is simultaneous) where an initial stage estimates random-variable intercept(s) and slope(s) for some particular out-

come in panel data and then these are used as outcomes in a second stage with covariates fitted to each to predict shifts, up or down, in intercept and slope values. In the former case, covariates in the intercept equation determine whether different sub-samples within a population have different “starting points,” while covariates in the slope equation determine whether different sub-samples within a population have different growth rates. Importantly, method of estimation or parameterization is entirely a matter of choice and different approaches will produce estimates that are substantively similar but not necessarily identical estimates given the elements in the models and peculiarities of the estimator.

We have also not placed much emphasis on effect sizes and their relationship to statistical significance. In this area, growth models are no different than any other generalized linear model in that the slope parameters of any sort indicate the magnitude of the association between the covariate and model parameter (i.e., intercept or slope). When interpreting such things, it is important to consider the scaling of independent

variables and to consider (a) how much change in intercept or slope is associated with change in the independent variable; and (b) how much residual variance is reduced when particular parameters are added to the model. There are no hard and fast rules but one can think about the issue as a general example of how much variation in the outcome is associated with a particular covariate and how large is the reduction in the variance of any given component when a particular parameter is added. On the issue of statistical significance, the main question is how one should incorporate the non-independence of units associated with the clustering of observations within individuals. Typically, one would simply adjust standard errors for non-independence using either a Huber-White sandwich estimator or a clustered sandwich estimator. Under most conditions, these increases the size of the standard error and hence decrease the likelihood of type-II errors. An equally sensible approach is to adjust upward the critical value on the hypothesis test of a given parameter and hence require a “more” significant effect before deeming it to be non-zero in the population.

7 Conclusion

The purposes of this chapter are to articulate some key concepts of a life course perspective, to translate them into a statistical structure, and show how a random-effects, growth model can articulate such concepts to speak to key questions in life course social science. We use the example of excess weight in the transition to adulthood as a means of describing both how such models work and how the relevant parameters can be interpreted to address key theoretical questions. Specifically, our analyses highlight the complex interactions of social structure, life course linkages, trajectories and turning points, and accentuation and attenuation in life course dynamics, both a general concepts and as relevant for studies of excess weight and their consequences.

A life course approach is organized around the concept of time. It is explicitly concerned with

the intersection of historical time and biographical time and the interlocked nature of development within historical context. In the most general sense, it emphasizes temporal variation in the occurrence and meaning of social events and social, psychological, and physiological states. Against this backdrop, the dynamics of social structure, particularly social position, exerts a powerful influence on variation in life course trajectories. Trajectories involve the interconnection of roles and states over time and ultimately generate life course patterns of accentuated or attenuated advantage. As a set of statistical tools, random-effect, growth analysis are particularly well suited to modeling heterogeneity in trajectories of states, social roles, or social positions by focusing explicitly on within-person change over time and its connection to time-invariant and time-varying factors. The life course perspective includes a flexible set of tools that can accommodate a wide range of relevant concepts and provide rigor of thought and method in the specification of testable hypotheses and the generation of empirical parameters.

The specifications and examples provided in this chapter are meant to orient researchers to the mechanics of growth curve analysis, the logical stages of implementation, the key statistical quantities that can be generated, and best practices for interpretation. Our example of BMI illustrates the various elements and was motivated by the specific health contexts of contemporary cohorts in OECD type countries that are rapidly witnessing “obesity epidemics” and the developmental nature of body mass. There are a wide range of applications beyond body mass and any quasi-continuous outcome is fair game, as is any dichotomous outcome that can reasonably be fit with respect to linear probability. The field of growth curve analyses is quite dynamic and increasingly broad in scope. We have not covered all the potential applications nor have we elaborated all elements in its statistical foundations. Still, as conceptualization and theorization expand and generate new and exciting questions, so will the utility of random-effect approaches to provide illuminating and provocative answers.

8 Appendix: Data and Measures

The data that we use in this research come from the National Longitudinal Survey of Youth – 1997 (hereafter NLSY97). The NLSY97 consists of an initial sample of 8,984 youths who were between the ages of 12 and 16 in 1997. When possible the respondents were re-interviewed annually and data were collected on a range of topics on the transition to adulthood. As of 2014, there are 15 waves of data that cover an age range of 12 to 31. In addition to non-Hispanic whites, the NLSY97 oversampled blacks and Hispanics such that there are relatively large samples of six race-sex groups. Compared to other national surveys, panel retention is excellent with 83 % of the sample retained at wave 15.

For a study of the dynamics of BMI, we capitalize on the record structure of the NLSY97 data and its position in the history of population health in America. For the former, the multi-panel record structure provides annual, repeated measures of self-reported height and weight, coupled a rich set of time-stable and time varying measures. In the latter case, the obesity epidemic in the United States has had profound effects on the age structure of health liabilities. As Harris (2010) notes, numerous data, including studies such as the National Longitudinal Study of Adolescent Health show unequivocally that obesity is harbinger of both short-term and longer-term chronic health problems and that a range of serious health problems (e.g., type II diabetes, hypertension) are increasingly visible through the early adult years.

The key outcome of interest is annual measures of respondent's body mass index score or *BMI* constructed from self-reported height and weight. There are clear anomalies and apparent coding errors in a small subset of person-periods and these introduce a number of extreme and unrealistic values for BMI. We deal with these by setting all values less than 12 and all values greater than 50 to be missing.

The central parameter of interest from which we extrapolate interpretation is *aging*. This is a measure that indexes the passage of time and

when included in a linear model fit to panel data captures the nature of change over time in the independent variable. This measure is the key parameter in that we can elaborate its effects in a number of ways to study the ways in which various life course dynamics are implicated in stability and change in BMI over time.

We capture various aspects of social structure by measuring *race -sex* group that differentiates *white males, white females, Black males, Black females, Hispanic males, and Hispanic females*. We also include the highest level of *father's educational attainment* based on the highest attainment of either the residential father in the household or the biological father if the former is missing. We capture an alternative measure of social structure and stratification through the *respondent's educational attainment*. Although there are a number of conceptualizations, we treat attainment as a set of dummy variables indexing 'high school/GED,' 'some college,' a 'two-year degree,' or a 'four-year college degree or greater' with the reference category being 'less than a high school degree.' This allows us to capture a range of meaningful contrasts in education as they relate to health and allows us to assess linearity or consider nonlinearities if apparent.

Finally, we capture key life course transitions and their effects on BMI. These include *school enrolment, independent residence, employment, marriage, marital disruption, and parenthood*. Each of these is measured as a dichotomous time-varying variable.

References

- Baltrus, P., Lynch, J., Everson-Rose, S., Raghunathan, T., & Kaplan, G. (2005). Race/ethnicity, life-course socioeconomic position, and body weight trajectories over 34 years: The Alameda County Study. *American Journal of Public Health, 95*, 1595–1601.
- Bauldry, S., Shanahan, M. J., Boardman, J. D., Miech, R. A., & Macmillan, R. (2012). A life course model of self-rated health through adolescence and young adulthood. *Social Science & Medicine, 75*(7), 1311–1320.
- Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure*. New York: The Free Press.
- Caspi, A., Elder, G. H., & Bem, D. J. (1987). Moving away from the world: Life-course patterns of shy children. *Developmental Psychology, 23*, 308–313.

- Conger, R. D., Conger, K. J., Elder, G. H., Lorenz, F. O., Simons, R. L., & Whitbeck, L. B. (1992). A family process model of economic hardship and adjustment of early adolescent boys. *Child Development, 63*(3), 526–541.
- Coale, A., & Demeny, P. (1966). *Regional model life tables and stable populations*. Princeton: Princeton University Press.
- Cook, T., Gruder, C., Hennigan, K., & Flay, B. (1979). History of the sleeper effect: Some logical pitfalls in accepting the null hypothesis. *Psychological Bulletin, 86*, 662–679.
- Cossrow, N., & Falkner, B. (2004). Race/ethnic issues in obesity and obesity-related comorbidities. *Journal of Clinical Endocrinology and Metabolism, 89*, 2590–2594.
- Cummins, S., & Macintyre, S. (1999). The location of food stores in urban areas: A case study in Glasgow. *British Food Journal, 101*, 545–553.
- Dannefer, D. (1987). Aging as intracohort differentiation: Accentuation, the Matthew effect, and the life course. *Sociological Forum, 2*, 211–236.
- Dannefer, D. (2003). Cumulative advantage/disadvantage and the life course: Cross-fertilizing age and social science theory. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 58*, S327–S337.
- Dong, C., Sanchez, & Price, R. (2004). Relationship of obesity to depression: A family-based study. *International Journal of Obesity, 28*, 790–795.
- Dowd, J., & Bengtson, V. (1978). Aging in minority populations an examination of the double jeopardy hypothesis. *Journal of Gerontology, 33*, 427–436.
- Dupre, M. E. (2007). Educational differences in age-related patterns of disease: Reconsidering the cumulative disadvantage and age-as-leveler hypotheses. *Journal of Health and Social Behavior, 48*, 1–15.
- Elder, G. H., & Rockwell, R. C. (1979). The life-course and human development: An ecological perspective. *International Journal of Behavioral Development, 2*(1), 1–21.
- Elder, G. H., Jr. (1985). *Life course dynamics: Trajectories and transitions 1968–1980*. Ithaca: Cornell University Press.
- Elder, G. H., Jr. (1994). Time, human agency, and social change: Perspectives on the life course. *Social Psychology Quarterly, 57*, 4–15.
- Elder, G. H., Jr. (1998). The life course as developmental theory. *Child Development, 69*, 1–12.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–14). New York: Kluwer, Springer, New York.
- Elder, G. H., Jr. (1999). *Children of the great depression*. Boulder: Westview Press.
- Ferraro, K., & Kelley-Moore, J. (2003). Cumulative disadvantage and health: Long-term consequences of obesity? *American Sociological Review, 68*, 707–729.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist, 49*, 333–343.
- Ferraro, K., Farmer, M., & Wybraniec, J. (1997). Health trajectories: Long-term dynamics among black and white adults. *Journal of Health and Social Behavior, 38*, 38–54.
- Furstenberg, F. (2003). Reflections on the future of the life course. In J. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 661–670). New York: Kluwer.
- Guo, S., & Chumlea, W. (1999). Tracking of body mass index in children in relation to overweight in adulthood. *The American Journal of Clinical Nutrition, 70*, 145s–148s.
- Guo, S., Huang, C., Maynard, L., Demerath, E., Towne, B., Chumlea, W., & Siervogel, R. (2000). Body mass index during childhood, adolescence and young adulthood in relation to adult overweight and adiposity: The Fels Longitudinal Study. *International Journal of Obesity and Related Metabolic Disorders, 24*, 1628–1635.
- Harris, K. (2010). An integrative approach to health. *Demography, 47*, 1–22.
- Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology, 27*, 177–298.
- Herd, P. (2006). Do functional health inequalities decrease in old age? Educational status and functional decline among the 1931–1941 birth cohort. *Research on Aging, 28*, 375–392.
- Hogan, D. P. (1978). The variable order of events in the life course. *American Sociological Review, 43*, 573–586.
- Horney, J., Osgood, D. W., & Marshall, I. H. (1995). Criminal careers in the short-term: Intra-individual variability in crime and its relation to local life circumstances. *American Sociological Review, 60*, 655–673.
- Khaodhiar, L., McCowen, K., & Blackburn, G. (1999). Obesity and its comorbid conditions. *Clinical Cornerstone, 2*, 17–31.
- Laub, J. L., & Sampson, R. J. (1993). Turing points in the life course: Why change matters to the study of crime. *Criminology, 31*, 301–325.
- Laub, J., Nagin, D., & Sampson, R. (1998). Trajectories of change in criminal offending: Good marriages and the desistance process. *American Sociological Review, 60*, 225–238.
- Laub, J. H., & Sampson, R. J. (2009). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge: Harvard University Press.
- Lütkepohl, H. (2007). *New introduction to multiple time series analysis*. New York: Springer.
- Lynch, S. (2008). Race, socioeconomic status, and health in life-course perspective introduction to the special issue. *Research on Aging, 30*, 127–136.
- Macmillan, R., & Copher, R. (2005). Families in the life course: Interdependency of roles, role configurations, and pathways. *Journal of Marriage and Family, 67*, 858–879.

- Macmillan, R., & Eliason, S. (2003). Characterizing the life course as role configurations and pathways: A latent structure approach. In J. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 529–554). New York: Kluwer.
- Marini, M. M. (1984). The order of events in the transition to adulthood. *Sociology of Education*, 57, 63–84.
- Massey, D., & Denton, N. (1993). *American apartheid: Segregation and the making of the underclass*. Cambridge, MA: Harvard University Press.
- Masters, R., Reither, E., Powers, D., Yang, Y., Burger, A., & Link, B. (2013). The impact of obesity on US mortality levels: The importance of age and cohort factors in population estimates. *American Journal of Public Health*, 103, 1895–1901.
- McLeod, J. D., & Almazan, E. P. (2003). Connections between childhood and adulthood. In J. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 391–411). New York: Kluwer.
- McLeod, J. D., & Shanahan, M. J. (1996). Trajectories of poverty and children's mental health. *Journal of Health and Social Behavior*, 37, 207–220.
- McLeod, J. D., & Fettes, D. L. (2007). Trajectories of failure: The educational careers of children with mental health problems. *American Journal of Sociology*, 113(3), 653.
- Meredith, W., & Tisak, J. (1990). Latent curve analysis. *Psychometrika*, 55, 107–122.
- Merton, R. (1968). The Matthew effect in science. *Science*, 159, 56–63.
- Mirowsky, J., & Ross, C. E. (2007). Life course trajectories of perceived control and their relationship to education. *American Journal of Sociology*, 112, 1339–1382.
- Modell, J., Furstenberg, F. F., Jr., & Hersberg, T. (1976). Social change and life course development in historical perspective. *Journal of Family History*, 1, 1860–1975.
- Monaghan, A. (2014, August 21). Number of young people classed as 'Neets' falls as labour market improves. *The Guardian*.
- Moss, B. G., & Yeaton, W. H. (2011). Young children's weight trajectories and associated risk factors: Results from the Early Childhood Longitudinal Study-Birth Cohort. *American Journal of Health Promotion*, 25, 190–198.
- Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, 24, 882–891.
- Nagin, D. S. (2009). *Group-based modeling of development*. Cambridge, MA: Harvard University Press.
- Nagin, D. S., Farrington, D. P., & Moffitt, T. E. (1995). Life-course trajectories of different types of offenders. *Criminology*, 33, 111–139.
- Ng, M. M., et al. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: A systematic analysis for the Global Burden of Disease Study. *The Lancet*, 384, 766–781.
- O'Rand, A. (1996). The precious and the precocious: Understanding cumulative disadvantage and cumulative advantage over the life course. *The Gerontologist*, 36, 230–238.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA*, 295, 1549–1555.
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011–2012. *JAMA*, 311, 806–814.
- Parsons, T. J., Power, C., Logan, S., & Summerbell, C. D. (1999). Childhood predictors of adult obesity: A systematic review. *International Journal of Obesity*, 23, S1–S107.
- Petersen, T. (1993). Recent advances in longitudinal methodology. *Annual Review of Sociology*, 19, 425–454.
- Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata*. College Station: Stata Press.
- Reilly, J. J., Armstrong, J., Dorosty, A. R., Emmett, P. M., Ness, A., Rogers, I., Steer, C., & Sherriff, A. (2005). Early life risk factors for obesity in childhood: Cohort study. *BMJ Open*, 330, 1–7.
- Rindfuss, R. R., Swicegood, C. G., & Rosenfeld, R. A. (1987). Disorder in the life course: How common and does it matter? *American Sociological Review*, 52, 785–801.
- Ross, C. E., & Wu, C. L. (1995). The links between education and health. *American Sociological Review*, 60, 719–745.
- Sampson, R. J., & Laub, J. H. (1995). *Crime in the making: Pathways and turning points through life*. Cambridge: Harvard University Press.
- Sewell, W. H., Jr. (1992). A theory of structure: Duality, agency, and transformation. *American Journal of Sociology*, 98, 1–29.
- Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology*, 26, 667–692.
- Shanahan, M. J., & Macmillan, R. (2008). *Biography and the sociological imagination: Contexts and contingencies*. New York: WW Norton.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford: Oxford University Press.
- Stearns, P. N. (2002). *Fat history: Bodies and beauty in the modern west*. New York: NYU Press.
- Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: Shaped by global drivers and local environments. *The Lancet*, 378, 804–814.
- U.S. Department of Health and Human Services. (2011). *Healthy weight, overweight, and obesity among U.S. adults*. Washington, DC: Centers for Disease Control and Prevention. National Center for Health Statistics.

- Wheaton, B., & Gotlib, I. H. (1997). Trajectories and turning points over the life course: Concepts and themes. Stress and adversity over the life course: Trajectories and turning points. In I. H. Gotlib & B. Wheaton (Eds.), *Stress and adversity over the life course: Trajectories and turning points* (pp. 1–25). Cambridge: Cambridge University Press.
- Whitaker, R., & Orzol, S. (2006). Obesity among US urban preschool children: Relationships to race, ethnicity, and socioeconomic status. *Archives of Pediatrics & Adolescent Medicine*, *160*, 578–584.
- Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

Three Generation Studies: Methodological Challenges and Promise

Terence P. Thornberry

1 Introduction

Human development takes place in the context of intertwined social relationships and the shape of one's life course is influenced by the shape of the life courses of others. "Actors do not behave or decide as atoms outside a social context ... Their attempts at purposive action are instead embedded in concrete, ongoing systems of social relations" (Granovetter 1985:487). One of the most intimate and influential of these relationships is that between parent and child. As Elder noted: "Each generation is bound to fateful decisions and events in the other's life course" (1985:40). A parent's catastrophic illness, sudden wealth or sudden unemployment, divorce or remarriage, imprisonment, and so forth not only affect that individual, but ripple across to affect members of other generations. They often have profound psychological and material effects on their children and, in some cases, their grandchildren. Similarly, such events can also impact prior generations of the family—parents and grandparents. Generations are linked not only by "fateful" events but by mundane, run-of-the-mill events as well. A parent's style of parenting, happiness or depression, and partner relationships can also

have profound effects on their children. It is true too that the behavior of a child can affect the parent's behavior. Bidirectional relationships between parent and child have been observed as early as toddlerhood and extend throughout the life course. For example, child temperament and the manner in which children react to a parent influence parental behavior (Patterson et al. 1992; Scaramella and Conger 2003). Clearly the lives of parents and children are inextricably linked.

Although parents and children have mutual, reciprocal influences on one another, for the design of three generation studies we are especially interested in the manner in which a parent influences the growth and development of their children.¹ Indeed, there are two central questions addressed by three generation studies. First, what are the levels of continuity and discontinuity in the behavior of interest across the generations? Second, what are the mediating and moderating influences that help explain the manner in which the lives of parent and child are linked?

The first question concerns the extent to which a parent's involvement in a particular behavior influences the likelihood that their child will also be involved in that same behavior at the same developmental stage. The typical hypothesis proffered is one of continuity. That is, we expect that children follow in the footsteps of their

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¹There are exceptions to this, for example, intergenerational studies in gerontology, which are discussed below.

parents such that parental behavior increases the odds that the child will also be involved in that same behavior. But, as discussed below, there are substantial levels of intergenerational discontinuity, an understudied area, that also require explanation.

The examination of intergenerational continuity and discontinuity in three generation studies (hereinafter 3G studies) is appropriate for and has been used to investigate a wide range of behaviors. They include conventional or prosocial activities such as educational attainment, work and career, marriage and intimate partner relations, fertility, positive parenting styles, religious affiliation, political orientation, and so forth. They also include the investigation of problem behaviors such as smoking, drug use, violence, delinquency, health problems such as obesity, mental health problems such as depression, maladaptive forms of parenting such as child maltreatment, and others. Intergenerational continuities are not limited to individual-level behaviors. For example, as Sharkey (2008) demonstrates, there are substantial levels of continuity in neighborhood context across multiple generations.

Intergenerational studies can address both homotypic and heterotypic continuity in behavior. With *homotypic continuity* parent involvement in a particular behavior—for example, drug use—significantly increases the risk that the child will also be involved in that *same* behavior. With *heterotypic continuity*, parent involvement in drug use significantly increases the risk that the child will be involved in *other* problem behaviors such as depression, violence, etc. The same issues apply to prosocial behaviors—for example, high educational attainment—where the investigation can focus on either homotypic or heterotypic continuity. Whichever type of continuity is the focus, in a sense this first core question of intergenerational study is descriptive: How similar (or dissimilar) are parents and children with respect to a particular behavior?

The second core question investigated in 3G studies is explanatory. What are the mediating and moderating influences that help account for the observed levels of intergenerational continu-

ity and discontinuity? If parents and children are similar with respect to a particular behavior, the central question is: Why? If the behavior of interest is antisocial—for example, drug use—what are the mediating processes by which the parent's involvement in drug use increases the child's risk of also being involved in drug use? There may be direct influences such as modeling the behavior, indirect influences such as the negative consequences of the parent's earlier drug use on their later life course development and on their ability to effectively socialize their children, or most likely both direct and indirect effects. If the behavior of interest is prosocial—for example, high educational attainment—the parallel question emerges. What are the processes by which the parent's success is translated into the child's success? Correctly answering these questions informs our theoretical understanding of the long-term *consequences* of the parent's behavior—drug use and educational attainment in these examples—as well as enhancing our understanding of the early *origins* of these behaviors from the perspective of the child's involvement. Understanding these processes provides vital information for the development of programs to enhance prosocial and to decrease antisocial outcomes.

In contrast, if the parent and child are dissimilar with respect to the behavior of interest—that is, if there is intergenerational discontinuity—the central question is: What moderating influences account for the discrepancy? There are two forms of discontinuity as illustrated by the example of drug use. In some cases, the child will be significantly less involved in drug use than the parent and the task is to explain intergenerational resilience. That is, what are the protective factors that reduce the transfer of risk from the parent's drug use to their child's drug use? In other cases, the child will use drugs when the parent did not and the task then is to account for *de novo* drug use. Intergenerational studies, therefore, confront an interesting, and often difficult, challenge—to account for *both* continuity and discontinuity in the behavior of interest across the generations.

Increasingly, these issues are being addressed in prospective studies based on three adjacent

generations of the same families. These 3G studies provide a powerful lens through which to view the extent to which the lives of parent and child are linked and to identify the life course processes by which those linkages are likely to emerge. The remainder of this chapter focuses on the methodological components of 3G studies. In doing so it first describes the core design characteristics of 3G studies characteristics that, when combined, distinguish them from traditional longitudinal studies. Second, it discusses a set of methodological challenges that are unique, or at least peculiar, to 3G studies, and some possible solutions to them. Third, in keeping with one of the central themes of the *Handbook*, I offer several suggestions for future research. Throughout, I will illustrate some of these points by referring to the Rochester Intergenerational Study, a long-term, 3G study of antisocial behavior that began in 1999 (Thornberry 2009). A brief description of the design of this study is presented in Appendix A, both to describe what I think is a reasonably typical 3G study and to provide the methodological detail needed for later discussions. Also, much of the presentation in this chapter is influenced by my own interest in the study of adolescent problem behaviors but I believe the core argument extends to other patterns of behavior such as educational attainment, parenting, and so forth.

2 Three Generation Studies of Behavior

Although discussed in the literature for quite some time, scientifically acceptable 3G studies are relatively new to the social sciences and, as a result, there is a lack of agreement about what constitutes an intergenerational study of a particular behavior. A number of early intergenerational studies used cross-sectional designs and asked a single respondent to report on their own behavior as well as the behavior of the preceding and following generations; for example, “The intergenerational transmission of aggression across three generations” (Doumas et al. 1994) used this approach (see also Alexander et al.

1991; Farrington 1993; Fuller et al. 2003). Obviously, there are many flaws with this type of design. First, the individual is reporting with imperfect knowledge on the behavior of their parents and their children. Second, these studies have to rely on retrospective data for at least one generation, and often on retrospective data with a very long recall period. Third, the reporter’s current behavior can influence their views of parent and child behavior; parents who are highly aggressive or who have serious alcohol problems, for example, may well project that behavior onto their perceptions of behavior in the other generations. If intergenerational studies are going to contribute to our understanding of the origins and course of behavior, they need to have greater conceptual and methodological integrity.

With that in mind, I would like to offer a definition, or at least a description, of what a scientifically credible intergenerational study would entail in order to validly answer the two core questions of intergenerational study. In doing so, I use the notational system of Generation 1 (G1) to refer to the grandparent generation, Generation 2 (G2) to refer to the parent generation, and Generation 3 (G3) to refer to the child generation. Typically, the G3 child is the focal participant in an intergenerational study and it is that person’s behavior that we are attempting to explain. In my view, an intergenerational study should, at a minimum, meet four central design criteria.

First, a 3G study should have *prospective data* on a G2 parent’s and on a G3 child’s involvement in the behavior of interest. Prospective data on a G1 grandparent’s behavior is also valuable (see below), but it is not necessary to investigate intergenerational continuity and discontinuity between G2 and G3, the core issue of intergenerational study. There are, of course, variations on this aspect of an intergenerational design. For example, it can be extended to additional generations as in the remarkable Trans-5 Study, a prospective study of five generations of the same families using official records in the Netherlands (Bijleveld and Wijkman 2009). Also, some studies combine prospective data on G2 with cross-sectional, or largely cross-sectional, data

on G3 to address intergenerational themes (Kaplan and Tolle 2006; Knight et al. 2014; Smith and Farrington 2004). Nevertheless, as discussed below there are distinct advantages to having prospective data on both G2 and G3 in order to fully address the two core questions of intergenerational study: identifying and accounting for continuity and discontinuity.

Second, the *measures* on each generation's involvement in the behavior of interest should be as independent as possible and, whenever possible, based on *different reporters*. For example, each could self-report on their own behavior. If the same reporter provides information on both generations, the independence of the independent and dependent variables is compromised. Also, using different reporters minimizes some of the methodological problems mentioned earlier, such as reliance on retrospective data for at least one of the generations.

The third design criterion is the key defining element of an intergenerational study and the one that most clearly separates intergenerational studies from traditional longitudinal studies. There is a growing consensus (Capaldi et al. 2012; Kaplan and Tolle 2006; Knight et al. 2014) that intergenerational studies should have comparable measures of G2 and G3 behavior covering the *same ages* or the *same developmental stages*. I return to a discussion of this issue and its centrality to intergenerational study, when I compare intergenerational and longitudinal studies.

Fourth, intergenerational studies should have detailed prospective data on *G2 life-course development*. This facilitates the identification of mediating and moderating processes that account both for intergenerational continuity and discontinuity in the behavior of interest as well as the investigation of gene-by-environment interactions if genetic data are also available. Essentially, information on G2's movement along major life-course trajectories (e.g., work, family formation, etc.) is required. Absent such developmental data, levels of similarity in the behavior could be established but there would be little ability to identify the mediating processes that help explain why that similarity occurs.

In combination, these four design criteria provided a template for considering what constitutes a 3G study, one with the potential to provide information that extends beyond what is typically learned in a longitudinal design. I recognize that these methodological criteria are not unique to intergenerational studies; for example, in any longitudinal study prospective data are generally viewed as psychometrically preferable to retrospective data. It is the *combination* of these four criteria that provide the defining qualities of 3G studies. That is, when all four are present a study can adequately address the core questions of intergenerational inquiry—describing the level of continuity and discontinuity as well as identify mediating and moderating influences to help explain continuity and discontinuity. When any one of these criteria is absent, the validity of the study in addressing these questions is compromised. For example, if the study does not meet the fourth criterion—i.e., it does not have data on G2 life course development—it would be able to determine the level of continuity in a particular behavior but it would be severely challenged to explain how that similarity occurs, that is, it would be difficult to identify mediating processes. This challenge is faced by many studies that rely entirely on official records (e.g., van de Rakt et al. 2008; Frisell et al. 2011). In contrast, a study that does not meet the second criterion—i.e., it relies on a single reporter for both generations—may have extensive information on mediating processes but its ability to validly measure the behavior of interest in both generations, and therefore estimate the level of continuity is compromised as we noted earlier (Dumas et al. 1994). When all four of these criteria are met, however, a 3G study is in strong position both to identify levels of continuity and to explore mediating and moderating processes.

The saliency of these criteria in defining a 3G study may vary somewhat across behaviors of interest and, as noted above, my own view is no doubt shaped by my current research agenda. For example, if the behavior of interest is relatively static—such as educational attainment or age at first marriage—the use of prospective designs may not be as essential. For behaviors that are more

changeable, however—such as school engagement or the quality of intimate relationships—they are quite salient. An important topic for future research is to continue this definitional discussion to arrive at a broader consensus as to what constitutes an intergenerational study and what distinguishes them from other types of study designs, for example, traditional longitudinal studies (see below).

2.1 Origins of Intergenerational Studies

Three generation studies typically begin as extensions—as add-ons—to an existing longitudinal study that followed an original G2 participant over time. In some cases the studies also followed a G1 participant. Thus, intergenerational studies are rarely planned from the outset, largely because of the length of time that would have to elapse between the time the study began and the time the G3 child exhibits an outcome of interest.

This observation about typical origins has two important methodological consequences. First, since the original longitudinal study was designed to study something other than intergenerational linkages, 3G studies inherit a set of design decisions about sampling, measurement, and so forth. While those design decisions may have been ideal for the initial purpose, they may not be ideal for the investigation of intergenerational issues. In a sense, 3G studies are akin to secondary data analysis projects; they have to build on and adapt to an existing foundation of already collected data.

Second, and more importantly, the origins of 3G studies create a very uneven age distribution across the three generations. Researchers only have control over the selection of the initial G2 participants and, therefore, over their ages (or birth cohorts). The original researchers define the population of interest and decide which G2 participants to sample. For example, the original Rochester Youth Development Study selected adolescents in the seventh and eighth grade because of the typical age of onset of delinquent

behavior, the behavior of interest in that study (Thornberry et al. 2003). G1 parents varied considerably in age, from their late 20s to their late 50s at the beginning of the study. The Rochester Intergenerational Study then sampled the oldest biological child age 2 or older of each G2 participant, starting in 1999. Obviously, the G2 participants became parents over a very wide age span (currently ages 14–39) and G3 participants currently range in age from 2 to 28.

2.2 Intergenerational Versus Longitudinal Designs

Although many 3G studies are themselves prospective extensions of an earlier study, the combination of the four core design characteristics described earlier distinguish them from traditional longitudinal studies. I will use a behavior that occurs during adolescence to illustrate these relationships. The behavior could be prosocial (e.g., attitudes toward school engagement and success) or antisocial (e.g., drug use). Figure 1 presents an overview of the intergenerational relationships in behavior that can be examined based on three types of research designs. The first (Fig. 1a) focuses on traditional longitudinal designs that examine the G1 and G2 generations. The particular focus of longitudinal studies, at least when using prospective data, is on the *concurrent* relationship between the parent's adult behavior and the child's adolescent behavior. This is indicated by the path labeled A.

Intergenerational designs shift the focus of the research in two important ways as represented in Fig. 1b. First, attention shifts from G1 and G2 to G2 and G3. The focal participants are the children in the third generation and it is their behavior that we are attempting to explain. Similar to traditional longitudinal studies, 3G studies can examine the concurrent impact of the G2 parent's adult behavior on the G3 child's adolescent behavior (Path A). In addition, however, 3G studies can uniquely estimate Path B, the impact of a parent's adolescent behavior on their child's adolescent behavior. That is, they can look at continuity (or discontinuity) between the generations

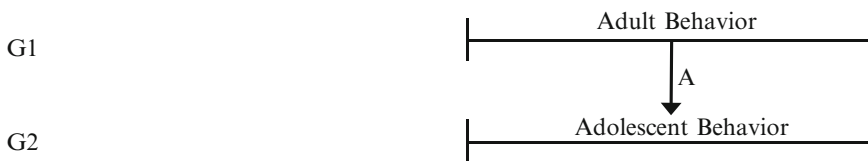
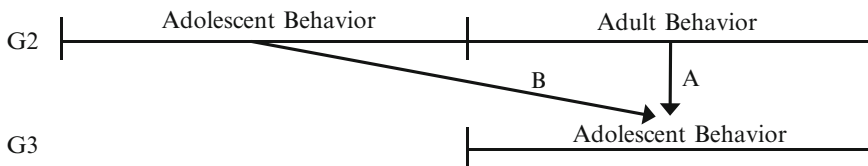
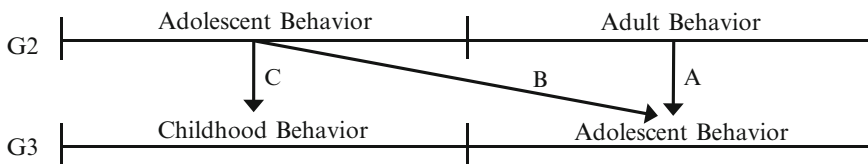
a Longitudinal Design**b Intergenerational Design****c Intergenerational Extension**

Fig. 1 Intergenerational relationships for behaviors based on longitudinal and intergenerational designs

for the *same behavior at the same developmental stage* and, importantly, do so using prospective data. In addition, as indicated in Fig. 1c, intergenerational studies can be extended to other developmental stages. For example, they can examine the impact of G2 adolescent behavior on G3 childhood behavior (Path C). More generally, intergenerational studies can look at relationships between G2 and G3 at various, but clearly defined, developmental stages.

This does not imply that results from longitudinal studies, as illustrated in Fig. 1a, are unimportant in explaining these behaviors. Whatever the behavior of interest is, the parent's adult involvement in that behavior is likely to have important direct and indirect effects on their child's involvement in that behavior. For example, the parent's behavior can influence the overall family environment in which the child is raised, it can directly model the behavior of interest for the child, and it can impact, either positively or negatively, parenting styles which, in

turn, have strong and proximal impacts on the child (Capaldi et al. 2003; Conger et al. 2003). Although all of those concurrent relationships are important, results about Path A do not inform us about the direction, significance, or magnitude of either Path B or Path C. For example, with respect to antisocial behavior, if we only have data on Path A we may well underestimate the true intergenerational effect since we would be assessing the parent's antisocial behavior well into their adult years when its prevalence and frequency drop precipitously and when there is less variability in the behavior. As a result, it is quite possible that the Path A relationship would be weaker than the total intergenerational effect. In fact, findings from several intergenerational studies of antisocial behavior are consistent with this contention (Huesmann et al. 1984; Thornberry et al. 2006; Wu and Kandel 1995). Future research should systematically investigate the extent to which estimates of continuity differ when based on Path A versus Path B and whether or not

different mediators are identified in these two approaches to research. Also, these questions should be investigated for different types of behaviors.

Moreover, focusing on Path B draws our attention to new and different pathways that link parents and children with respect to behavior. The mediators of the Path B linkage, often separated by 20–25 years, are likely to be quite different from the mediators associated with concurrent similarity in behavior across the generations (Path A). Intergenerational mediators focus attention on long-term developmental processes in addition to the more immediate family context (Thornberry 2005, 2009). Identifying these mediators can offer new and different insights into the origins of behavior that complement those of traditional longitudinal studies. The results of these studies will also lead to new, and earlier, approaches to the development of programs. Indeed, they have the potential of identifying intervention targets to increase prosocial outcomes and reduce antisocial outcomes that exist even before the child is born.

Overall, in my view there are four defining design features that constitute a 3G study. They include: prospective data on G2 and G3 behavior; independent measures in each generation; measures of the behavior of interest at comparable ages or developmental stages; and data on long-term mediating processes. Studies with all of these features are better able to address the central questions of intergenerational study. In this regard they differ from traditional longitudinal studies and, therefore, their results enable us to extend our understanding of the origins and course of antisocial behavior.

In assessing these core questions, it would also be ideal to identify causal relationships. But, as is true of all non-experimental designs, the issue of identifying causal relationships is difficult in the context of intergenerational studies. Typically, we simply observe or measure the independent variable (the parent's and perhaps grandparent's behavior), the dependent variable (the child's behavior) as well as the mediators. As a result, 3G designs are no more or less able to assess causality than other observational studies.

For example, there are a range of counterfactual approaches that help in this regard (Pearl 2009; Rosenbaum and Rubin 1983) and they have been used in intergenerational investigations (e.g., Thornberry and Henry 2013). Nevertheless, they are not the equivalent of experimental designs and their ability to assess causality has been debated. It is beyond the scope of this chapter to resolve this issue but it is an important one for future research to address, not only for 3G designs but, more generally, for all non-experimental studies.

2.3 Grandparental Influences

To this point I have focused entirely on the G2 and G3 generations. G1 grandparents, however, also contribute substantially to our understanding of intergenerational processes. Figure 2 presents a very simplified view of grandparental influences. The right hand, vertical portion represents the types of relationships that can be investigated in longitudinal studies. For example, we can examine how G2 parenting influences G3 behavior, in this case school engagement, and we can investigate how concurrent factors, represented here by G2 depressive symptomatology, influence those parenting behaviors. There is a robust literature demonstrating that experiencing depressive symptoms reduces effective parenting (Conger et al. 2010). That type of analysis, of course, can be extended to other concurrent influences on G2 parenting behaviors, both positive (e.g., partner satisfaction or stable employment) and negative (e.g., ongoing substance use or marital conflict).

While we know that parenting styles have a major influence on a child's behavior, we know relatively little about the origins of parenting styles from longitudinal studies (Belsky 1993; Conger et al. 2010). By incorporating information on G1 behavior patterns, however, we can greatly extend our investigation of this issue. For example, we can examine how parenting styles are reproduced across the generations (see Fig. 2). That is, we can examine the extent to which G2's parenting style exhibited towards G3 reflects the parenting styles to which G2 parents

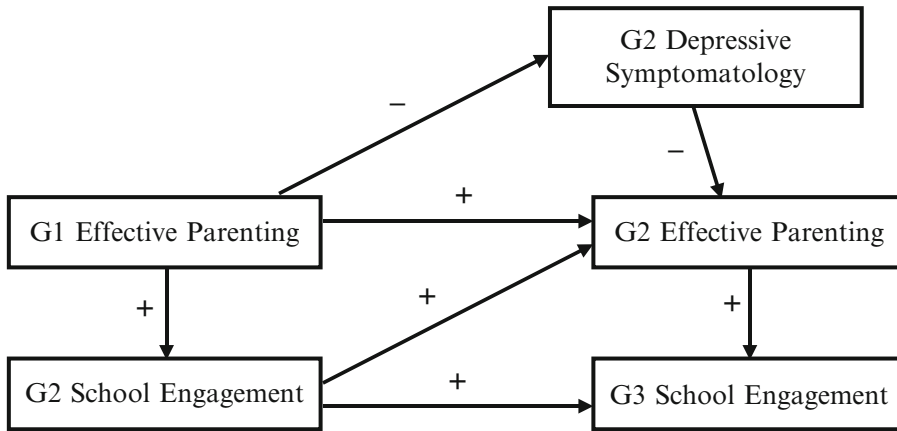


Fig. 2 Grandparental influences in intergenerational designs

were exposed when they themselves were children. Conger and colleagues (Conger et al. 2003; Neppl et al. 2009; Scaramella and Conger 2003) have shown that between G1 and G2 there is homotypic continuity for harsh parenting and for positive parenting; that is, exposure to harsh parenting leads to significantly higher levels of harsh parenting and exposure to positive parenting leads to significantly higher levels of positive parenting. At the same time, they did not find heterotypic continuity from one type of parenting to the other; that is, exposure to harsh parenting did not significantly reduce positive parenting nor did exposure to positive parenting significantly reduce harsh parenting. Furthermore, Neppl et al. (2009) also show that the mediators of these intergenerational linkages are different for positive parenting versus harsh parenting. Thornberry (2009) reports similar findings that vary by G2 gender, with harsh parenting being more important for G2 fathers and positive parenting being more important for G2 mothers. If we can examine the reproduction of parenting styles across the G1 and G2 generations, we can also examine other factors that can have important indirect influences on G3 behavior. They include the reproduction of poverty and structural adversity, neighborhood context, school performance, fertility patterns, psychopathology, marital conflict, and many others.

Intergenerational studies with this design can also examine both direct and indirect effects of

G1 on G3. For example, Thornberry et al. (2006) found that G1's earlier drug use directly increased the likelihood of G3 drug use (independent of the effect of G2 drug use) as long as G1 had ongoing contact with G3. Indirect effects are illustrated in Fig. 2. First, G1 parenting style is hypothesized to indirectly influence G3 school engagement via its impact on G2 adolescent school engagement which itself has both direct and indirect (via G2 parenting) effects on the G3 outcome. Another indirect pathway of G1 parenting operates through G2 depressive symptomatology. All of these relationships enhance our understanding of the G3 child's behavior by fleshing out our understanding of the long-term origins of what we know to be powerful, proximal causes of that behavior. Although understanding the contributions that grandparents make to an understanding of intergenerational influences is an important contribution of 3G studies, in the interest space I will focus primarily on relationships between G2 and G3 in the remainder of this chapter.

2.4 Variations in Three Generation Studies

Thus far I have focused on prospective 3G studies that begin from an ongoing longitudinal study of G2 in discussing core design elements. This type of design enables one to address what I consider to be the basic issues of intergenerational

study—examining and explaining continuity and discontinuity in a particular behavior at the same developmental stage. There are related designs that can also address this core issue.

In a traditional longitudinal study, if the G2 participant is followed far enough into the life course, for example into the adult years, they would overlap in age with G1 when they were included in the original study as an adult. In this case Path B in Fig. 1 would represent continuity in the behavior during the adult years but the age-specific rates for G1 and for G2 would still be separated by about 20–30 years. That is, it would not reflect a concurrent relationship but an intergenerational one. In general, intergenerational continuity in adult behaviors can be studied in designs of this nature, for example, studies of intergenerational continuity in criminal behavior (e.g., Besemer and Farrington 2012; van de Rakt et al. 2008). Conger and colleagues have examined continuity and discontinuity in parenting styles by comparing G1 parenting towards G2 when they were children and adolescents with G2 parenting towards G3 when they were children and adolescents (Conger et al. 2003; Neppel et al. 2009; Scaramella and Conger 2003). Here also, the focus of investigation is on an intergenerational relationship, not a concurrent one.

Another variation in 3G study designs occurs in the field of gerontology with its focus on the investigation of family relations with respect to aging. These projects are, in a sense, the mirror image of the 3G studies described above which focus on childhood and adolescent behaviors. Bengston's Longitudinal Study of Generations (LSOG) is a classic example of this approach (Bengston et al. 2002). At its initiation, the focal participants were a sample of G1 grandparents who were eligible for the study if they were married, had children, and had at least one grandchild between the ages of 16 and 26. Thus, the LSOG acquired three generations of the same families by starting with grandparents and then selecting their children and their grandchildren, following all three generations across time, from 1971 to 1997, a span of 26 years. Of course, there was a

tremendous amount of natural attrition in the grandparent generation, from 516 participants to just 61. As with other 3G studies “the LSOG, with a fully elaborated generation-sequential design, allows comparisons of sets of aging parents and children *at the same stage of life during different historical periods*” (Bengston 1971 ff; emphasis added).

Clearly, there are variations of the basic 3G design with which to address the two core intergenerational issues of describing and explaining continuity and discontinuity in behavior. In this chapter, I focus on the 3G design described earlier which emanates from an ongoing longitudinal study of G2 participants; however, I will comment on variations in this approach at appropriate points.

3 Methodological Issues Related to Three Generation Studies

Given the typical origins of 3G studies as extensions of existing longitudinal studies, researchers face a number of design decisions and issues that create particular challenges for the investigation of intergenerational themes. The remainder of this chapter identifies and discusses various ways of responding to them. These design issues are themselves interrelated and the decisions made to resolve one has implications for, and often constrains, decisions for the others. I will illustrate some of these issues using the Rochester Intergenerational Study (Thornberry 2009).

3.1 Additional Design Issues

Earlier I presented a discussion of what I consider to be the core defining characteristics of a 3G study. In addition to those defining characteristics, there are other design elements that, when present, greatly extend the power and scope of 3G studies to address issues of continuity and discontinuity. In this section, I discuss two of them.

3.1.1 Inclusion of Both Mothers and Fathers

It is not essential for a 3G study to have a G2 sample that includes both G2 mothers and G2 fathers but having both greatly extends the reach of 3G investigation. To be clear, we are not referring to mother-father pairs in this discussion (that issue is dealt with later in the chapter). Here we refer to studies that have an initial adolescent sample of males (who become G2 fathers) and females (who become G2 mothers). In other words, the 3G study includes a sample of G2 fathers, their G3 children (and perhaps the child's mother) as well as G2 mothers, their G3 children (and perhaps the child's father). When both G2 fathers and G2 mothers are included a number of important issues can be addressed.

First, what we know about father effects, relative to what we know about mother effects, in explaining a child's behavior is relatively sparse (Phares et al. 2005). Indeed, most of what we know about "parental" influences on child development is, in fact, an understanding of maternal influences. G2 samples that include both mothers and fathers can therefore contribute to our investigation of how fathers affect their children. Second, and perhaps more importantly, since the G2 fathers and mothers in a 3G study are drawn from the same population and followed over time in identical ways, 3G studies that include both G2 mothers and G2 fathers can uniquely enable direct comparisons of the similarities and differences in the ways in which fathers and mothers impact their children.

For example, Thornberry (2009) hypothesizes that the strength of some relationships will vary by G2 gender. In American culture, mothers are cast as the primary parent and "...norms are stricter on the centrality and endurance of the mother-child dyad" (Doherty et al. 1998). As a result, family factors could be more important mediators of IG continuity for mothers than for fathers (Martin et al. 2010). In contrast, the impact of fathers appears to be more diverse. Since fathers play numerous roles within the family, as "...spouses, protectors, models, moral guides, teachers, breadwinners" (Lamb and Tamis-LeMonda 2004:10), there are likely to be

multiple mediating pathways that help account for IG continuity for fathers. Adjustment to work and stable employment appear to be particularly important (Conger et al. 1993; Moffitt et al. 2002). Also, ongoing contact and involvement between the father and child is likely to play a strong role in moderating IG continuity and processes for fathers, but not for mothers. Father absence is generally detrimental to child development (Carlson 2006; Magnuson and Berger 2009), although the absence of highly antisocial fathers may be beneficial (Jaffee et al. 2003). Father absence also has a variety of indirect effects on child development via economic stress (Martin et al. 2010), the lack of a co-parent (Hetherington and Kelly 2002), and marital conflict (Kelly 2000).

The overall point, of course, is that a sample that includes both G2 mothers and G2 fathers allows us to examine these issues empirically. That is, we can examine the extent to which intergenerational influences are similar or different for mothers and fathers. It may be, for example, that hypothesized mediators, like parental depression or work related stress, are equally damaging in the families of G2 fathers and G2 mothers (Thornberry et al. 2009a) but that can only be determined by the direct comparison of mothers and fathers. Direct comparisons of maternal and paternal influences in these 3G designs should be a high priority for future research.

3.1.2 Other Caregivers

Intergenerational studies often have a curious quality of operating as if each child only had one parent—the G2 participant in the initial longitudinal study. It is also quite important to include the G3 child's other parent or other primary caregiver and to collect prospective data from that person. It is particularly important in the case of G2 fathers, as the other caregiver is overwhelmingly G3's biological mother who is usually the child's primary caregiver. In the case of G2 mothers, the other caregiver is often G3's biological father but in many cases it is a grandmother, stepparent, or another relative (see Appendix A), and the likelihood of these relationships occurring varies considerably by the composition of

the sample in terms of such factors as SES, race/ethnicity, urbanicity, and so forth.

Incorporating the other primary caregiver into a 3G study helps intergenerational analyses in several ways. First, it is useful to be able to identify major concurrent influences on the child's behavior, especially by the primary caregiver, in order to better interpret how intergenerational influences operate. For example, the G2 parent's influence on the child's behavior may be primarily indirect, operating through the other caregiver, effects that could be missed if only the G2 parent is included in the design.

Second, the role of the other caregiver may be particularly important in accounting for intergenerational resilience. One reason why a G2 parent with a substantial history of problem behaviors may have a G3 child who avoids those behaviors could be the presence of another caregiver who is generally more prosocial than G2. For example, more prosocial other caregivers are more likely to make orderly transitions to adulthood, experience lower levels of stressors and structural adversity, and have effective parenting styles, all of which may reduce G3 problem behavior. They can also be a source of control and social capital to increase G2 prosocial opportunities and parenting skills (Conger et al. 2010). There is some evidence of protective effects from prosocial other caregivers in accounting for intergenerational resilience (Dong and Krohn 2014; Lovegrove 2010).

Third, the inclusion of data from the other caregiver reduces the likelihood of having to rely on a common reporter in assessing intergenerational relationships. If parental reports of G3 behavior are collected from the other caregiver, then the other caregiver report can be used to assess the relationship between G2 behavior and G3 behavior, rather than relying on the G2 report for both. This can also help in the measurement of mediating and moderating variables. For example, in the RIGS, in addition to self reports, we collect G2's assessment of the other caregiver's parenting style and the other caregiver's assessment of G2's parenting style.

Finally, including the G3 child's other biological parent enhances the investigation of genetic

influences. Collecting genotypic data from the full trio—the child and both biological parents—enhances our ability to identify genetic risk and protective factors as well as to investigate gene-environment interactions in accounting for various behaviors of interest. As described in detail elsewhere (Laird and Lange 2006), family-based designs that include both biological parents are robust to population stratification in which small allele frequency differences across socially defined racial and ethnic groups lead to false positives in genetic epidemiological research. Specifically, these models enable researchers to evaluate the association between a risk allele and some behavioral trait but condition the association on the probability that a particular individual will have inherited the risk allele given their parent's genotypes. This eliminates the risk of spurious false positives. Equally important, the availability of family trios also allows more precise statistical estimates because within and between family information can be used to reduce the burden of multiple testing.

3.2 Sampling Issues

3.2.1 Sample Size and Statistical Power

Three generation studies that develop from an original longitudinal study of G2 participants typically have a relatively small number of families and G3 participants. Although there are some exceptions that start with a large G2 sample such as the AddHealth study (Harris et al. 2009), most longitudinal studies have samples that range from several hundred families (Besemer and Farrington 2012; Capaldi et al. 2012) to a few thousand (Knight et al. 2014). Following the G2 participants over time until they become parents inevitably involves some degree of attrition and only those who remain in the study form the pool for the new intergenerational study. Of those who remain, only some become parents; estimates indicate that approximately 16 % of women and 24 % males will remain childless (Martinez et al. 2012). Finally, of those who become parents it is inevitable that not all the G3 children and their

G2 caretakers agree to participate in the 3G study. This is particularly the case for G2 fathers. Fathers have varying degrees of involvement with their children, ranging from being the primary caregiver to quite literally not knowing where the child is. When fathers have little contact with the child, researchers need to locate and elicit cooperation from the child's primary caregiver, typically the biological mother, to enroll G3 in the study. That is often difficult, especially if there is conflict between the parents. This is typically not the case with G2 mothers as they are almost universally the child's primary caregiver.

Thus, there is an inevitable, and often substantial, erosion of families as one moves to the third generation. The Rochester study began with 1,000 G2 participants, but it is likely to have a maximum of approximately 530 G3 participants despite having high cooperation and retention rates. As a result, statistical power is always an issue that needs to be carefully assessed in 3G studies. While the researcher had control over the initial G2 sample size and presumably insured adequate power to estimate theoretical models of interest, there is no such guarantee for the G3 sample. Nevertheless, the purpose of the 3G study is to estimate similar, and often more complicated, models but inevitably with a smaller sample.

Relatedly, if the sample of G2 participants is properly selected, that is, if it is a probability sample from a well-defined population, it can be considered to be representative of that population. It is less clear that either the G1 or the G3 participants would constitute a representative sample. For example, G1 parents are not necessarily representative of all parents in their generation. Similarly, the G3 children do not necessarily represent the children of their generation nor even the children of the full G2 cohort given the inevitable loss of families through attrition and noncooperation. The central point is that it is likely that only the generation initially sampled at the beginning of the study (G2 in the case of the Rochester study and G1 in the case of the Bengston study) can be considered a representative sample. The implications of this issue are not well discussed in the literature and should be more fully investigated.

3.2.2 G3 Age Heterogeneity

The issue of sample size is further complicated by G3 age heterogeneity. As noted earlier there is no control over when G3 participants are born and they typically span a considerable age range. The G3 children in the Rochester study currently range from toddlers to young adults. Thus, the total sample size, which is often already small, is also divided across many birth cohorts. The most feasible way for 3G studies to gain adequate statistical power to test theoretical models is to cluster G3 participants of the same ages, drawn from different birth cohorts, into synthetic cohorts of adequate size that represent meaningful segments of the overall life course, for example, late adolescence. In other words, 3G studies are almost inevitably a special case of cohort sequential or accelerated longitudinal designs (Prinzle and Onghena 2005).

Combining different cohorts, however, is not necessarily straightforward. First, G3 participants of similar ages will be drawn from different birth cohorts that may be separated by 20 or more years. Therefore, cohort and period effects need to be considered. Second, some G3 participants will be the children of teenage parents and others will be born to parents who become parents for the first time in their early 40s. There is a robust literature indicating that the timing of first births, especially teen parenthood versus a more age-normative onset of parenthood, affects child development (Hofferth and Goldscheider 2010; Nagin et al. 1997). Finally, at the selected ages, some G3 participants will be interviewed during the earlier waves of the 3G study while others will be interviewed toward the end of the study. Panel bias or testing effects may be embedded in the longitudinal data (Thornberry 1989; Torche et al. 2012), so that too will need to be considered.

The most common response to the necessity of combining multiple birth cohorts in one analysis is to control either for G3 age (e.g., Bailey et al. 2013) or for G2 age at the birth of G3 (e.g., Capaldi et al. 2012; Thornberry et al. 2009a, b). A more formal way of testing the appropriateness of combining multiple cohorts is to estimate a multilevel model to examine the extent to which

constructs of interest vary as a function of birth cohort.² The variance in the construct at each level may be estimated and then used to calculate the intraclass correlation (ICC), which quantifies the proportion of variance that exists at each of the upper levels. If we can safely combine cohorts in an analysis, we would expect to see very small ICCs associated with birth cohort indicating that little variance is accounted for by differences across cohorts.

To illustrate this approach we used data from the RIGS to examine three important outcomes in studies of adolescent problem behaviors. In particular, we examine G3 involvement in externalizing problems, internalizing problems, and delinquent behavior as reported by the parent using the Child Behavior Checklist, a well-known instrument for assessing childhood problem behaviors (Achenbach 1991). We selected these measures because in the RIGS they have been measured a sufficient number of times—from ages 4 to 17—and for a sufficient number of birth cohorts—birth years range from 1986 to 2006—to constitute a rigorous test of whether or not there are likely to be cohort differences.

We started with an unconditional model with three levels: repeated measures of G3 behavior (Level 1), nested in G3 (Level 2), nested in birth cohort (Level 3). The Level 3 ICC is of particular interest when determining the extent to which G3 are non-independent as a function of when they were born (and given the RIGS design, the age of G2 when G3 was born). The unconditional models produced the following ICCs: Delinquent Behavior (Level 1 = 49.6 %, Level 2 = 44.7 %, Level 3 = 5.7 %), Externalizing Behavior (Level 1 = 37.0 %, Level 2 = 61.7 %, Level 3 = 1.3 %), Internalizing Behavior (Level 1 = 39.0 %, Level 2 = 60.0 %, Level 3 = 0.9). Very little of the variance is due to G3 birth year differences, particularly for externalizing and internalizing behavior. The Level 3 ICC for delinquency is a bit higher (close to 6 %). We therefore examined the extent to which the unconditional ICC for delinquency

changes with the addition of pertinent control variables that we consistently include in our models: G2 gender and race/ethnicity, G2 birth year, G1 education, the arrest rate and poverty rate of the neighborhood that G2 grew up in, G3 age, G3 gender, and family poverty at each year the outcome was measured. In this model, the ICC at Level 3 was reduced to 1.4 %, indicating that the birth cohort differences can be readily explained by a carefully thought out set of covariates.

In this illustration there is compelling evidence for the appropriateness of combining multiple birth cohorts for analysis. It would be wise for 3G researchers generally to assess ICCs as they start new analyses that combine participants from different birth cohorts in order to determine the appropriateness of doing so and to identify pertinent control variables to include in the base model to minimize the conditional ICCs.

3.2.3 Selection of G3 Participants

G2 participants obviously can have multiple children. A fundamental design question, therefore, is which G3 children to include in the intergenerational sample. Ultimately, the answer to this question depends upon the behavior of interest and the specific theoretical questions that are being posed about that behavior. (It also depends on such practical considerations as the available budget and the interests of funding agencies.) Nevertheless, there are a number of general dimensions that should be taken into account in making this decision and existing 3G studies differ on the choices that have been made.

Some 3G studies only include biological children (e.g., Bailey et al. 2006) while others include a mix of biological, step, adopted, and foster children (e.g., Kaplan and Tolle 2006). Some studies only include G3 children if they live with or are being reared by the G2 parent (at least at the beginning of the study), while others include all G3 children who meet the main inclusion criterion whether or not there is ongoing contact between the G3 child and the G2 parent. Some studies include only one G3 child per family, while others include multiple G3 children. Regardless of the decisions made about the above

²I would like to thank my colleague Kimberly Henry of Colorado State University for contributing this analysis to the chapter.

dimensions, specific decisions on which G3 child or children to sample must also be made. If a single child per family is included, should it be the oldest child, youngest child, or a random selection? If multiple children are included, decisions must be made about the number per family and, again, which ones.

Obviously, by combining these (and other dimensions) a variety of specific 3G study designs are available and can be illustrated by several ongoing 3G studies of adolescent problem behaviors. The Intergenerational Project (TIP), the 3G extension of the Seattle Social Development Project, sampled the oldest biological child who had face-to-face contact with the G2 parent on at least a monthly basis (Bailey et al. 2006). The Oregon Youth Study (OYS) sampled all children and cohabiting stepchildren of the G2 fathers in the initial OYS. Later, because of budgetary limitations, they sampled only “the first two biological children per pairing of an OYS man with a woman (i.e., OYS men who fathered children with more than one woman could have more than two children followed)” (Kerr et al. 2012:892). In the RIGS, we sampled the oldest biological child of each G2 regardless of whether or not G2 had contact with the child.

These three studies address the same basic intergenerational questions about continuity and discontinuity of adolescent problem behaviors and yet have somewhat different designs. All these choices have advantages and disadvantages. For example, by including G3 children whether or not they have ongoing contact with the G2 parent allows the RIGS to investigate whether or not contact moderates the level of intergenerational continuity in problem behaviors.³ It turns out that it is quite a powerful moderator (Thornberry et al. 2009a, b). This is a clear advantage. At the same time, the inclusion of G2 fathers with little or no contact with the G3 child is somewhat wasteful. It is pointless to ask them about some parenting behaviors such as monitoring, supervision, and discipline which are hypoth-

esized to be core mediators of intergenerational continuity (Thornberry 2009) and these families therefore drop out of these analyses, reducing sample size and statistical power. This is a clear disadvantage. Similarly, studies that include biological children and stepchildren can examine whether there are different levels of continuity and discontinuity in these different types of relationships and whether or not the mediating and moderating processes are the same or different. RIGS cannot address this issue at all.

The basic point is that there are a number of core dimensions on which to make decisions about the selection of G3 participants. There is no right answer as each of these decisions entails a set of advantages and disadvantages. They need to be carefully assessed with respect to the theoretical questions being addressed to maximize each project’s validity. They also need to be coordinated with other aspects of the project’s design in order to ensure a coherent study. There are no methodological studies of the consequences of these different design decisions. That too should be investigated in future research.

3.2.4 G3 Age at Study Initiation

Another important decision concerns the age of the G3 participants at the beginning of the 3G study. This is largely dependent on the age of onset and course of the behavior of interest, and that can vary widely. For example, aggression and general antisocial behavior often begin during toddlerhood (Tremblay and Nagin 2005) while drug use does not typically begin until mid-adolescence and peaks during late adolescence and early adulthood (Knight et al. 2014). Clearly these behaviors could lead to different decisions about when to start following G3 participants. Other behaviors, for example occupational attainment (Mare 2011) or parenting styles (Conger et al. 2012), are adult behaviors and would lead to yet different decisions. In the latter cases as noted earlier, the design itself might change to include a focus on continuity (or discontinuity) between G1 and G2, assuming appropriate data are available for the G1 generation.

Although the natural course of the behavior of interest will influence decisions about the age at

³This can only be investigated for G2 fathers since virtually all G2 mothers, about 95 %, are the child’s primary caregiver.

study initiation, some general guidelines seem appropriate. First, it is ideal to begin the assessments of G3 prior to the typical age of onset of the behavior. This allows the project to better capture age of onset and provides important information about the precursors of the behavior. Too many longitudinal studies enter the life course midstream and one of the contributions that 3G studies can make, since they are often extensions of existing studies, is to begin earlier. Second, many behaviors of interest co-occur and are sequentially related over the life course. For example, earlier aggression and delinquency often precede serious substance use; educational attainment precedes and influences occupational attainment, and so forth. Even though the ultimate behavior of interest may onset later in life course, beginning assessments earlier has the advantage of facilitating the investigation of these behavioral chains.

Regardless of when it is desirable to begin assessing the G3 participants, the natural course of human fertility will influence those decisions. For example, in most samples a relatively small number of G3 children will be born to young teenage parents and for a while there will be a very small number of G3 participants available for study. It is often difficult to secure funding to launch a study under those conditions. Waiting for a large enough number of G3 children to be born in order to demonstrate that the sample size is adequate for the proposed project means that children in the right-hand tail of the age distribution may enter the study at somewhat older ages than desired. For example, at Year 1 of the RIGS, half of the G3 participants were already of school age even though it would have been desirable to begin following all G3 participants during the preschool years. There is little that can be done to avoid this problem entirely but confronting it directly in the initial proposal may minimize its consequences.

3.2.5 Length and Frequency of Assessment

Finally, the number and frequency of assessments in the 3G study has to be established. Existing studies vary considerably on this dimen-

sion. Several current studies collect data from and about the G3 participants on an annual basis (e.g., Capaldi et al. 2012; Conger et al. 2012; Thornberry 2009). Other studies, however, add what is primarily cross-sectional data about G3 to the ongoing prospective investigation of G2. For example, Kaplan and Tolle (2006) followed an initial panel of seventh graders from 1971 to the late 1990s. At the last interview they also interviewed all of the children who were 12 and older, a total of 7,519 children from the 5,467 original participants who remained in the study. Similarly, at Waves 11 and 12 of the National Youth Survey, G3 children ages 12–24 were interviewed twice, in 2003 and 2004 (Knight et al. 2014). Finally, in the Cambridge Study in Delinquent Development Farrington and colleagues collected parent reports about the conduct problems of the G3 children at the age 32 interviews of the G2 participants (Smith and Farrington 2004) and also interviewed 550 of the offspring of the original male participants. The G3 children averaged 25.4 years of age at the time of the interview (Auty et al. 2014).

The more “cross-sectional” 3G studies often have considerably larger samples of G3 participants. For example, there are 1,227 G3 participants in the National Youth Survey (Knight et al. 2014) and 7,519 in the Houston survey by Kaplan and Tolle (2006). They also collected data about multiple G3 children per family. In contrast, the prospective 3G studies have smaller sample sizes, typically between 300 and 500, and usually collect data on one or two G3 children per family.

Each strategy has strengths and limitations. The former studies obviously have more statistical power and may be able to provide more precise estimates of intergenerational similarities. It should be noted though that the nesting of children within families needs to be taken into account in analytic models and statistical power may be more related to the number of independent families than to the total number of G3 children. Nevertheless, the larger sample sizes enable more refined analysis, for example, intergenerational models that take both G2 gender and G3 gender into account. On the other hand, prospective 3G studies, while based on smaller samples,

collect data on risk and protective factors over time allowing for more refined estimation of mediating and moderating processes. Both of these data collection strategies have important, albeit somewhat distinct, advantages.

3.3 Measurement Issues

In order to more accurately address the central questions of intergenerational study, it is valuable to have as broad a measurement space as possible for each of the generations. Doing so helps to identify more accurately the level of intergenerational continuity by addressing potential sources of spuriousness and by enabling the estimation of models that more closely approximate causal analysis, such as propensity score models. A broad approach to measurement also provides the indicators necessary to examine mediating and moderating influences. In this section I discuss only three of the types of measures that are helpful for these purposes.

3.3.1 G2 Developmental Data

There are likely to be many, time-varying mediating pathways that link a parent's adolescent behavior with their child's involvement in that same behavior 20–25 years later. In other words, there are multiple developmental pathways that could account for Path B in Fig. 1. Elsewhere I have presented a life-course theory of intergenerational continuity in antisocial behavior (Thornberry 2005, 2009). In a nutshell, it argues that one way to understand how a parent's antisocial behavior creates risk for their children is through the cascading consequences that serious and prolonged involvement in adolescent delinquency, drug use, and related problem behaviors have on later development. Among other consequences, those behaviors increase the risk of disorderly transitions from adolescence to adulthood (Rindfuss et al. 1987; Wickrama et al. 2010), later stressors (e.g., depressive symptomatology) (McLoyd 1990), structural adversity (e.g., poverty, marital and family instability) (Conger et al. 2010), and continued involvement in antisocial behavior (Piquero et al. 2003). This course of

development is hypothesized to influence the quality of the family environment G2 provides to G3 including family structure, family climate, and parenting styles (Patterson et al. 1992; Scaramella et al. 2008), all of which are related to IG continuity in adolescent problem behaviors. Obviously, to test intergenerational models like this one requires comprehensive prospective data on movement along major life-course trajectories such as education, work, and family formation. Only by having this detailed information on G2's life course can we empirically assess cascading models that attempt to explain both continuity and discontinuity across the generations. It is also important to have similar information on G3's life-course trajectories to incorporate **intra**generational influences into the story.

3.3.2 Genotypic Data

It is also important to collect genotypic data as part of 3G studies as several ongoing intergenerational studies are doing (e.g., Bailey et al. 2013; Capaldi et al. 2012; Conger et al. 2003; Thornberry et al. 2009a). There is considerable evidence of heritability for most behaviors (Plomin 1989); for example, heritability estimates for antisocial behavior average about 40–50 % (Miles and Carey 1997; Rhee and Waldman 2002). Collecting DNA from intergenerational study participants, especially the trio of G3 and both biological parents, allows us to investigate genetic main effects as well as gene-environment correlations and gene-by-environment interactions (e.g., Caspi et al. 2002).

The centrality of genetics to the primary research questions has implications for other design features and decisions. For example, if it is important to conduct a genome wide association study (GWAS), then that may lead to the use of an intergenerational project that relies primarily on cross-sectional data about G3 since those studies typically have a larger sample size and therefore the greater statistical power that is needed for a GWAS approach. However, those studies have more limited assessments of the G3 phenotype, based on either point estimates or retrospective data, and may also have less detailed prospective data for the investigation of

gene–environment interactions. In contrast, studies that have prospective G3 data over longer portions of the life course typically have smaller sample sizes and may have to use a candidate gene approach. While having richer prospective data on the phenotype and on environmental factors, the range of genetic risk and protective factors that can be examined will be more limited. Both approaches have advantages for enhancing our understanding of the role of genetics in accounting for intergenerational continuity and discontinuity. Combining the extensive life-course information on G2 and G3 development mentioned above with genetic risk and protective factors is an important topic for future research that will ultimately enable a very comprehensive assessment of intergenerational linkages.

3.3.3 Contextual Data

It is also helpful to have data on the broader context in which the linkage between G2 and G3 occurs. For example, the neighborhood of residence influences individual behaviors as well as the structure and interaction patterns of families (Anderson 1990; Burton 1996; Wilson 1987). Moreover, Sharkey (2008) has demonstrated a substantial degree of intergenerational continuity in neighborhood context. That is, the socioeconomic status of the parent's neighborhood has a pronounced impact on the likely socioeconomic status of the child's neighborhood once they grow to adulthood, independent of individual and family characteristics. Exposure to neighborhood poverty and disadvantage is often reproduced, especially for African-American families. Measuring these processes is valuable in its own right. But, in addition, understanding the neighborhood context in each generation and, perhaps more importantly, its continuity across generations, has the potential to add new insights into identifying the mechanisms by which individual level behaviors, either prosocial or antisocial, are transmitted across generations.

There is relatively little research on the reproduction of social contexts, including neighborhood context, or the mechanisms that bring about (Sharkey 2008). There is also a little research on how the reproduction of social context influences

individual behaviors and levels of continuity and discontinuity. That is an important avenue for future 3G projects to investigate.

It would also be advantageous to have detailed measures on the broader family context, including the structure of the household, the presence of extended family members either in the household or nearby, the number of siblings, and so forth. All of these broader familial characteristics can influence parent-child interactions, the level of intergenerational continuity, and mediating processes that account for it. For example, in their investigation of intergenerational continuity in cigarette use, Vuolo and Staff (2013) found that one of the most powerful mediators was the presence of an older sibling who also smoked.

3.3.4 Similarity of Measures

Regardless of the specific measures that are included, a 3G study also needs to consider whether the same measures are used to assess G2 and G3 at comparable ages. Recall that G3 assessments are likely to occur 20–25 years later. If identical or virtually identical measures are used, there is obviously a high degree of comparability in the assessment of key concepts across the generations. That facilitates the evaluation of whether there is change or stability in the behaviors of interest and in mediating and moderating influences. However, it is likely that new and improved measures for at least some of the concepts have been developed in the interim and large improvements in psychometric properties may mandate the use of new measures. If different measures are used, then, by definition, there is less comparability in the way key concepts are assessed. If there is change in the prevalence or frequency of the behavior of interest, for example, it is difficult to conclude whether that reflects an actual change in the behavior—perhaps a period or birth cohort effect—versus a change in the measurement approach.

There is obviously no correct answer to this issue. My own view is that it is not necessary to use identical measures across the generations. An underlying theory of intergenerational continuity posits that adjacent generations will be similar on some concept of interest. As long as the same

concept is measured with acceptable validity and reliability in both generations, the specific measure used should not matter. Indeed, if we only observe intergenerational continuity when identical measures are used, it raises the possibility that the similarities are generated not by the behavior of interest but by a particular approach to measurement. Also, the extent to which intergenerational relationships are replicated across different studies that are likely to use different measurement approaches is important in assessing the overall validity of the intergenerational theory.

3.3.5 Source of Measures

Some behaviors of interest can only be measured by direct contact with the G2 and G3 participants, for example, by interviews or videotaped observations of parent-child interactions (Scaramella et al. 1999). For this issue I view the use of informants—for example, parent reports about the behavior of young children or about the parenting of the parent's partner—as a special case of direct contact data. Other behaviors can be measured either by direct contact or by official or archival data. For example, with the exception of child maltreatment, the study of intergenerational patterns of parenting can only be investigated by direct contact. In contrast, the study of delinquent behavior can be measured either by self-reports, archival data such as arrest records, or both.

Both strategies have been used in the study of antisocial behavior and, again, there are advantages and disadvantages to these approaches. Studies based on archival records typically have the largest sample sizes since data collection is relatively inexpensive. Van de Rakt et al. (2008) used the Dutch registry data to study intergenerational continuity in criminal convictions of fathers and children with a sample of 8,085 children. Frisell et al. (2011) examined whether violent crime runs in families based on a total population study of 12.5 million individuals in Sweden. In addition, it is easier for archival studies to be extended beyond three generations as in Bijleveld's Dutch study of five generations of the same families (Bijleveld and Wijkman 2009). These very large samples obviously increase statistical power and facilitate the use of sophisti-

cated analytic techniques such as group-based trajectory models (Nagin 2009) and latent class models (McCutcheon 1987) that divide the sample into meaningful subgroups. Also, looking at the biological relatedness of pairs of participants, as done by Frisell et al. (2011), can contribute to our understanding of genetic and environmental influences. At the same time reliance entirely on archival data comes at a cost. These studies are almost entirely descriptive and are focused only on the first core intergenerational question—the level of continuity and discontinuity. They have few if any explanatory variables and therefore very little ability to address the second core question—which mediating and moderating influences help to explain continuity and discontinuity.

Studies with direct contact measures suffer from the opposite set of problems. Samples tend to be small, especially if complicated measurement strategies such as videotaped observations are used (e.g., Capaldi et al. 2012; Conger et al. 2012). Thus, they often encounter issues of statistical power which, as noted above, may limit the application of some analytic techniques. Nevertheless, the richness of data that can only be collected via direct contact with the families enables these studies to investigate mediating and moderating influences in greater detail.

4 Contributions of Three Generation Studies

Intergenerational studies have the potential to advance our understanding of a number of themes that are central to the life-course perspective. In the remainder of this chapter I comment on some of them and, in doing so, address the potential that 3G studies have and suggest some additional themes for future research.

4.1 Consequences of Behavior

A central theme of the life-course approach is to describe and understand the long-term consequences of movement along major developmen-

tal trajectories such as family, education, work, involvement in antisocial behavior, and so forth. For example, there is a persistent theme related to the timing of transitions with a major assumption that off-time and disorderly transitions will be problematic both in the short-term and long-term (Elder 1985). Accordingly, many longitudinal studies have examined this issue. Focusing on adolescence as I have throughout this chapter, there is ample evidence that successful adaptation along prosocial trajectories (for example, school engagement and satisfactory performance) has many long-term benefits for the individual while failure in prosocial arenas (for example, school disengagement, dropping out, and involvement in problem behaviors) has many long-term costs.

Most longitudinal studies that have addressed this issue have been concerned with the consequences of a person's earlier development on that same individual's later development. 3G studies have the potential to increase our understanding of the scope of this issue by examining the extent to which those consequences, both positive and negative, also extend across the generations to affect the person's children. These studies can examine whether the effects are direct or indirect and, if indirect, the mediating pathways through which they operate. There is growing evidence from 3G studies that these intergenerational effects can be quite strong and persistent.

Moreover, 3G studies have the potential to extend this line of inquiry by also investigating grandparental effects to see whether behavioral consequences extend across multiple generations of family lineage. Evidence for independent grandparental effects is mixed and may depend on the particular behavior being investigated. Cherlin and Furstenberg (1992) found few independent grandparental effects on child development. In contrast, Thornberry et al. (2006) found that grandmother's drug use had an effect on the grandchild's drug use if she had ongoing contact with the grandchild and Sharkey (2008) found that continuity in the neighborhood context persisted across several generations. There are, unfortunately, too few investigations of grandparental effects and, more generally, multigenera-

tional effects (Mare 2011). That is an important gap for 3G studies to investigate in the future.

Nevertheless, 3G studies provide a more complete understanding of the consequences that a person's "fateful decisions and events" can have by extending our view past the consequences for only the individual to consequences for other generations. These investigations are quite consistent with developmental psychology's concern with multifinality, the notion that a single behavior or characteristic can have causal linkages to many different, and seemingly disparate, outcomes.

Identifying more fully the range of consequences that a particular behavior can generate has important policy implications for the development of programs to enhance prosocial behaviors (e.g., school engagement) and to reduce problem behaviors (e.g., drug use). Assume for the moment that these behaviors have multigenerational consequences—consequences for the individual, his or her children, and grandchildren. Efforts that successfully increase prosocial behaviors and reduce problem behaviors have the potential to benefit children and grandchildren, even though they may not yet be born. Those benefits, while quite likely of a very modest size, improve the cost-benefit ratio associated with the program and provide additional evidence of value (Aos et al. 2004). Also, by providing information about the mediating pathways associated with intergenerational effects, 3G studies can provide crucial evidence about the proper content of these programs.

4.2 Origins of Behavior

A second important theme of the life-course approach is to identify the origins of behavior. There is little difference in whether the behavior is prosocial—such as warm/nurturing parenting—or antisocial—such as child maltreatment. A central question is to identify precursors, and ideally causal influences for that behavior. Given the complexity of human behavior there are likely to be multiple pathways that lead to a

particular behavior, what developmental psychology refers to as equifinality.

Recently, the social sciences have relied on longitudinal studies to investigate this theme, in large part because of the advantages those studies offer with respect to temporal ordering. But longitudinal studies primarily focus on intragenerational influences such as the person's earlier development and the concurrent relationships between parents and children in explaining a particular behavior. As Mare has noted: "social scientists tend to maintain a two-generation view of the world" (2011:8). 3G studies have the potential to move beyond this orientation and greatly extend our understanding of the origins of any particular behavior by addressing the two major questions of intergenerational study.

First, they provide a more complete understanding of the origins of a particular behavior by examining not only how a G2 parent concurrently influences G3 behavior but by examining how a parent's earlier developmental history also influences the behavior. In part, this is done by examining both homotypic and heterotypic continuity in behavior as illustrated earlier by Path B in Fig. 1.

Second, 3G studies provide a more complete understanding by examining the mediating pathways that account for observed levels of intergenerational continuity (or discontinuity) in behavior. These mediators are likely to be quite different from those that account for concurrent similarity. Many of them exist before the child is born and refer to long-term movement along the parent's life course trajectories. They are therefore likely to provide novel information compared to that typically reported in a longitudinal study.

Third, 3G studies invariably uncover a substantial level of intergenerational discontinuity in which children do not follow in the footsteps of their parents. Indeed, for the behaviors we have investigated in the RIGS, while continuity coefficients are statistically significant, a majority of the children do not exhibit the same problem behaviors as their parents (e.g., Thornberry et al. 2006, 2009a; Thornberry and Henry 2013). Understanding discontinuity, especially intergenerational resilience where children are signifi-

cantly less likely to engage in problem behaviors as compared to parents, also adds novel information to our understanding of the causes of problem behavior. Similarly, for prosocial behaviors, understanding discontinuity—for example why children are more successful than their parents in the educational arena—also enhances our understanding of the origins of educational success.

Findings from 3G studies about discontinuity have important policy and programmatic implications. Identifying protective factors that create intergenerational resilience for problem behaviors or promotive factors that enhance better outcomes for prosocial behaviors provides specific information for the content of programmatic efforts to improve human development. That is, by better understanding the processes that lead some children not to follow in the footsteps of their parents, we will have identified areas of development that programmatic efforts should attempt to enhance.

Unfortunately, there are very few studies that focus specifically on discontinuity (e.g., Conger et al. 2012; Dong and Krohn 2014; Haller and Chassin 2010; Lovegrove 2010) and one specific area for future research is increased investigation of this topic. The study of intergenerational discontinuity raises a new set of conceptual and methodological issues that needed to be carefully addressed. For example, if the G3 participants are not followed far enough into their life courses it is easy to misclassify them as experiencing intergenerational discontinuity when, with additional follow-up, they would exhibit the same behavior as their parents, demonstrating continuity. Hopefully, 3G studies will begin to address issues of discontinuity more fully as they extend their follow-up of the G3 samples.

4.3 Linked Lives

Another life-course theme at the heart of 3G studies is the one with which we began—linked lives. Clearly, the life courses of individuals become intertwined, mutually influencing one another over time. That is true of all intimate relationships and, aside from spouses, no relationship

may be as intertwined as that between parent and child. Intergenerational or 3G studies typically focus on how parental development and behaviors influence child development and behaviors. As just noted, doing so has greatly enhanced our understanding of the multiple consequences of behavior as well as the multiple origins of behavior. But in both cases the focus is typically on the G2 parent “acting on” the G3 child. In part, this is quite sensible given the temporal, indeed, generational, ordering of these behaviors. For so many behaviors investigated in 3G studies—educational attainment, fertility, adolescent problem behaviors, occupations, etc.—the flow of causality is overwhelmingly from parent to child.

Nevertheless there is little focus within the context of 3G studies on examining the impact of how the behavior of the G3 child also influences the behavior of the G2 parent. For example, I cannot think of any study that examines how G3 drug use influences the likelihood of the initiation of G2 drug use or, more generally, how a child’s antisocial behavior influences a parent’s initiation or escalation of antisocial behavior. Clearly, it is plausible that the child can introduce a parent to these and other forms of behavior but there is little empirical information on this issue. It obviously can be addressed in the context of a 3G study and that too should be a topic for future research. Doing so emphasizes the bidirectional quality of the concept of linked lives—how individuals mutually influence one another. That interactive quality should be a more prominent feature of 3G studies and intergenerational analyses.

5 Closing Comments

The focus of this chapter has been on methodological issues that 3G studies of human behavior need to confront. I recognize that there are many limitations to the approach presented here. My own scholarly focus is on the study of adolescent and early adult development with a particular emphasis on understanding the causes and consequences of delinquency, drug use, gang membership, and related problem behaviors. Also, I

approach 3G studies from the perspective of a social scientist and not a geneticist or a behavioral geneticist. All of that no doubt limits my understanding of 3G studies, the topics they can address, the methodological issues they confront, and how those issues can be resolved. If this chapter had been written by a scholar focusing on gerontology or demography (e.g., Bengtson 1996 or Mare 2011), for example, I am quite sure that it would have been different in tone and content.

Nevertheless, I think the major themes identified here are central to most intergenerational studies and provide an integrity to them that separates them from traditional longitudinal studies and therefore raises the potential for them to extend our understanding of human behavior. At their heart intergenerational studies address two fundamental issues. The first is to identify the level of intergenerational continuity and discontinuity in a particular behavior at the same developmental stage for each generation. The second is to identify the mechanisms that help us to understand how adjacent generations are linked and, therefore, to inform programmatic efforts to improve prosocial outcomes and ward off antisocial outcomes.

In designing 3G studies to address these themes there are, as I hope this chapter has demonstrated, a wide range of specific designs that can be implemented. As discussed above there are many sampling, research design, measurement, and data analytic decisions to be made in creating a particular study. By mixing and matching across those various decision points, 3G studies offer researchers tremendous flexibility in designing a study to address the particular behavior of interest and the specific theoretical questions being posed. Indeed, even studies that address the same basic theoretical questions about the same behavior often end up with somewhat different designs. We should welcome that flexibility, while at the same time maintaining a keen focus on the core issues of intergenerational study, as we continue to pursue themes central to the life-course perspective. As more and more prospective 3G studies become available, they have the potential to greatly expand our understanding of the causes and consequences of

human behavior and how behaviors—both prosocial and antisocial—become reproduced across the generations.

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Appendix: The Rochester Intergenerational Study

The Rochester Intergenerational Study started as an add-on to an existing longitudinal study, the Rochester Youth Development Study, which began in 1988. Its core design is summarized in the left-hand portion of Fig. 3. We began with a sample of 1,000 seventh and eighth graders from the Rochester, New York public schools. The initial purpose of the project was to study the causes and consequences of serious, chronic, and violent

delinquency. Because of that, we oversampled males, 3 to 1, given their greater involvement in serious violent offending. We also oversampled youth who resided in neighborhoods with a high resident arrest rate. The sample can be weighted to account for this stratification. The final sample of G2 participants averaged 14 years of age; 73 % were males and 27 % were females. The full G2 panel was followed forward with 12 interviews from age 14 to 23, at which point the retention rate was 85 %. In addition, we also interviewed one of their G1 parents 11 times; 85 % of the G1 respondents were the G2 child’s biological mother and another 10 % were stepmothers. In addition to the interviews that were conducted at regular intervals, we also collected information from schools, police, and child protective services. Details of the Rochester study design are presented in Thornberry et al. (2003).

The Rochester Intergenerational Study (RIGS), described in the right-hand portion of Fig. 3, began in 1999. The focal participants are the oldest biological child of each of the initial G2 participants. In Year 1 (1999), 370 children (ages 2–13, average age 6) and their families enrolled in the study. In each subsequent year we identified additional first-born children and enrolled them in the study as they turned 2. A

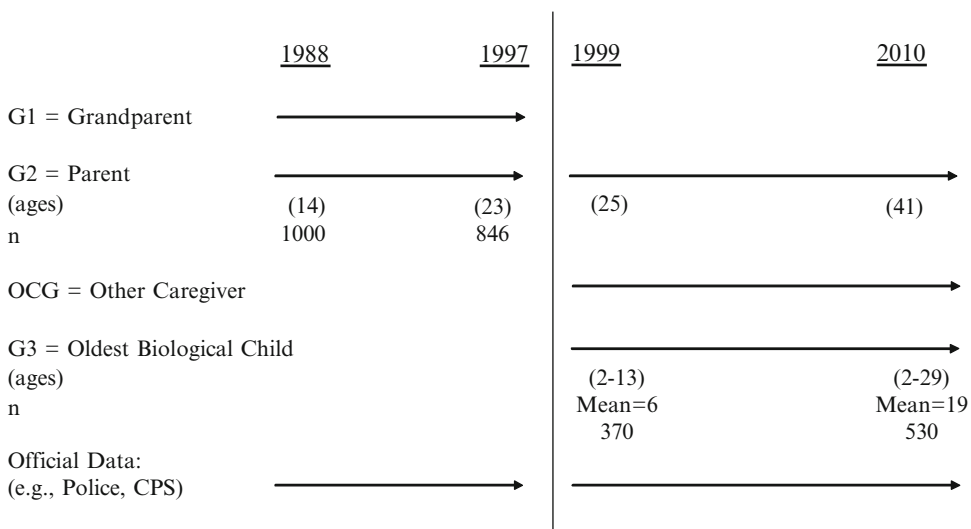


Fig. 3 Research design for the Rochester Intergenerational Study

total of 530 G3 children have enrolled in the study, currently ranging in age from 2 to 29 with an average age of 19. Importantly, therefore, many now overlap in age with the age of the G2 parents when they were first assessed as part of the original Rochester study.

For each family in the intergenerational study we annually interview three participants. We assess the G2 parents (the original adolescent participants in the Rochester Study), the G3 child when they are 8 years and older, and another primary caregiver (OCG) for each G3 child. In the case of G2 fathers, the OCG is almost invariably (93 %) the child's biological mother. In the case of G2 mothers, however, the OCGs are grandmothers (47 %), biological fathers (31 %), stepfathers (6 %), aunts (7 %), and others (9 %). At younger ages when G3 could not be interviewed, we conducted videotaped observations of G3 interacting with G2 and with OCG. We also collected DNA from a subsample of the families. Finally, we collect data from official agencies such as police and social services. More detail about the RIGS design can be found in Thornberry (2009).

References

- Achenbach, T. M. (1991). *Manual for the child behavior checklist/4-18 and 1991 profile*. Burlington: University of Vermont, Department of Psychology.
- Alexander, P. C., Moore, S., & Alexander, E. R., III. (1991). What is transmitted in the intergenerational transmission of violence? *Journal of Marriage and the Family*, 53, 657–668.
- Anderson, E. (1990). *Streetwise: Race, class, and change in an urban community*. Chicago: The University of Chicago Press.
- Aos, S., Lieb, R., Mayfield, J., Miller, M., & Penucci, A. (2004). *Benefits and costs of prevention and early intervention programs for youth*. Olympia: Washington State Institute for Public Policy.
- Auty, K. M., Farrington, D. P., & Coid, J. W. (2014). Intergenerational transmission of psychopathy and mediation via psychosocial risk factors. *British Journal of Psychiatry*, 206, 26–31.
- Bailey, J. A., Hill, K. G., Oesterle, S., & Hawkins, J. D. (2006). Linking substance use and problem behavior across three generations. *Journal of Abnormal Psychology*, 115, 263–282.
- Bailey, J. A., Hill, K. G., Guttmanova, K., Oesterle, S., Hawkins, J. D., Catalano, R. F., & McMahon, R. J. (2013). The association between parent early adult drug use disorder and later observed parenting practices and child behavior problems: Testing alternate models. *Developmental Psychology*, 49, 887–899.
- Belsky, J. (1993). Etiology of child maltreatment: A developmental-ecological analysis. *Psychological Bulletin*, 114, 413–434.
- Bengtson, V. L. (1971, 1985, 1988, 1991, 1994, 1997, 2000). Longitudinal study of generations, [California]. ICPSR22100-v2. Ann Arbor: Inter-university Consortium for Political and Social Research [distributor], 2009-05-12. <http://doi.org/10.3886/ICPSR22100.v2>.
- Bengtson, V. L. (1996). Continuities and discontinuities in intergenerational relationships over time. In V. L. Bengtson (Ed.), *Adulthood and aging: Research on continuities and discontinuities* (pp. 271–303). New York: Springer.
- Bengtson, V. L., Biblarz, T. J., & Roberts, R. E. (2002). *How families still matter: A longitudinal study of youth in two generations*. New York: Cambridge University Press.
- Besemer, S., & Farrington, D. P. (2012). Intergenerational transmission of criminal behaviour: Conviction trajectories of fathers and their children. *European Journal of Criminology*, 9, 120–141.
- Bijleveld, C. J. H., & Wijkman, M. (2009). Intergenerational continuity in convictions: A five-generation study. *Criminal Behaviour and Mental Health*, 19, 142–155. doi:10.1002/cbm.714.
- Burton, L. M. (1996). Age norms, the timing of family role transitions, and intergenerational caregiving among aging African American women. *The Gerontologist*, 36(2), 199–208.
- Capaldi, D. M., Pears, K. C., Patterson, G. R., & Owen, L. D. (2003). Continuity of parenting practices across generations in an at-risk sample: A prospective comparison of direct and mediated associations. *Journal of Abnormal Child Psychology*, 31, 127–142.
- Capaldi, D. M., Pears, K. C., Kerr, D. C. R. (2012). The Oregon Youth study three-generational study: Theory, design, and findings. *The International Society for the Study of Behavioural Development Bulletin*, Serial No. 62 (pp. 29–33).
- Carlson, M. J. (2006). Family structure, father involvement, and adolescent behavioral outcomes. *Journal of Marriage and Family*, 68, 137–154.
- Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., . . . Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, 297, 851–854.
- Cherlin, A. J., & Furstenberg, F. F., Jr. (1992). *The new American grandparent: A place in the family, a life apart*. Cambridge, MA: Harvard University Press.
- Conger, R. D., Lorenz, F. O., Elder, G. H., Jr., Simons, R. L., & Ge, X. (1993). Husband and wife differences

- in response to undesirable life events. *Journal of Health and Social Behavior*, *34*, 71–88.
- Conger, R. D., Neppel, T. K., Kim, K. J., & Scaramella, L. V. (2003). Angry and aggressive behavior across three generations: A prospective, longitudinal study of parents and children. *Journal of Abnormal Child Psychology*, *31*, 143–160.
- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and Family*, *72*, 685–704.
- Conger, R. D., Schofield, T. J., & Neppel, T. K. (2012). Intergenerational continuity and discontinuity in harsh parenting. *Parenting: Science and Practice*, *12*, 222–231.
- Doherty, W. J., Kouneski, E. F., & Erickson, M. F. (1998). Responsible fathering: An overview and conceptual framework. *Journal of Marriage and the Family*, *60*, 277–292.
- Dong, B., & Krohn, M. D. (2014). Exploring intergenerational discontinuity in problem behavior: Bad parents with good children. *Youth Violence and Juvenile Justice*. doi:10.1177/1541204014527119.
- Doumas, D., Margolin, G., & John, R. S. (1994). The intergenerational transmission of aggression across three generations. *Journal of Family Violence*, *9*, 157–175.
- Elder, G. H., Jr. (1985). Perspectives on the life course. In G. H. Elder Jr. (Ed.), *Life course dynamics* (pp. 23–49). Ithaca: Cornell University Press.
- Farrington, D. P. (1993). Have any individual, family or neighbourhood influences on offending been demonstrated conclusively? In D. P. Farrington, R. J. Sampson, & P.-O. H. Wikström (Eds.), *Integrating individual and ecological aspects of crime* (pp. 7–37). Stockholm: Allmaana Forlaget.
- Frisell, T., Lichtenstein, P., & Langstrom, N. (2011). Violent crime runs in families: A total population study of 12.5 million individuals. *Psychological Medicine*, *41*, 97–105.
- Fuller, B. E., Chermack, S. T., Cruise, K. A., Kirsch, E., Fitzgerald, H. E., & Zucker, R. A. (2003). Predictors of aggression across three generations among sons of alcoholics: Relationships involving grandparental and parental alcoholism, child aggression, marital aggression and parenting practices. *Journal of Studies on Alcohol*, *64*, 472–483.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, *91*, 481–510.
- Haller, M. M., & Chassin, L. (2010). The reciprocal influences of perceived risk for alcoholism and alcohol use over time: Evidence for aversive transmission of parental alcoholism. *Journal of Studies on Alcohol and Drugs*, *71*, 588–596.
- Harris, K. M., Halpern, C. T., Whitse, E., Hussey, J., Tabor, J., Entzel, P., Udry, J. R. (2009). The National Longitudinal Study of Adolescent to Adult Health: Research Design [WWW document]. URL: <http://www.cpc.unc.edu/projects/addhealth/design>.
- Hetherington, E. M., & Kelly, J. (2002). *For better or for worse*. New York: Norton.
- Hofferth, S. L., & Goldscheider, F. (2010). Family structure and the transition to early parenthood. *Demography*, *47*, 415–437.
- Huesmann, L. R., Eron, L. D., Lefkowitz, M. M., & Walder, L. O. (1984). Stability of aggression over time and generations. *Developmental Psychology*, *20*, 1120–1134.
- Jaffee, S. R., Moffitt, T. E., Caspi, A., & Taylor, A. (2003). Life with (or without) father: The benefits of living with two biological parents depend on the father's antisocial behavior. *Child Development*, *74*, 109–126.
- Kaplan, H. B., & Tolle, G. C., Jr. (2006). *The cycle of deviant behavior: Investigating intergenerational parallelism*. New York: Springer.
- Kelly, J. B. (2000). Children's adjustment in conflicted marriage and divorce: A decade review of research. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 963–973.
- Kerr, D. C. R., Capaldi, D. M., Pears, K. C., & Owen, L. D. (2012). Intergenerational influences on early alcohol use: Independence from the problem behavior pathway. *Development and Psychopathology*, *24*, 889–906.
- Knight, K. E., Menard, S., & Simmons, S. B. (2014). Intergenerational continuity of substance use. *Substance Use & Misuse*, *49*, 221–233.
- Laird, N. M., & Lange, C. (2006). Family-based designs in the age of large-scale gene-association studies. *Nature Reviews Genetics*, *7*, 385–394. doi:10.1038/nrg1839.
- Lamb, M. E., & Tamis-Lemonda, C. S. (2004). The role of the father: An introduction. In M. E. Lamb (Ed.), *The role of the father in child development* (pp. 1–31). New York: Wiley.
- Lovegrove, P. J. (2010). *Explaining discontinuous cross-generational patterns of delinquency*. Unpublished doctoral dissertation, University of Colorado.
- Magnuson, K., & Berger, L. M. (2009). Family structure states and transitions: Associations with children's well-being during middle childhood. *Journal of Marriage and Family*, *71*, 575–591.
- Mare, R. D. (2011). A multigenerational view of inequality. *Demography*, *48*, 1–23.
- Martin, M. J., Conger, R. D., Schofield, T. J., Dogan, S. J., Widaman, K. F., Donnellan, M. B., & Neppel, T. K. (2010). Evaluation of the interactionist model of socioeconomic status and problem behavior: A developmental cascade across generations. *Development and Psychopathology*, *22*, 697–715.
- Martinez, G. M., Daniels, K., & Chandra, A. (2012). *Fertility of men and women aged 15–44 years in the United States: National survey of family growth, 2006–2010 National Health Statistics report*. Hyattsville: National Center for Health Statistics.

- McCutcheon, A. L. (1987). *Latent class analysis* (Quantitative Applications in the Social Sciences Series No. 64). Thousand Oaks: Sage.
- McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61*, 311–346.
- Miles, D. R., & Carey, G. (1997). Genetic environment architecture of human aggression. *Journal of Personality and Social Psychology, 72*, 207–217.
- Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology, 14*, 179–207.
- Nagin, D. S. (2009). *Group-based modeling of development*. Cambridge, MA: Harvard University Press.
- Nagin, D. S., Pogarsky, G., & Farrington, D. P. (1997). Adolescent mothers and the criminal behavior of their children. *Law and Society Review, 31*, 137–162.
- Neppl, T. K., Conger, R. D., Scaramella, L. V., & Ontai, L. L. (2009). Intergenerational continuity in parenting behavior: Mediating pathways and child effects. *Developmental Psychology, 45*, 1241–1256.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys*. Eugene: Castalia Publishing Company.
- Pearl, J. (2009). *Causality: Models, reasoning, and inference*. Cambridge: Cambridge University Press.
- Phares, V., Fields, S., Kamboukos, D., & Lopez, E. (2005). Still looking for poppa. *American Psychologist, 60*, 735–736.
- Piquero, A. R., Farrington, D. P., & Blumstein, A. (2003). The criminal career paradigm. In M. Tonry (Ed.), *Crime and justice: A review of research* (Vol. 30, pp. 359–506). Chicago: University of Chicago Press.
- Plomin, R. (1989). Behavioral genetics. *Journal of Nervous and Mental Disease, 177*, 645.
- Prinz, P., & Oghena, P. (2005). Cohort sequential design. In B. S. Everitt & D. C. Howell (Eds.), *Encyclopedia of statistics in behavioral science* (Vol. 1, pp. 319–322). Chichester: Wiley.
- Rhee, S. H., & Waldman, I. D. (2002). Genetic and environmental influences on antisocial behavior: A meta-analysis of twin and adoption studies. *Psychological Bulletin, 128*, 490–529.
- Rindfuss, R. R., Swicegood, C. G., & Rosenfeld, R. (1987). Disorder in the life course: How common and does it matter? *American Sociological Review, 52*, 785–801.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika, 70*, 41–55.
- Scaramella, L. V., & Conger, R. D. (2003). Intergenerational continuity of hostile parenting and its consequences: The moderating influence of children's negative emotional reactivity. *Social Development, 12*, 420–439.
- Scaramella, L. V., Conger, R. D., & Simons, R. L. (1999). Parental protective influences and gender-specific increases in adolescent internalizing and externalizing problems. *Journal of Research on Adolescence, 9*, 111–141.
- Scaramella, L. V., Neppl, T. K., Ontai, L. L., & Conger, R. D. (2008). Consequences of socioeconomic disadvantage across three generations: Parenting behavior and child externalizing problems. *Journal of Family Psychology, 22*, 725–733.
- Sharkey, P. (2008). The intergenerational transmission of context. *American Journal of Sociology, 113*(4), 931–969.
- Smith, C. A., & Farrington, D. P. (2004). Continuities in antisocial behavior and parenting across three generations. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 45*, 230–248.
- Thornberry, T. P. (1989). Panel effects and the use of self-reported measures of delinquency in longitudinal studies. In M. W. Klein (Ed.), *Cross-national research in self-reported crime and delinquency* (pp. 347–369). Dordrecht: Kluwer Academic Publishers.
- Thornberry, T. P. (2005). Explaining multiple patterns of offending across the life course and across generations. *The Annals of the American Academy of Political and Social Science, 602*, 156–195.
- Thornberry, T. P. (2009). The apple doesn't fall far from the tree (or does it?): Intergenerational patterns of antisocial behavior. *Criminology, 47*, 297–325.
- Thornberry, T. P., & Henry, K. L. (2013). Intergenerational continuity in maltreatment. *Journal of Abnormal Child Psychology, 41*, 555–569.
- Thornberry, T. P., Krohn, M. D., Lizotte, A. J., Smith, C. A., & Tobin, K. (2003). *Gangs and delinquency in developmental perspective*. New York: Cambridge University Press.
- Thornberry, T. P., Krohn, M., & Freeman-Gallant, A. (2006). Intergenerational roots of early onset substance use. *Journal of Drug Issues, 36*, 1–28.
- Thornberry, T. P., Freeman-Gallant, A., & Lovegrove, P. J. (2009a). The impact of parental stressors on the intergenerational transmission of antisocial behavior. *Journal of Youth and Adolescence, 38*, 312–322.
- Thornberry, T. P., Freeman-Gallant, A., & Lovegrove, P. J. (2009b). Intergeneration linkages in antisocial behavior. *Criminal Behaviour and Mental Health, 19*, 80–93.
- Torche, F., Warren, J. R., Halpern-Manners, A., & Valenzuela, E. (2012). Panel conditioning in a longitudinal study of adolescents' substance use: Evidence from an experiment. *Social Forces, 90*, 891–918.
- Tremblay, R. E., & Nagin, D. S. (2005). The developmental origins of physical aggression in humans. In R. E. Tremblay, W. W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression* (pp. 83–106). New York: The Guilford Press.
- van de Rakt, M., Nieuwbeerta, P., & de Graaf, N. D. (2008). Like father, like son: The relationships between conviction trajectories of fathers and their sons and daughters. *British Journal of Criminology, 48*, 538–556.

- Vuolo, M., & Staff, J. (2013). Parent and child cigarette use: A longitudinal, multigenerational study. *Pediatrics, 132*, e568–e577.
- Wickrama, T., Wickrama, K. A. S., & Baltimore, D. L. (2010). Adolescent precocious development and young adult health outcomes. *Advances in Life Course Research, 15*, 121–131.
- Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: The University of Chicago Press.
- Wu, P., & Kandel, D. B. (1995). The roles of mothers and fathers in intergenerational behavioral transmission: The case of smoking and delinquency. In H. B. Kaplan (Ed.), *Drugs, crime, and other deviant adaptations: Longitudinal studies* (pp. 49–81). New York: Plenum Press.

Neighborhood, Place, and the Life Course

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1 Introduction

The health and developmental consequences of residential and other spatial environments across the life course have been a focus of social science disciplines for decades. The last 25 years, in particular, have seen a marked increase in the investigation of “neighborhood effects” (particularly in urban settings) on collective and individual wellbeing. These efforts have yielded compelling evidence of neighborhood influences on a range of outcomes. Largely focused on variation in socioeconomic factors, extant research has offered robust evidence of neighborhood effects on mental and physical health, delinquency and crime, educational achievement, sexual and fertility-related behavior, among other outcomes (Sampson 2012). Despite the dramatic upsurge in interest and the cumulative body of findings signaling the relevance of neighborhoods, the field has nevertheless been the subject of extensive criticism. A number of scholars have called for recognition of the significant limitations of exist-

ing research and the need for novel strategies to address ongoing challenges (Harding et al. 2011).

In this chapter we take stock of contemporary advances in neighborhood research and their implications for understanding life course processes. We highlight the fundamental challenges the field faces and novel directions that hold the promise to usher in a new era of neighborhood and broader “place” effects research. At the core of our argument is the claim that neighborhood research has neglected the role of actual mobility as captured by day-to-day activity patterns and exposures. Incorporating individual level *activity spaces* – i.e., the set of places individuals come into contact with as a result of their routine activities – into theory, data, and measurement will substantially advance research on neighborhoods and extend the field beyond a focus on arbitrarily defined neighborhood boundaries (Golledge and Stimson 1987; Inagami et al. 2007; Newsome et al. 1998; Schönfelder and Axhausen 2002, 2003). A shift toward activity space thinking in neighborhood research is already evident in an emerging, interdisciplinary theoretical and empirical literature (Browning and Soller 2014; Cagney et al. 2013; Graif et al. 2014; Jones and Pebley 2014; Krivo et al. 2013; Kwan 2013; Matthews 2011; Matthews and Yang 2013; Mennis and Mason 2011; Perchoux et al. 2013). Nevertheless, this trend remains inchoate. Moreover, efforts to understand how activity patterns concatenate in urban settings to form what

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we term *ecological networks* – with implications for the collective functioning of neighborhood and activity space environments – are only just emerging (Browning and Soller 2014; Graif et al. 2014; Sampson 2012).

We begin with a brief overview of key principles of life course research and their application to understanding neighborhood and place effects. We focus specifically on the role of agency in the construction of the sociospatial contexts of everyday experience, the historical and spatial specificity of life course trajectories and transitions, and the linkage of lives in space and time. We then turn to a short history of research on neighborhood effects, from the origins of the neighborhood approach in the work of the Chicago School of Sociology, to the mid-twentieth century ebb in interest, to the current revitalization of the field across a number of disciplines. The core of the chapter reviews a range of challenges facing contemporary neighborhood research and the potential for new directions rooted in more rigorous emphasis on exposure processes. We focus primarily on issues in theorizing and estimating multilevel influence processes, but also discuss concerns regarding the appropriate unit of analysis, selection and causation, data resources, and the tendency for contextual research to be siloed.

2 Principles of Life Course Research: The Role of Place

With Gieryn (2000), we understand “places” as not only geographic locations, but the material form, social practices, and cultural representations of these locations. “Neighborhoods” are residential places, but they are also composed, to some degree, of smaller scale places such as schools, stores, parks, and so on. Research on neighborhoods as units of exposure is thus, implicitly or explicitly, also research on the cluster of places that give the neighborhood its material form and shape its social and cultural organization. From the standpoint of individuals, residential neighborhoods are places to which people are regularly (but variably) exposed and worthy of emphasis in understanding the role of

places (more generally) in shaping life outcomes.

The life course approach provides an important organizing frame with which to understand variability in neighborhood and other place-based exposures and influences. Fundamentally, the concepts of trajectory – “sequences of roles and experiences” – and transition – “changes in roles or state” (Elder et al. 2003) implicitly incorporate the contribution of place to life course processes. Residential moves are critical transitions in the life course, potentially reshaping trajectories across a number of life domains. Educational or work transitions imply significant changes of settings involving a high level of exposure. Even without explicit moves, residential, education and work contexts can change around us, implying transitions of another kind and acknowledging the dynamic interplay of individual experience and context. Thus, place is heavily implicated in understanding the consequences of roles and experiences across the life course.

Elder and colleagues outline a series of principles to organize the key contributions of life course research (Elder et al. 2003). A number of these principles are relevant to understanding the connection of life course with neighborhood and place approaches. First, the life course perspective emphasizes the role of *agency* in the construction of life course trajectories. Decisions regarding residential moves, everyday activity patterns, and organizational involvements produce a complex constellation of person-environment interactions that is not well captured by conventional neighborhood effects research designs. For instance, the assumption that individuals are nested within some neighborhood unit that constitutes an equivalent and encompassing space for residents (e.g., persons embedded in census tracts) implies a kind of residential determinism that belies individual agency in the production of daily exposures.

Second, the life course perspective explicitly recognizes the embeddedness of developmental experiences in history and place (Dannefer 1984; Elder 1974). Neighborhood approaches add richness to research focused exclusively on the micro level contexts of development, but too

often such research is limited to incorporation of abstract structural conditions (e.g., the neighborhood poverty level) without attention to actual exposure settings. The principle of *time and place* highlights the historical and temporal specificity of place-based exposures, drawing attention to experiences in actual routine activity settings and their cumulative consequences.

Third, the emphasis on “linked lives” acknowledges the interdependence of life course trajectories, an insight that is particularly relevant in understanding the social processes responsible for place effects on well-being. Linked lives may be understood both temporally (e.g., intergenerational linkages) and spatially (e.g., concurrent influences of proximate others). Research has focused heavily on understanding the influence of social network ties on life course outcomes (e.g. Cornwell et al. 2008). A more sophisticated emphasis on place, however, extends the notion of linked lives to incorporate shared routine activities and the potentially critical role of encounters in space that would not be considered conventional social network ties (e.g., friendship, kinship, occupational, etc.). Despite the centrality of this form of ecologically-based interaction to a number of prominent theories (e.g. Wilson 1987), few efforts to formalize the notion of linked lives in space have been undertaken. We consider these principles of life course research and their application to an improved understanding of neighborhood and place effects throughout the chapter.

3 Neighborhood Research: A Brief History

Research on neighborhood can be traced to the origins of the sociological discipline, most notably in the work of the Chicago School of Sociology. Reacting to a historical context marked by rapid urbanization, large-scale immigration, and increasing salience of social problems such as urban poverty, crime, and mental illness, Chicago School scholars articulated a set of research questions that continue to preoccupy the social sciences. Why are urban contexts asso-

ciated with more prevalent “social pathology”? Are there features of urban social life that encourage such outcomes, above and beyond the characteristics of the individuals that settle in urban environments? How and why are areas within cities differentiated with respect to collective and individual well-being? The insights that emerged from the Chicago School integrated Durkheimian views on the potentially disruptive aspects of social change with human ecological models of urban growth (Park and Burgess 1925). Thomas and Znaniecki (1919) introduced the concept of “social disorganization” to describe the process by which normative structures of immigrant cultures became attenuated when imported to new contexts, with implications for family functioning and immigrant child outcomes. Shaw and McKay (1942), in turn, applied the social disorganization concept to the neighborhood level to explain area level variation in crime rates. Focusing on the implications of poverty, residential instability, and race/ethnic heterogeneity for the ability of communities to realize shared values and maintain effective social controls, these authors pioneered the investigation of neighborhood-level influences on delinquency and crime. A key contribution of their work was the explicit distinction between the criminogenic structural features of neighborhood contexts and the individual residents of urban neighborhoods. Subsequent studies of social disorganization extended the investigation of neighborhood influences to include mental health outcomes (Faris and Dunham 1939).

The framework pioneered by Chicago School scholars spawned a body of research in the mid-twentieth century documenting substantial spatial inequality across a number of dimensions. This spate of research, however, was largely characterized by macro-level analytic approaches that limited the capacity of researchers to disentangle individual and contextual effects (i.e., through multilevel designs). Moreover, research in the social disorganization tradition became the subject of criticism as theoretical models of the mechanisms translating neighborhood structural disadvantage into diminished wellbeing were increasingly recognized to be underdeveloped

(Bursik 1988). In combination with the emerging dominance of the survey research model, the critique led to relatively slow growth in macro-level research on neighborhoods in US-based urban sociology and related subfields. Population researchers, however, continued to make substantive and methodological advances in this area (Casterline 1985; Entwisle 2007).

The 1987 publication of William Julius Wilson's seminal text, *The Truly Disadvantaged*, marked a critical turning point in research on neighborhood contexts. Wilson's core thesis shifted disciplinary attention away from individual-level factors as principal mechanisms explaining the highly unequal outcomes of urban populations by race, ethnicity, and socioeconomic status, to the sociospatial conditions to which the most disadvantaged urban residents were exposed. Wilson documented dramatic inequalities in structural aspects of neighborhood environments, articulating a model of both the origin of concentrated poverty neighborhoods and their consequences for life prospects. Wilson presented a number of hypotheses regarding the actual mechanisms accounting for neighborhood poverty effects on resident individuals, with a significant emphasis on social isolation from conventional institutions, the lack of salient mainstream role models, and compromised informal social control at the neighborhood level. *The Truly Disadvantaged* ultimately set the stage for a veritable explosion in research on neighborhood contexts (Sampson et al. 2002).

Following the publication and broad impact of *The Truly Disadvantaged*, researchers renewed focus on the potential influence of residential places, particularly for child development. Jencks and Mayer's (1990) review of the literature highlighted the role of collective socialization practices, peer influences, and local institutional resources as factors linking disadvantaged neighborhood environments to child outcomes. The Massey and Denton (1993) publication of Massey and Denton's *American Apartheid* further energized the focus on neighborhood influences and joined the debate regarding the foundational role of residential racial segregation in exacerbating the impact of concentrated poverty on urban African American

outcomes. The empirical research that followed largely corroborated the expectation that residence in disadvantaged neighborhoods influenced a wide range of outcomes, including child and adolescent development (Brooks-Gunn et al. 1993; Elliott et al. 1996), sex, fertility and family formation (Baumer and South 2001; Brewster 1994), educational achievement (Ainsworth 2002; Harding 2003), labor market opportunities (Massey and Shibuya 1995), exposure to crime (Krivo and Peterson 1996), mental and physical health (Aneshensel and Sucoff 1996; Ross 2000), and later life wellbeing (Krause 1996).

Consistent support for neighborhood structural influences on life course outcomes drew attention to the need for more extensive data collection to assess neighborhood influences and careful empirical assessment of potential mediating mechanisms. Consequently, the mid- to late-1990s saw unprecedented, large-scale data collection efforts explicitly designed to capture multilevel influences on individual outcomes. The Project on Human Development in Chicago Neighborhoods (PHDCN) (Earls et al. 1995), initiated in 1994, was a massive, multi-faceted data collection undertaking designed to test a range of hypotheses regarding the potential social mechanisms that linked neighborhood structural disadvantage to the developmental outcomes of urban youth. A second major data collection development was the Moving to Opportunity Demonstration (MTO) – an experimental study of the impact of moving public housing residents from high- to low-poverty environments (Goering and Feins 2003). The PHDCN and MTO data collection projects are among the more visible indicators of the substantial excitement that attended research on neighborhoods in the latter half of the 1990s and the promise the perspective held for shedding light on the origins of disparities in outcomes across the life course.

Research emerging in the wake of these and other studies offered additional evidence in support of the already widely held contention that neighborhood structural disadvantage negatively influenced a wide variety of life course outcomes (Sampson et al. 2008; Sanbonmatsu et al. 2012). Beyond the influence of neighborhood structure,

however, the PHDCN, in particular, offered the opportunity to assess aspects of neighborhood social climate and physical conditions that might independently influence individual-level wellbeing and mediate the effects of neighborhood structural factors. Sampson and colleagues (1997) emphasized the role of collective efficacy – the combination of mutual trust and expectations regarding the collective capacity to act on behalf of shared goals – as a critical community-level ingredient accounting for the association between neighborhood disadvantage and crime, among other outcomes. Other approaches emphasized social capital in the form of network ties (Bellair 1997; Bursik and Grasmick 1993; Haynie et al. 2006), social contagion (Crane 1991), social and physical disorder (visible cues of community decline) (Browning et al. 2013; Cohen et al. 2000; Taylor 2001), and local institutional resources (Small and McDermott 2006), among other processes.

The availability of high quality data on multiple aspects of community environments beyond structural background initiated a period of intensive effort to adjudicate among possible mechanisms channeling neighborhood influence. Other large-scale studies emerged to advance this effort, including the Los Angeles Family and Neighborhood Study (L.A.FANS) and the Chicago Community Adult Health Study (CCAHS) (Morenoff et al. 2007; Sastry et al. 2006). The theoretical and empirical emphasis on neighborhood social processes constituted a significant turning point in neighborhood research (Sampson et al. 2002). Indeed, the field remains heavily focused on identifying the neighborhood processes and conditions that are most relevant for individual level wellbeing (Galster 2012), which neighborhood processes are relevant for distinct aspects of wellbeing (health, behavior, educational outcomes, etc.; Leventhal et al. 2009), and the extent to which relevant processes actually mediate neighborhood structural influences on key outcomes. Though much has been accomplished since researchers began investigating neighborhood social processes in earnest, the field nevertheless faces a range of ongoing challenges, to which we now turn.

4 Neighborhood Research: Challenges and New Directions

We focus primarily on challenges concerning theory and empirical investigation of multilevel influence processes, but also consider concerns regarding the appropriate unit of analysis (e.g., neighborhood boundary), selection and causal inference, limitations in available data, and the “siloeed” nature of contextual research. We draw attention to potential new directions for neighborhood and place research and their relevance for understanding life course processes. We emphasize, in particular, more sophisticated attention to exposure processes through the concepts of activity space and ecological networks.

4.1 Multilevel Influence Processes

The “social process turn” (Sampson et al. 2002) placed heavy emphasis on identifying and empirically investigating the mechanisms through which neighborhood effects are channeled. This research has yielded complex and equivocal findings. We have chosen to label this section “multilevel influence processes” in recognition of the need to address not only what substantive mechanisms operate to channel neighborhood influence, but also two other critical issues: the potential for *differential exposure* to neighborhood factors among residents and *differential reception* of neighborhood exposures (i.e., the potential for individuals to experience the same environments differently, with implications for outcomes).

4.1.1 Neighborhood Mechanisms

The move toward more rigorous investigation of mechanisms, largely occurring during the late 1990s and 2000s, has spawned a substantial literature, adequate review of which is beyond the scope of the current chapter. Significant progress has been made with respect to the measurement and testing of neighborhood mechanisms. Nevertheless, a sampling of research examining effects of theoretically-informed neighborhood

mechanisms on health (mental and physical) and risk behavior (e.g., violence, crime, substance use, and risky sexual activity)¹ corroborates the assertion that findings on the impact of neighborhood social processes remain equivocal. We focus on the role of collective efficacy, social network and contagion processes, organizational resources, social/physical disorder, and routine activities.²

Collective Efficacy Collective efficacy has been widely emphasized in the work of Sampson and colleagues as capturing expectations for action relevant for the group-level capacity to realize shared values. Rooted in Kornhauser's (1978) classic reformulation of the social disorganization perspective, collective efficacy is theoretically linked with a broad range of benefits to neighborhood environments. For instance, norms and expectations for pro-social action may contribute to regulation of the misuse of public space, with direct implications for the prevalence of problem behavior within urban communities. Sampson and colleagues have demonstrated the substantial effects of collective efficacy on the prevalence of violence within urban neighborhoods (Morenoff et al. 2001; Sampson et al. 1997, 1999) and additional studies have found regulatory effects of collective efficacy on affiliation with deviant peers (Brody et al. 2001) and delinquency among adolescents (Molnar et al. 2008; Simons et al. 2005). Collective efficacy is also hypothesized to promote socialization processes with indirect implications for a wide range of developmental outcomes, including the prevalence of risky sexual behavior (Browning et al. 2008) and drug use (Fagan et al. 2014). The prevalence of trust among local neighborhood residents and norms regarding mutual protection

from victimization may also be linked with social psychological outcomes and improved mental health. A number of studies have found collective efficacy and cohesion effects on depression and other mental health related outcomes at various stages of the life course (Ahern and Galea 2011; Echeverría et al. 2008; Maimon et al. 2010; Xue et al. 2005). Collective efficacy has also been associated with physical health outcomes such as self-rated health (Fan and Chen 2012), mortality (Cohen et al. 2003; Wen and Christakis 2005), physical activity (Fisher et al. 2004; Kimbro et al. 2011), asthma (Cagney et al. 2007), and obesity (Cohen et al. 2006).

Although evidence supporting collective efficacy as a beneficial neighborhood-level mechanism has been substantial, extant research is by no means conclusive. Indeed, prominent studies have found no association between collective efficacy and key behavioral outcomes. For instance, a study of adolescent participation in violence using data from the PHDCN found no evidence of an association between collective efficacy and survey-reported participation in violent behavior (Sampson et al. 2005). Fagan and Wright (2012) find no association between collective efficacy and self-reported offending among males, and a positive relationship, opposite of the theorized direction, among females. A number of other studies find no evidence of a relationship between collective efficacy and physical and mental health outcomes, including self-rated health (Cagney et al. 2005; Franzini et al. 2005), obesity (Burdette et al. 2006), physical activity (Pabayo et al. 2014), and adolescent internalizing behaviors (Dupéré et al. 2012). Although not definitive, findings on the breadth and impact of collective efficacy on individual level wellbeing are, on balance, impressive, indicating that continued investigation of this social process is likely to be a productive area of inquiry.

Social Networks Theory and empirical research on neighborhood social networks have been longstanding interests of urban social scientists. Seminal research (Kasarda and Janowitz 1974) heightened interest in "systemic" network-based processes by which neighborhoods achieve regu-

¹We make only occasional reference to the now extensive neighborhood research on educational achievement in this section given the recent publication of high quality reviews of this literature (Sastry 2012; Sharkey and Faber 2014).

²Space precludes adequate review of the literature on neighborhood cultural mechanisms. See Small et al. (2010) for a recent review of cultural approaches in urban sociology.

latory capacity (Bursik and Grasmick 1993). Research on the individual-level health benefits of social network ties and support (Berkman et al. 2000; House 2002; Thoits 2011) also prompted interest among social scientists and social epidemiologists in the potential influence of macro-level neighborhood networks through social support and influence processes (Browning and Cagney 2002; Carpiano 2006; Kawachi and Berkman 2000). Indeed, some research has found positive effects of neighbor-based social interaction for health. Morenoff (2003), for instance, found protective effects of the extent of neighbor-based reciprocal exchange on the prevalence of low-birth weight in Chicago. Network exchange has also been linked with lower levels of adult depression (Kim 2010; Mair et al. 2010) and improved self-rated health (Mohnen et al. 2011).

Yet, in total, research on the role of interpersonal ties in urban communities has not yielded consistent evidence of beneficial effects. With respect to behavioral outcomes, for instance, studies of neighbor networks have yielded inconclusive evidence regarding protective effects on crime and violence (Bellair 1997; Browning et al. 2004; Merry 1981; Simcha-Fagan and Schwartz 1986; Warner and Rountree 1997) and risk behaviors such as alcohol use (Åslund and Nilsson 2013; de Haan et al. 2010; Ennett et al. 2008; although see Fagan et al. 2007; Steen 2010). Indeed, some have hypothesized that extensive network ties may carry negative consequences for urban communities if they serve as conduits for health compromising or risk-oriented behavior. Wilson (1996) has argued that highly disadvantaged, socially isolated communities may combine both dense network ties and lack of contact with mainstream institutions and organizations. In such contexts, network influences are less likely to be shaped by embeddedness in settings characterized by conventional norms and expectations. Thus the consequences of network ties for collective and individual well-being are uncertain and potentially contingent. Extant findings suggest the importance of research on the types of network ties that are most likely to yield beneficial influence and the conditions under

which ties may yield positive or negative outcomes.

Organizational resources Local organizations such as schools, churches, youth services, health services, and local commerce are places that may provide a range of resources relevant for both the individual level wellbeing of urban residents as well as the effective functioning of communities (Marwell 2009). First, the effects of neighborhood-based organizations may operate through the individual exposures to organizations of varying quality (Cubbin et al. 2012), availability (Curley 2010), diversity (Murphy and Wallace 2010), and affordability. For instance, studies of the joint influence of neighborhoods and schools are expanding rapidly; these studies offer robust evidence of both the association between neighborhood and school quality and the influence of the latter on developmental outcomes (Cook et al. 2002; Kirk 2009; Owens 2010; Teitler and Weiss 2000).

Local organizations may also be studied by examining the consequences of organizations for effective neighborhood-level functioning. Small and colleagues (Allard and Small 2013; Small 2009) argue that organizations are constitutive of informal social processes that are consequential for urban social organization. Small (2009) found that residents of a high poverty neighborhood who frequented a local child care organization benefited not only from the direct services provided by the organization, but also from exposure to network-based resources that were, in many cases, incidental outcomes of organizational participation. Informal networks – even those based on relatively weak ties – emerging from local organization-based interactions are a key feature of the “organizational embeddedness” perspective Small proposes, in which the origin of network ties is critical to understanding their resource potential. Small’s work on the implications of organizational participation for the availability of valuable social resources highlights the potential for beneficial collective features of neighborhood life to emerge from viable organizational bases in urban communities.

Similarly, Sampson points to the relevance of “organization-based resources” in contributing to beneficial neighborhood social processes (Sampson 2012). Sampson measured such resources through a multi-item index tapping the survey-reported presence of organizations such as community newspapers, neighborhood watch groups, block group or tenant associations, crime prevention programs, substance abuse and mental health treatment programs, family planning clinics, youth centers, and afterschool recreational programs for youth, among others. Organization-based resources predicted collective efficacy in longitudinal models from the PHDCN, net of a range of controls for neighborhood structure and potentially confounding social processes, including lagged collective efficacy.

Thus an emerging strand of research points to organizational features of neighborhood environments as a critical backdrop for the development of other potentially beneficial informal social processes. Findings on the consequences of neighborhood organizational environments for aspects of wellbeing are consistent with these studies. Research examining the effects of organizational density have found evidence of protective effects on the prevalence of crime (Peterson et al. 2000; Slocum et al. 2013) and adolescent aggression and delinquency (Molnar et al. 2008). Despite significant theoretical attention to the role of organizations in urban community context and an emerging body of empirical research, extant research has not assessed the role of aggregate patterns of shared organizational involvement in the everyday lives of urban residents. Studies to date have focused on specific types of organizations (Small 2009) or survey-reported and administrative measures of organizational density and participation. However, research on the extent to which local organizations collectively bring neighborhood residents together, with implications for the development of informal social ties and mobilization capacity, has yet to emerge.

Social and Physical Disorder Social and physical disorder – or visible cues of decline such as graffiti, litter on the street (physical disorder),

homelessness, prostitution, and people drinking in public (social disorder) – has received considerable attention in the neighborhood literature as a precursor to both behavioral and health problems. A number of scholars have argued that such signs of disorder signal the weakening of local social order, emboldening potential offenders and inducing health-consequential fear and physiological stress in neighborhood residents. Research on the behavioral implications of disorder or “incivilities” has offered some evidence that disorder contributes to crime, but notable challenges to this model have also appeared. Sampson and Raudenbush (1999), for instance, call into question whether disorder is a causal factor in neighborhood variation in crime and other behavioral problems or simply a correlated outcome determined by the same factors that generate spatial variability in crime (see also Boggess and Maskaly 2014; Geller 2007; Yang 2010). Research has offered some evidence of neighborhood disorder effects on outcomes such as sexual risk behavior (Latkin et al. 2007), drug use (Latkin et al. 2005) and alcohol use among youth (Steen 2010; Yabiku et al. 2007), although findings have been inconsistent with respect to the latter (Jackson et al. 2014).

Arguably more robust are associations between aspects of disorder and psychosocial and health outcomes. A number of studies have found links between neighborhood disorder and mental health (Ford and Rechel 2012; Hill et al. 2005; Ross and Mirowsky 2009), sexually transmitted disease (Cohen et al. 2000), and self-rated health and chronic conditions (Hale et al. 2010; Ross and Mirowsky 2001). These findings suggest that disorder cues operate more consistently through fear and stress-related responses, with consequences for mental and physical health (Ross and Jang 2000). Some behavioral outcomes (e.g., drug use and risky sexual behavior), in turn, may be an indirect result of efforts to cope with ongoing stressful exposures (Latkin et al. 2007). The expanding literature on exposure to violence (ETV) also offers robust evidence of negative health consequences. Often considered among disorder-related outcomes, ETV has been associated with internalizing behavior

(Browning et al. 2014; Fowler et al. 2009), child physical and self-rated health (Boynton-Jarrett et al. 2012; Sternthal et al. 2010), and adult hypertension (Ford and Browning 2014; Mujahid et al. 2010). In contrast to more equivocal results for crime and delinquency, associations between neighborhood disorder, crime and health outcomes appear to be more robust.

Routine Activities Finally, routine activity patterns at the neighborhood level have been emphasized in a number of recent literature reviews (Browning and Soller 2014; Harding et al. 2011; Sharkey and Faber 2014). Patterns of space use may differ considerably across neighborhoods due to variability in the availability and quality of local organizations and amenities that draw residents into the local area. Calls have increased in recent years for incorporation of routine activities in theoretical models of neighborhood effects and data collection efforts designed to capture mobility patterns more precisely. Sampson (2006), for instance, argues that the intersection of adults and children in neighborhood space as a function of routine activity patterns may have important implications for the effectiveness of informal social control efforts. However, few empirical investigations of neighborhood routines have emerged. This mechanism is central to our discussion of future directions for neighborhood and place-based analyses; hence we reserve a more extended discussion of routine activities until Sect. 4.1.2 below.

We next turn to a discussion of two additional issues in considering multilevel influence processes related to neighborhood effects – the potential for *differential exposures* among residents of the same local area and *differential reception* of local area influences by individual level characteristics.

4.1.2 Differential Exposures

A recent review of literature examining neighborhood effects on achievement outcomes highlights emerging research on the temporal dimension of neighborhood exposure (Sharkey and Faber 2014). The vast majority of research

on neighborhoods has taken a cross-sectional approach with characteristics of the neighborhood of residence at a given time point hypothesized to capture exposure to environments of varying levels of advantage. Sharkey and Faber (2014) rightly point out that understanding cumulative exposure to neighborhood environments over the life course or even inter-generationally (Sharkey 2013; Sharkey and Elwert 2011) is critical to adequately assess their consequences for life prospects. Sampson and colleagues (2008) have attempted to estimate the influence of cumulative exposure to concentrated disadvantage on verbal ability through capturing the effects of neighborhood of residence across multiple waves of a longitudinal survey, employing marginal structural models (Robins et al. 2000) to account for time-varying confounders. Other recent work has found neighborhood poverty effects consistent with cumulative exposure models of health (Clarke et al. 2014) and fertility (South and Crowder 2010; Wodtke 2013) outcomes.

Ironically, the *spatial* dimension of exposure – i.e., the actual locations urban residents encounter on a regular basis – has only recently received more focused attention. Yet, establishing the actual *content* of exposures should ideally precede the effort to determine the *duration* of exposure. The emphasis on agency in life course research challenges the somewhat deterministic approach to spatial exposure taken in conventional neighborhood research. For instance, extant multilevel studies of neighborhood effects on health and behavioral outcomes have tended to assume that residential neighborhoods encompass the relevant set of spatial exposures for subjects at virtually all life stages (Cagney et al. 2013). As an operationalization of this approach, researchers often assign a neighborhood context, typically a census unit such as a tract or block group in the US context, to the subject based on residential address and then attach characteristics of the chosen administrative unit such as poverty level or, when, available, social process indicators in order to model the effects of these contextual characteristics on some outcome. This approach is problematic from the standpoint of both theory and measurement. For instance,

measures of residential neighborhood exposure do not capture variability in non-residential exposures that may be included within resident activity spaces. Actual day-to-day routine exposures are unlikely to be neatly contained within the boundaries of administrative units employed to proxy neighborhoods. Moreover, assumptions about the equivalence of *within*-neighborhood exposures (i.e., that time spent within the neighborhood boundary results in a common set of experiences) may also be problematic.

It follows that more precise assessment of the time and place of everyday exposures – a key principle of life course research – might offer more accurate representation of spatial environments than conventional neighborhood measurement. A number of contemporary studies have demonstrated the extent to which traditional administrative units fail to capture the spatial extent of non-home exposures (Chaix 2009; Zenk et al. 2011). Even for adolescents – a life stage typically thought to be associated with greater exposure to the local neighborhood – administratively defined neighborhood boundaries appear to misrepresent actual exposures. For instance, in a recent study tracking the travel paths of a sample of youth over the course of a day, Basta and colleagues found that “half of the subjects spent 91.5 % or more of their outside-the-home time in a census tract other than the census tract where their home was located” (2010, p. 1947). Individuals will vary, however, in the extent to which their own resources (money, time, social support) will enable choice regarding activity locations. Such choices will also be made within the spatial constraints presented by the availability of options for routine activities both within and beyond the immediate neighborhood (Furstenberg et al. 1999).

A number of researchers have focused more directly on the role of activity space exposures in assessing the relevance of context for health and behavioral outcomes. Literature on delinquency and crime, for instance, has incorporated relatively sophisticated assessments of activity space. Wikström and colleagues (2012) developed a “space-time budget” approach (Anderson 1971; Goodchild and Janelle 1984; Hägerstrand 1970)

to assessing actual exposures among a sample of British youth. They also collected independent data on urban areas operationalized as clusters of approximately 125 households. Measures of collective efficacy for each areal unit are then linked with fine-grained data on the travel paths of youth over a 4-day period. In a series of studies, Wikström and colleagues (2012) found evidence that activity space exposures to areas characterized by varying levels of collective efficacy predicts instances of delinquent and criminal activity (although only for a subset of youth). The pronounced effect of collective efficacy on youth behavior when assessed using activity space measures suggests that the equivocal findings for collective efficacy in prior research may be due to the use of conventional neighborhood designs.

With respect to health outcomes, Zenk et al. (2011) demonstrate associations between the presence of fast food outlets proximate to the activity spaces of urban adolescents and increased saturated fat intake and reduced whole grain intake. Kestens and colleagues (2012) employ cell phone based technologies to examine the links between activity space food environment and overweight status. Inagami and colleagues (2007) found that non-residential exposures moderated the impact of traditionally measured neighborhood characteristics on self-rated health. Although incipient, research on the health and behavioral consequences of activity space exposures offers evidence that more precise measurement of spatial exposures is a fruitful direction for research on place and context effects (Chaix et al. 2013).

Finally, the principle of “linked lives” illuminates the potential role of intersecting routine activity patterns for understanding a range of social processes shaping the life course. Network concepts offer an important resource for advancing understanding of the structure of shared exposures. Sampson, for instance, argues inter-neighborhood networks based on residential moves offer insight into the social origins of links between neighborhoods. Beyond spatial proximity, Sampson and colleagues find that inter-neighborhood mobility is driven by demographic similarity as well as features of social

climate such as levels of collectively perceived disorder (Graif and Sampson 2010; Sampson 2012). Building on this insight, Graif et al. (2014) argue that identifying the extent, structure, and influence of non-residential neighborhood exposures is an important next step in contextual research on crime and delinquency. They suggest that an expanded focus on the network of neighborhoods generated through shared residential and activity space exposures offers an opportunity to understand influence channels across environments linked through residential moves and shared routines (independent of spatial proximity).

Browning and Cagney (Browning and Soller 2014; Cagney et al. 2013) employ the concept of an *ecological (or 'eco-') network* to capture the intersection between people and places – either through residential mobility or as people engage in daily routine activities. More formally, the eco-network can be understood as an instance of a two-mode network where the nodes are locations and actors. Eco-network processes figure prominently in research on urban social organization and child development. For instance, Wilson (1987, 1996) argues that urban neighborhoods characterized by high levels of unemployment limit the extent to which resident youth encounter adults engaged in work-related daily routines. In this view, regular exposure in public space to adults engaged in employment-related practices reinforces norms about the role of work in adult lives and expectations for the life course – including future employment. In an important contribution to life course research (Elder et al. 2003), Barker and colleagues (Barker and Schoggen 1973) argue that changes in the tendency toward age-specialization in behavior settings occurring in mid-twentieth century rural Kansas resulted in increasing spatial segregation of youth routine activities (primarily through concentrating youth activities within schools). These changes led to fewer opportunities for involvement in (and apprenticeship through) non-school community-based activities led by adults, with implications for socialization. Like Wilson, Barker emphasizes the socialization consequences of intersecting ecologies of

community-based routine activity involving children and adults who do not have close (e.g., family) social network ties, but nevertheless interact in meaningful ways.

More recently, Browning and colleagues (Browning et al. 2015a,b; Browning and Soller 2014) examined the impact of ecological networks measured from survey data provided by the Los Angeles Family and Neighborhood Survey (L.A.FANS). Using routine activity location reports for L.A.FANS sampled households within 65 census tracts (roughly 40 households per tract), they estimate the structure of tract-based eco-networks, finding that more extensive linkage within the network (i.e., more overlap in routine activity locations between households) is positively associated with neighborhood collective efficacy, intergenerational closure, and network interaction among neighbors (Browning et al. 2015a). They also find protective effects of more densely tied eco-networks on the prevalence of adolescent health risk behavior (Browning et al. 2015b).

In summary, the spatial dimension of exposure has been relatively neglected in research on neighborhood and place effects on life course outcomes. Yet exposure processes are critical for understanding the relevance of context. Indeed, we argue that the continued lack of precise information on exposures in research on place effects exacerbate a range of additional challenges to the field.

4.1.3 Differential Reception of Neighborhood Influences

Alongside attention to the exposure processes through which neighborhood effects operate is increasing recognition of the potential for *differential reception* of neighborhood contextual influences at the individual level. The term “reception” is used here to capture the processes by which people encounter the environment, recognizing that individuals are agents in these encounters, not merely passive recipients of influence. A range of studies has investigated cross-level interactions between features of neighborhoods and individual level characteristics. Age has been among the most prominent

individual-level conditioning factors investigated in such studies (Robert and Li 2001; Vartanian and Buck 2005). “Critical period” approaches, for instance, suggest that exposure to features of neighborhood contexts during particularly sensitive phases of the life course may amplify effects on wellbeing (Kuh and Ben-Shlomo 1997; Lynch and Smith 2005).

No consensus exists on which periods of the life course are most likely to enhance the impact of neighborhood exposures. With respect to childhood and adolescence, Anderson et al. (2014) review two conceptual models of neighborhood effects across the early life course relevant to understanding differential reception processes. First, the early exposure and carry forward model proposes that neighborhood influences during early periods are crucial; early experiences set trajectories of development in motion, with long-term implications (consistent with Vartanian and Houser 2010; Wheaton and Clarke 2003). Second, the adolescent exposure model emphasizes the importance of neighborhood exposures during the teen years, a developmental period when environments outside the home become more salient (Sastry and Pebley 2010). The results of research investigating the critical period hypothesis are mixed, however. For instance, Sastry and Pebley (2010) found that the effects of average neighborhood income on test scores were particularly strong for those aged 8–12 and 13–17 compared to children aged 3–7. Wheaton and Clark (2003) find that early exposure to neighborhood disadvantage at ages 6–11 explains the association between neighborhood and mental health in early adulthood. Anderson et al. (2014) use longitudinal data to assess these models, finding the strongest relationship between neighborhood effects and achievement and internalizing symptoms measured concurrently in early childhood, with some modest support for the carry-forward model from childhood into adolescence for reading scores. Despite prior theoretical support for the heightened importance of neighborhoods during adolescence (Phillips and Shonkoff 2000; Steinberg and Morris 2001), Anderson et al. do not find support for an adolescent critical period during which neighborhood

processes are increasingly influential compared to other developmental periods.

Neighborhood exposures may also be particularly relevant for older adults who experience an increasing sense of physical vulnerability. For instance, older adults may be more susceptible to the effects of disorder and mobility-impeding physical decay (e.g., sidewalk cracks, potholes, and broken curbs) (Balfour and Kaplan 2002; Clarke et al. 2008; Mendes de Leon et al. 2009; and for a review see Yen et al. 2009). Adult years accrued in the same neighborhood may also have an impact in its own right. Personal and financial investments that lead to “linked lives” reinforce neighborhood influence and may create an identity informed by residential location (Rubinstein and Parmelee 1992). As noted in the discussion of life course variability in exposures, however, generalizations about the differential salience or impact of neighborhood and other spatial exposures across age are likely to misrepresent the complexity of environmental influence processes (Cagney et al. 2013).

A number of other characteristics have been considered as potential factors shaping reception of neighborhood processes – most notably gender, but also race and ethnicity. Although too voluminous to review here, we note that the number of studies investigating differential reception of neighborhood effects have mounted rapidly (and are far more common than research on differential exposures). However, three issues complicate interpretation of findings from this body of research. First, theoretical justifications for exploring differential reception hypotheses remain relatively underdeveloped (Sharkey and Faber 2014). Although the gendered reception of adverse neighborhood environments, for instance, has received comparatively extensive theoretical treatment (Leventhal et al. 2009), research on other potential demographic or socioeconomic conditioning factors has been more limited.

A second concern relates to the potential for differential reception processes to be confounded with exposures. Hypotheses regarding differential reception are difficult if not impossible to test in the absence of detailed data on exposures. For instance, conclusions regarding the gendered

reception of neighborhood environments require that differences in exposure by gender – likely substantial in some urban environments – be controlled. Finally, the foregoing discussion highlights the potential for reciprocal associations between differential reception and exposure processes. Parents, for instance, may react differently to comparable neighborhood exposures – e.g., a neighborhood-based crime event (or changes in crime trends) may lead some parents to increase supervision levels or remove their children from exposure to neighborhood environments while others may be more constrained in their capacity to respond to local crime patterns. Differences in responses to the environment then set in motion exposure processes with potentially substantial impact on life course trajectories (e.g., choice of a non-neighborhood school). In the absence of information about exposures, hypotheses regarding reciprocal relations between exposure and reception processes cannot be examined, and biased conclusions favoring differential reception hypotheses may be drawn. Thus studies attempting to address the potential for differential reception must carefully assess underlying exposure assumptions.

4.2 Additional Challenges

The range of issues we label “multilevel influence processes” remain central to ongoing debates regarding neighborhood effects. A number of other concerns, however, have also drawn considerable attention, including the appropriate unit of analysis, selection and causation, data concerns, and the siloed nature of contextual research.

First, questions regarding the nature of exposures raise obvious concerns about the appropriate unit of analysis when conducting neighborhood research (Hipp 2007). The concept of a neighborhood poses substantial problems of operationalization – an issue that has beset the field since its inception (Isaacs 1948; McKenzie 1921; Mumford 1954). As several researchers have noted, the “tyranny of census geography”

(Sperling 2012) is difficult to resist, given data constraints and the force of custom within the field. Despite longstanding concerns, few efforts to develop theoretically motivated aggregate exposure units that move beyond census-defined boundaries have been undertaken (see also Logan 2012, pp. 520–521).

To the extent that the unit of analysis question motivates effective measurement of exposures, activity space information introduces the possibility of corroboration – i.e., the ability to address the question of what unit of analysis best contains the theoretically relevant exposures. Construction of eco-networks also allows for alternative specifications of the relevant aggregate exposure space rooted in people- as opposed to exclusively spaced-based designations (Kwan 2009). By specifying the intersection of people and places as an ecological network, community detection algorithms may be employed to identify structures of shared routines (i.e., clusters of people that tend to encounter one another at higher rates or clusters of places that are linked by visits from the same people). As sources of contextual influence, these “eco-communities” may play an independent (and potentially powerful) role when compared to residential neighborhoods.

These approaches offer potential for improved measurement of communities in rural and less densely populated areas as well. A long history of well-developed urban theory, coupled with readily available data sources, has led to a preponderance of contextual research focused on urban communities. Suburban and rural contexts currently lack sufficient research attention and data to examine the collective processes that lead to prosocial behavior or individual wellbeing. Studies that engage these communities, and that provide opportunity for comparative analyses, are needed (York Cornwell and Cagney 2014).

Second, causality and selection have been particularly intractable problems in studies of neighborhood effects. Although observational research has offered relatively consistent effects of neighborhood structural disadvantage on a range of outcomes (Brooks-Gunn et al. 1997; Pickett and Pearl 2001; Robert 1999), these studies cannot demonstrate a causal relationship with certainty.

Observational studies face the inevitable criticism that families who select into disadvantaged contexts may be at high risk for compromised outcomes. In turn, unobserved family-level risk factors may explain apparent links between features of the neighborhood context and youth outcomes.

Although studies such as MTO have attempted to approximate an experimental design (Goering and Feins 2003; Kling et al. 2007; Sanbonmatsu et al. 2012), the capacity of such designs to shed light on the nature of neighborhood influence has been questioned (Sampson 2008). A key concern is the lack of information regarding the assumption that the residential move from a high to a low-poverty neighborhood actually resulted in sustained differences in the routine spatial exposures of study participants (Clampet-Lundquist and Massey 2008). The current status of the debate on causality and selection suggests that estimating unbiased contextual effects is extremely difficult.

Clearly, causal inference on the effects of neighborhoods on individual outcomes is a thorny problem to which activity space approaches provide no easy solution. Nevertheless, notions fundamental to causal thinking, including treatment effects and dose-response, require information on the timing and duration of contextual exposures. In the context of neighborhood and other place effects research, activity space data provide a means of capturing exposure to treatments more directly. Moreover, exogenous shocks in the context of urban environments are rare events; however, research on such occurrences (e.g., the community context of adaptation to natural disasters) is far more useful when information on the timing and duration of exposures to exogenously changing local resources or risks is available (Frankenberg et al. 2012; Fussell et al. 2010; Kirk 2012).

Third, the collection of activity space data is still relatively rare and new technologies for gathering spatially referenced data (e.g., mobile technologies) have only recently been integrated into neighborhood research (Browning and Soller 2014). The limited attention to such data in extant neighborhood-oriented study designs has contin-

ued, despite direct acknowledgement by a number of scholars of the need for richer information on spatial exposures. As Harding and colleagues state (in a review of the literature on neighborhood effects and educational attainment):

Neighborhood research desperately needs new and far more nuanced data. In particular, we need data that measure how individuals and families of different types allocate their time between different places, the extent of exposure to different people and locations, as well as the consequent influences on individual behavior. (2011, p. 276; see also Sampson 2006; Sharkey and Faber 2014)

The PHDCN and L.A.FANS have provided important data resources allowing for a number of significant advances in neighborhood research. The next generation of neighborhood and contextual research more generally, however, will require up-to-date and far more detailed data on the dynamics of urban exposures and the mechanisms through which environments influence life course trajectories. Several projects are already capitalizing on efficient survey-based methods for collecting location data, for example, mobile technologies and GPS for collecting continuous travel path information, and Ecological Momentary Assessment (surveys administered over smartphones collecting information on exposures in real time) (Browning and Soller 2014; Palmer et al. 2013; Trull and Ebner-Priemer 2013). Moreover, the capacity to leverage Big Data resources on the characteristics of locations is increasing at breakneck pace with the proliferation of administrative data resources, e.g., through new urban data transparency initiatives (City of Chicago Data Portal 2010), volunteered geographic information (VGI; Goodchild 2007), social media data, and sensor data (Kaplan and Stone 2013). Indeed, the exponential increase in the quantity and availability of data on places holds the potential to fundamentally transform the capacity to estimate exposures precisely.

Finally, the increasing interest in neighborhood and other place effects on individual outcomes has spawned efforts to understand “multi-contextual” influence processes. This movement is an important corrective to the longstanding problem of contextual research

silos. For instance, with respect to youth outcomes, Cook and colleagues (2002) emphasize the joint influence of neighborhoods, schools, peers, and families on youth developmental outcomes. In this view, a singular focus on any given context may neglect the cumulative influence of all contexts, the potential for features of contexts to interact with one another, and the possibly mediating role of some contexts (e.g., peers) in the association between others (e.g., neighborhood or school) and individual outcomes. The multi-contextual approach highlights the limitations of siloed contextual research (e.g., separate literatures for school and neighborhood effects) and the need for broader recognition of the range of contexts relevant for development. Similar challenges might be leveled at literatures focused on other phases of the life course. For instance, the need to recognize the joint role of activity spaces, institutional settings, and social networks in a more encompassing contextual theory of older adult well-being has been acknowledged in recent work on aging (Cagney et al. 2013).

An emphasis on multiple contextual influences on individual outcomes is an important research direction. At the same time, acknowledgment of the simultaneous and potentially interactive effects of people and places on individual outcomes adds clarity to the multi-contextual insight. For instance, a focus on neighborhoods, schools, peers, and families as key contexts for youth development combines two presumably spatially-bounded places (neighborhoods and schools) with two aspects of youth social networks (peers and family). In practice, face-to-face social network interactions always take place in a shared spatial setting. Settings for interaction might include schools, public spaces in residential neighborhoods, or homes. Family-based network interactions frequently take place in a home setting, but many occur outside the home. Similarly, face-to-face interactions with peers may occur virtually anywhere. Interactions on social media do not typically occur in shared spaces, but parties to such interactions always occupy some setting at the time of contact. In short, space is a virtually constant feature of

social network interactions and cannot simply be assumed away in understanding the consequences of such interaction (Feld 1981). Thus combining activity space and network thinking in a more comprehensive contextual model is likely to be a fruitful research direction.

5 Conclusion

In recent decades, neighborhood and place-based research has expanded rapidly with respect to productivity, interdisciplinary interest, methodological advances, and multilevel data resources. Although the field faces a number of ongoing challenges, we have argued that the emerging emphasis on more sophisticated theoretical and empirical assessment of exposures holds the potential to substantially advance the field. A fundamental advantage of an emphasis on exposures – employing activity space and ecological network concepts – is the ability to capture actual individual level and aggregate (shared) exposures both within and beyond conventionally defined neighborhood environments.

Beyond incorporating exposures into theory and data collection efforts, we see a number of additional areas of potential growth. First, more attention to relatively neglected phases of the life course, such as early childhood and mid-life, is warranted. Much of the extant research – particularly that focused on neighborhood influences – has focused on child and adolescent development, with a burgeoning literature on the role of neighborhoods in the lives of older adults. Although mid-life has not been ignored in this literature, neither has it been an explicit or central focus. Research that includes adults in mid-life has given insufficient attention to the distinct and potentially variable demands of this life stage. Research on early childhood has not been as prevalent in the neighborhood literature, again possibly due to an assumption that the more limited exposure radii during this period may render non-home exposures less relevant. In both cases, we would argue that place and activity space exposures are likely to contribute significantly to individual level outcomes.

Second, an area that remains in its infancy is the assessment of place trajectories over time. Rapid change in the form of gentrification (Pattillo 2007), the suburbanization of poverty (Holliday and Dwyer 2009; Howell and Timberlake 2014), increasing segregation by income (Reardon and Bischoff 2011) vs. race and ethnicity, and more general increases in spatial inequality suggest the importance of collecting fine-grained, theoretically relevant measures of key place-based attributes across time (Raudenbush and Sampson 1999). Initiatives to generate a longitudinal database on places have emerged in recent years, but have yet to result in large-scale efforts to collect rich place-level data that could be incorporated into longitudinal, multilevel analyses of life course processes (Bachrach et al. 2013; Social Observatories Coordinating Network 2012)

We can only assume that research on the role of place in understanding inequality in life prospects will continue to grow as contextual approaches to health, behavior, and other domains increasingly attract interest. As the field expands in visibility and influence, research will benefit from ongoing efforts to link life course processes to the inevitably situated nature of experiences in place and time.

References

- Ahern, J., & Galea, S. (2011). Collective efficacy and major depression in urban neighborhoods. *American Journal of Epidemiology*, 173(12), 1453–1462. doi:10.1093/aje/kwr030.
- Ainsworth, J. W. (2002). Why does it take a village? The mediation of neighborhood effects on educational achievement. *Social Forces*, 81(1), 117–152. doi:10.1353/sof.2002.0038.
- Allard, S. W., & Small, M. L. (2013). Reconsidering the urban disadvantaged: The role of systems, institutions, and organizations. *The ANNALS of the American Academy of Political and Social Science*, 647(1), 6–20. doi:10.1177/0002716213479317.
- Anderson, J. (1971). Space-time budgets and activity studies in urban geography and planning. *Environment and Planning A*, 3(4), 353–368. doi:10.1068/a030353.
- Anderson, S., Leventhal, T., & Dupéré, V. (2014). Exposure to neighborhood affluence and poverty in childhood and adolescence and academic achievement and behavior. *Applied Developmental Science*, 18(3), 123–138. doi:10.1080/10888691.2014.924355.
- Aneshensel, C. S., & Sucoff, C. A. (1996). The neighborhood context of adolescent mental health. *Journal of Health and Social Behavior*, 37(4), 293–310. doi:10.2307/2137258.
- Åslund, C., & Nilsson, K. W. (2013). Social capital in relation to alcohol consumption, smoking, and illicit drug use among adolescents: A cross-sectional study in Sweden. *International Journal for Equity in Health*, 12(1), 33. doi:10.1186/1475-9276-12-33.
- Bachrach, C., Adler, N. E., Chase-Lansdale, L., Hofferth, S. L., & Tran, V. C. (2013). The contribution of a national network of social observatories to improving population health. Social Observatory Coordinating Network White Paper. http://socialobservatories.org/papers/paper_20130703.0001
- Balfour, J. L., & Kaplan, G. A. (2002). Neighborhood environment and loss of physical function in older adults: Evidence from the Alameda County Study. *American Journal of Epidemiology*, 155(6), 507–515. doi:10.1093/aje/155.6.507.
- Barker, R. C., & Schoggen, P. (1973). *Qualities of community life*. Oxford: Jossey-Bass.
- Basta, L. A., Richmond, T. S., & Wiebe, D. J. (2010). Neighborhoods, daily activities, and measuring health risks experienced in urban environments. *Social Science & Medicine*, 71(11), 1943–1950. doi:10.1016/j.socscimed.2010.09.008.
- Baumer, E. P., & South, S. J. (2001). Community effects on youth sexual activity. *Journal of Marriage and Family*, 63(2), 540–554. doi:10.1111/j.1741-3737.2001.00540.x.
- Bellair, P. E. (1997). Social interaction and community crime: Examining the importance of neighbor networks. *Criminology*, 35(4), 677–704. doi:10.1111/j.1745-9125.1997.tb01235.x.
- Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science & Medicine*, 51(6), 843–857. doi:10.1016/S0277-9536(00)00065-4.
- Boggess, L. N., & Maskaly, J. (2014). The spatial context of the disorder–crime relationship in a study of Reno neighborhoods. *Social Science Research*, 43, 168–183. doi:10.1016/j.ssresearch.2013.10.002.
- Boynton-Jarrett, R., Rosenberg, L., Palmer, J. R., Boggs, D. A., & Wise, L. A. (2012). Child and adolescent abuse in relation to obesity in adulthood: The black women’s health study. *Pediatrics*, 130(2), 245–253. doi:10.1542/peds.2011-1554.
- Brewster, K. L. (1994). Neighborhood context and the transition to sexual activity among young black women. *Demography*, 31(4), 603–614. doi:10.2307/2061794.
- Brody, G. H., Conger, R., Gibbons, F. X., Ge, X., McBride Murry, V., Gerrard, M., & Simons, R. L. (2001). The influence of neighborhood disadvantage, collective socialization, and parenting on African American children’s affiliation with deviant peers. *Child Development*, 72(4), 1231–1246. doi:10.1111/1467-8624.00344.
- Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Sealander, N. (1993). Do neighborhoods influence child

- and adolescent development? *American Journal of Sociology*, 99(2), 353–395. doi:10.1086/230268.
- Brooks-Gunn, J., Duncan, G. J., & Aber, J. L. (1997). *Neighborhood poverty: Context and consequences for children* (Vol. 1). New York: Russell Sage Foundation Publications.
- Browning, C. R., & Cagney, K. A. (2002). Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting. *Journal of Health and Social Behavior*, 43(4), 383–399. doi:10.2307/3090233.
- Browning, C. R., & Soller, B. (2014). Moving beyond neighborhood: Activity spaces and ecological networks as contexts for youth development. *Cityscape*, 16(1), 165–196.
- Browning, C. R., Dietz, R. D., & Feinberg, S. L. (2004). The paradox of social organization: Networks, collective efficacy, and violent crime in urban neighborhoods. *Social Forces*, 83(2), 503–534. doi:10.1353/soc.2005.0006.
- Browning, C. R., Burrington, L. A., Leventhal, T., & Brooks-Gunn, J. (2008). Neighborhood structural inequality, collective efficacy, and sexual risk behavior among urban youth. *Journal of Health and Social Behavior*, 49(3), 269–285. doi:10.1177/002214650804900303.
- Browning, C. R., Soller, B., Gardner, M., & Brooks-Gunn, J. (2013). “Feeling disorder” as a comparative and contingent process: Gender, neighborhood conditions, and adolescent mental health. *Journal of Health and Social Behavior*, 54(3), 296–314. doi:10.1177/0022146513498510.
- Browning, C. R., Gardner, M., Maimon, D., & Brooks-Gunn, J. (2014). Collective efficacy and the contingent consequences of exposure to life-threatening violence. *Developmental Psychology*, 50(7), 1878–1890. doi:10.1037/a0036767.
- Browning, C. R., Calder, C. A., Soller, B., Jackson, A. L., & Dirlam, J. (2015a). Ecological networks and neighborhood social organization. Presented at the annual meetings of the American Sociological Association, Chicago, IL.
- Browning, C. R., Soller, B., & Jackson, A. L. (2015b). Neighborhoods and adolescent health-risk behavior: An ecological network approach. *Social Science & Medicine*, 125, 163–172. doi:10.1016/j.socscimed.2014.06.028.
- Burdette, H. L., Wadden, T. A., & Whitaker, R. C. (2006). Neighborhood safety, collective efficacy, and obesity in women with young children. *Obesity*, 14(3), 518–525. doi:10.1038/oby.2006.67.
- Bursik, R. J., Jr., & Grasmick, H. G. (1993). *Neighborhoods and crime: The dimensions of effective community control*. New York: Lexington Books.
- Bursik, R. J., Jr. (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. *Criminology*, 26(4), 519–552. doi:10.1111/j.1745-9125.1988.tb00854.x.
- Cagney, K. A., Browning, C. R., & Wen, M. (2005). Racial disparities in self-rated health at older ages: What difference does the neighborhood make? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 60(4), S181–S190. doi:10.1093/geronb/60.4.S181.
- Cagney, K. A., Browning, C. R., & Wallace, D. M. (2007). The Latino paradox in neighborhood context: The case of asthma and other respiratory conditions. *American Journal of Public Health*, 97(5), 919–925. doi:10.2105/AJPH.2005.071472.
- Cagney, K. A., Browning, C. R., Jackson, A. L., & Soller, B. (2013). Networks, neighborhoods, and institutions: An integrated “activity space” approach for research on aging. In L. J. Waite & T. J. Plewes (Eds.), *New directions in the sociology of aging* (pp. 60–80). Washington, DC: National Academies Press.
- Carpiano, R. M. (2006). Toward a neighborhood resource-based theory of social capital for health: Can Bourdieu and sociology help? *Social Science & Medicine*, 62(1), 165–175. doi:10.1016/j.socscimed.2005.05.020.
- Casterline, J. B. (1985). *The collection and analysis of community data: WFS seminar on collection and analysis of data on community and institutional factors, 20–23 June 1983*. Voorburg: International Statistical Institute.
- Chaix, B. (2009). Geographic life environments and coronary heart disease: A literature review, theoretical contributions, methodological updates, and a research agenda. *Annual Review of Public Health*, 30(1), 81–105. doi:10.1146/annurev.publhealth.031308.100158.
- Chaix, B., Méline, J., Duncan, S., Merrien, C., Karusisi, N., Perchoux, C., et al. (2013). GPS tracking in neighborhood and health studies: A step forward for environmental exposure assessment, a step backward for causal inference? *Health & Place*, 21, 46–51. doi:10.1016/j.healthplace.2013.01.003.
- City of Chicago Data Portal. (2010). <https://data.cityof-chicago.org/>
- Clampet-Lundquist, S., & Massey, D. S. (2008). Neighborhood effects on economic self-sufficiency: A reconsideration of the moving to opportunity experiment. *American Journal of Sociology*, 114(1), 107–143. doi:10.1086/588740.
- Clarke, P., Ailshire, J. A., Bader, M., Morenoff, J. D., & House, J. S. (2008). Mobility disability and the urban built environment. *American Journal of Epidemiology*, 168(5), 506–513. doi:10.1093/aje/kwn185.
- Clarke, P., Morenoff, J. D., Debbink, M., Golberstein, E., Elliott, M. R., & Lantz, P. M. (2014). Cumulative exposure to neighborhood context consequences for health transitions over the adult life course. *Research on Aging*, 36(1), 115–142. doi:10.1177/0164027512470702.
- Cohen, D. A., Spear, S., Scribner, R., Kissinger, P., Mason, K., & Wildgen, J. (2000). “Broken windows” and the risk of gonorrhoea. *American Journal of Public Health*, 90(2), 230–236. doi:10.2105/AJPH.90.2.230.
- Cohen, D. A., Farley, T. A., & Mason, K. (2003). Why is poverty unhealthy? Social and physical mediators. *Social Science & Medicine*, 57(9), 1631–1641. doi:10.1016/S0277-9536(03)00015-7.

- Cohen, D. A., Finch, B. K., Bower, A., & Sastry, N. (2006). Collective efficacy and obesity: The potential influence of social factors on health. *Social Science & Medicine*, 62(3), 769–778. doi:10.1016/j.socscimed.2005.06.033.
- Cook, T. D., Herman, M. R., Phillips, M., Settersten, J., & Richard, A. (2002). Some ways in which neighborhoods, nuclear families, friendship groups, and schools jointly affect changes in early adolescent development. *Child Development*, 73(4), 1283–1309. doi:10.1111/1467-8624.00472.
- Cornwell, B., Laumann, E. O., & Schumm, L. P. (2008). The social connectedness of older adults: A national profile. *American Sociological Review*, 73(2), 185–203. doi:10.1177/000312240807300201.
- Crane, J. (1991). The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. *American Journal of Sociology*, 96(5), 1226–1259.
- Cubbin, C., Jun, J., Margerison-Zilko, C., Welch, N., Sherman, J., McCray, T., & Parmenter, B. (2012). Social inequalities in neighborhood conditions: Spatial relationships between sociodemographic and food environments in Alameda County, California. *Journal of Maps*, 8(4), 344–348. doi:10.1080/17445647.2012.747992.
- Curley, A. M. (2010). Neighborhood institutions, facilities, and public space: A missing link for HOPE VI residents' development of social capital? *Cityscape*, 12(1), 33–63.
- Dannefer, D. (1984). Adult development and social theory: A paradigmatic reappraisal. *American Sociological Review*, 49(1), 100–116. doi:10.2307/2095560.
- De Haan, L., Boljevac, T., & Schaefer, K. (2010). Rural community characteristics, economic hardship, and peer and parental influences in early adolescent alcohol use. *Journal of Early Adolescence*, 30(5), 629–650. doi:10.1177/0272431609341045.
- Dupéré, V., Leventhal, T., & Vitaro, F. (2012). Neighborhood processes, self-efficacy, and adolescent mental health. *Journal of Health and Social Behavior*, 53(2), 183–198. doi:10.1177/0022146512442676.
- Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (1995). *Project on human development in Chicago neighborhoods 1995–2002 [Computer file]*. ICPSR13714-v1. Ann Arbor: Inter-university Consortium for Political and Social Research [distributor].
- Echeverría, S., Diez-Roux, A. V., Shea, S., Borrell, L. N., & Jackson, S. (2008). Associations of neighborhood problems and neighborhood social cohesion with mental health and health behaviors: The multi-ethnic study of atherosclerosis. *Health & Place*, 14(4), 853–865. doi:10.1016/j.healthplace.2008.01.004.
- Elder, G. H., Jr. (1974). *Children of the great depression: Social change in life experience*. Chicago: University of Chicago Press.
- Elder, G. H., Jr., Johnson, M. K., & Crosnoe, R. (2003). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). New York: Springer. doi:10.1007/978-0-306-48247-2_1.
- Elliott, D. S., Wilson, W. J., Huizinga, D., Sampson, R. J., Elliott, A., & Rankin, B. (1996). The effects of neighborhood disadvantage on adolescent development. *Journal of Research in Crime and Delinquency*, 33(4), 389–426. doi:10.1177/0022427896033004002.
- Ennett, S. T., Foshee, V. A., Bauman, K. E., Hussong, A., Cai, L., Luz, H., et al. (2008). The social ecology of adolescent alcohol misuse. *Child Development*, 79(6), 1777–1791. doi:10.1111/j.1467-8624.2008.01225.x.
- Entwisle, B. (2007). Putting people into place. *Demography*, 44(4), 687–703. doi:10.1353/dem.2007.0045.
- Fagan, A. A., & Wright, E. M. (2012). The effects of neighborhood context on youth violence and delinquency: Does gender matter? *Youth Violence and Juvenile Justice*, 10(1), 64–82. doi:10.1177/1541204011422086.
- Fagan, A. A., Van Horn, M. L., Hawkins, J. D., & Arthur, M. (2007). Using community and family risk and protective factors for community-based prevention planning. *Journal of Community Psychology*, 35(4), 535–555. doi:10.1002/jcop.20163.
- Fagan, A. A., Wright, E. M., & Pinchevsky, G. M. (2014). The protective effects of neighborhood collective efficacy on adolescent substance use and violence following exposure to violence. *Journal of Youth and Adolescence*, 43(9), 1–15. doi:10.1007/s10964-013-0049-8.
- Fan, Y., & Chen, Q. (2012). Family functioning as a mediator between neighborhood conditions and children's health: Evidence from a national survey in the United States. *Social Science & Medicine*, 74(12), 1939–1947. doi:10.1016/j.socscimed.2012.01.039.
- Faris, R. E. L., & Dunham, H. W. (1939). *Mental disorders in urban areas: An ecological study of schizophrenia and other psychoses* (Vol. xxxviii). Chicago/London: University of Chicago Press.
- Feld, S. L. (1981). The focused organization of social ties. *American Journal of Sociology*, 86(5), 1015–1035. doi:10.2307/2778746.
- Fisher, K. J., Li, F., Michael, Y., & Cleveland, M. (2004). Neighborhood-level influences on physical activity among older adults: A multilevel analysis. *Journal of Aging & Physical Activity*, 12(1), 45–63.
- Ford, J. L., & Browning, C. R. (2014). Effects of exposure to violence with a weapon during adolescence on adult hypertension. *Annals of Epidemiology*, 24(3), 193–198. doi:10.1016/j.annepidem.2013.12.004.
- Ford, J. L., & Rechel, M. (2012). Parental perceptions of the neighborhood context and adolescent depression. *Public Health Nursing*, 29(5), 390–402. doi:10.1111/j.1525-1446.2012.01015.x.
- Fowler, P. J., Tompsett, C. J., Braciszewski, J. M., Jacques-Tiura, A. J., & Baltes, B. B. (2009). Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Development and Psychopathology*, 21(01), 227–259. doi:10.1017/S0954579409000145.

- Frankenberg, E., Nobles, J., & Sumantri, C. (2012). Community destruction and traumatic stress in post-tsunami Indonesia. *Journal of Health and Social Behavior*, 53(4), 498–514. doi:10.1177/0022146512456207.
- Franzini, L., Caughy, M., Spears, W., & Fernandez Esquer, M. E. (2005). Neighborhood economic conditions, social processes, and self-rated health in low-income neighborhoods in Texas: A multilevel latent variables model. *Social Science & Medicine*, 61(6), 1135–1150. doi:10.1016/j.socscimed.2005.02.010.
- Furstenberg, F. F., Cook, T. D., Eccles, J., & Elder, G. H., Jr. (1999). *Managing to make it: Urban families and adolescent success*. Chicago: University of Chicago Press.
- Fussell, E., Sastry, N., & VanLandingham, M. (2010). Race, socioeconomic status, and return migration to New Orleans after Hurricane Katrina. *Population and Environment*, 31(1–3), 20–42. doi:10.1007/s11111-009-0092-2.
- Galster, G. C. (2012). The mechanism(s) of neighbourhood effects: Theory, evidence, and policy implications. In M. van Ham, D. Manley, N. Bailey, L. Simpson, & D. Maclennan (Eds.), *Neighbourhood effects research: New perspectives* (pp. 23–56). Dordrecht: Springer. doi:10.1007/978-1-4020-2309-2_2.
- Geller, A. (2007). *Neighborhood disorder and crime: An analysis of "broken windows" in New York City*. Columbia University. Retrieved from <http://gradworks.umi.com/32/66/3266579.html>
- Gieryn, T. F. (2000). A space for place in sociology. *Annual Review of Sociology*, 26(1), 463–496. doi:10.1146/annurev.soc.26.1.463.
- Goering, J. M., & Feins, J. D. (Eds.). (2003). *Choosing a better life? Evaluating the moving to opportunity social experiment*. Washington, DC: The Urban Institute.
- Golledge, R. G., & Stimson, R. J. (1987). *Analytical behavioural geography*. London: Croom Helm.
- Goodchild, M. F. (2007). Citizens as sensors: The world of volunteered geography. *GeoJournal*, 69(4), 211–221. doi:10.1007/s10708-007-9111-y.
- Goodchild, M. F., & Janelle, D. G. (1984). The city around the clock: Space-time patterns of urban ecological structure. *Environment and Planning A*, 16(6), 807–820. doi:10.1068/a160807.
- Graif, C., & Sampson, R. J. (2010). *Inter-neighborhood networks and the structure of urban residential mobility*. Cambridge, MA: Harvard University, Department of Sociology.
- Graif, C., Gladfelder, A. S., & Matthews, S. A. (2014). Urban poverty and neighborhood effects on crime: Incorporating spatial and network perspectives. *Sociology Compass*, 8(9), 1140–1155. doi:10.1111/soc4.12199.
- Hägerstrand, T. (1970). What about people in Regional Science? *Papers of the Regional Science Association*, 24(1), 6–21. doi:10.1007/BF01936872.
- Hale, L., Hill, T. D., & Burdette, A. M. (2010). Does sleep quality mediate the association between neighborhood disorder and self-rated physical health? *Preventive Medicine*, 51(3–4), 275–278. doi:10.1016/j.ypmed.2010.06.017.
- Harding, D. J. (2003). Counterfactual models of neighborhood effects: The effect of neighborhood poverty on dropping out and teenage pregnancy. *American Journal of Sociology*, 109(3), 676–719. doi:10.1086/379217.
- Harding, D. J., Gennetian, L., Winship, C., Sanbonmatsu, L., & Kling, J. R. (2011). Unpacking neighborhood influences on education outcomes: Setting the stage for future research. In G. J. Duncan & R. J. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 277–296). New York: Russell Sage Foundation.
- Haynie, D., Silver, E., & Teasdale, B. (2006). Neighborhood characteristics, peer networks, and adolescent violence. *Journal of Quantitative Criminology*, 22(2), 147–169. doi:10.1007/s10940-006-9006-y.
- Hill, T. D., Ross, C. E., & Angel, R. J. (2005). Neighborhood disorder, psychophysiological distress, and health. *Journal of Health and Social Behavior*, 46(2), 170–186. doi:10.1177/002214650504600204.
- Hipp, J. R. (2007). Block, tract, and levels of aggregation: Neighborhood structure and crime and disorder as a case in point. *American Sociological Review*, 72(5), 659–680. doi:10.1177/000312240707200501.
- Holliday, A. L., & Dwyer, R. E. (2009). Suburban neighborhood poverty in U.S. metropolitan areas in 2000. *City & Community*, 8(2), 155–176. doi:10.1111/j.1540-6040.2009.01278.x.
- House, J. S. (2002). Understanding social factors and inequalities in health: 20th century progress and 21st century prospects. *Journal of Health and Social Behavior*, 43(2), 125–142. doi:10.2307/3090192.
- Howell, A. J., & Timberlake, J. M. (2014). Racial and ethnic trends in the suburbanization of poverty in U.S. metropolitan areas, 1980–2010. *Journal of Urban Affairs*, 36(1), 79–98. doi:10.1111/juaf.12030.
- Inagami, S., Cohen, D. A., & Finch, B. K. (2007). Non-residential neighborhood exposures suppress neighborhood effects on self-rated health. *Social Science & Medicine*, 65(8), 1779–1791. doi:10.1016/j.socscimed.2007.05.051.
- Isaacs, R. R. (1948). Are urban neighborhoods possible? *Journal of Housing*, 6(1), 177–180.
- Jackson, N., Denny, S., & Ameratunga, S. (2014). Social and socio-demographic neighborhood effects on adolescent alcohol use: A systematic review of multi-level studies. *Social Science & Medicine*, 115, 10–20. doi:10.1016/j.socscimed.2014.06.004.
- Jencks, C., & Mayer, S. E. (1990). The social consequences of growing up in a poor neighborhood. In L. E. Lynn Jr. & M. G. H. McGeary (Eds.), *Inner-city poverty in the United States* (pp. 111–185). Washington, DC: National Academies Press.

- Jones, M., & Pebley, A. R. (2014). Redefining neighborhoods using common destinations: Social characteristics of activity spaces and home census tracts compared. *Demography*, *51*(3), 727–752. doi:10.1007/s13524-014-0283-z.
- Kaplan, R. M., & Stone, A. A. (2013). Bringing the laboratory and clinic to the community: Mobile technologies for health promotion and disease prevention. *Annual Review of Psychology*, *64*(1), 471–498. doi:10.1146/annurev-psych-113011-143736.
- Kasarda, J. D., & Janowitz, M. (1974). Community attachment in mass society. *American Sociological Review*, *39*(3), 328–339. doi:10.2307/2094293.
- Kawachi, I., & Berkman, L. F. (2000). Social cohesion, social capital, and health. In L. F. Berkman & I. Kawachi (Eds.), *Social epidemiology* (pp. 174–190). New York: Oxford University Press.
- Kestens, Y., Lebel, A., Chaix, B., Clary, C., Daniel, M., Pampalon, R., et al. (2012). Association between activity space exposure to food establishments and individual risk of overweight. *PLoS ONE*, *7*(8), e41418. doi:10.1371/journal.pone.0041418.
- Kim, J. (2010). Neighborhood disadvantage and mental health: The role of neighborhood disorder and social relationships. *Social Science Research*, *39*(2), 260–271. doi:10.1016/j.ssresearch.2009.08.007.
- Kimbro, R. T., Brooks-Gunn, J., & McLanahan, S. (2011). Young children in urban areas: Links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine*, *72*(5), 668–676. doi:10.1016/j.socscimed.2010.12.015.
- Kirk, D. S. (2009). Unraveling the contextual effects on student suspension and juvenile arrest: The independent and interdependent influences of school, neighborhood, and family social controls. *Criminology*, *47*(2), 479–520. doi:10.1111/j.1745-9125.2009.00147.x.
- Kirk, D. S. (2012). Residential change as a turning point in the life course of crime: Desistance or temporary cessation? *Criminology*, *50*(2), 329–358. doi:10.1111/j.1745-9125.2011.00262.x.
- Kling, J. R., Liebman, J. B., & Katz, L. F. (2007). Experimental analysis of neighborhood effects. *Econometrica*, *75*(1), 83–119. doi:10.1111/j.1468-0262.2007.00733.x.
- Kornhauser, R. (1978). *Social sources of delinquency*. Chicago: University of Chicago Press.
- Krause, N. (1996). Neighborhood deterioration and self-rated health in later life. *Psychology and Aging*, *11*(2), 342–352. doi:10.1037/0882-7974.11.2.342.
- Krivo, L. J., & Peterson, R. D. (1996). Extremely disadvantaged neighborhoods and urban crime. *Social Forces*, *75*(2), 619–648. doi:10.1093/sf/75.2.619.
- Krivo, L. J., Washington, H. M., Peterson, R. D., Browning, C. R., Calder, C. A., & Kwan, M.-P. (2013). Social isolation of disadvantage and advantage: The reproduction of inequality in urban space. *Social Forces*, *92*(1), 141–164. doi:10.1093/sf/sot043.
- Kuh, D., & Ben-Shlomo, Y. (Eds.). (1997). *A life course approach to chronic disease epidemiology*. New York: Oxford University Press.
- Kwan, M.-P. (2009). From place-based to people-based exposure measures. *Social Science & Medicine*, *69*(9), 1311–1313. doi:10.1016/j.socscimed.2009.07.013.
- Kwan, M.-P. (2013). Beyond space (as we knew it): Toward temporally integrated geographies of segregation, health, and accessibility. *Annals of the Association of American Geographers*, *103*(5), 1078–1086. doi:10.1080/00045608.2013.792177.
- Latkin, C. A., Williams, C. T., Wang, J., & Curry, A. D. (2005). Neighborhood social disorder as a determinant of drug injection behaviors. *Health Psychology*, *24*(1), 96–100. doi:10.1037/0278-6133.24.1.96.
- Latkin, C. A., Curry, A. D., Hua, W., & Davey, M. A. (2007). Direct and indirect associations of neighborhood disorder with drug use and high-risk sexual partners. *American Journal of Preventive Medicine*, *32*(6), S234–S241. doi:10.1016/j.amepre.2007.02.023.
- Leventhal, T., Dupéré, V., & Brooks-Gunn, J. (2009). Neighborhood influences on adolescent development. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., Vol. 2, pp. 411–443). New York: Wiley.
- Logan, J. R. (2012). Making a place for space: Spatial thinking in social science. *Annual Review of Sociology*, *38*(1), 507–524. doi:10.1146/annurev-soc-071811-145531.
- Lynch, J., & Smith, G. D. (2005). A life course approach to chronic disease epidemiology. *Annual Review of Public Health*, *26*(1), 1–35. doi:10.1146/annurev.publhealth.26.021304.144505.
- Maimon, D., Browning, C. R., & Brooks-Gunn, J. (2010). Collective efficacy, family attachment, and urban adolescent suicide attempts. *Journal of Health and Social Behavior*, *51*(3), 307–324. doi:10.1177/0022146510377878.
- Mair, C., Diez Roux, A. V., & Morenoff, J. D. (2010). Neighborhood stressors and social support as predictors of depressive symptoms in the Chicago Community Adult Health Study. *Health & Place*, *16*(5), 811–819. doi:10.1016/j.healthplace.2010.04.006.
- Marwell, N. P. (2009). *Bargaining for Brooklyn: Community organizations in the entrepreneurial city*. Chicago: University of Chicago Press.
- Massey, D. S., & Denton, N. (1993). *American apartheid: Segregation and the making of the underclass*. Cambridge, MA: Harvard University Press.
- Massey, D. S., & Shibuya, K. (1995). Unraveling the tangle of pathology: The effect of spatially concentrated joblessness on the well-being of African Americans. *Social Science Research*, *24*(4), 352–366. doi:10.1006/ssre.1995.1014.
- Matthews, S. A. (2011). Spatial polygamy and the heterogeneity of place: Studying people and place via ego-centric methods. In L. M. Burton, S. A. Matthews, M. Leung, S. P. Kemp, & D. T. Takeuchi (Eds.),

- Communities, neighborhoods, and health* (pp. 35–55). New York: Springer. doi:[10.1007/978--j1-4419-7482-2_3](https://doi.org/10.1007/978--j1-4419-7482-2_3).
- Matthews, S. A., & Yang, T.-C. (2013). Spatial Polygamy and Contextual Exposures (SPACES): Promoting activity space approaches in research on place and health. *American Behavioral Scientist*, *57*(8), 1057–1081. doi:[10.1177/0002764213487345](https://doi.org/10.1177/0002764213487345).
- McKenzie, R. D. (1921). The neighborhood: A study of local life in the city of Columbus, Ohio. II. *American Journal of Sociology*, *27*(3), 344–363.
- Mendes de Leon, C. F., Cagney, K. A., Bienias, J. L., Barnes, L. L., Skarupski, K. A., Scherr, P. A., & Evans, D. A. (2009). Neighborhood social cohesion and disorder in relation to walking in community-dwelling older adults: A multi-level analysis. *Journal of Aging and Health*, *21*(1), 155–171. doi:[10.1177/0898264308328650](https://doi.org/10.1177/0898264308328650).
- Mennis, J., & Mason, M. J. (2011). People, places, and adolescent substance use: Integrating activity space and social network data for analyzing health behavior. *Annals of the Association of American Geographers*, *101*(1), 272–291. doi:[10.1080/00045608.2010.534712](https://doi.org/10.1080/00045608.2010.534712).
- Merry, S. E. (1981). *Urban danger: Life in a neighborhood of strangers*. Philadelphia: Temple University Press.
- Mohnen, S. M., Groenewegen, P. P., Völker, B., & Flap, H. (2011). Neighborhood social capital and individual health. *Social Science & Medicine*, *72*(5), 660–667. doi:[10.1016/j.socscimed.2010.12.004](https://doi.org/10.1016/j.socscimed.2010.12.004).
- Molnar, B., Cerda, M., Roberts, A., & Buka, S. (2008). Effects of neighborhood resources on aggressive and delinquent behaviors among urban youths. *American Journal of Public Health*, *98*(6), 1086–1093. doi:[10.2105/AJPH.2006.098913](https://doi.org/10.2105/AJPH.2006.098913).
- Morenoff, J. D. (2003). Neighborhood mechanisms and the spatial dynamics of birth weight. *American Journal of Sociology*, *108*(5), 976–1017. doi:[10.1086/374405](https://doi.org/10.1086/374405).
- Morenoff, J. D., Sampson, R. J., & Raudenbush, S. W. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology*, *39*(3), 517–558. doi:[10.1111/j.1745-9125.2001.tb00932.x](https://doi.org/10.1111/j.1745-9125.2001.tb00932.x).
- Morenoff, J. D., House, J. S., Hansen, B. B., Williams, D. R., Kaplan, G. A., & Hunte, H. E. (2007). Understanding social disparities in hypertension prevalence, awareness, treatment, and control: The role of neighborhood context. *Social Science & Medicine*, *65*(9), 1853–1866. doi:[10.1016/j.socscimed.2007.05.038](https://doi.org/10.1016/j.socscimed.2007.05.038).
- Mujahid, M. S., Roux, A. V. D., Cooper, R. C., Shea, S., & Williams, D. R. (2010). Neighborhood stressors and race/ethnic differences in hypertension prevalence (the Multi-Ethnic Study of Atherosclerosis). *American Journal of Hypertension*, *24*(2), 187–193. doi:[10.1038/ajh.2010.200](https://doi.org/10.1038/ajh.2010.200).
- Mumford, L. (1954). The neighborhood and the neighborhood unit. *Town Planning Review*, *24*(4), 256.
- Murphy, A. K., & Wallace, D. (2010). Opportunities for making ends meet and upward mobility: Differences in organizational deprivation across urban and suburban poor neighborhoods. *Social Science Quarterly*, *91*(5), 1164–1186. doi:[10.1111/j.1540-6237.2010.00726.x](https://doi.org/10.1111/j.1540-6237.2010.00726.x).
- Newsome, T. H., Walcott, W. A., & Smith, P. D. (1998). Urban activity spaces: Illustrations and application of a conceptual model for integrating the time and space dimensions. *Transportation*, *25*(4), 357–377. doi:[10.1023/A:1005082827030](https://doi.org/10.1023/A:1005082827030).
- Owens, A. (2010). Neighborhoods and schools as competing and reinforcing contexts for educational attainment. *Sociology of Education*, *83*(4), 287–311. doi:[10.1177/0038040710383519](https://doi.org/10.1177/0038040710383519).
- Pabayo, R., Molnar, B. E., Cradock, A., & Kawachi, I. (2014). The relationship between neighborhood socioeconomic characteristics and physical inactivity among adolescents living in Boston, Massachusetts. *American Journal of Public Health*, *104*(11), e142–e149. doi:[10.2105/AJPH.2014.302109](https://doi.org/10.2105/AJPH.2014.302109).
- Palmer, J. R. B., Espenshade, T., Bartumeus, F., Chung, C., Ozgencil, N., & Li, K. (2013). New approaches to human mobility: Using mobile phones for demographic research. *Demography*, *50*(3), 1105–1128. doi:[10.1007/s13524-012-0175-z](https://doi.org/10.1007/s13524-012-0175-z).
- Park, R. E., & Burgess, E. W. (1925). *The city*. Chicago: University of Chicago Press. Reprint 1984.
- Pattillo, M. (2007). *Black on the block: The politics of race and class in the city*. Chicago: University of Chicago Press.
- Perchoux, C., Chaix, B., Cummins, S., & Kestens, Y. (2013). Conceptualization and measurement of environmental exposure in epidemiology: Accounting for activity space related to daily mobility. *Health & Place*, *21*, 86–93. doi:[10.1016/j.healthplace.2013.01.005](https://doi.org/10.1016/j.healthplace.2013.01.005).
- Peterson, R. D., Krivo, L. J., & Harris, M. A. (2000). Disadvantage and neighborhood violent crime: Do local institutions matter? *Journal of Research in Crime and Delinquency*, *37*(1), 31–63. doi:[10.1177/0022427800037001002](https://doi.org/10.1177/0022427800037001002).
- Phillips, D. A., & Shonkoff, J. P. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academies Press.
- Pickett, K. E., & Pearl, M. (2001). Multilevel analyses of neighbourhood socioeconomic context and health outcomes: A critical review. *Journal of Epidemiology and Community Health*, *55*(2), 111–122. doi:[10.1136/jech.55.2.111](https://doi.org/10.1136/jech.55.2.111).
- Raudenbush, S. W., & Sampson, R. J. (1999). Ecometrics: Toward a science of assessing ecological settings, with application to the systematic social observation of neighborhoods. *Sociological Methodology*, *29*(1), 1–41. doi:[10.1111/0081-1750.00059](https://doi.org/10.1111/0081-1750.00059).

- Reardon, S. F., & Bischoff, K. (2011). Income inequality and income segregation. *American Journal of Sociology*, *116*(4), 1092–1153. doi:10.1086/657114.
- Robert, S. A. (1999). Socioeconomic position and health: The independent contribution of community socioeconomic context. *Annual Review of Sociology*, *25*, 489–516. doi:10.2307/223514.
- Robert, S. A., & Li, L. W. (2001). Age variation in the relationship between community socioeconomic status and adult health. *Research on Aging*, *23*(2), 234–259. doi:10.1177/0164027501232005.
- Robins, J. M., Hernán, M. A., & Brumback, B. (2000). Marginal structural models and causal inference in epidemiology. *Epidemiology*, *11*(5), 550–560.
- Ross, C. E. (2000). Neighborhood disadvantage and adult depression. *Journal of Health and Social Behavior*, *41*(2), 177–187. doi:10.2307/2676304.
- Ross, C. E., & Jang, S. J. (2000). Neighborhood disorder, fear, and mistrust: The buffering role of social ties with neighbors. *American Journal of Community Psychology*, *28*(4), 401–420. doi:10.1023/A:1005137713332.
- Ross, C. E., & Mirowsky, J. (2001). Neighborhood disadvantage, disorder, and health. *Journal of Health and Social Behavior*, *42*(3), 258–276. doi:10.2307/3090214.
- Ross, C. E., & Mirowsky, J. (2009). Neighborhood disorder, subjective alienation, and distress. *Journal of Health and Social Behavior*, *50*(1), 49–64. doi:10.1177/002214650905000104.
- Rubinstein, R. I., & Parmelee, P. A. (1992). Attachment to place and the representation of the life course by the elderly. In I. Altman & S. M. Low (Eds.), *Place attachment* (pp. 139–163). New York: Springer. doi:10.1007/978-1-4684-8753-4_7.
- Sampson, R. J. (2006). How does community context matter? Social mechanisms and the explanation of crime rates. In P.-O. H. Wikström & R. J. Sampson (Eds.), *The explanation of crime: Context, mechanisms, and development* (pp. 31–60). Cambridge: Cambridge University Press.
- Sampson, R. J. (2008). Moving to inequality: Neighborhood effects and experiments meet social structure. *American Journal of Sociology*, *114*(1), 189–231. doi:10.1086/589843.
- Sampson, R. J. (2012). *Great American city: Chicago and the enduring neighborhood effect*. Chicago: University of Chicago Press.
- Sampson, R. J., & Raudenbush, S. W. (1999). Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology*, *105*(3), 603–651. doi:10.1086/210356.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. J. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, *277*(5328), 918–924. doi:10.1126/science.277.5328.918.
- Sampson, R. J., Morenoff, J. D., & Earls, F. J. (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. *American Sociological Review*, *64*(5), 633–660. doi:10.2307/2657367.
- Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. *Annual Review of Sociology*, *28*, 443–478. doi:10.2307/3069249.
- Sampson, R. J., Morenoff, J. D., & Raudenbush, S. (2005). Social anatomy of racial and ethnic disparities in violence. *American Journal of Public Health*, *95*(2), 224–232. doi:10.2105/AJPH.2004.037705.
- Sampson, R. J., Sharkey, P., & Raudenbush, S. W. (2008). Durable effects of concentrated disadvantage on verbal ability among African-American children. *Proceedings of the National Academy of Sciences*, *105*(3), 845–852. doi:10.1073/pnas.0710189104.
- Sanbonmatsu, L., Potter, N. A., Adam, E., Duncan, G. J., Katz, L. F., Kessler, R. C., et al. (2012). The long-term effects of moving to opportunity on adult health and economic self-sufficiency. *Cityscape*, *14*(2), 109–136.
- Sastry, N. (2012). Neighborhood effects on children’s achievement: A review of recent research. In R. King & V. Maholmes (Eds.), *The Oxford handbook of poverty and child development* (pp. 423–447). New York: Oxford University Press. doi:10.1093/oxfordhb/9780199769100.001.0001/oxfordhb-9780199769100-e-24.
- Sastry, N., & Pebley, A. R. (2010). Family and neighborhood sources of socioeconomic inequality in children’s achievement. *Demography*, *47*(3), 777–800. doi:10.1353/dem.0.0114.
- Sastry, N., Ghosh-Dastidar, B., Adams, J., & Pebley, A. R. (2006). The design of a multilevel survey of children, families, and communities: The Los Angeles Family and Neighborhood Survey. *Social Science Research*, *35*(4), 1000–1024. doi:10.1016/j.ssresearch.2005.08.002.
- Schönfelder, S., & Axhausen, K. W. (2002). Measuring the size and structure of human activity spaces—the longitudinal perspective. In *Arbeitsbericht Verkehrs- und Raumplanung 135*. Institut für Verkehrsplanung und Transportsysteme (IVT), ETH Zürich, Zürich. doi:10.3929/ethz-a-004444846.
- Schönfelder, S., & Axhausen, K. W. (2003). Activity spaces: Measures of social exclusion? *Transport Policy*, *10*(4), 273–286. doi:10.1016/j.tranpol.2003.07.002.
- Sharkey, P. (2013). *Stuck in place: Urban neighborhoods and the end of progress toward racial equality*. Chicago: University of Chicago Press.
- Sharkey, P., & Elwert, F. (2011). The legacy of disadvantage: Multigenerational neighborhood effects on cognitive ability. *American Journal of Sociology*, *116*(6), 1934–1981. doi:10.1086/660009.
- Sharkey, P., & Faber, J. W. (2014). Where, when, why, and for whom do residential contexts matter? Moving away from the dichotomous understanding of neighborhood effects. *Annual Review of Sociology*, *40*(1), 559–579. doi:10.1146/annurev-soc-071913-043350.
- Shaw, C., & McKay, H. D. (1942). *Juvenile delinquency and urban areas*. Chicago: University of Chicago Press.

- Simcha-Fagan, O., & Schwartz, J. E. (1986). Neighborhood and delinquency: An assessment of contextual effects. *Criminology*, 24(4), 667–699. doi:10.1111/j.1745-9125.1986.tb01507.x.
- Simons, R. L., Simons, L. G., Burt, C. H., Brody, G. H., & Cutrona, C. (2005). Collective efficacy, authoritative parenting and delinquency: A longitudinal test of a model integrating community- and family-level processes. *Criminology*, 43(4), 989–1029. doi:10.1111/j.1745-9125.2005.00031.x.
- Slocum, L. A., Rengifo, A. F., Choi, T., & Herrmann, C. R. (2013). The elusive relationship between community organizations and crime: An assessment across disadvantaged areas of the South Bronx. *Criminology*, 51(1), 167–216. doi:10.1111/1745-9125.12001.
- Small, M. L. (2009). *Unanticipated gains: Origins of network inequality in everyday life*. Oxford: Oxford University Press.
- Small, M. L., & McDermott, M. (2006). The presence of organizational resources in poor urban neighborhoods: An analysis of average and contextual effects. *Social Forces*, 84(3), 1697–1724. doi:10.1353/sof.2006.0067.
- Small, M. L., Harding, D. J., & Lamont, M. (2010). Reconsidering culture and poverty. *The ANNALS of the American Academy of Political and Social Science*, 629(1), 6–27. doi:10.1177/0002716210362077.
- Social Observatories Coordinating Network. (2012). *Vision statement for a national network of social observatories*. Social Observatory Coordinating Network White Paper. <http://socialobservatories.org/vision>.
- South, S. J., & Crowder, K. (2010). Neighborhood poverty and nonmarital fertility: Spatial and temporal dimensions. *Journal of Marriage and the Family*, 72(1), 89–104. doi:10.1111/j.1741-3737.2009.00685.x.
- Sperling, J. (2012). The tyranny of census geography: Small-area data and neighborhood statistics. *Cityscape*, 14(2), 219–223.
- Steen, J. A. (2010). A multilevel study of the role of environment in adolescent substance use. *Journal of Child & Adolescent Substance Abuse*, 19(5), 359–371. doi:10.1080/1067828X.2010.502479.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Journal of Cognitive Education and Psychology*, 2(1), 55–87. doi:10.1891/194589501787383444.
- Sternthal, M., Jun, H.-J., Earls, F. J., & Wright, R. J. (2010). Community violence and urban childhood asthma: A multilevel analysis. *European Respiratory Journal*, 36(6), 1400–1409. doi:10.1183/09031936.00003010.
- Taylor, R. B. (2001). *Breaking away from broken windows: Baltimore neighborhoods and the nationwide fight against crime, grime, fear, and decline*. Boulder: Westview Press.
- Teitler, J. O., & Weiss, C. C. (2000). Effects of neighborhood and school environments on transitions to first sexual intercourse. *Sociology of Education*, 73(2), 112–132. doi:10.2307/2673240.
- Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, 52(2), 145–161. doi:10.1177/0022146510395592.
- Thomas, W. I., & Znaniecki, F. (1919). *The Polish peasant in Europe and America: Monograph of an immigrant group*. Chicago: The University of Chicago Press.
- Trull, T. J., & Ebner-Priemer, U. (2013). Ambulatory assessment. *Annual Review of Clinical Psychology*, 9(1), 151–176. doi:10.1146/annurev-clinpsy-050212-185510.
- Vartanian, T. P., & Buck, P. W. (2005). Childhood and adolescent neighborhood effects on adult income: Using siblings to examine differences in ordinary least squares and fixed-effect models. *Social Service Review*, 79(1), 60–94. doi:10.1086/426718.
- Vartanian, T. P., & Houser, L. (2010). The effects of childhood neighborhood conditions on self-reports of adult health. *Journal of Health and Social Behavior*, 51(3), 291–306. doi:10.1177/0022146510378241.
- Warner, B. D., & Rountree, P. W. (1997). Local social ties in a community and crime model: Questioning the systemic nature of informal social control. *Social Problems*, 44(4), 520–536. doi:10.2307/3097221.
- Wen, M., & Christakis, N. A. (2005). Neighborhood effects on posthospitalization mortality: A population-based cohort study of the elderly in Chicago. *Health Services Research*, 40(4), 1108–1127. doi:10.1111/j.1475-6773.2005.00398.x.
- Wheaton, B., & Clarke, P. (2003). Space meets time: Integrating temporal and contextual influences on mental health in early adulthood. *American Sociological Review*, 68(5), 680–706. doi:10.2307/1519758.
- Wikström, P.-O. H., Oberwittler, D., Treiber, K., & Hardie, B. (2012). *Breaking rules: The social and situational dynamics of young people's urban crime*. Oxford: Oxford University Press.
- Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.
- Wilson, W. J. (1996). *When work disappears: The world of the new urban poor*. New York: Knopf.
- Wodtke, G. T. (2013). Duration and timing of exposure to neighborhood poverty and the risk of adolescent parenthood. *Demography*, 50(5), 1765–1788. doi:10.1007/s13524-013-0219-z.
- Xue, Y., Leventhal, T., Brooks-Gunn, J., & Earls, F. J. (2005). Neighborhood residence and mental health problems of 5- to 11-year-olds. *Archives of General Psychiatry*, 62(5), 554–563. doi:10.1001/archpsyc.62.5.554.
- Yabiku, S. T., Dixon Rayle, A., Okamoto, S. K., Marsiglia, F. F., & Kulis, S. (2007). The effect of neighborhood context on the drug use of American Indian youth of the Southwest. *Journal of Ethnicity in Substance Abuse*, 6(2), 181–204. doi:10.1300/J233v06n02_11.
- Yang, S.-M. (2010). Assessing the spatial-temporal relationship between disorder and violence. *Journal of*

- Quantitative Criminology*, 26(1), 139–163. doi:10.1007/s10940-009-9085-7.
- Yen, I. H., Michael, Y. L., & Perdue, L. (2009). Neighborhood environment in studies of health of older adults: A systematic review. *American Journal of Preventive Medicine*, 37(5), 455–463. doi:10.1016/j.amepre.2009.06.022.
- York Cornwell, E., & Cagney, K. A. (2014). Assessment of neighborhood context in a nationally representative study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 69(Suppl 2), S51–S63. doi:10.1093/geronb/gbu052.
- Zenk, S. N., Schulz, A. J., Matthews, S. A., Odoms-Young, A., Wilbur, J., Wegrzyn, L., et al. (2011). Activity space environment and dietary and physical activity behaviors: A pilot study. *Health & Place*, 17(5), 1150–1161. doi:10.1016/j.healthplace.2011.05.001.

Part V

**The Life Course
and Policy: Building the Nexus**

Life Course Research and the Shaping of Public Policy

John H. Laub

1 The Nexus of Life Course and Public Policy¹

Social scientists are often frustrated by the apparent disconnect between sound empirical research and public policy initiatives. This occurs across a number of domains including education, health, labor, and the focus of this chapter—crime and criminal justice. Recently, there have been several attempts to better connect research evidence and public policy. However, these attempts have focused somewhat narrowly on improving research methodology (e.g., using more randomized controlled trials in evaluation studies) or by creating new strategies of dissemination (e.g., what works clearinghouses and the ubiquitous one pager). A focus on new means of dissemination is especially timely given recent changes in how individuals access information drawing on new forms of social media (e.g., Twitter).

While these new strategies may well bear fruit I believe the challenge is largely an intellectual

one. Ideas must guide public policy. In this chapter, I examine the nexus between one idea – the life course – and public policy. I argue that the life course paradigm is especially relevant for shaping public policy.² A life course perspective offers ideas, data, and tools that can readily shape and enhance public policy. Another attraction is the fact that a life course perspective is inherently interdisciplinary. Indeed, life course researchers are drawn from a number of disciplines and fields including sociology, psychology, economics, life sciences, gerontology, criminology, social work, public policy, and law.

In this first section, I focus on the role of life course theory and life course methodology. I then highlight several life course principles that are central for shaping effective public policies pertaining to crime and criminal justice.

1.1 The Role of Life Course Theory and Method

The life course perspective is a theoretical orientation, a research methodology, and an empirical field of study. Many of the key ideas from the life

¹The focus of this chapter is on how life course research can inform public policy. I recognize that the life course can also be altered by public policies. As but one example, witness the fourfold increase in the rate of incarceration in the United States over the last 40 years (see Travis et al. 2014). Space limitations preclude me from tackling this second issue.

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²In an earlier paper, I argued that a life course perspective could serve as a paradigm for the field of criminology. Drawing on known facts about crime, I made the case that a life course perspective provided insight and understanding of the causes and dynamics of crime across the life span (see Laub 2006).

course – social change; trajectories, transitions, turning points; behavioral continuity and change; cohort and historical period – generate important insight and understanding of crime and human development across the life span. Elder (1999) uses the term “*life course theory* to refer to a theoretical orientation that establishes a common field of inquiry by defining a framework that guides research in terms of problem identification and formulation, variable selection and rationales, and strategies of design and analysis” (p. 302).

A life course perspective focuses on temporal dimensions of individual lives and societal structure. Much of social science research takes a “snapshot” look at social reality; namely, drawing on cross-sectional research that captures one point in time. In contrast, the life course perspective shifts focus to the dynamics of lives and social change. In other words, a life course perspective could be thought of as a “movie” that captures the unfolding of lives over time. The life course has been defined as “pathways through the age differentiated life span” (Elder 1985: 17), in particular the “sequence of culturally defined age-graded roles and social transitions that are enacted over time” (Caspi et al. 1990: 15). Two central concepts underlie life-course dynamics. A *trajectory* is a line of development over the life span such as worklife, parenthood, or criminal behavior. Trajectories refer to long-term patterns of behavior and are marked by a sequence of transitions. *Transitions* are marked by life events such as first job or first marriage that are embedded in trajectories and evolve over shorter time spans (Elder 1985: 31–32).

The interlocking nature of trajectories and transitions may generate *turning points* or a change in the life course (Elder 1985: 32). Adaptation to life events is crucial because the same event or transition followed by different adaptations can lead to different trajectories (Elder 1985: 35). The long-term view embodied by the life-course focus on trajectories implies a strong connection between childhood events and experiences in adulthood. However, the simultaneous shorter-term view also implies that transitions or turning points can modify life

trajectories – they can “redirect paths.” Social institutions and triggering life events that may modify trajectories (either in a positive or negative direction) include school, work, the military, residential change, marriage, parenthood, and contact with the criminal justice system.

Given this theoretical orientation it is no surprise that life course researchers use longitudinal data to answer questions about human development over life span. Prospective (forward looking) longitudinal research designs form the heart of life-course research (as opposed to retrospective life-histories). Data covering the period from childhood through adulthood is preferred. The good news is that there are a number of statistical techniques that can be used to analyze longitudinal data (see Elder and Giele 2009). In addition, life course researchers often use both quantitative and qualitative data to link social history and social structure to the unfolding of human lives (see Elder and Giele 2009; cross-reference Hermanowicz, chapter “[Longitudinal Qualitative Research](#)” this volume; Macmillan and Furstenberg, chapter “[The Logic and Practice of Growth Curve Analysis: Modeling Strategies for Life Course Dynamics](#)” this volume).

1.2 Important Life Course Principles

A life course perspective recognizes the importance of putting “persons in context” – individual, group, and community/ neighborhood characteristics matter. Drawing on the ecological perspective of human development from Urie Bronfenbrenner (1979), my view is that individuals are embedded in a broader social developmental and structural context and that individual behavior is the product of the interaction between individual development and social context (e.g., family, school, and neighborhood).

Elder (1999) identified four paradigmatic principles for the study of the life course. The first principle is “The life course of individuals is embedded in and shaped by the historical times and events they experience over their lifetime” (Elder 1999: 304). Macro level events such as the

Great Depression in the 1930s and World War II during the 1940s have had profound effects on individual development. More recently, the effects of social unrest during the 1960s, the terrorist attacks on 9/11/01, and the Great Recession in 2008 were equally profound. With respect to crime and criminal justice, growing up during the War on Crime (1960s and 1970s), the War on Drugs (1980s and 1990s), and the War on Terror (2001 to the present) shaped life course development largely through increased contact with the criminal justice system.

The second principle is “The developmental impact of a succession of life transitions or events is contingent on when they occur in a person’s life” (Elder 1999: 306). This principle draws attention to the timing of both historical and life events. As Elder’s research demonstrated experiencing the Great Depression as a young child had different effects compared to those who experienced the Great Depression during adolescence (for details see Elder 1999). In criminology, there is good evidence that experiencing an arrest during adolescence could have severe consequences with respect to school completion (see Kirk and Sampson 2013).

The third paradigmatic principle is “Lives are lived interdependently, and social-historical influences are expressed through this network of shared relationships” (Elder 1999: 307). It is thus important to consider not only that lives are linked horizontally say husbands and wives, but also how lives are linked vertically and across generations (grandparents and parents and parents and children). This idea of linked lives is especially relevant for the study of crime and justice. For instance, what is the relationship between parental criminality and the criminality of their offspring? Also, the fact is that the targets of criminal justice policies are often linked to others, especially other family members such as children. For example, Wakefield and Wildeman (2014) have examined the deleterious consequences of high rates of incarceration for children. In addition, whole communities can be affected by criminal justice policies such as “mass incarceration” (see Travis et al. 2014).

The fourth principle is “Individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstances” (Elder 1999: 308). This suggests that in a life course perspective individuals are not passive vessels, but rather they are integral actors exercising agency in shaping life course outcomes. The challenge is to assess how social structures affect individual actions and in turn to examine how individual actions change social structures.

2 Life-Course Criminology

Since 1987, my colleague, Robert Sampson, and I have been engaged in a long-term research project examining continuity and change in criminal offending from childhood through old age. This project generated two award winning books (*Crime in the Making: Pathways and Turning Points Through Life* (1993) and *Shared Beginnings and Divergent Lives: Delinquent Boys to Age 70* (2003); an edited volume of the *Annals* (2005); 28 articles, 18 book chapters, and scores of presentations. In 2011, Robert Sampson and I were awarded the Stockholm Prize in Criminology for our research on how and why offenders stop offending. We coined the term “life-course criminology” to describe our theoretical and empirical work. In this section, I discuss our theoretical framework, the longitudinal data we collected and analyzed, and our key research findings.

2.1 Theoretical Framework

In our research program, we drew on the life course perspective to better understand the development and patterning of crime across the life span. We were especially interested in documenting the trajectories of criminal offending over time and examining key transitions within trajectories that may be turning points in the life course. In doing so, we developed a theoretical framework to explain childhood antisocial behavior, adolescent delinquency, and crime in

early adulthood. The general organizing principle was that crime is more likely to occur when an individual's bond to society is attenuated. Our analysis of the causes of delinquency shared much in common with the focus in classical social control theory (Hirschi 1969) on adolescence, but the reality of later life-course milestones required us to develop a modified theoretical perspective. After all, the transition to young adulthood brings with it new social control institutions and potential turning points that go well beyond adolescence.

We thus developed an *age-graded* theory emphasizing informal social controls that are manifested in shifting and possibly transformative ways as individuals age. For example, we focused on parenting styles (supervision, warmth, consistent discipline) and emotional attachment to parents in childhood, school attachment and peers in adolescence, and marital stability, military service, and employment in adulthood. Although these are manifestly distinct domains that are age graded, we argued that there are higher-order commonalities with respect to the concept of social connectivity through time (see Sampson and Laub 1993; Laub and Sampson 2003 for details).

2.2 The Glueck Data

We used a unique longitudinal data set to test our theory of crime. In the first part of our research project, we reconstructed what is known in criminology as the *Unraveling Juvenile Delinquency* study conducted by Sheldon and Eleanor Glueck (1950, 1968). This classic study began in 1940 and the initial data collection lasted 10 years. The two samples of boys were studied. The first consisted of 500 delinquent boys who were incarcerated in two reform schools in Massachusetts. The second consisted of 500 nondelinquent boys who were enrolled in the Boston public schools. All of the boys were born in Boston during the late 1920s or early 1930s. An unusual feature of the Gluecks' *UJD* design was that each delinquent and nondelinquent boy were matched on four characteristics believed to be related to delin-

quency – age, general IQ, ethnicity, and neighborhood socio-economic status. The Gluecks were interested in learning how it was that two boys with the same age, IQ, ethnic make-up, and neighborhood SES could have different outcomes with respect to delinquency. To ensure an adequate comparison, boys in reform school were selected for their serious and/or persistent involvement in crime while boys in public schools were selected for their *absence* of serious and/or persistent delinquency based on official record checks and interviews with parents, teachers, and the boys themselves.

A large amount of biological, psychological, and sociological data were collected for each boy and their families at wave one (average age 14) (see Glueck and Glueck 1950 for details). But of even greater interest from a life course perspective was that the same boys were followed up by the Gluecks at age 25 and again at age 32 (see Glueck and Glueck 1968 for details). One of the remarkable features of the Gluecks' study was the large number of data sources that were used. Before the era of "Big Data" and "Integration Across Administrative Records," the Gluecks' research team conducted interviews with the boys themselves at all three waves as well as interviews with parents, teachers, employers, spouses, friends, community members, social workers, probation officers, parole officers, and psychiatrists. In addition, criminal histories were examined across various state depositories and from the FBI. Finally, administrative records were surveyed across a number of social service agencies and from the military. My colleague, George Vaillant referred to the Glueck data archive as the "Hubble Telescope" for social scientists (see also Elder and Giele 2009: 2).

In the first phase of our project we reconstructed and reanalyzed the Glueck data for our book, *Crime in the Making: Pathways and Turning Points Through Life* (see Sampson and Laub 1993 for details). Shortly after the publication of *Crime in the Making*, we decided to launch a follow-up of the delinquent men from the Gluecks' study. We knew that 475 of the original 500 delinquents had survived to age 32, but the last point of contact was circa 1960, more than 30 years ago.

Nevertheless, we launched our follow-up study focusing on three components. The first was a criminal record search both at the state level as well as using FBI “rap sheets.” The second was a search of death records both at the state level as well as using the National Death Index. The third and most challenging was to locate and interview a subset of the men as they approached age 70. Using information gleaned from the criminal record search, we selected a stratified sample of men ranging from those men with no arrests since adolescence to men who were arrested in each decade of their life. We ended up conducting life history interviews with 52 men. We merged the quantitative and qualitative data in our follow-up study from age 32 to roughly age 70 with the data collected by Gluecks data from childhood to age 32 to have a complete set of data on criminal offending over the full life span. These combined data may well be the longest longitudinal study of criminal offenders in the world.

2.3 Review of Key Research Findings

What did we learn over the course of our long-term project? A number of key research findings emerged from our reanalysis of the reconstructed Glueck data archive as well as from our own follow-up study.

First, consistent with our theory of age-graded informal social control, we found that informal social control processes are crucial in understanding the onset of delinquency. More specifically, in our analyses of the Glueck data, we found that the strongest and most consistent effects on both official and unofficial delinquency flow from the social processes of family, school, and peers. Low levels of parental supervision, erratic, threatening, and harsh discipline, and weak parental attachment were strongly related to delinquency. School attachment had large negative effects on delinquency independent of family processes. Attachment to delinquent peers had a significant positive effect on delinquency regardless of family and school process. Further analyses did reveal, however, that family and

school processes appeared to be most important in the causal chain (for details see Sampson and Laub 1993: chapters 4 and 5).

Second, we found continuity in crime and other problematic behaviors across the life span. More specifically, in our analyses of the Glueck data, we found that independent of age, IQ, neighborhood SES, and ethnicity, the original delinquents and nondelinquents displayed behavioral consistency – both homotypic and heterotypic³ – well into adulthood. Indeed, delinquency and other forms of antisocial conduct in childhood were strongly related to troublesome adult behavior including crime, incarceration, economic dependency, unemployment, marital discord, and divorce (for details see Sampson and Laub 1993: chapter 6).

Third, using the data on crime over the long haul, we probed the relationship between age and crime. Our analyses of the Glueck data showed that, on the one hand, the aggregate age-crime curve was not the same as individual age-crime trajectories, lending apparent support to one of the major claims of the criminal career model. More precisely, we found enormous variability in the peak ages of offending and the age at desistance varied markedly across the Glueck men (see Laub and Sampson 2003: chapter 5). On the other hand, we found that crime declines with age even for active offenders and that trajectories of desistance cannot be prospectively identified based on typological accounts rooted in childhood and individual differences (see, for example, Moffitt 1993). That is, drawing on extant theory and a multitude of childhood and adolescent risk factors, offenses eventually decline for all groups of offenders. Simply put, desistance processes are at work even for the highest-risk and predicted life-course persistent offenders. While prognoses from childhood factors such as low IQ, aggressive temperament, or early onset of antisocial behavior were modestly accurate in

³Homotypic continuity is continuity in similar behaviors across the life course such as the linkage between juvenile delinquency and adult crime. Heterotypic continuity is continuity in diverse behaviors across the life course such as the linkage between crime and other problem behaviors.

predicting stable differences in adolescent offending, they did not yield distinct groupings that were valid prospectively for troubled kids over the long haul. Not only was prediction poor at the individual level, our data raised questions regarding the categorically distinct groupings that dominate theoretical and policy discussions (e.g., “life-course-persistent offenders,” and/or “super-predators”). We found that these groupings tended to wither when placed under the microscope of long-term observation (Laub and Sampson 2003: chapter 5; Sampson and Laub 2003). Our “take-away” is that trajectories of crime are influenced but not determined by prior childhood differences.

Fourth, we found that adult turning points matter for desistance from crime. More specifically, in our analyses of the Glueck data, we found that job stability and marital attachment in adulthood were significantly related to changes in adult crime – the stronger the adult ties to work and family, the less crime and deviance. Despite differences in early childhood experiences, adult social bonds to work and family thus had similar consequences for the life-course trajectories of the 500 delinquents and 500 nondelinquent controls. These results were consistent for a wide variety of crime outcome measures, control variables (e.g., childhood anti-social behavior and individual-difference constructs) and analytical techniques ranging from methods that accounted for persistent unobserved heterogeneity in criminal propensity such as random-effects panel models to analyses of qualitative data (see details Sampson and Laub 1993: chapters 7 thru 9 and Laub and Sampson 2003: Chapters 7 thru 9). We concluded from these analyses that the adult life course matters.

What was of particular importance were the common features of the turning points we uncovered. Regardless of the type of turning point such as marriage or serving in the military, there were four underlying mechanisms at work. The mechanisms are all consistent with the general idea of informal social control. Namely, what appears to be important about institutional or structural turning points are that they all involve, to varying degrees:

- A “knifing off” from one’s delinquent past.
- Monitoring coupled with social support

- Enactment and the reinforcement of new routines
- Cognitive identity shifts and new “life scripts.” What we referred to as moving from a “hell raiser” to a “family man.”

3 **Translational Criminology: Using Life Course Research on Crime to Shape Public Policy**

In order to fully discuss using life course research on crime to shape public policies regarding crime and justice, I must provide some context and personal history. After 30 years in academe, I had the good fortune of being nominated by President Barack Obama to serve as the Director of the National Institute of Justice in the Office of Justice Programs in the Department of Justice. The position of Director is a presidential appointment with confirmation by the United States Senate.

Created more than 40 years ago, the National Institute of Justice (NIJ) is the research, development and evaluation agency of the U.S. Department of Justice. NIJ is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to reduce crime and promote justice, particularly at the state and local levels. In my view, NIJ has a unique mission as a science agency focused on policy and practice. Given this position, NIJ faces a twofold strategic challenge – generating knowledge that is scientifically rigorous and disseminating knowledge that is relevant to policymakers and practitioners.

On July 22, 2010, I was sworn in as the Director of the National Institute of Justice. Never before in the history of the Institute has the position of Director been filled by someone with a Ph.D. in criminology and criminal justice and with extensive research experience. Some have called this a turning point for the field and it is a clear indication that science is and will be an important part of the mission of NIJ, the Office of Justice Programs, and the Department of Justice as a whole.

There are other important features of NIJ and my role as the director that need to be pointed out. First, despite the fact that NIJ is the primary federal funding source for research on crime and justice, it is woefully underfunded with a base budget of about \$40 million a year. Second, NIJ resides in the Office of Justice Programs in the Department of Justice. In other words, NIJ sits amidst a sea of lawyers which represents a challenge to NIJ as a science agency. There is simply not a strong culture of science in the Justice Department. Third, and perhaps most important, in July 2010, the same month that I started my stint as Director, the National Research Council released a report entitled, *Strengthening the National Institute of Justice*.

This was the first large scale evaluation of NIJ by an independent entity in more than 30 years (see NRC 1977). The 2010 NRC Report offered five broad recommendations that focused on the need for independence and self-governance at NIJ; the critical elements essential for a science agency that NIJ purports to be; the need for NIJ to bolster the research infrastructure internally and externally; the need for NIJ to embrace scientific integrity and transparency in all of its activities; and the need for NIJ to embrace a culture of self-assessment. According to the NRC Report, NIJ has lacked the essential tools commensurate with a science agency: (a) a strong management structure; (b) a scientific staff; (c) a budget to support both short- and long-term goals; and (d) protections from political shifts. Moreover, because of budget constraints and directives from Congress starting in 2004, NIJ has shifted attention and resources away from both basic and applied social science research toward capacity building and training, especially in the area of forensic sciences (see NRC 2010).

3.1 Providing a Conceptual Framework

So what should be the priorities of NIJ? In my view, NIJ lacked a conceptual and intellectual framework. Too often the wrong questions were posed, the wrong language was used, and false choices were presented. Coherent theory orga-

nizes research findings, sets priorities for future research, and provides influential guides to policy and practice. Despite efforts by many to divide theory and research from policy, the fact is theory, research, and policy are deeply intertwined and central to the lives of everyone involved in explaining crime and advancing justice and public safety.

In 2003 when I was President of the American Society of Criminology,⁴ I organized the annual meeting program around the following theme – “The Challenge of Practice, The Benefits of Theory.” I did this because I believe that such distinctions are unnecessary and ultimately counterproductive. Furthermore, the distinction is inconsistent with much of the history of criminology. We have a strong tendency to favor dichotomies, all or nothing propositions, and subsequently we are forced to choose, theory or policy. As I wrote in my presidential address, I believe that in order to enhance policy and practice one needs not only sound research, but strong theory (see Laub 2004).

One can legitimately ask – What is the role of the federal government in criminology and criminal justice? In the broadest sense, it is to support research and data collection, analysis, and dissemination. Following James Q. Wilson (1996), the federal government can be and should be the research and development arm of the criminal justice system. For instance, a key role for NIJ is designing and testing crime prevention and crime control strategies. In order to accomplish this mission, I believe you need to focus on three major areas – the nature of crime, the causes of crime, and the response to crime. In my view, this is the nucleus of a comprehensive research plan in the area of crime and justice and can be informed by the three scientific offices housed at NIJ – social sciences, physical sciences, and forensic sciences.

In thinking about the creation of a research agenda at NIJ, I drew on my experiences as a life

⁴The American Society of Criminology is one of the largest international organizations in the world whose members are devoted exclusively to the study of and the prevention and control of crime.

course researcher. The conceptual framework I used included the following:

- The need for a long-term view. One of my favorite sayings at NIJ was one data point does not make a trend.
- There are multiple causes of crime. One major development in criminology over the last 25 years is the recognition that there is no single cause or risk factor for crime and violence. Indeed, there are various pathways to crime and violence. Chronic offenders, in particular, have multiple risk factors in their background including *individual* factors such as hyperactivity, impulsivity, and attention deficit; *family* characteristics, especially poor family functioning and childrearing practices, *school* factors like poor school achievement and low commitment to school, and *peer* factors, especially associating with delinquent peers and gang membership. In addition, *community* influences such as poverty and inequality, race and family composition, housing and density, and neighborhood disorder and change are important risk factors of criminal offending, especially violence. These factors tend to be cumulative and interact with one another over time.
- There is a strong interconnection of problem behaviors. Based on our research and others, it appears that youth problems – delinquency, substance abuse, violence, dropping out of school, teen pregnancy – often share common risk characteristics (Sampson and Laub 1993; Jessor and Jessor 1977). Furthermore, these “packages of problems” often extend into adulthood (Sampson and Laub 1993; Cairns and Cairns 1994). In addition, men and women face numerous collateral consequences when exiting prison in the “mass incarceration” era with respect to employment, education, housing, and civic life (see Travis et al. 2014 for a review). Moreover, the reach of the criminal justice system extends to the courts and police as well with potentially disturbing consequences (see Goffman 2014). So it makes perfect sense for the Department of Justice to be interested in working with the Departments of Health and Human Services, Labor, Housing and Urban Development, Education, and Veterans Affairs.
- Crime is both a dependent variable and an independent variable. The example I used repeatedly at NIJ was how many of the Glueck men who were involved in serious criminal activity as young adults died early and often violently (see Laub and Vaillant 2000). Along the same lines, Lee Robins concluded that “antisocial behavior [in childhood] predicts class status more efficiently than class status predicts antisocial behavior” (Robins 1966: 305).
- There is considerable heterogeneity in criminal offending over the life course. The stability of criminal behavior patterns throughout the life course is one of the most consistently documented patterns found in longitudinal research on crime. However, not all children and youth who are involved in crime grow up to be criminal or antisocial as adults. Somewhat paradoxically then, while studies show that antisocial behavior in children is one of the best predictors of antisocial behavior in adults, most antisocial children do not become antisocial as adults. Some have called this the Robins’ paradox (see Robins 1978). For example, in our study using the Gluecks’ prospective longitudinal data, we found that despite continuity in antisocial behavior, there was considerable change in criminal behavior across the life span. Therefore, there are continuities *and* discontinuities in criminal offending over the life course and this underscores the need to look at both stability and change in life course trajectories (see Sampson and Laub 1993, 2005; Laub and Sampson 2003).

3.2 Moving Criminal Justice Policy Forward

One of the ideas that I emphasized at NIJ was what I call “Translational Criminology.” I believe translational criminology acknowledges NIJ’s unique mission to facilitate rigorous research that

is relevant to the practice and policy. The idea of translational criminology is simple, yet powerful. If we want to prevent, reduce, and manage crime, scientific discoveries must be translated into policy and practice. Translational criminology aims to break down barriers between basic and applied research by creating a dynamic interface between research and practice. This process is a two-way street – scientists discover new tools and ideas for use in the field and evaluate their impact. In turn, practitioners offer novel observations from the field setting that stimulate basic investigation. This is the *knowledge creation process* and both researchers and practitioners play key roles here. In translational medicine, this is referred to as T1 – taking research from the “bench” (basic research) to the patient’s “bedside” (clinical/applied research) (see <http://www.michr.umich.edu/about/clinicaltranslationalresearch>).

A unique aspect of translational criminology then is the dynamic interface between research and practice and vice versa. To have this kind of exchange assumes a great deal of trust. It should be recognized that there is skepticism amongst practitioners about researchers, and researchers do not often trust the observations of practitioners as meaningful and important. Thus, translational criminology requires something that heretofore has not occurred with much regularity – the research community and the practitioner community working together as equal partners.

Another goal of translational criminology is to address the gaps between scientific discovery, program delivery, and effective crime policy. This is the *knowledge application process*. This is referred to as T2 in translational medicine – “enhancing access to and the adoption of evidence-based strategies in clinical and community practice” (http://obssr.od.nih.gov/scientific_areas/translation/index.aspx).

Translational criminology thus calls for more data on the implementation process. In particular, we need to know whether the research evidence is being implemented with *fidelity*. Over the last decade or so, we have spent a considerable effort to find out what programs work and what programs don’t work. However, this is not enough. What is needed is an understanding of how to

implement research evidence in real world practice settings and to find out *why* a program works. Unpacking the underlying mechanisms of successful policies and programs is essential in translational research.

Finally, translational criminology focuses on dissemination of existing research results as much as generating new knowledge. What is needed is more systematic study of the process of knowledge dissemination with the recognition that successful dissemination of research findings may well require multiple strategies including using new forms of social media. We spend so much time and energy on the front end of the research process, but not nearly enough time on making sure that critical research findings make their way into the field in a meaningful way. Without robust dissemination efforts, research evidence will not be used the way it was intended – to inform criminal justice policy and practice.

Recently, Sampson and colleagues (2013) articulated a strategy and a set of principles for translating causal claims into public policy. The key question they raise is “how does policy work within a larger social context?” They contend the answer to this question goes beyond estimating causal effects. According to Sampson and colleagues, there are three domains which must be part of the translational process. The first is the identification of mechanisms and causal pathways. The second is an assessment of effect heterogeneity. And the third is contextualization. The key point they make which is consistent with the main theme of this chapter is that theory is essential to understand the policy implications of any research evidence (see also Laub 2004).

So how can we move criminal justice policy forward? There are several policies that emerge from life course research on crime that can shape and inform public policies.

The first is the importance of focusing on *crime prevention*, especially early on in the life course. Our life course research clearly documented the crucial role that that families play in the causation of crime, especially relating to parent training in monitoring, recognizing, and disciplining the misbehavior of children and efforts should be devoted to strengthening families in order to prevent crime

and other problem behaviors (see also Gottfredson and Hirschi 1990). Moreover, intervention strategies should consider a broad array of antisocial, criminal, and deviant behaviors, and not just limit the prevention focus to one subgroup or crime type. Comprehensive strategies that focus on a wider range of concurrent problem behaviors are needed. As David Farrington has argued “Because of the link between crime and numerous other social problems, any measure that succeeds in reducing crime will probably have benefits that go far beyond this. Early prevention efforts that reduce crime will probably also reduce alcohol abuse, drunk driving, drug abuse, sexual promiscuity, and family violence, and probably also school failure, unemployment, marital disharmony, and divorce” (1990:110).

The second is that one needs to be cognizant of the unintended criminogenic effects of severe sanctions. In our research using the Glueck data, we examined the role of criminal behavior and reactions to it by the criminal justice system and found that delinquent behavior has a systematic attenuating effect on the social and institutional bonds linking adults to society (e.g., labor force attachment, marital cohesion). More specifically, we found that social bonds to employment were directly influenced by criminal sanctions – incarceration as a juvenile and as a young adult had a negative effect on later job stability, which in turn was negatively related to continued involvement in crime over the life course (see Laub and Sampson 1995).

The third is cumulative disadvantage over the life course is a concern. There are spillover effects from criminal activity into other life domains that may well forestall desistance from crime. The idea of cumulative disadvantage posits that delinquency incrementally mortgages the future by generating negative consequences for the life chances of stigmatized and institutionalized youth. For example, arrest and incarceration may spark failure in school, unemployment, and weak community bonds, in turn increasing adult crime. Serious delinquency in particular leads to the “knifing off” of future opportunities such that participants have fewer options for a conventional life (see Sampson and Laub 1997).

Fourth, turning points can be conceptualized and supported by criminal justice institutions.

Given stability and change in crime and deviance over the life span, policies and programs are needed that seek to develop and strengthen social ties across an array of social institutions. Moreover, this notion applies to each and every stage of an individual’s life course. Pathways and turning points serve as useful metaphors in the development of such policy. The concept of pathways suggests that some individuals are set on a stable track toward delinquency and adult crime through the combined negative influence of poor parenting, weak school attachment, and cumulative disadvantage from criminal justice and juvenile justice sanctions (Sampson and Laub 1993). This calls for policies that *prevent crime*. At the same time, the notion of turning points suggests that pathways can be deflected by positive developments that strengthen ties to key institutions in society (Laub and Sampson 1993, 2003). This calls for policies that *reduce recidivism*. The challenge is for the criminal justice system to assist in the facilitation of turning points for those involved in crime. Recall that one of our findings from the Glueck project was that severe sanctions can inhibit turning points. Moreover, men and women leaving prison today face numerous collateral consequences with respect to employment, education, housing, and civic life (see Travis et al. 2014 for a review). At the very least, we should ensure that the criminal justice system response writ large does not block potential turning points from occurring.

Fifth, a key question is how can we create a “choice architecture” to “nudge” offenders toward decisions that will improve their lives? In their book, *Nudge*, Thaler and Sunstein (2008) draw on recent research on decision-making, especially from behavioral economics, and they make a strong case that people can be nudged to make better decisions that will improve their lives. One way to do this is to organize the context in which people make decisions. I think there is an enormous opportunity to apply the “nudge” idea to change offender behavior. But equally compelling to consider is how the “nudge” idea can also be applied to change the behavior of criminal justice officials. As states look to reduce both the rate and length of incarceration, attention needs to be directed to probation and parole

supervision and services. The question is what can be done to make probation and parole practice more “desistance-focused”? Through supervision of offenders in the community, probation and parole officers can deter offenders from committing new crimes. At the same time, probation and parole officers can serve as resources for offenders regarding employment, housing, substance abuse treatment and the like. In this manner, probation and parole officers can act as monitors and mentors and provide both supervision and social support, and as a result, behavioral change away from crime may well occur.

It is important to note that because I am drawing on the extant research on crime and the life course most of the discussion and examples offered here focus on individuals. Of course, the idea of translational criminology applies to macro-level variables as well and could readily incorporate an examination of how crime rates vary across social aggregates. Moreover, one could imagine a rigorous research program with an eye toward shaping public policies at the state level by investigating differences across states in crime rates, laws regarding firearms, laws regarding the availability and cost of alcohol, and the legalization of marijuana in Colorado and Washington to highlight a few examples. In particular, we would want to learn how these state policies affect the onset of, persistence in, and desistance from crime across the life course. Similar questions can be asked regarding the level of resources devoted to family support and schooling, especially early on in the life course, at the state, county, and city levels and their effect on life course development. Finally, much of our research on the life course of crime could also be enhanced by taking a cross-national focus, which would in turn have important implications for shaping public policies about crime in the U.S.

4 The Challenge of Bringing Research to Public Policy

In 2012, the National Research Council of the National Academies issued a report, *Using Science as Evidence in Public Policy*. The report stated that “Science is not the only source of

knowledge used in policy argument – beliefs, experience, trial and error, reasoning by analogy, and personal or political values are also used in policy argument” (page 8). At NIJ, I argued forcefully for science to be at the policy and practice table. However, I soon recognized that political considerations and value preferences are also present in all policy decisions (see also Dornan, chapter “[Longitudinal Studies and Policy for Children in Low- and Middle-Income Countries](#)” this volume). What were some specific constraints I faced at NIJ?

4.1 Competing Priorities

One constraint is **competing priorities**. The President, the Vice President, the Attorney General, and the Office of Management and Budget (OMB) have their priorities and interests. At the same time, Congress, especially those on the Appropriations staff, have their priorities and interests as well. The result of all this was “crave outs” by Congress, OMB, the Justice Department and/or the White House to direct money to specific research activities. For example, in FY 2014, the House Appropriations panel directed NIJ to spend \$4 million dollars to support research on domestic radicalization – the process by individuals in the United States become violent extremists and seek to engage in terrorist acts here and abroad. Similarly, in FY 2014, the Senate Appropriations panel directed NIJ to spend \$2 million dollars on gun safety technology. These directed requests for funding occur virtually every year.

4.2 Time Pressure

Another constraint is **time pressure**. Science needs time, but policymakers cannot wait. They must act now. After the tragedy in Newtown, Connecticut, NIJ responded to multiple requests from Congress, Department of Justice, and the White House about gun violence. I was asked to review a joint proposal from the Department of Homeland Security and the Office for Community Oriented Policing Services calling for scores of

school resources officers to be placed in schools around the country. I asked if there was any empirical evidence that school resource officers reduced violence in school. I was told, “John, good question, but what we need now are answers, not questions.”

4.3 Fragility of the Evidence

The third constraint is **the fragility of the evidence**. In evaluation research in criminal justice there are few studies that use randomized controlled trials and as a result selection issues loom large. Moreover, single site studies are the norm and once positive results are found there is enormous pressure to scale-up quickly. When the results came in from a NIJ funded study of Judge Alm’s HOPE program (Hawaii Opportunity Probation with Enforcement) showing large reductions in recidivism NIJ was under pressure from Congress to implement HOPE in all 50 states! Finally, criminal justice research is plagued by weak data. Official administrative records are often not suited for research purposes and missing data are a major concern.⁵

5 Promising Strategies

One question that is often asked is “how can social scientists think more effectively about designing research so that it can have an impact.” My response would be the usual – pick a compelling topic and use the most rigorous research methods possible. That said, I do not think that will get us very far. I think we need to focus our attention on other domains, especially the

⁵One challenge facing life course researchers is convincing policymakers that longitudinal data collected over the long term are relevant to the current policy issues today. We faced this with the Glueck data which was drawn from a sample of white, ethnic delinquents who grew up during the Great Depression and came of age during an era when drugs like crack cocaine were nonexistent and guns were far less frequently used in violent crime compared to today.

demand side for research. Let me briefly touch on three possibilities here.

5.1 Research on the Use of Research

In a masterful review of policing research since 1975, Larry Sherman writes, “The examples offered . . . support a key conclusion: there has been a massive growth of policing knowledge over the levels in 1975. Equally important is a second conclusion: there has been less progress in using knowledge than in generating it” (2013: 415).

The William T. Grant Foundation has a whole portfolio of research on the use of research covering a wide range of topical areas affecting youth ages 8–25 (see <http://www.wtgrantfoundation.org/>). The goal of this research program is to build “stronger theory and empirical evidence on how, when, and under what conditions” research will be used in policy and practice. Focusing on the demand for research, some of the questions being investigated are: Who are the users of research? How is research defined, acquired, interpreted, and used? What is the social ecology of research use? I believe that there are a number of lessons from this research program that we can use to enhance our understanding the nexus between research and policy. For instance, emerging research has demonstrated the importance of social networks in acquiring research evidence (Tseng 2012a). The implication of this is that we need to better understand how it is that criminal justice practitioners and policymakers hear about life course research. More attention is also needed on uncovering the underlying conditions that facilitate the use of research evidence in policy making and the conditions that inhibit or block the use of research evidence.

5.2 Infusing Evidence into the Grant Making Process

On May 18, 2012, a memo from the Office of Management and Budget (OMB) was circulated

to all agency heads that contained the following: “Agencies should demonstrate the use of evidence throughout their Fiscal Year (FY) 2014 budget submissions.” This is an example of an *imposed use* of evidence – government budgeting will be based on whether agencies have adopted programs backed by evidence. Carol Weiss and her colleagues (2008) have called this “The Fairy Godmother” approach to research influence.

Of course, many questions remain: What is good evidence? What is a fair and accurate representation of evidence? While promising, one would not want to see this OMB requirement become yet another bureaucratic requirement without any real meaning.

5.3 Researcher-Practitioner Partnerships

I believe we can change the very nature of the research enterprise by engaging practitioners throughout the research process (see also Tseng 2012b). We need to shift attention away from pushing research out to the field and create a stronger research-practice connection from the beginning. Insights from practitioners can be invaluable in the research process.

An illustration of a successful researcher-practitioner partnership was NIJ’s 4-year project with Harvard’s Kennedy School of Government on the Executive Session on Policing and Public Safety. In my view, the Executive Sessions are an exemplar of translational criminology. Here the leading police executives and researchers came together on a regular basis to tackle the major issues facing the field. The Executive Sessions recognize in a direct way that practitioners are partners in the research enterprise. It is not about pushing research results out to the field. Rather it is focusing on practitioners and finding out what research they need to do their jobs better. There are several papers published from these Executive Sessions (jointly written by police chiefs and researchers). There is also considerable attention being paid to how best to “influ-

ence the field” through concerted efforts to transform practice and policy (see <http://www.hks.harvard.edu/programs/criminaljustice/research-publications/executive-sessions/executive-session-on-policing-and-public-safety-2008-2014>).

6 Concluding Remarks

The former administrator of the National Oceanic and Atmospheric Administration, Janet Lubchenco said, “Operating in D.C is much harder than it needs to be. It’s exhausting, it’s frustrating, and at times depressing. That said, it is possible to get things done” (Powell 2013).

As the Director of NIJ I had a once in a lifetime opportunity to shape criminal justice research and practice for years to come. I strongly believed that NIJ needed to develop a cutting edge research agenda that addressed the major topics of interest in the field. Consider the following. In the last 40 years in the field of criminal justice, two of the most important developments were the run-up in the rate of incarceration, sometimes referred to as mass incarceration, and the crime rate increases during the 1980s, followed by an equally large crime rate declines during the 1990s and continuing into the new century. Yet NIJ had no active, systematic research portfolio on either topic. In FY 2011, NIJ co-funded, with the MacArthur Foundation, the National Academy of Sciences to create a panel to study the causes and consequences of high rates of incarceration (see Travis et al. 2014). In FY 2012, NIJ funded the National Academy of Sciences to host a series of roundtables to better understanding crime trends. In addition, in FY 2011 and FY 2012, NIJ funded research in a number of new areas including: California realignment (the shifting of low-level offenders from state prisons to county jails and probation); race, crime, and victimization; victim-offender overlap; desistance from crime; police legitimacy; and criminal sanctions. NIJ also continued funding work in their signature research programs such as violence against women, teen dating violence, sexual assault, and police officer safety.

In this paper, I argue that a life-course perspective offers a unique conceptual framework for thinking about public policies regarding crime and criminal justice. Embracing what I call “translational criminology,” I drew on key findings from my long-term research project examining the life course of crime from childhood to old age to illustrate how life course research can shape policies on crime and criminal justice moving forward. Of course, this is not meant to ignore the challenges of bringing research to bear on public policy. There are real obstacles and at times these are difficult to overcome. Moreover, recently we have witnessed serious attacks on the social sciences in the federal government (see Prewitt 2013a, b). Regardless, the fact is we need more social science researchers in government. Our voices are essential and the academy needs to recognize this, nurture and encourage it, and ultimately, reward it. My main takeaway message is “Get Involved!”

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References

- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge: Harvard University Press.
- Cairns, R. B., & Cairns, B. D. (1994). *Lifelines and risks: Pathways of youth in our time*. New York: Cambridge University Press.
- Caspi, A., Elder, G. H., Jr., & Herbener, E. S. (1990). Childhood personality and the prediction of life-course patterns. In L. Robins & M. Rutter (Eds.), *Straight and devious pathways from childhood to adulthood* (pp. 13–35). Cambridge: Cambridge University Press.
- Elder, G. H., Jr. (1985). Perspectives on the life course. In G. H. Elder Jr. (Ed.), *Life course dynamics* (pp. 23–49). Ithaca: Cornell University Press.
- Elder, G. H., Jr. (1999). *Children of the great depression: Social change in life experience, 25th Anniversary*. Boulder: Westview Press.
- Elder, G. H., Jr., & Giele, J. Z. (Eds.). (2009). *The craft of life course research*. New York: The Guilford Press.
- Farrington, D. P. (1990). Implications of criminal career research for the prevention of offending. *Journal of Adolescence*, 13, 93–113.
- Glueck, S., & Glueck, E. (1950). *Unraveling juvenile delinquency*. New York: Commonwealth Fund.
- Glueck, S., & Glueck, E. (1968). *Delinquents and nondelinquents in perspective*. Cambridge: Harvard University Press.
- Goffman, A. (2014). *On the run: Fugitive life in an American city*. Chicago: University of Chicago Press.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford: Stanford University Press.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley: University of California Press.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic.
- Kirk, D. S., & Sampson, R. J. (2013). Juvenile arrest and collateral educational damage in the transition to adulthood. *Sociology of Education*, 86, 36–62.
- Laub, J. H. (2004). The life course of criminology in the United States: The American Society of Criminology 2003 presidential address. *Criminology*, 42, 1–26.
- Laub, J. H. (2006). Edwin H. Sutherland and the Michael-Adler report: Searching for the soul of criminology seventy years later. The American Society of Criminology 2006 Sutherland address. *Criminology*, 44, 235–258.
- Laub, J. H., & Sampson, R. J. (1993). Turning points in the life course: Why change matters to the study of crime. *Criminology*, 31, 301–325.
- Laub, J. H., & Sampson, R. J. (1995). The long-term effect of punitive discipline. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 247–258). Cambridge: Cambridge University Press.
- Laub, J. H., & Sampson, R. J. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Cambridge: Harvard University Press.
- Laub, J. H., & Vaillant, G. E. (2000). Delinquency and mortality: A fifty year follow-up study of 1,000 delinquent and nondelinquent boys. *American Journal of Psychiatry*, 157, 96–102.
- Moffitt, T. E. (1993). Adolescent-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701.
- National Research Council. (1977). *Understanding crime: An evaluation of the National Institute of Law Enforcement and Criminal Justice*. Washington, DC: The National Academies Press.
- National Research Council. (2010). *Strengthening the National Institute of Justice*. Washington, DC: The National Academies Press.
- National Research Council. (2012). *Using science as evidence in public policy*. Washington, DC: The National Academies Press.
- Powell, A. (2013, May 17). Speaking up for science. *Harvard Gazette*.
- Prewitt, K. (2013a, May 24). The congressional war on the social sciences. *Pacific Standard*.
- Prewitt, K. (2013b). Is any science safe? *Science*, 340, 525.

- Robins, L. N. (1966). *Deviant children grown up*. Baltimore: Williams and Wilkins.
- Robins, L. N. (1978). Sturdy childhood predictors of adult antisocial behavior: Replications from longitudinal studies. *Psychological Medicine*, 8, 611–622.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Cambridge: Harvard University Press.
- Sampson, R. J., & Laub, J. H. (1997). A life-course theory of cumulative disadvantage and the stability of delinquency. In T. P. Thornberry (Ed.), *Developmental theories of crime and delinquency: Advances in criminological theory* (Vol. 7, pp. 133–161). New Brunswick: Transaction Publishers.
- Sampson, R. J., & Laub, J. H. (2003). Life-course desistors? Trajectories of crime among delinquent boys followed to age 70. *Criminology*, 41, 301–339.
- Sampson, R. J., & Laub, J. H. (special issue editors). (2005). *Developmental criminology and its discontents: Trajectories of crime from childhood to old age*. *The Annals of the American Academy of Political and Social Science* (Vol. 602). Sage Publications, Thousand Oaks, CA.
- Sampson, R. J., Winship, C., & Knight, C. (2013). Translating causal claims: Principles and strategies for policy-relevant criminology. *Criminology & Public Policy*, 12, 587–616.
- Sherman, L. W. (2013). The rise of evidence-based policing: Targeting, testing, and tracking. In M. Tonry (Ed.), *Crime and justice in America: 1975–2025* (pp. 377–451). Chicago: University of Chicago Press.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven: Yale University Press.
- Travis, J., Western, B., & Redburn, S. (Eds.). (2014). *The growth of incarceration in the United States: Exploring causes and consequences*. Washington, DC: The National Academies Press.
- Tseng, V. (2012a). The use of research in policy and practice. *Social Policy Report*, 26, 1–16.
- Tseng, V. (2012b). *Partnerships: Shifting the dynamics between research and practice*. New York: William T. Grant Foundation.
- Wakefield, S., & Wildeman, C. (2014). *Children of the prison boom: Mass incarceration and the future of American inequality*. New York: Oxford University Press.
- Weiss, C. H., Murphy-Graham, E., Petrosino, A., & Gandhi, A. G. (2008). The fairy godmother and her warts: Making the dream of evidence-based policy come true. *American Journal of Evaluation*, 29, 29–47.
- Wilson, J. Q. (1996). *What, if anything, can the federal government do about crime?* (Perspectives on crime and justice: 1996–1997 lecture series, Vol. I). Washington, DC: NIJ Perspectives on Crime and Justice Seminars.

Epidemiological Perspectives on the Life Course

Michael E.J. Wadsworth and Diana Kuh

1 Introduction

The task of epidemiology is to understand the causes of disease and health in populations. When long-term chronic disease became the predominant health problem in urbanised countries, once infectious disease had been controlled, the need for life course epidemiology emerged. Evidence accumulated that the natural history or development of many long-term (chronic) physical illnesses was considerably longer than originally expected (Butterfield 1968), possibly beginning in early life (Reid 1969). Clinicians began to ask whether the risks of chronic illness, which tends first to become evident in mid-life, were in fact to be found in early life (Reid 1969; Morris 1967). Now, in addition to concerns about the development of illness, life course epidemiology has begun also to study the processes of ageing which are thought to begin in early life (Kuh et al. 2011).

The idea that environment and experience early in life have long-term effects discernible throughout adulthood has been well established in the sciences concerned with behaviour,

cognition and mental health (Rutter 2013). In contrast, life course epidemiology was only much more recently developed in relation to physical health, and that is the concern of this chapter. The evidence base developed first from questions posed by clinicians and social scientists about the persistence and inequitable socio-economic distribution of risk of death and illness in infancy (Titmuss 1938; Royal Commission on Population 1949; Douglas 1951; Butler and Bonham 1963; Wadsworth 2014).

Two principal types of data provide the resource for an epidemiological perspective on the life course. The first type is the long-term prospective follow-up study of the same individuals over many years of life. Some of these studies begin in early life, that is, at or before birth (e.g., Power and Elliott 2006; Wadsworth 2010; Kuh et al. 2011; Halfon et al. 2013), and others in mid-life (e.g. Reid et al. 1974; D'Agostino et al. 1989; Walker et al. 2004; Marmot and Brunner 2005). The second type of data is derived from studies which identify populations known to have experienced such early life health risk as poor nutrition before birth or poor growth, and then measure their health in adulthood in comparison with others not, or partially, exposed to the early life risk (e.g. Barker 1991; Lumey et al. 2007). Great ingenuity has been used to find in adulthood individuals who had been exposed to risk in early life, for example, to famine because of war (Stein et al. 1975; Lumey et al. 2007) or to poor

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socio-economic environments (Barker 1991). Such catch-up studies are mirrored by follow-back studies, which begin prospective follow-up in adulthood and use record sources and recollection to find out about earlier life exposure to hypothesised risk (e.g. Marmot and Brunner 2005; D'Agostino et al. 2013).

Life course data collected in prospective studies has both an inherent problem of research design and an inherent value; each of which increases as time passes. Scientific concepts and measures develop and expand, but study samples are rooted in the scientific time of their origins. Consequently, for example, an early life DNA resource or measure of respiratory function cannot be available for samples first studied many years before it was technically possible to measure those parameters in large population samples. It has therefore been necessary to begin new life course studies as science develops, in order to provide measures and sample characteristics appropriate for contemporary science (Halfon et al. 2013). Studies begun some time ago are still inherently valuable because they provide prospective data on early life and later outcomes, as well as information on the sequence of exposure to risk and protective elements. Furthermore, they can show trajectories of change with age in biological function (e.g. blood pressure, respiratory function) and body state (e.g. body shape and size).

The term life course epidemiology was first used in 1997 (Kuh and Ben-Shlomo 1997) even though research applying a life course perspective to population health developed during the 1970s. Growing empirical evidence that early life matters for adult health and disease, set within conceptual life course models and evolutionary frameworks, has strengthened the life course perspective as a general paradigm for the study of development and ageing, health and disease.

The first aim of this chapter is to trace the history of the predominant health problems in Western societies, and how that influenced the development of life course perspectives in epidemiology and public health. The development of

data resources for life course epidemiology is also outlined, including the continuation of the original and now maturing longitudinal birth cohort studies that focus on health, and the development of their modern equivalents. We show how the changing history of health concepts influenced the development and the nature of data used in life course perspectives in psychological, social and biomedical studies, and where novel and imaginative ideas from epidemiologists acted as catalysts. Within that wider context, our second aim is to show how life course epidemiology became a recognised field of epidemiological research at the beginning of the twenty-first century, developing a conceptual framework and set of life course models which are being applied now to a growing range of health outcomes, across an increasing number of cohort studies with life course data. Finally, we highlight some current and future opportunities and challenges faced by life course epidemiology and life course studies.

2 The Development of the Life Course Concept in Health

Hamlin (1992) observed that changes in the concept of disease and its causes in the nineteenth century were associated with the development of epidemiological ideas and practice. We extend that observation from the nineteenth century to the present, and identify seven eras of health in order to trace ideas that culminated in life course epidemiology. This section deals with the first four eras of the development of ideas about health and what has become a legacy of essential data resources for life course epidemiology in each historical period. These eras are summarized in Table 1.

During the *first health era* (1800–1840) the prevalent problem was infectious disease. Concepts of cause ranged widely, but with little understanding, although individual resilience and vulnerability were thought to be implicated. Jenner's experiments with vaccination, which began in 1796, marked the beginning of

Table 1 Summary of development of resources for life course epidemiology 1800–2014

Health era and period	Predominant health problem	Development of resources for life course epidemiology	Concepts of disease and prevention
Era 1 1800–1840	Infectious disease	New ideas about the individual constitution and personal vulnerability and resilience	Perception of environmental causes
Era 2 1840–1900	Infectious disease	National records of vital statistics begin (birth, death, the census)	Identification of microbiological causes and transmission
		Mandated notification of some infections	Preventive measures through environmental change (e.g. sewers) and behavioural advice
Era 3 1900–1940	Infectious disease begins to give way to chronic disease	New small longitudinal studies of child growth and development. Large cross-section studies of nutrition and mental health	New understanding of attainment of immunity in populations as well as individuals Recognition that environmental and genetic effects implicated in some infectious disease
		Setting up of community studies of health and morbidity (population laboratories)	Effects recognised of poverty on child health, growth and nutrition
		Health insurance studies	Overwhelming need for environmental improvements
Era 4 1940–1970	Infectious disease increasingly gives way to chronic disease	New prospective studies begun in early life to study child and adolescent health, illness, growth, cognition and behaviour	Increasing emphasis on chronic disease, and screening for proximal risk factors and lifestyle in adulthood, and education programmes for prevention
		New prospective studies of specific disease begun in midlife	
		New measures of health function and state show the population distribution (e.g. of blood pressure), and permit studies of pre-symptomatic illness	
Era 5 1970–1990	Chronic disease, disability and ageing	New prospective studies begun in early life	Socioeconomic, psychosocial and developmental models of chronic disease causation challenge the dominant adult lifestyle model Signs that infections are still important causes of diseases, even in developed countries (the AIDS epidemic is identified first in 1981)
		Catch-up of samples studied in era 3	
		New catch-up studies with samples based on birth records from 1920s	
		Studies in pregnancy and before are established to explore Barker's hypothesis	
		Birth cohort studies begun in era 4 prepare to study ageing	
		New and continuing midlife prospective studies continue into later life, and new later life studies begun	
Census linked longitudinal study begins in Britain			

(continued)

Table 1 (continued)

Health era and period	Predominant health problem	Development of resources for life course epidemiology	Concepts of disease and prevention
Era 6 1990–2000	Chronic disease, disability, ageing, AIDS and childhood allergies	Early life study samples from era 4 approach and enter later life, becoming unique life course data resources for lifetime studies of ageing	Chronic diseases of affluence, AIDS, childhood allergies all seen as current problems, and ageing as an imminent problem
		More prospective studies of ageing established from midlife	
		First synthesis of life course ideas in relation to chronic disease	
Era 7 2000–the present	Chronic disease, disability and ageing, AIDS and childhood allergies	Simplification of methods of collecting biological samples and making DNA resources	Health risks now thought to include super-hygienic environment in early life
		Life course epidemiology becomes an established discipline	Healthy ageing is increasingly seen as an essential goal and its definition hotly debated
		Emerging ‘omics’ fields of large-scale data-rich biology needs life course studies and methods	The concept of health broadening to include the ability to adapt physiologically, psychologically and socially
		Life course resources used to study epigenetic effects, and reversibility of environmental effects	
		Existing birth cohort studies show how adult experience modifies the relationship of early life growth with adverse risk in adulthood	
		New, increasingly larger sample prospective studies begin in early life, and new studies of ageing start from midlife	
		New biobank studies of very large adult samples begin, based mostly on individual health records and biological samples	
		The international rich resource of life course data is widely available for testing life course hypotheses	

prevention of infectious and viral disease, but it was not until the twentieth century that the major infectious diseases were brought under control. Concerns (e.g. of Malthus) about population size, fertility and replacement, and their implications

for future national defense, the work force and the economy, prompted thinking about age cohort differences in health (Glass 1973) but did not translate effectively into health policy or research ideas.

In the *second health era* (1840–1910) scientific discoveries of causes and means of transmission of infectious disease showed the role of the environment. That translated in health policy terms to environmental intervention (e.g. installation of sewers and drains), legislation about health care (e.g. work environment, food quality), and advice about personal hygiene and child care. In Britain the surveys of Booth (1891) and Rowntree (1901) brought awareness of the extent of poverty and its association with adverse health. The poor health, in particular the short stature and poor physique of recruits for the war in South Africa (Great Britain Parliamentary Papers 1904), showed the need for improvements in child health and nutrition in order to have successive generations fit enough for military purposes and the predominantly manual occupations in industry and agriculture. Consequently, systematic national recording was established in most Western urbanised countries to monitor population trends through a regular census, to provide mandatory registration of births and deaths, and mandatory notification of specific diseases known to be infectious. These data sources provided essential data for the study of epidemics, and revealed falling trends in fertility and in mortality rates of children and young adults.

During the *third health era* (1910–1940) there was increasing concern with the impact of poverty on health, prompted in Europe and the US by the economic depressions and mass unemployment during this period. For Britain, the war in South Africa and contemporary social and economic conditions at home stimulated the political will to begin a national insurance programme to reduce the effects of poverty particularly on health, the inauguration of school medical examinations (1918), and a government department responsible for health (1919). In the US, research was developed to examine the impact of the economic depression on children's health, growth and development in the Fels study (Roche 1992), the Berkeley Growth study (Jones and Bayley 1941), and the Oakland Growth study (Jones 1939). In Britain a family dietary study (Boyd 1937) and the Scottish study of children's

mental development (Scottish Council for Research in Education 1993) were established for similar reasons.

The two world wars accelerated the development of curative and preventive health care, from surgery to nutrition, and reliably effective preventive and curative medication against infectious disease began to become available. Improvements in environmental health continued, including new emphases on occupational health, such as the limitation of effects of working in dusty atmospheres, for example, in mining (Morris 1967). Epidemiologists showed how population immunity from infectious diseases was to be achieved through immunisation (Stocks 1975). In a study of the aetiology of juvenile rheumatism, undertaken during this era, Morris and Titmuss (1942) noted the long history of risk development and the range of presumptive causes, concluding that this condition was 'so sensitive to social inequality that emphasis on hereditary influences is premature.' Kermack et al. (1934) found cohort differences in patterns of mortality in the UK and Sweden that indicated the importance of childhood conditions for adult health (Kuh and Davey Smith 1993). In his study of socio-economic and regional differences in mortality, Titmuss (1938) commented that districts that had high rates of infant mortality and infant serious illness would give rise to 'many premature deaths in later life' (p. 85), recognising that such change was going to have age cohort specific effects. This strikingly anticipated early life course epidemiological work on this topic published 53 years later (Barker 1991).

The resources of national data established in the previous era were continued, and augmented by community studies of population health (e.g. Collins 1949), by data from clinical follow-up of patients (e.g. White 1931) and by insurance companies' collection of records about age at and cause of death in the insured (e.g., Metropolitan Life Insurance Co 1946). Analyses of insurance data showed that important changes were taking place in Western urbanised countries. As fertility continued to fall, and average age at death continued to rise in those countries, the predominant pattern of ill health changed. Those who now

escaped premature death from infectious causes lived on into midlife, the time when symptoms begin of serious, long-term diseases such as heart disease, stroke, cancer and bronchitis. These changes became known in population health as the epidemiological transition. Its cause is much debated, and current thinking considers whether it may have been principally brought about by improvements in environmental health, or nutrition, or health care (Caldwell 2001).

During the *fourth health era* (1940–1970) in countries that had completed the epidemiological transition, there was less concern with poverty as a potential source of disease risk, and greater emphasis on developing hypotheses about the natural history of chronic disease. New biological measures were developed of the current state of health that could also indicate risk in the longer term (e.g. measures of sugar in urine and later also in blood). Portable and reliable equipment for measuring physiological function (e.g. blood pressure, lung function) was designed for use in prospective studies of large populations in non-clinical settings. Those measures were the basis, when repeated over time, for tracing the trajectory of change in the individual's risk of chronic diseases before symptoms or the full extent of the disease appeared. That prompted new thinking about the natural history of disease, which asked, for example, where in the population distribution of measurements, such as of blood pressure, risk could reliably be said to begin. With the new knowledge derived from such work, public health policy set up screening programmes for the pre-symptomatic identification of disease (e.g. mass miniature x-ray screening for pulmonary tuberculosis, and blood pressure screening to detect risk of cardiovascular disease), and programmes to promote personal responsibility for reducing the risk of illness through smoking cessation, exercise and dietary improvement.

At the beginning of this period, concerns in Britain among demographers, public health physicians and pediatricians about falling fertility and persistently high infant mortality stimulated the inauguration of a first national study of births in 1946 (Wadsworth 2010). Within 2 years that became a longitudinal study of child and later

adolescent health known as the National Survey of Health and Development (Wadsworth 2014); it later continued as a study of adult health and ageing (Kuh et al. 2011). That study was replicated in 1958 and 1970 by two new national studies of mortality in the first 7 days of life, intended to compare early life health and survival since the beginning of the National Health Service (in 1948) with data collected in the 1946 study. These two studies were begun by clinicians and continued as longitudinal studies by epidemiologists, developmental psychologists and social scientists: the National Child Development Study and the 1970 Birth Cohort Study (Power and Elliott 2006; Elliott and Shepherd 2006). A comparable long-term prospective study was begun in Finland in 1966 (Rantakallio 1988). Initially these studies showed how poverty was a marked disadvantage for many aspects of birth and for growth in early life. Explanations for these findings were sought not only within the study samples but also by thinking on a longer time-scale. Illsley and Kincaid (1963) speculated that risks to the baby associated with short maternal stature may have originated in poor diets of mothers who in their study were born during the interwar economic depression.

The challenge of increasing prevalence of chronic physical disease in adulthood in the mid-twentieth century stimulated new kinds of prospective studies of health that began in mid-life, when the first signs of many such illnesses appear. These midlife studies were particularly concerned with proximal and behavioural risk factors, and some also focused on the effect of social and work environment. They used the new technology of measurement developed for screening purposes. One of the earliest and most well-known of the midlife prospective studies is the US Framingham study, begun in 1948, a prospective study of cardiovascular health, disease and disease risk (D'Agostino et al. 1989). The Whitehall I prospective study of cardiovascular health began in 1967 (Reid et al. 1974). These studies used their longitudinal data to examine the dynamics of risk, including interactions of risk factors and accumulation of environmental risk exposures (for example from stress, nutrition,

smoking and diet) over many years of adult life. While most midlife cohort studies focused on specific chronic diseases, the first ageing cohorts were established (for example, the Baltimore Study of Aging began in 1958) (Ferrucci 2008).

Recognition that risk or the actual beginnings of chronic illness shown in midlife cohort studies might in fact originate in early life began in this era. In chronic bronchitis epidemiology it was suggested that since adult environmental risk did not entirely explain the incidence, some part might be explained by vulnerability established as a result of developmental damage caused by childhood or adolescent respiratory disease (Reid 1969). There were other signs that research of this kind would be of value. Dubos et al. (1966) had already reported (a) that in animals maternal nutritional state during lactation affected both the rate of infant development and the final adult stature; and (b) that in humans infectious disease retarded growth, and nutrition in early life determined the extent of damage caused by infection. They concluded that ‘many problems of adulthood and old age will be found to be the distant manifestations of environmental factors that were influential during the formative years’ (Dubos et al. 1966: 799).

3 How Life Course Epidemiology Came of Age

At the beginning of the fifth health era (1970–1990; see Table 1) life course research proved difficult to fund in the US and Britain. Despite the promising research in the 3rd and 4th eras suggesting that the origins of adult health might lie in early life, the value of longitudinal studies was subject to much criticism (Wall and Williams 1970). Nevertheless, unconnected research scattered across the scientific literature on the role of early life in later health gradually built up during this period, and would later be integrated through developmental and life course perspectives on health and disease.

For example, Colley and colleagues (1973), building on Reid’s suggestion that adult onset of chronic bronchitis might be associated with

vulnerability established in childhood, found that respiratory disease among young adults in the first British birth cohort study was associated with lower respiratory tract illness before age 2 years, and with indicators of poor socio-economic conditions at that stage. In cardiovascular disease, Miall and Chinn (1974) showed that blood pressure levels and their change in young adulthood had predictive value for future illness, and should be treated. Where this kind of research could not find a source of data collected sequentially over the course of a sample’s lifetime, ingenious methods were devised to approximate that ideal. Forsdahl (1977) proposed that growing up in poor socio-economic circumstances and then living an affluent adult life style increased risk of premature death from cardiovascular disease. He confirmed that hypothesis using Norwegian national statistics to show that districts with high rates of infant mortality had high rates of premature adult death from arteriosclerotic heart disease in the same age cohort. He concluded that ‘the weaker of the cohort die in infancy, [and] the more fit survive and carry with them a life-long vulnerability because of the poor living conditions in early years.’

Perhaps these indications of the importance of health in early life helped with the establishment in 1972 of the US Bogalusa study of cardiovascular risk in early life (Berenson 2001); it is certain that findings from the Framingham study were influential. In addition, catch-up of participants in the US Hagerstown morbidity survey in the 1930s showed that those who had been relatively underweight as children, and then overweight in adult life, were most at risk of ‘hypertensive vascular disease’ (Abraham et al. 1971).

Concerns about possible early life origins of adult ill health certainly encouraged continuation (in 1979) of the 1946 British birth cohort, and its refocussing to include measures of functional change (e.g. blood pressure, respiratory function at the 36 year follow-up in 1982, and additionally cognitive function at the 43 year follow-up in 1989), in order to study influences on health change with age (Wadsworth 2014). By the end of this era, this study was contributing to the stronger evidence for the relevance of early life

for adult health by showing the association of blood pressure at age 36 years with weight at birth (Wadsworth et al. 1985). The first of Barker's ecological studies (Barker and Osmond 1986) replicated Forsdahl's (1977) finding that risk of premature death from cardiovascular disease was highest in areas of highest infant mortality. In a catch-up study from birth records Barker then identified the association of low birth weight with premature adult death from cardiovascular disease (Barker et al. 1989).

Because of this kind of work on physical health, and the contemporary life course work in mental health (e.g. by Robins and Rutter 1990; and Stein and Susser, see Stein et al. 1975) and the social sciences (e.g. by Elder 1974), a life course approach to studying the processes of ageing, before later life began, was considered likely to be fruitful (Riley 1987).

During the sixth health era (1990–2000; see Table 1) life course epidemiology became established. The immediate catalyst for this was Barker's hypothesis that low birth weight indicated poor nutrition of the unborn child during the unique time of development for some vital organs (e.g. brain, kidneys) and systems (e.g. cardiovascular, respiratory); he consolidated these ideas about the fetal origins of adult disease in the biological programming hypothesis (Barker 1995).

A group of mainly UK epidemiologists actively involved in the maturing British birth cohort studies gave wider consideration to these ideas about the implications of early life risk for adult chronic disease (Kuh and Ben-Shlomo 1997), and proposed the term 'life course epidemiology' as 'the study of the biological, behavioural, and psychosocial pathways that link physical and social exposures during gestation, childhood, adolescence and adult life to chronic disease risk.' Their first objective was to critically review all the available evidence for pre-adult risk factors on cardiovascular, respiratory and metabolic disease, seeking replications in other datasets, and considering risk factors in later childhood and adolescence as well as fetal life. Their reviews showed that the relationships

between birth weight and chronic disease were not usually confounded by lifetime socioeconomic circumstances; that metabolic diseases, such as diabetes, were commonly associated with either low or both high and low weight at birth, as were interactions with later risk factors, particularly adult body mass index; and that adult classical risk factors did not appear to explain the relationships. A second objective was the synthesis of three apparently competing models of the causes of adult chronic diseases, which were not mutually exclusive. Life course epidemiology encouraged the adult lifestyle model to consider the childhood origins of adult lifestyle; the social causation model to consider the long-term impact of the early socioeconomic environment; and the fetal origins model to consider other potential sensitive phases in the postnatal period that could leave long-term imprints on the body that might increase susceptibility to subsequent chronic diseases. Whether the impact of the physical and social environment on risks to later health primarily occurred during critical periods in early life when growth and development were rapid, or whether the risks from environmental impacts accumulated throughout life, was increasingly debated in the UK and in North America (Keating and Hertzman 1999).

The development of life course epidemiology highlighted the scientific contributions from the maturing British birth cohort studies and mobilised future life course research using these and other existing studies and the plethora of new cohort studies that were established from the 1990s. These studies began to collect biological samples for DNA extraction and for an increasingly wide range of disease biomarkers. One of the initial purposes was to investigate whether the epidemiological associations between early growth and later life physical health reflected genetic rather than environmental risk (Hattersley and Tooke 1999). New cohort studies were established to collect greater detail about physical development in early life. In 1991 the British Avon Longitudinal Study of Pregnancy and Childhood began in pregnancy in order to measure such prenatal effects as maternal smoking,

exercise and nutrition (Golding et al. 2001). The Southampton Women's Survey began in 1998, before first pregnancy, so that the effect of pre-pregnancy health on fetal development and outcome could be studied (Inskip et al. 2006). At the same time the already long-running cohort studies increased their range of health outcome measures. The British 1946 birth cohort study expanded its midlife measures to include muscle strength, physical performance and women's health during the menopause years, in order to continue research into the processes of ageing and the modification of early life effects by adult influences (Wadsworth et al. 2006). The first biomedical follow-up of the 1958 British birth cohort study measured aspects of cardiovascular and respiratory risk. The prospective longitudinal studies begun in midlife to investigate disease risk, such as the Framingham and Whitehall II studies of cardiovascular disease, continued into the later life of their subjects. In the US, more of the cohort studies developed a focus on ageing, encouraged by the establishment of the National Institute on Aging in 1974, whereas in the UK the first wave of the English Longitudinal Study of Ageing did not take place until 1998 (Stephoe et al. 2013). Social science longitudinal studies primarily concerned with socio-economic disparities in education, occupation and opportunity began also to include measurements of health, in order to study inequity in health and the impact of social diversity on health (www.iser.essex.ac.uk/bhps).

During the 7th health era (2000–2014; see Table 1) life course epidemiology became established as a research field (Ben-Shlomo and Kuh 2002; Kuh et al. 2003; Kuh and Ben-Shlomo 2004), and is now recognised as part of mainstream epidemiology (Ben-Shlomo et al. 2014) and public health (Kuh et al. 2014a).

Multidisciplinary interest in the fetal origins of adult disease had, by 2003, broadened into a field of study with a learned society called the Developmental Origins of Health and Disease (www.mrc-leu.soton.ac.uk/dohad/). It was concerned with the long-term effects of postnatal as well as prenatal development, with a growing

focus on middle and lower income countries (e.g. Raghupathy et al. 2010). Findings on the developmental origins of adult disease increasingly are seen within an evolutionary perspective offering a broad unifying and interpretative framework (Gluckman and Hanson 2004; Gluckman et al. 2009). It is argued, for example, that the processes of adaptation to the environment in early life may help to ensure later reproductive success, and have consequences for later life health. Developmental biologists are enhancing understanding of these processes and their long-term effects (Kuh and Ben Shlomo 2014). This evolutionary perspective on development is mirrored by evolutionary arguments which explain ageing as decline in the force of natural selection which, in the post-reproductive phase of life, gradually reduces the ability to repair the accumulating molecular and cellular damage (Kirkwood and Austad 2000; Austad 2008). This perspective provides the wider context for an integrated life course perspective on ageing (see Sect. 4.1 below). These developments in epidemiology and biology, coupled with growing life course concerns in psychology, sociology, and demography, show how the life course perspective is becoming a common conceptual framework for interdisciplinary research on development, health and ageing (Alwin 2012; Settersten Jr 2009).

At the beginning of this seventh era, life course epidemiology continued to evaluate the hypothesis about developmental origins of adult disease, and now includes findings of systematic reviews and meta-analyses, for example on birth size and adult disease risk (e.g. Huxley et al. 2007; Whincup et al. 2008; Kuh and Ben-Shlomo 2014). Life course epidemiology also gave more attention to whether early life influences explained time trends (Kuh et al. 2002; dos Santos Silva 2004), and socio-economic inequalities in disease (Davey Smith and Lynch 2004; Leon and Walt 2000). It linked with other disciplines, and widened its gaze beyond cardio-metabolic and respiratory disease to a range of health outcomes and pathways to them, such as obesity, cancers, neuropsychiatric outcomes, reproductive health and menopause, musculo-

skeletal ageing, depression and body image, infectious diseases, endocrine function, lifetime social relationships, and health behaviours. Life course models were proposed that reflected the underlying pathways between early life factors and adult function and disease (Ben-Shlomo and Kuh 2002; Kuh et al. 2003); and innovative ways of testing these models were presented (Mishra et al. 2009).

Two groups of models of the development of risks to future health can be distinguished, namely the critical or sensitive period models, and the risk accumulation models. The first group of models propose that an exposure acting during a period of rapid development has effects on the structure or function of organs, tissues or body systems which are unique (critical) or stronger (sensitive) than effects outside that time window; factors acting later in life may or may not modify these effects. By contrast, the accumulation of risk models propose that the effects of exposures gradually accumulate throughout life, which cause increasing damage to body systems. Figure 1 summarises four ways in which risks may accumulate across life. In model (a) the three effects act independently. In model (b) a fourth effect (such as social class) influences each of the other three independent effects. In model (c) the three effects not only act independently but also influence each other; and in the fourth model (d) the three effects act only through their influence on one another.

During this seventh health era life course epidemiologists increasingly focused on measures of biological functional outcomes and how these changed across life (Hardy et al. 2000; Wills et al. 2011; Lawlor and Hardy 2014) (Johnson et al. 2015), how they related to growth and developmental trajectories (Wills et al. 2012), and the consequent implications for later disease risk (Ghosh et al. 2014). An adapted version of Strachan's original diagram for lung function trajectories across life (Strachan 1997) has become the key, simple figure to show how function changes across life and to illustrate the main

scientific questions addressed by life course epidemiology (Fig. 2).

The trajectories shown in Fig. 2 reflect many aspects of biological function (e.g. lung function, muscle function, cognitive function) which display rapid growth and development in the early stages of life until maturity when a peak or plateau is reached, sometimes described as functional reserve capacity. This is followed by a gradual decline in function with age. In Fig. 2, trajectory A illustrates normal development and decline; trajectory B illustrates the influence of exposures or genetic factors that result in sub-optimal development resulting in a reduced functional reserve at maturity; trajectory C illustrates the influence of exposures or genetic factors acting post maturity that result in accelerated age-related decline; and trajectory D is a combination of trajectories B and C. Early life factors can potentially affect the peak or structural reserve and/or the rate of decline but factors acting in adult life can only affect the rate of decline. There is growing knowledge about the early life factors that are associated with level of function at the peak, or at various ages in later life. But as yet little is known about the early life determinants that drive functional change. The fundamental tasks of life course epidemiology are therefore (1) to understand the natural history of physiological trajectories, such as lung, muscle and cognitive function, to identify periods of life when important functional change occurs, and to study how such change influences subsequent disease risk; (2) to investigate the early life factors and developmental trajectories associated with peak adult function and reserve, and whether these factors also influence the rate of functional decline; and (3) to show how these earlier life factors independently, additively, or interactively operate with adult risk factors that influence the rate of functional decline. The life course approach uniquely identifies risky trajectories and subgroups before disease or disability is manifest, opening up opportunities for preventive health intervention.

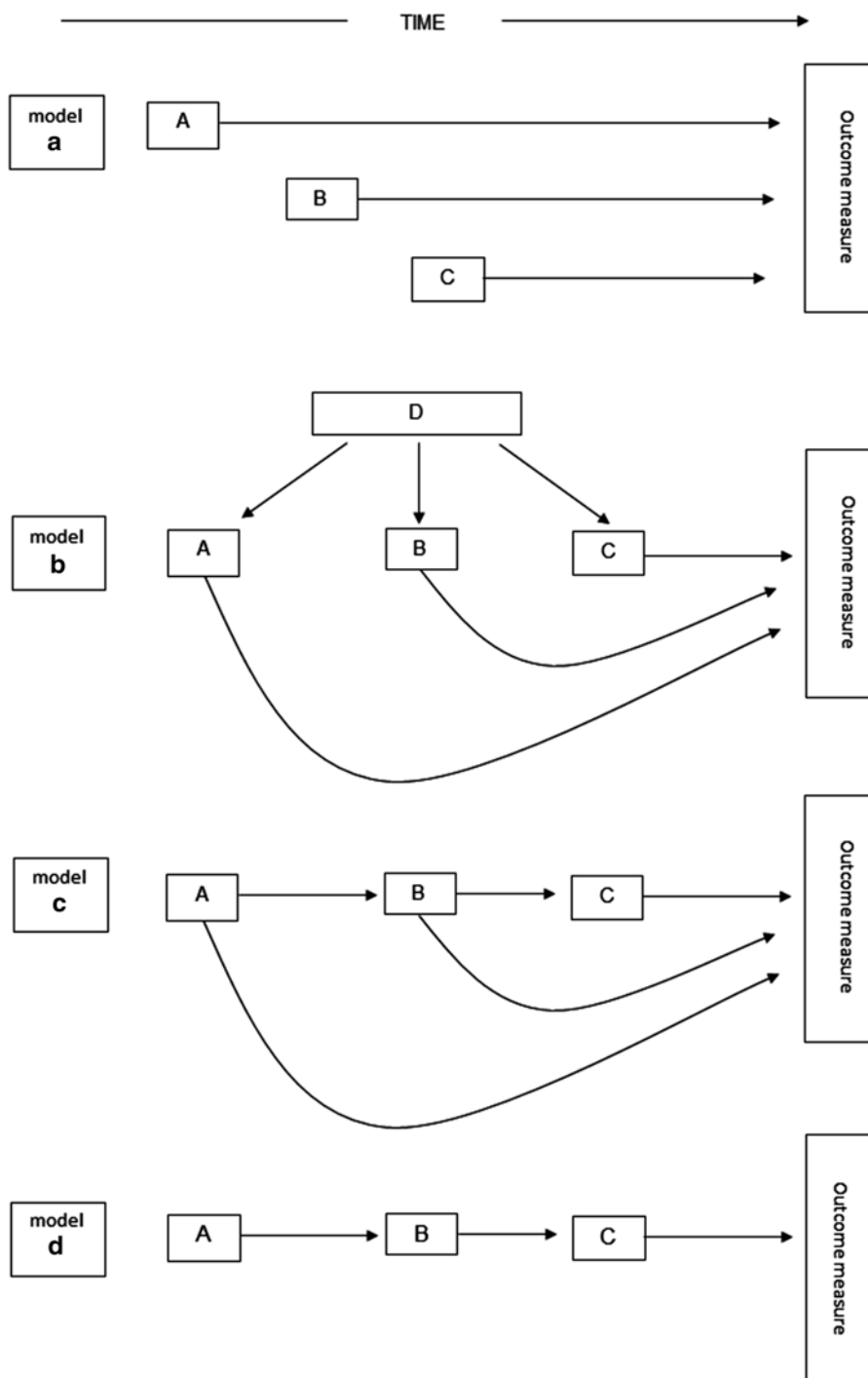


Fig. 1 Life course risk accumulation models (Reproduced from Kuh et al. 2003)

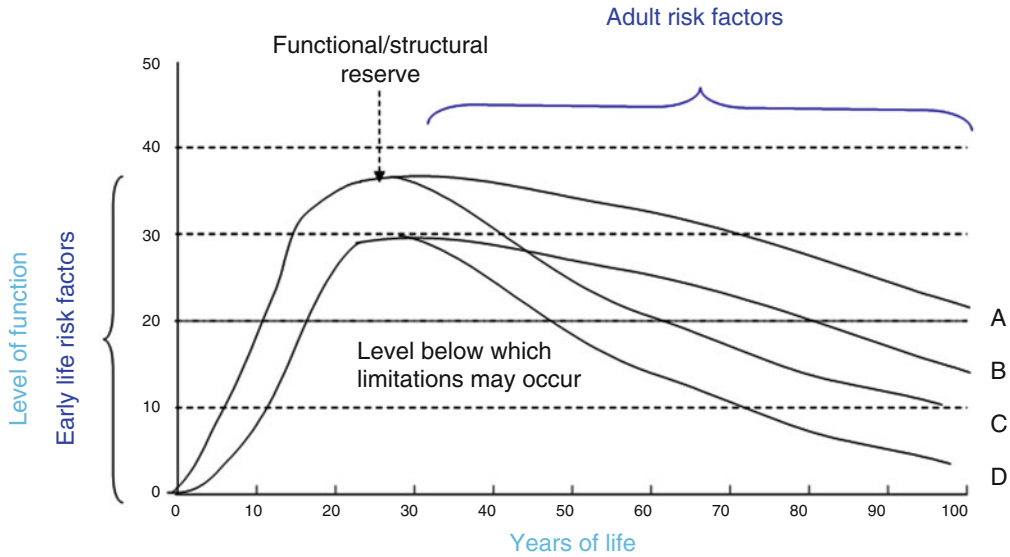


Fig. 2 Life course functional trajectories (Adapted from Kuh and Ben-Shlomo 1997)

4 Three Central Aspects of Current Life Course Epidemiology

The focus of life course epidemiology is currently, as it always has been, driven by the requirements of the medical sciences, policy thinkers, and the social sciences. For the medical sciences the strongest demand is associated with the development of new knowledge in relation to genetics and the processes of ageing. Policy thinkers are concerned with health management in an ageing population and how most effectively to use new medical knowledge in population health care. Social scientists are concerned with social and economic implications of an ageing population and gaining greater understanding about the sources and impact of psychological stress, and with the variation of these in different age cohorts and cohorts in different cultures. Three particularly important topics of current concern to life course epidemiology are (1) the processes of ageing; (2) the impact on physical health of chronic exposure to psychological stress; and (3) how best to manage new requirements for ‘big data’ for genetic studies.

4.1 A Life Course Epidemiological Perspective on Ageing

Over the last decade, life course epidemiology has increasingly been applied to the study of ageing. This was a natural extension of the longitudinal study of change in functional outcomes with age throughout life, since an accepted definition of biological ageing is the progressive deterioration of functional capacity. The focus has been on integrating scientific concepts from life course epidemiology with those from ageing research, conceptually and methodologically, and making best use of the empirical evidence from longitudinal studies, particularly the maturing birth cohort studies (Kuh et al. 2014). Comparative research using data from existing cohort studies is beginning to capitalize on their differences in measurement of early life exposures that impact development (e.g. in nutrition, exposure to and immunisation against infection, parental smoking and education) in order to study cohort differences in growth, adult health and functional change (e.g. Li et al. 2008). The increasing number of repeat functional measures in maturing birth cohort studies and in adult cohort studies makes it possible to study within person change, and stimulates further development of methodol-

ogy for analysing such change. Policy concerns about social and economic costs of population ageing, together with a growing policy awareness of the practical value of the life course perspective, have led to increased research funding for an interdisciplinary, life course approach to healthy ageing that facilitates cross-cohort comparative research. The Healthy Ageing across the Life Course (HALCyon) research programme was one of the first to study lifetime influences on ageing. It uses nine UK cohort studies, systematic reviews, cross cohort studies and in depth analysis of cohorts with unique features (see references on www.halcyon.ac.uk). Kuh and colleagues summarised findings and the wider epidemiological literature within an integrated life course conceptual framework for ageing research (Kuh and Ben Shlomo 2014; Kuh et al. 2014). Another network of ageing studies, known as the Integrative Analysis of Longitudinal Studies (www.ialsa.org), brings together data resources from more than 90 longitudinal studies, including the HALCyon cohorts. It aims to enhance the study of change with age in health and illness, the early detection of neurodegenerative disorders, and the identification of periods in life when intervention is likely to have the greatest benefit for health.

4.2 The Life Course Epidemiological Perspective on Stress

There has been continuing concern with the effects of stress on health and disease risk. Cohort studies of health and the social environment, such as the Whitehall II study, have for a long time been concerned with the health impact of chronic exposure to stress, including stress through occupation, home life, and poverty (Marmot and Brunner 2005), that may be manifest, e.g., as anger and powerlessness (Williams 2002). The initial focus was on adult stress; psychosocial and biological pathways were identified that could account for how environmental and behavioural effects gradually became manifest as physical illness. Brunner and Marmot (2006) concluded that ‘disturbance of the usual homeostatic equilibrium by the repeated activation of the fight-or-

flight response may be responsible for social differences in neuroendocrine, physiological, and metabolic variables which are the precursors of ill health and disease’ (p. 27).

Increasingly the need for a life course perspective in this area has been recognised, and factors from early life that may influence the physiological systems concerned are investigated (Ben-Shlom et al. 2014). These factors may include, for example, maternal anxiety and depression during pregnancy, prenatal substance exposure (alcohol, tobacco, cocaine), anger expressed in the family, infection load and poor early growth, although the evidence is not always consistent. Such risk factors often cluster and are imprecisely measured in the midlife cohort studies, making it difficult to identify which aspects of the early environment or the early stress response have particularly adverse long-term effects. Equally challenging is the task of disentangling whether early life effects operate through continuity in the social environment, or behavioural pathways, or through processes of biological embedding (i.e. how they ‘get under the skin’). What has become known as ‘the developmental biology of social adversity’ (Hertzman and Boyce 2010; Rutter 2012) combines insights from disciplines such as neuroscience, genetics and epigenetics, together with data from birth cohort and life course studies, in order to unravel the biological pathways that link early experience to later health and health inequalities (Cohen et al. 2010; Shonkoff 2012). Effects are seen across the social gradient, not just among the most disadvantaged children; socio-economic gradients in physical, socio-emotional and language/cognitive development in early life differentiate ‘access to environments that provide adequate attachment, support, nurturance and stimulation’ (p. 115) (Hertzman 2007).

4.3 The Life Course Epidemiological Perspective and ‘Big Data’

Combining data from multiple cohorts has been a key feature of the past decade in life course research on development, ageing and disease

development. No one cohort has repeat measures across the whole of life, so combining cohorts allows lifetime functional and behavioural trajectories to be described, replication of findings to be tested, and more robust evidence to be provided for policy purposes. For example, cohort data has been combined to investigate lifetime trajectories of blood pressure (Wills et al. 2011), body size (Johnson et al. 2015) and alcohol consumption (Britton et al. 2015). This type of research is building up a growing body of experience on harmonisation of existing cohort data, and the development of standardised protocols for new data collections; nevertheless, each longitudinal study has to have a scientific niche, as well as a core of common variables, to compete successfully for renewed funding.

Combining cohorts and establishing new mega cohorts and biobanks is a feature of epidemiology more generally, driven by the dynamic and symbiotic relationship between rapid biological and technological advances and greater scientific questioning and understanding of the complex nature of human health and disease development across the life course. The very existence of rich data archives going back many years in an increasing number of cohorts promotes a life course perspective. For example, the UK Dementia Platform, launched in 2014, brings together cohort studies (initially 22 population or familial disease cohorts) and an informatics platform to co-ordinate and integrate dementia research. Its aim is find how to detect disease early, improve treatment of symptoms, and delay the onset and progression of dementias (<http://www.mrc.ac.uk/research/facilities/dementias-research-platform-uk/>). Some of the cohorts involved have long-term follow up over many years, including the British 1946 cohort from birth, that will bring a life course perspective to dementia research.

The rapid development of genetic epidemiology, from the early candidate gene approach through to genome-wide association studies, required large samples to discover small genetic effects, to investigate rare as well as common diseases, and to explore gene-environment interactions. Cohort investigators formed consortia to

respond to this need; for example, the 1958 British birth cohort study acted as the normative comparison sample, or control arm, of the Wellcome Trust Case Control Consortium to study seven common diseases (Wellcome Trust Case Control Consortium 2007). From a life course epidemiological perspective, the most interesting genetic studies are those that show: how genetic associations with body composition or other health-related characteristics vary across life (Ong et al. 2011); how genetic factors act on the tempo of growth in childhood and are associated with susceptibility to obesity in adulthood (Elks et al. 2012); and how genetic studies can contribute to understanding the environmental determinants of disease through the use of Mendelian randomisation (Davey Smith and Ebrahim 2003).

New cohort studies established in this era generally have been much larger than previous cohort studies, mainly in order to address genetic questions. Adult cohorts, such as UK Biobank, recruited 0.5 million participants or more (Tyrrell et al. 2013). The new prospective birth cohort studies include the Danish National Birth Cohort (Olsen et al. 2001), which has a sample size of over 80,000 children and data from before birth (Olsen et al. 2001), and the Norwegian Mother and Child Study, which is similar in design and size (Magnus et al. 2006). The UK Life Study (www.lifestudy.ac.uk) is just beginning to collect data on 80,000 pregnancies and newborn children. The US National Children's Study aimed to have a sample of 100,000 recruited before birth (Landrigan et al. 2006), but funding was stopped at the end of 2014 after the pilot phase.

Allied to genomics, the emerging field of systems biology also requires large scale detailed data in order to study the properties of cells, organisms and tissues, and how they interact. Systems biology, including such fields as lipidomics (cellular level study of lipids), and proteomics (cellular level study of proteins), is concerned with the relationship between the genome of an organism and its characteristics (phenotype). These fields of study will increase opportunities to study biomarkers and processes of development, as well as ageing and disease at

the molecular and cellular levels. Particularly notable is epigenomics, concerned with the complete set of epigenetic modifications on the epigenome (the genetic material of a cell) and how these may be affected by environmental influences (Relton and Davey Smith 2012). Prospective cohort studies are of great value for systems biology which aims to gain insight into biological mechanisms, test their predictive ability for disease risk and/or functional change, and provide suitable targets for drug interventions. Pregnancy and birth cohort studies are of particular value because they allow epigenetic changes in prenatal and early postnatal life to be studied, when the epigenome may be particularly susceptible to influence (Ng et al. 2012). These epigenetic changes are thought to be potentially key explanations for the developmental origins of adult chronic diseases (Waterland and Michels 2007; Haggarty and Ferguson-Smith 2014); and a growing number of studies are investigating this possibility (Heijmans et al. 2008; Relton et al. 2012; Godfrey et al. 2011). Epigenetic epidemiology (the study of influences, such as smoking, on gene regulation of health, developmental and ageing trajectories), and molecular epidemiology (the study of such influence as it happens at the molecular level), also benefit from the methodological tools and conceptual models that have been developed in life course epidemiology. These relatively new fields of study are well poised to investigate development and ageing trajectories and to identify the most relevant life course models, while taking into account the lifetime biological, behavioural and social risk factors that may confound, mediate or moderate these trajectories (Ng et al. 2012). It is still too early, and we do not yet have the necessary expertise, to properly evaluate the additional value of these ‘omics’ collaborations in terms of insight into the biological understanding or prognostic value of functional change and disease development, and the extent to which they will reveal changes at the molecular and cellular levels that mediate or modify the effects of earlier environmental risk.

In addition to the ‘omics’ technologies, there are a growing number of portable, cost effective

and minimally invasive devices which can be used in large population samples to measure physiological function and behaviours in everyday life; they are measures which do not need to be undertaken in a clinical setting. They include, for example, monitoring of blood pressure or glucose levels, heart rate or physical activity, in order to capture intensity and variability in real time. Other technologies capture exposure to the physical environment (such as long-term pollution exposure). These new technologies are also part of ‘big data’, characterising better the ‘exposome’ that has been described as including internal body processes (e.g. metabolism), influential external exposures (e.g. diet, lifestyle), and the wider social, economic and psychological influences (Wild 2012). That kind of ‘big data’ for studies which have function and change as their outcomes, as compared with research into relatively rare diseases, does not necessarily require very large samples of individuals, and in some cases smaller cohorts that can be intensively phenotyped may be an advantage. Currently the necessary size of these cohorts and the balance between big data strategies and classical epidemiological approaches are being debated (Kuller et al. 2013).

5 Future Directions of Life Course Epidemiology

We cannot do justice here to all the types of epidemiological life course research that flourished in the last decade and/or will be priorities in the decade to come. Important areas outside the scope of this chapter include (1) family-based studies, including intergenerational, sibling and twin studies, which are increasingly used to study within family differences and to strengthen causal inference (Lawlor and Mishra 2009); (2) comparative studies, over time and location, of populations and their variation in life course health risks (Schooling and Leung 2010); and (3) life course intervention studies (Hertzman 2007).

Ultimately the purpose of epidemiology, including life course epidemiology, is to improve population health. Strengthening causal infer-

ence for life course findings from observational cohort studies is particularly important as randomised controlled trials are often impractical or unethical for testing life course hypotheses. There is a growing number of ways of improving causal inference in cohort and other observational studies (Academy of Medical Sciences Working Group (Chair M Rutter) 2007). These include: careful study design and appropriate analytical strategies, including sensitivity analyses, and the use of instrumental variables (e.g. Mendelian randomisation) or propensity scores (Hardy et al. 2014); evidence synthesis, asking whether findings from experimental and non-experimental, and from animal and human studies, are consistent; and the use of family based studies and cohort comparisons where factors that may potentially confound the relationship between the exposure of interest and the health outcome are differentially distributed.

Over a hundred years ago in the US and the UK, public health officials acknowledged, and new welfare policies reflected, the significance of the early environment for adult health. At that time empirical evidence was limited. Now the evidence base has become stronger, and in the last decade life course perspectives are increasingly favoured by research funders, and by researchers and policymakers searching for strategies to improve population health, and child health in particular (Shonkoff et al. 2009; Halfon 2012). The need for researchers to focus on translational aspects of life course epidemiology for the development of health services and the delivery of care has come to the fore. In the words of the UK's Chief Medical Officer in her annual report for 2012: "There is a growing knowledge of the complex interplay between psychosocial events and biological factors, and we now understand that events that occur as a fetus develops and in early life play a fundamental part in later life, and indeed in the lives of future generations" (Chief Medical Officer 2013).

The development of life course epidemiology and its data resources began as collaborations between epidemiologists, clinicians, social scientists and health service planners. In the last decade, geneticists, epigeneticists, and other

experts in the 'omics' technologies applied to population health have also become key collaborators. 'Team science' should always be the preferred approach of investigators of prospective cohort studies seeking answers to fundamental questions about development and ageing, and the determinants and consequences of lifelong health and disease.

Life course epidemiological interest began principally as a concern with health and growth in early life in a time of persistently high infant mortality (Wadsworth 2010), and continues now in a period when ageing is one of the most significant health problems. The concept of health is broadening to include the ability to adapt physiologically, psychologically and socially (Huber et al. 2011). Within life course epidemiology the key questions on which the field now concentrates are:

- How do human systems and function change across life, and do they vary by gender, socio-economic circumstances and opportunities, and ethnicity?
- During which periods of life are important changes in function observed?
- What are the lifetime environmental and intrinsic biological determinants of level and change of function?
- Are the influences of early life factors modified by factors in adulthood, and vice versa?
- What is the relationship between earlier life levels and changes in function with subsequent disease risk?

There is probably most opportunity to address these questions for cardiovascular function, as long-established cohort studies have many repeat measures. However, a recent review of lifetime trajectories of vascular and metabolic function showed that as yet surprisingly little use has been made of the repeat data (Lawlor and Hardy 2014). Addressing these questions will help to identify when in life interventions may have their greatest impact on maintaining health, maximising function and delaying the diseases of later life, and revealing the population subgroups that may benefit most from interventions. Knowing how best

to intervene requires active collaborations with those working in the implementation sciences, policy makers, and those whom the interventions are designed to help.

6 Conclusions

Life course epidemiology evolved as hypotheses developed that many chronic diseases were probably preceded by a long period of risk development. When those hypotheses were developing, demographers were studying determinants of change in fertility and mortality, and health scientists were beginning to be concerned about the challenges of caring for the health of ageing populations. Consequently epidemiologists, clinicians and demographers developed life course data resources and devised ingenious ways to study long periods of life and to compare population health as well as the health of individuals across generations.

Epidemiological research into how health risk develops throughout the life course investigates the beginnings of individual vulnerability, and later influences that increase or protect that vulnerability; it asks whether processes of accumulation of risk or protective experience significantly change vulnerability. At the same time research in the life sciences has developed practical and reliable measures of health, illness and biological function. It is now possible to measure trajectories of change over years of life, thereby increasing understanding of processes that precede illness and that are associated with functional decline with age. The genetic sciences have added new dimensions to research into health and the processes of ageing. They now also require new life course data to study how genetic effects interact with the environment to increase vulnerability to health problems or to protect against risk, as well as to investigate environmental impact on gene expression. New data resources include combining existing life course data sources, and beginning new large-scale cohort studies, as well as studies of smaller samples with much more detailed data.

This kind of new work requires collaboration between life course epidemiology and a broad range of life and social sciences, and means that life course epidemiology is involved in research at cellular, individual and population levels.

For public health, life course epidemiology may be expected to deliver new information to help in developing innovative preventive care, targeted at the most vulnerable individuals, and at the period of their life course when it will have maximum benefit. The now considerable resource of life course data has great potential for investigating long-term effects of exposures to health risks, to show age-cohort differences in risk experience, and consequently to model hypothetical scenarios to show age-cohort differences in early life risk experience, which reveal likely future variation in population health and ageing.

For the social sciences, life course epidemiology will continue to provide information on health related determinants of population structural changes, including those brought about by health care innovation. It will also continue to study how social adversity impacts the health of the individual, and the effects of socio-economic change on population health. The international development of new large-scale life course data resources will provide opportunities for cross-cultural comparative research and research across time within countries.

References

- Abraham, S., Collins, G., & Nordsieck, M. (1971). Relationship of childhood weight status to morbidity in adults. *HSMHA Health Reports*, *86*, 273–284.
- Academy of Medical Sciences Working Group (Chair M Rutter). (2007). *Identifying the environmental causes of disease: How should we decide what to believe and when to take action?* London: Academy of Medical Sciences.
- Alwin, D. F. (2012). Integrating varieties of life course concepts. *Journals of Gerontology Series B, Psychological Sciences and Social Sciences*, *67*, 206–220.
- Austad, S. (2008). Making sense of biological theories of aging. In V. Bengtson, M. Silverstein, N. Putney, & D. Gans (Eds.), *Handbook of theories of aging* (2nd ed., pp. 163–178). New York: Springer.

- Barker, D. J. P. (1991). *Fetal and infant origins of adult disease*. London: BMJ Publishing.
- Barker, D. J. P. (1995). Fetal origins of coronary heart disease. *British Medical Journal*, *311*, 171–174.
- Barker, D. J., & Osmond, C. (1986). Infant mortality, childhood nutrition, and ischaemic heart disease in England and Wales. *Lancet*, *1*(8489), 1077–81.
- Barker, D. J., Winter, P. D., Osmond, C., Margetts, B., & Simmonds, S. J. (1989). Weight in infancy and death from ischaemic heart disease. *Lancet*, *2*(8663), 577–80.
- Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology*, *31*, 285–293.
- Ben-Shlomo, Y., Gardner, M., & Lightman, S. (2014a). A life course approach to neuroendocrine systems: The example of the HPA axis. In D. Kuh, R. Cooper, R. Hardy, M. Richards, & Y. Ben-Shlomo (Eds.), *A life course approach to healthy ageing* (1st ed., pp. 133–145). Oxford: Oxford University Press.
- Ben-Shlomo, Y., Mishra, G., & Kuh, D. (2014b). Life course epidemiology. In W. Ahrens & I. Pigeot (Eds.), *Handbook of epidemiology* (2nd ed., pp. 1521–1549). New York: Springer.
- Berenson, G. S. (2001). Bogalusa Heart Study: A long-term community study of a rural biracial (black/white) population. *The American Journal of the Medical Sciences*, *322*, 267–274.
- Board, E. (2009). The life course is coming of age. *Advances in Life Course Research*, *14*, 83–86.
- Booth, C. (1891). *Life and labour of the people*. London: Williams and Norgate.
- Boyd Orr, J. (1937). *Food health and income* (2nd ed.). London: Macmillan.
- Britton, A., Ben-Shlomo, Y., Benzeval, M., Kuh, D., & Bell, S. (2015). Life course trajectories of alcohol consumption in the United Kingdom using longitudinal data from nine cohort studies. *BMC Medicine*, *13*, 47.
- Brunner, E., & Marmot, M. (2006). Social organisation, stress and health. In M. Marmot & R. G. Wilkinson (Eds.), *Social determinants of health* (2nd ed., pp. 6–30). Oxford: Oxford University Press.
- Butler, N. R., & Bonham, D. G. (1963). *Perinatal mortality*. Edinburgh: Livingstone.
- Butterfield, W. J. H. (1968). *Priorities in medicine*. London: Nuffield Provincial Hospitals Trust.
- Caldwell, J. C. (2001). Population health in transition. *Bulletin of the World Health Organization*, *79*, 159–160.
- Chief Medical Officer. (2013). *Chief Medical Officer's annual report 2012: Our children deserve better: Prevention pays*. Department of Health. <https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2012-our-children-deserve-better-prevention-pays>
- Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. *Annals of New York Academy of Sciences*, *1186*, 37–55.
- Colley, J. R. T., Douglas, J. W. B., & Reid, D. D. (1973). Respiratory disease in young adults; Influence of early childhood lower respiratory tract illness, social class, air pollution, and smoking. *British Medical Journal*, *2*, 195–198.
- Collins, S. D. (1949). Statistical studies of heart disease. V. Illness from heart and other cardiovascular-renal diseases recorded in general morbidity surveys of families. *Public Health Reports*, *64*, 1439–1497.
- D'Agostino, R. B., Kannel, W. B., Belanger, A. J., & Sytkowski, P. A. (1989). Trends in CHD and risk factors at age 55–64 in the Framingham Study. *International Journal of Epidemiology*, *18*, S67–S72.
- D'Agostino, R. B., Sr., Pencina, M. J., Massaro, J. M., & Coady, S. (2013). Cardiovascular disease risk assessment: Insights from Framingham. *Global Heart*, *8*, 11–23.
- Davey Smith, G., & Ebrahim, S. (2003). 'Mendelian randomization': Can genetic epidemiology contribute to understanding environmental determinants of disease? *International Journal of Epidemiology*, *32*, 1–22.
- Davey Smith, G., & Lynch, J. (2004). Life course approaches to socioeconomic differentials in health. In D. Kuh & Y. Ben-Shlomo (Eds.), *A life course approach to chronic disease epidemiology* (2nd ed., pp. 77–116). Oxford: Oxford University Press.
- dos Santos Silva, I. (2004). Time trends in cancer incidence and mortality. In D. Kuh & Y. Ben-Shlomo (Eds.), *A life course approach to chronic disease epidemiology* (2nd ed., pp. 281–306). Oxford: Oxford University Press.
- Douglas, J. W. B. (1951). Health and survival of infants in different social classes. *The Lancet*, *ii*, 440–446.
- Dubos, R., Savage, D., & Schaedler, R. (1966). Biological Freudianism. Lasting effects of early environmental influences. *Pediatrics*, *38*, 789–800.
- Elder, G. H. (1974). *Children of the great depression*. Chicago: University of Chicago Press.
- Elks, C. E., Loos, R. J., Hardy, R., Wills, A. K., Wong, A., Wareham, N. J., et al. (2012). Adult obesity susceptibility variants are associated with greater childhood weight gain and a faster tempo of growth: The 1946 British Birth Cohort Study. *American Journal of Clinical Nutrition*, *95*, 1150–1156.
- Elliott, J., & Shepherd, P. (2006). Cohort profile: 1970 British Birth Cohort (BCS70). *International Journal of Epidemiology*, *35*, 836–843.
- Ferrucci, L. (2008). The Baltimore Longitudinal Study of Aging (BLSA): A 50-year-long journey and plans for the future. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *63*, 1416–1419.
- Forsdahl, A. (1977). Living conditions in childhood and adolescence and important risk factor for arteriosclerotic heart disease? *British Journal of Preventive and Social Medicine*, *31*, 91–95.
- Ghosh, A. K., Hardy, R. J., Francis, D. P., Chaturvedi, N., Pellerin, D., Deanfield, J., et al. (2014, December). Midlife blood pressure change and left ventricular mass and remodelling in older age in the 1946 British

- birth cohort study. *European Heart Journal*, 35(46), 3287–3295.
- Glass, D. V. (1973). *Numbering the people; The eighteenth-century population controversy and the development of census and vital statistics in Britain*. Farnborough: Saxon House.
- Gluckman, P. D., & Hanson, M. A. (2004). Living with the past: Evolution, development, and patterns of disease. *Science*, 305, 1733–1736.
- Gluckman, P. D., Hanson, M. A., Bateson, P., Beedle, A. S., Law, C. M., Bhutta, Z. A., et al. (2009). Towards a new developmental synthesis: Adaptive developmental plasticity and human disease. *The Lancet*, 373, 1654–1657.
- Godfrey, K. M., Sheppard, A., Gluckman, P. D., Lillycrop, K. A., Burdge, G. C., McLean, C., et al. (2011). Epigenetic gene promoter methylation at birth is associated with child's later adiposity. *Diabetes*, 60, 1528–1534.
- Golding, J., Pembrey, M., & Jones, R. (2001). ALSPAC – The Avon Longitudinal Study of Parents and Children. I Study methodology. *Paediatric and Perinatal Epidemiology*, 15, 74–87.
- Great Britain Parliamentary Papers. (1904). *Report of the Interdepartmental Committee on physical deterioration*. London: His Majesty's Stationery Office.
- Haggarty, P., & Ferguson-Smith, A. C. (2014). Life course epigenetics and healthy ageing. In D. Kuh, R. Cooper, R. Hardy, M. Richards, & Y. Ben-Shlomo (Eds.), *A life course approach to healthy ageing* (1st ed., pp. 198–212). Oxford: Oxford University Press.
- Halfon, N. (2012). Addressing health inequalities in the US: A life course health development approach. *Social Science and Medicine*, 74, 671–673.
- Halfon, N., Larson, K., Lu, M., Tullis, E., & Russ, S. (2013). Lifecourse health development: Past, present and future. *Maternal and Child Health Journal*, 18(2), 344–365.
- Hamlin, C. (1992). Predisposing causes and public health in early nineteenth-century medical thought. *Social History of Medicine*, 5, 43–70.
- Hardy, R., Wadsworth, M. E. J., & Kuh, D. (2000). The influence of childhood weight and socioeconomic status on change in adult body mass index in a British national birth cohort. *International Journal of Obesity*, 24, 1–10.
- Hardy, R., Muniz-Terrera, G., & Hofer, S. M. (2014). Design of life course studies of healthy ageing. In D. Kuh, R. Cooper, R. Hardy, M. Richards, & Y. Ben-Shlomo (Eds.), *A life course approach to healthy ageing* (1st ed., pp. 65–78). Oxford: Oxford University Press.
- Hattersley, A. T., & Tooke, J. E. (1999). The fetal insulin hypothesis: An alternative explanation of the association of low birthweight with diabetes and vascular disease. *The Lancet*, 353, 1789–1792.
- Heijmans, B. T., Tobi, E. W., Stein, A. D., Putter, H., Blauw, G. J., Susser, E. S., et al. (2008). Persistent epigenetic differences associated with prenatal exposure to famine in humans. *Proceedings of the National Academy of Sciences*, 105, 17046–17049.
- Hertzman, C. (2007). Human development, life course, intervention and health. In: Pickles A, Maughan B, and Wadsworth M (Eds), *Epidemiological methods in life course research* (pp. 111–136). Oxford: Oxford University Press.
- Hertzman, C., & Boyce, T. (2010). How experience gets under the skin to create gradients in developmental health. *Annual Review of Public Health*, 31, 329–347.
- Huber, M., Knottnerus, J. A., Green, L., van der Horst, H., Jadad, A. R., Kromhout, D., et al. (2011). How should we define health? *British Medical Journal*, 343, d4163.
- Huxley, R., Owen, C. G., Whincup, P. H., Cook, D. G., Rich-Edwards, J., Smith, G. D., et al. (2007). Is birth weight a risk factor for ischemic heart disease in later life? *American Journal of Clinical Nutrition*, 85, 1244–1250.
- Illsley, R., & Kincaid, J. C. (1963). Social correlates of perinatal mortality. In N. R. Butler & D. G. Bonham (Eds.), *Perinatal mortality* (pp. 270–286). Edinburgh: Churchill Livingstone.
- Inskip, H. M., Godfrey, K. M., Robinson, S. M., Law, C. M., Barker, D. J., & Cooper, C. (2006). Cohort profile: The Southampton women's survey. *International Journal of Epidemiology*, 35, 42–48.
- Johnson, W., Li, L., Kuh, D., & Hardy, R. (2015). How has the age-related process of overweight or obesity development changed over time? Co-ordinated analyses of individual participant data from five United Kingdom birth cohorts. *PLoS Medicine*, 12(5), e1001828.
- Jones, H. E. (1939). Resources for the consultant: Principles and methods of the Adolescent Growth Study. *Journal of Consulting Psychology*, 3(5), 157–159.
- Jones, H. E., & Bayley, N. (1941). The Berkeley growth study. *Child Development*, 12, 167–180.
- Keating, D. P., & Hertzman, C. (Eds.). (1999). *Developmental health and the wealth of nations: Social, biological and educational dynamics*. New York: The Guilford Press.
- Kermack, W. O., McKendrick, A. G., & McKinlay, P. L. (1934). Death rates in Great Britain and Sweden: Some general regularities and their significance. *The Lancet*, 226, 698–703.
- Kirkwood, T. B., & Austad, S. N. (2000). Why do we age? *Nature*, 408, 233–238.
- Kuh, D., & Ben Shlomo, Y. (2014). Early life origins of adult health and ageing. In L. K. George & K. F. Ferraro (Eds.), *Handbook of aging and the social sciences*. Elsevier Science Publishing Co Inc, San Diego.
- Kuh, D., & Ben-Shlomo, Y. (1997). *A life course approach to chronic disease epidemiology: Tracing the origins of ill-health from early to adult life* (1st ed.). Oxford: Oxford University Press.
- Kuh, D., & Ben-Shlomo, Y. (2004). *A life course approach to chronic disease epidemiology* (2nd ed.). Oxford: Oxford University Press.
- Kuh, D., & Davey Smith, G. (1993). When is mortality risk determined? Historical insights into a current debate. *Social History of Medicine*, 6, 101–123.

- Kuh, D., dos Santos Silva, I., & Barrett-Connor, E. (2002). Disease trends in women living in established market economies: Evidence of cohort effects during the epidemiological transition. In D. Kuh & R. Hardy (Eds.), *A life course approach to women's health* (pp. 347–373). Oxford: Oxford University Press.
- Kuh, D., Ben Shlomo, Y., Lynch, J., Hallqvist, J., & Power, C. (2003). Life course epidemiology. *Journal of Epidemiology and Community Health*, *57*, 778–783.
- Kuh, D., Pierce, M., Adams, J., Deanfield, J., Ekelund, U., Friberg, P., et al. (2011). Cohort profile: Updating the cohort profile for the MRC National Survey of Health and Development: A new clinic-based data collection for ageing research. *International Journal of Epidemiology*, *40*, e1–e9.
- Kuh, D., Ben-Shlomo, Y., Tilling, K., & Hardy, R. (2014a). Life course epidemiology and analysis. In R. Detels, M. Gulliford, Q. Abdool Karim, & C. Tan (Eds.), *The Oxford textbook of public health* (6th ed.). Oxford: Oxford University Press.
- Kuh, D., Cooper, R., Hardy, R., Richards, M., & Ben Shlomo, Y. (2014b). *A life course approach to healthy ageing* (1st ed.). Oxford: Oxford University Press.
- Kuller, L. H., Bracken, M. B., Ogino, S., Prentice, R. L., & Tracy, R. P. (2013). The role of epidemiology in the era of molecular epidemiology and genomics: Summary of the 2013 AJE-sponsored Society of Epidemiologic Research Symposium. *American Journal of Epidemiology*, *178*, 1350–1354.
- Landrigan, P. J., Trasande, L., Thorpe, L. E., Gwynn, C., Lioy, P. J., D'Alton, M. E., et al. (2006). The National Children's Study: A 21-year prospective study of 100,000 American children. *Pediatrics*, *118*, 2173–2186.
- Lawlor, D. A., & Hardy, R. (2014). Vascular and metabolic function across the life course. In D. Kuh, R. Cooper, R. Hardy, M. Richards, & Y. Ben-Shlomo (Eds.), *A life course approach to healthy ageing* (1st ed., pp. 146–161). Oxford: Oxford University Press.
- Lawlor, D., & Mishra, G. (2009). *Family matters: Designing, analysing and understanding family based studies in life course epidemiology* (1st ed.). Oxford: Oxford University Press.
- Leon, D., & Walt, G. (2000). *Poverty, inequality and health: An international perspective*. Oxford: Oxford University Press.
- Li, L., Hardy, R., Kuh, D., Lo Conte, R., & Power, C. (2008). Child-to-adult body mass index and height trajectories: a comparison of 2 British birth cohorts. *American Journal of Epidemiology*, *168*(9), 1008–15.
- Lumey, L. H., Stein, A. D., Kahn, H. S., van der Pal-de Bruin, K. M., Blauw, G. J., Zybert, P. A., et al. (2007). Cohort profile: The Dutch Hunger Winter families study. *International Journal of Epidemiology*, *36*, 1196–1204.
- Magnus, P., Irgens, L. M., Haug, K., Nystad, W., Skjaerven, R., & Stoltenberg, C. (2006). Cohort profile: The Norwegian Mother and Child Cohort Study (MoBa). *International Journal of Epidemiology*, *35*, 1146–1150.
- Marmot, M., & Brunner, E. (2005). Cohort profile: The Whitehall II study. *International Journal of Epidemiology*, *34*, 251–256.
- Metropolitan Life Insurance Co. (1946). *Studies in heart disease*. New York: Metropolitan Life Insurance Co.
- Miall, W. E., & Chinn, S. (1974). Screening for hypertension: Some epidemiological observations. *British Medical Journal*, *3*, 595–600.
- Mishra, G., Nitsch, D., Black, S., De, S. B., Kuh, D., & Hardy, R. (2009). A structured approach to modelling the effects of binary exposure variables over the life course. *International Journal of Epidemiology*, *38*, 528–537.
- Morris, J. N. (1967). *Uses of epidemiology* (2nd ed.). London: Churchill Livingstone.
- Morris, J. N., & Titmus, R. M. (1942). The epidemiology of juvenile rheumatism. *The Lancet*, *234*, 300–307.
- Ng, J. W., Barrett, L. M., Wong, A., Kuh, D., Smith, G. D., & Relton, C. L. (2012). The role of longitudinal cohort studies in epigenetic epidemiology: Challenges and opportunities. *Genome Biology*, *13*, 246.
- Olsen, J., Melbye, M., Olsen, S. F., Sorensen, T. I., Aaby, P., Andersen, A. M., et al. (2001). The Danish National Birth Cohort – Its background, structure and aim. *Scandinavian Journal of Public Health*, *29*, 300–307.
- Ong, K. K., Elks, C. E., Wills, A. K., Wong, A., Wareham, N. J., Loos, R. J., et al. (2011). Associations between the pubertal timing-related variant in LIN28B and BMI vary across the life course. *Journal of Clinical Endocrinology and Metabolism*, *96*, E125–E129.
- Power, C., & Elliott, J. (2006). Cohort profile: 1958 British birth cohort (National Child Development Study). *International Journal of Epidemiology*, *35*, 34–41.
- Raghupathy, P., Antonisamy, B., Geethanjali, F. S., Saperia, J., Leary, S. D., Priya, G., et al. (2010). Glucose tolerance, insulin resistance and insulin secretion in young south Indian adults: Relationships to parental size, neonatal size and childhood body mass index. *Diabetes Research and Clinical Practice*, *87*, 283–292.
- Rantakallio, P. (1988). The longitudinal study of the northern Finland birth cohort of 1966. *Paediatric and Perinatal Epidemiology*, *2*, 59–88.
- Reid, D. D. (1969). The beginnings of chronic bronchitis. *Proceedings of the Royal Society of Medicine*, *62*, 316.
- Reid, D. D., Brett, G. Z., Hamilton, P. J., Jarrett, R. J., Keen, H., & Rose, G. (1974). Cardiorespiratory disease and diabetes among middle-aged male Civil Servants. A study of screening and intervention. *The Lancet*, *1*, 469–473.
- Relton, C. L., & Davey, S. G. (2012). Is epidemiology ready for epigenetics? *International Journal of Epidemiology*, *41*, 5–9.
- Relton, C. L., Groom, A., St Pourcain, B., Sayers, A. E., Swan, D. C., Embleton, N. D., et al. (2012). DNA methylation patterns in cord blood DNA and body size in childhood. *PLoS ONE*, *7*, e31821.

- Riley, M. W. (1987). Aging, health and social change: An overview. In M. W. Riley, J. D. Matarazzo, & A. Baum (Eds.), *Perspectives in behavioural medicine: The aging dimension* (pp. 1–14). Hillsdale: Lawrence Erlbaum.
- Robins, L., & Rutter, M. (1990). *Straight and devious pathways from childhood to adulthood*. Cambridge: Cambridge University Press.
- Roche, A. F. (1992). *Growth, maturity, and body composition: The Fels longitudinal study*. Cambridge: Cambridge University Press.
- Rowntree, B. S. (1901). *Poverty: A study of town life*. London: Macmillan.
- Royal Commission on Population. (1949). London: His Majesty's Stationery Office.
- Rutter, M. (2012). Achievements and challenges in the biology of environmental effects. *Proceedings of the National Academy of Science*, 109(Suppl 2), 17149–17153.
- Rutter, M. (2013). Developmental psychopathology: A paradigm shift or just a relabeling? *Development and Psychopathology*, 25, 1201–1213.
- Schooling, C. M., & Leung, G. M. (2010). A socio-biological explanation for social disparities in non-communicable chronic diseases: The product of history? *Journal of Epidemiology and Community Health*, 64, 941–949.
- Scottish Council for Research in Education. (1993). *The intelligence of Scottish children: A national survey of an age-group*. London: University of London Press.
- Settersten, R. A., Jr. (2009). It takes two to tango: The (un) easy dance between life-course sociology and lifespan psychology. *Advances in Life Course Research*, 14, 74–81.
- Shonkoff, J. P. (2012). Leveraging the biology of adversity to address the roots of disparities in health and development. *Proceedings of the National Academy of Science*, 109(Suppl 2), 17302–17307.
- Shonkoff, J. P., Boyce, W. T., & McEwen, B. S. (2009). Neuroscience, molecular biology, and the childhood roots of health disparities: Building a new framework for health promotion and disease prevention. *The Journal of the American Medical Association*, 301, 2252–2259.
- Stein, S., Susser, M., Saenger, G., & Marolla, F. (1975). *Famine and human development: The Dutch Hunger Winter of 1944–45*. New York: Oxford University Press.
- Stephens, A., Breeze, E., Banks, J., & Nazroo, J. (2013). Cohort profile: The English longitudinal study of ageing. *International Journal of Epidemiology*, 42, 1640–1648.
- Stocks, P. (1975). An appreciation. *British Journal of Preventative and Social Medicine*, 29, 65–72.
- Strachan, D. P. (1997). Respiratory and allergic diseases. In D. Kuh & Y. Ben-Shlomo (Eds.), *A life course approach to chronic disease epidemiology* (pp. 101–120). Oxford: Oxford University Press.
- Titmuss, R. (1938). *Poverty and population*. London: Macmillan.
- Tyrell, J. S., Yaghoobkar, H., Freathy, R. M., Hattersley, A. T., & Frayling, T. M. (2013). Parental diabetes and birthweight in 236 030 individuals in the UK Biobank Study. *International Journal of Epidemiology*, 42, 1714–1723.
- Wadsworth, M. E. J. (2010). The origins and innovatory nature of the 1946 British birth cohort study. *Longitudinal and Life Course Studies*, 1, 136.
- Wadsworth, M. E. J. (2014). Focussing and funding a birth cohort study over 20 years: The British 1946 national birth cohort study from 16 to 36 years. *Longitudinal and Life Course Studies*, 1, 121–136.
- Wadsworth, M. E. J., Cripps, H. A., Midwinter, R. A., & Colley, J. R. T. (1985). Blood pressure at age 36 years and social and familial factors, cigarette smoking and body mass in a national birth cohort. *British Medical Journal*, 291, 1534–1538.
- Wadsworth, M., Kuh, D., Richards, M., & Hardy, R. (2006). Cohort profile: The 1946 National birth cohort (MRC National Survey of Health and Development). *International Journal of Epidemiology*, 35, 49–54.
- Walker, M., Whincup, P. H., & Shaper, A. G. (2004). The British Regional Heart Study 1975–2004. *International Journal of Epidemiology*, 33, 1185–1192.
- Wall, W. D., & Williams, H. L. (1970). *Longitudinal studies and the social sciences* (1st ed.). London: Heinemann Educational Books Ltd.
- Waterland, R. A., & Michels, K. B. (2007). Epigenetic epidemiology of the developmental origins hypothesis. *Annual Review of Nutrition*, 27, 363–388.
- Wellcome Trust Case Control Consortium. (2007). Genome-wide association study of 14,000 cases of seven common diseases and 3,000 shared controls. *Nature*, 447, 661–678.
- Whincup, P. H., Kaye, S. J., Owen, C. G., Huxley, R., Cook, D. G., Anazawa, S., et al. (2008). Birth weight and risk of type 2 diabetes: A systematic review. *The Journal of the American Medical Association*, 300, 2886–2897.
- White, P. D. (1931). *Heart disease*. New York: Macmillan Co.
- Wild, C. P. (2012). The exposome: From concept to utility. *International Journal of Epidemiology*, 41, 24–32.
- Williams, R. (2002). Hostility, psychosocial risk factors, changes in brain serotonergic function, and heart disease. In S. A. Stansfeld & M. Marmot (Eds.), *Stress and the heart: Psychosocial pathways to coronary heart disease* (pp. 86–100). London: BMJ Books.
- Wills, A. K., Lawlor, D. A., Matthews, F. E., Sayer, A. A., Bakra, E., Ben-Shlomo, Y., et al. (2011). Life course trajectories of systolic blood pressure using longitudinal data from eight UK cohorts. *PLoS Medicine*, 8, e1000440.
- Wills, A. K., Lawlor, D. A., Muniz-Terrera, G., Matthews, F., Cooper, R., Ghosh, A. K., et al. (2012). Population heterogeneity in trajectories of midlife blood pressure. *Epidemiology*, 23, 203–211.

The Influence of Social Welfare Policies on Health Disparities Across the Life Course

Pamela Herd

1 Introduction

Social welfare spending consumes around 60 % of the federal budget—and just as large a fraction of state budgets (CBPP 2015). Moreover, the magnitude of the cumulative effects of social welfare policies on socioeconomic resources throughout the life course, is large. Overall, the poverty rate for Americans would be 30 %, instead of 16 %, without these social welfare policies (Sherman et al. 2013). While we tend to focus on the relative lack of generosity of the US welfare state as compared to our European counterparts and our comparative poor health outcomes, this has possibly led us to underestimate the actual size and influence of the US welfare state—even if it is weaker in a relative sense. These policies do not just impact those with very limited socioeconomic resources; from the cradle to the grave, nearly every American benefits from the welfare state.

Evolving from decades of research that examined how socioeconomic position, especially income and education, influences health and consequent health disparities across the life course, there is a large and growing body of research demonstrating that social welfare policies play a

large role in determining health and mortality outcomes. These two literatures, however, one focused on the health impacts of policies and the other focused on the processes shaping the evolution of health disparities across the life course, now exist in parallel streams. The existing body of research based on the life course perspective pays little attention to social welfare policy, despite the likelihood that policies targeting early life environments, education, and income, play a critical role in shaping a lifetime of dynamic and cumulative exposures and experiences, all of which contribute to evolving health disparities across the life course. Social welfare policies, or the state more broadly, has not been incorporated theoretically or empirically into life course research on health disparities. In turn, policy research has been limited by its inattention to life course processes, focusing, for example, on immediate health effects of social welfare policies, but failing to integrate or test the potentially life long implications of poverty reduction policies targeted at children or the later life health impacts of policies targeted at working age adults. Moreover, this literature has generally neglected the potential influence of social welfare policies on adult and later life health, instead emphasizing early life impacts and influences in isolation from the rest of the life course and the family in which individuals are situated.

In this chapter I will show how a life course perspective can help further inform the growing

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body of literature focused on the health impacts of social welfare policies. I will begin by reviewing our current knowledge regarding how health disparities emerge across the life course—as well as the inattention in this literature to the social welfare policies that may be shaping some of these disparities. In particular, I will demonstrate the magnitude of these programs. For example, 50 % of all children will benefit from social welfare policy supports at some point before the age of 18—and these policies reduce the poverty rate for children from 30 to 18 % (CBPP 2013). I will then review the existing literature exploring the health impacts of social welfare policies—as well as its inattention to the life course consequences of these investments. I will focus on social welfare policies that foster strong early childhood care and education, increase access to health care, and supplement income. Finally, I will conclude by pointing to ways that life course scholars focused on health disparities and policy scholars focused on the influence of social welfare policies on health can learn from each other as to how to further develop our understanding of the relationship between socioeconomic position and health.

2 Health Disparities Across the Life Course

In this section, I will review the contributions of the life course perspective towards understanding how health disparities emerge and develop across the life course, as well as the limitations of this research in regards to attention to social welfare policies. The life course approach focuses on how processes of stratification work over the life span of individuals, families, groups, and cohorts to produce health outcomes in later life (Mortimer and Shanahan 2004). Essentially, a life course perspective assumes that social status can affect health at any point in one's life, but that the timing of exposures and experiences linked to inequity may matter more at some ages in the life span. Alwin and Wray (2005) highlight that “the structure, sequence, and dynamics of events, transitions, and trajectories (social pathways)

that take place within life-stage phases over the life span have consequences on health” (p. 10).

A central tenet of the life course perspective is that early life plays a critical role in shaping health across the life course. The Barker hypothesis suggests that most sources of later life health disparities can be found in fetal and infant life (Barker 1992; Barker et al. 1993). Poor maternal health, which itself is often a product of poverty, led to an in-utero environment that stagnated infant development (Barker 1992; Barker et al. 1993; for additional discussion of this hypothesis, see chapters by Avison “[Mental Health](#)”, Hayward and Sheehan “[Does the Body Forget? Adult Health, Life Course Dynamics, and Social Change](#)”, and Ferraro “[Life Course Lens on Aging and Health](#)”, this volume). For example, there are large differences in health at birth, as measured by low birth weight, by parental socioeconomic status (Aizer and Currie 2014).

Some of the health effects of poor in-utero environments, however, may not emerge until later in life. In essence, this unhealthy in-utero environment leads to biological programming of ill health across the life course (Petronis 2010). The strongest evidence for long term health effects of poor in-utero environments are from studies of famines after World War II, which generally support the premise that deprived fetal environments increase risks for cardiovascular risk factors (see Almond and Currie 2011 for a review).

There is more general evidence that childhood experiences, not simply the fetal environment, affect health across the life course. Having parents with limited socioeconomic resources, both education and income, lead to accumulating health disadvantages across the life course (Case et al. 2002; Luo and Waite 2005). Children who grow up poor or with parents with limited education and occupational attainment have worse health outcomes throughout childhood and into adulthood (Guralnik et al. 2006; Lawlor et al. 2005b; Power et al. 2005; Singh-Manoux et al. 2004) and old age (Blackwell et al. 2001; Holland et al. 2000). In addition to material resources, the child development literature has convincingly shown that early enriching environments, the

quality and stability of parental relations, and low exposure to adverse events, such as abuse, play a critical role in shaping well-being in childhood and well into adulthood (Bradely et al. 1988, 1989; Estrada et al. 1987; Gottfried et al. 1994; Pianta et al. 1997; Burchinal et al. 2000; Shonkoff and Phillips 2000; Knudsen et al. 2006; Heckman 2007, 2012; Ferraro “Life Course Lens on Aging and Health”, this volume).

Further, the evidence from neuropsychology indicates that these material and social resources in childhood actually affect physical brain development and, through it, a host of behaviors (Danese et al. 2010; NSCDC 2011). A recent summary of results from research on brain structure and emotional development in children notes that “stated simply, as young children develop, their early emotional experiences literally become embedded in the architecture of their brains” (National Scientific Council on the Developing Child 2011). These cognitive and psychological resources, in turn, influence health via their impact on behaviors that regulate exposure to health risks. These factors have long been considered ‘coping’ resources that mitigate the effects of a range of stressors, including those associated with the SES hierarchy, on health (Pearlin et al. 2005).

Yet despite this robust and growing body of literature examining health disparities across the life course, strikingly absent has been the degree to which early childhood policies, which exert strong impacts on early childhood resources, are playing a role in how these disparities develop over the life course. This research generally fails to recognize the magnitude of these programs. Income supports that affect children, including the Earned Income Tax Credit (EITC), the Child Tax Credit, Supplementary Nutritional Aid Program (SNAP), housing assistance, and Supplemental Security Income (SSI), *reduce the poverty rate for children from 30 to 18 %* (CBPP 2013). *Further, at least 50 % of children will access at least one of these programs at some point in their childhood.* Given that the bulk of the relationship between income and health is at the bottom end of the income distribution, the cumulative impacts of these programs is likely

very large (Backlund et al. 1996). Moreover, Medicaid pays for nearly one-half of all births in the United States (Markus et al. 2013). Access to health insurance, both in terms of how that affects access to health care, but also the degree to which it protects income against high medical costs, also has implications for childhood health. Finally, programs that affect children more broadly, ranging from preschool to family leave policies, also have received little attention from life course scholars interested in health.

The same can be said for research on adult and later life health. Life course researchers have paid little attention to the social welfare policies that affect socioeconomic resources in adulthood and later life. The inattention to policy is an important limitation given the magnitude of the cumulative effects of social welfare policies on socioeconomic resources in adulthood and, especially, in later life. Among those aged 18–64 the combined impact of social welfare policies reduces the poverty rate from 23 to 15 %. Among older adults the poverty rate, largely due to Social Security, is reduced from 30 to 18 % (CBPP 2013). Moreover, the existing policy research has not filled this hole, instead focusing on childhood health impacts of social welfare policies. Yet, existing work focused on adult and later life would indicate that these policies matter. There is evidence that not only do adult socioeconomic circumstances exert direct effects on adult and later life health, they may also help offset the influence of early, and negative, childhood experiences on long term health (Lynch et al. 1994; Pensola and Martikainen 2003; Luo and Waite 2005; Marmot et al. 2001; Wamala et al. 2001). There is an ongoing debate, however, regarding the extent to which adult socioeconomic position (SEP) weakens the health effects of childhood SEP. Many studies that have more effectively adjusted for adult SEP contradict the Barker hypothesis; they find that adult SEP is a better predictor of health outcomes than childhood SEP, to some extent offsetting the health effects of disadvantage childhood experiences (Lynch et al. 1994; Pensola and Martikainen 2003; Luo and Waite 2005; Marmot et al. 2001; Wamala et al. 2001). However, most studies do find that the effects of

childhood disadvantage persist into later life. The remaining questions focus on the magnitude of the direct effect of childhood experiences, but not the importance of the independent effect of adult SEP (for a review see Galobardes et al. 2008).¹

3 Social Welfare Policies and Health

In this section, I will review the existing literature examining the health effects of social welfare policies that foster strong early childhood care and education, increase access to health care, and supplement income. There are two key limitations that are apparent in this review. First, there is a lack of attention to how policies may influence not only early childhood health, but also the cumulative impact of these policies over the life course. Second, there is an inattention in this literature to direct effects of social welfare policies on adult and later life health or the degree to which these policies may offset a childhood characterized by limited socioeconomic resources.

3.1 Social Welfare Policies: Early Childhood Care Environments

Very early in life, the care environment can have a profound influence on early childhood development. Social welfare policies focused on early childhood education, particularly preschool, and parental leave policies in the immediate period following childbirth, have also generated some meaningful evidence regarding health outcomes.

While there is a wealth of evidence demonstrating how educational attainment more broadly

influences health and well being (see chapter “Living Healthier and Longer: A Life Course Perspective on Education and Health” by Johnson et al., this volume), there is a growing body of evidence focused specifically on preschool experiences very early in life, especially for children from low socioeconomic backgrounds. The most well known studies are of the Perry Preschool Project and the Carolina Abecedarian Project, which were experimental studies, done in the 1960s and 1970s, that attempted to understand how high quality preschool experiences could influence child outcomes. Both programs were focused on disadvantaged children. They produced both short and long term impacts on cognition, educational attainment and earnings in adulthood (Heckman et al. 2012). More recently, Gabrielle Conti and James Heckman (2014) found evidence that those who received the preschool treatment also engaged in healthier behaviors later in life. They attribute these improved outcomes to reductions in externalizing behavior or more broadly improvements in non-cognitive skills (Conti and Heckman 2013). While these are very small samples, the long-term findings on adult health outcomes are striking. Further, focusing on the long-term health effects of preschool is very unusual—and an important contribution. That said, as Gregory Duncan and colleagues (2014) emphasize, when one examines evidence from a broader array of preschool experiments and studies, on average, positive development impacts, at least in childhood, are relatively small.

A final critical area of social policy that might influence child-well being is family leave policy. Relative to most industrialized countries, mothers and fathers in the U.S. have limited access to leave following the birth of a child. The only existing federal policy, the Family and Medical Leave Act (FMLA), provides 3 months of unpaid leave. Approximately half of workers are eligible because FMLA generally only covers large employers. But the existing research, both in the U.S. and in other countries, shows a positive impact on childhood health. These policies are linked to better vaccination rates, higher rates of breastfeeding, and lower rates of post-neonatal and child mortality (Berger

¹ It is important to point out, however, the methodological challenges inherent in this kind of life course research, specifically the interplay between health and socioeconomic status, which make it difficult to assess the magnitude of these relationships. Poor health does affect socioeconomic trajectories across the life course. A growing body of literature documents how childhood health affects educational attainment and adult income (Case et al. 2005; Haas 2006; Palloni 2006; Johnson et al. “Living Healthier and Longer: A Life Course Perspective on Education and Health”, this volume).

et al. 2005; Ruhm 2000; Tanaka 2005; Rossin 2011; Daku et al. 2012).

The large bulk of the evidence examining the effect of family leave focuses on children rather than their mothers or fathers. There is some limited evidence, however, regarding the influence on mothers. In short, it does appear that women experience mental health benefits from family leave following the birth of a baby. These include lower levels of depressive symptoms and significantly lowered risk of severe depression (Chatterji and Markowitz 2008; Dagher et al. 2014). The paucity of this research, however, makes it difficult to make any strong statements about the effect of these policies on health in midlife.

3.2 Social Welfare Policies: Medicaid and Medicare

While much of the research on health disparities across the life course emphasizes the critical nature of social resources, rather than medical care or access to health insurance, there is a growing body of evidence that having access to health insurance does influence health outcomes. The two primary sources of public health insurance for Americans of all ages include Medicaid and Medicare and cumulatively provide health insurance for 35 % of all Americans—and nearly 100 % of those aged 65 and older (United States Census Bureau 2014).

Medicaid, the primary source of public health insurance for poor and/or disabled Americans, plays an important role in providing that access. The program is jointly run between states and the federal government, so eligibility and benefits vary from state to state. That said, the program covers nearly all individuals below 100 % of the poverty line and, in many states those below 135 % of the poverty line. Older adults relying on Medicaid use it to either supplement their Medicare coverage, to pay for things like co-payments and deductibles, or if they are receiving institutional care. The Medicaid program funds half of all births in the United States and at any given time 36 % of children receive health insurance via Medicaid. Overall, there is meaningful

evidence that Medicaid coverage improves child health outcomes. Janet Currie and Jeffrey Grogger (2002) found that expansions of income eligibility thresholds for Medicaid increased prenatal care and reduced fetal deaths. Large Medicaid expansions in the 1980s and early 1990s reduced childhood mortality (Currie and Gruber 1996). Janet Currie and colleagues (2008) also found that access to Medicaid coverage in early childhood influences later childhood health.

Most of the research on Medicaid, and especially its expansions in coverage over time, has focused on the health of children. As one study notes, “a key beneficiary—the mother has been completely left out of the analysis” (Conway and Kutinova 2006). With large expansions of Medicaid since the passage of the Affordable Care Act in 2010, however, there was one recent randomized experiment that evaluated the influence of the program on adult health in the state of Oregon (Baicker et al. 2013). The second year follow-up of this experiment found no influence of coverage on the prevalence, diagnosis or treatment for hypertension or high levels of cholesterol. They did find increased diagnoses of diabetes, but no impact on glycated hemoglobin levels—a measure of long term glucose levels. The prevalence of depression, however, declined significantly and there was a dramatic decline in catastrophic medical care expenditures. In short, one might argue that the greatest influence of the program may have been on income security, which may have, in turn, influenced mental health.

Older adults by and large rely on Medicare for their health insurance. And most receive coverage for Medicare at age 65, with the exception of those who qualify based on disability at earlier ages. The evidence is somewhat limited with studies finding generally mixed effects. Most studies estimate the effects by looking at changes in health among the previously uninsured after enrollment in Medicare (McWilliams et al. 2007, 2010; Polsky et al. 2009, 2010). Varying estimation strategies produce variation in findings with either no effect or a positive effect on health (McWilliams et al. 2007, 2010; Polsky et al. 2009, 2010). There are two central challenges to

this estimation strategy. First, those previously uninsured are generally in poorer health than those with health insurance. A simple pre-post access to examining the effects of Medicare on health is difficult to do because even if those who had been previously uninsured continue to face health declines after receiving Medicare coverage it's not clear that health insurance hasn't had some kind of impact. It may be that Medicare slightly reduced the rate of decline even if health is still declining. Even the best observable data cannot guarantee that the comparison between previously insured and previously uninsured is truly an equivalent comparison in terms of baseline health. Second, because access to coverage is positively correlated with increasing age—one only becomes eligible for Medicare at 65 and had been uninsured at younger ages—this would also bias against finding a positive effect associated with access to Medicare. In short, because Medicare is a universal program, it is very difficult to find plausible exogenous variation in access to the benefit that could lend insights into the program's influence on health. As we will discuss later, the same issue exists for a program like Social Security.

Interestingly, there is evidence of the impact of Medicare on the health of infants—albeit via an indirect impact that was a function of the program's influence on the desegregation of Southern hospitals after the program's implementation in 1966. In order for hospitals to receive Medicare funds they had to demonstrate they did not segregate. At this point, most Southern hospitals were still segregated, with many hospitals still refusing to accept black patients or having a quota on the number of black patients they would treat. This effectively reduced or eliminated access to medical care for many African Americans. However, within the span of a relatively short period—about a year—Southern hospitals were desegregated as a function of the Medicare requirement. But there was resistance, especially in the deep South, and in particular, in Mississippi, leading to variation in when hospitals were actually desegregated. The Social Security Administration was on the ground

in these localities to ensure compliance (Quadagno 2000). Ken Almond and colleagues (Forthcoming) focused on the effects of this desegregation—and consequent increase in access to medical care—on black infant mortality and the racial gap in infant mortality. They focused on one of the leading causes of infant mortality during this era—specifically due to gastroenteritis and pneumonia, both of which required access to hospital based treatment for respiratory distress and dehydration. They found dramatic reductions in infant mortality for black infants but not white infants—during the period immediately following desegregation. For example the black infant mortality rate in Mississippi, which had remained virtually unchanged from 1955 through 1965, dropped from 325 in 1000 to 130 in 1000 between 1965 and 1967, while white infant mortality remained virtually unchanged. They were able to draw on very localized variation in the timing of the desegregation of these hospitals to demonstrate this effect throughout much of the South. And these effects were not observed in the North where hospitals had long been desegregated.

3.3 Social Welfare Policies: Income Supports

In early life, the largest income support policy to influence economic security is the Earned Income Tax Credit (EITC). The EITC largely benefits poor and lower middle class families. It is a 'refundable' tax credit. In short, this means that individuals do not simply pay fewer taxes, many receive an income subsidy in the form of a tax credit—that is they pay no income taxes and receive an income supplement. One must work to be eligible for the credit. Up to an earnings threshold (or phase-out), the credit rises as earnings rise, but then gradually declines after that earnings threshold. Maximum benefits top out at over \$6000 a year. EITC benefits lifted 5.3 million children above the poverty line in 2012. Further, it is estimated that 50 % of all families will receive the EITC for at least 1 year while

their children are below the age of 18 (Marr et al. 2014-CBPP).

The existing research focused on the EITC finds some meaningful health impacts of the program, particularly early in life. Researchers have used two different approaches to capturing exogenous variation in EITC benefits. The first approach relies on state variation over time in EITC benefits. States can supplement federal EITC benefits, and many states do. However, the supplements are relatively small. As a consequence, these estimates are likely underestimated (Larrimore 2011; Strully et al. 2010). Indeed, Strully and colleagues (2010) and Larrimore (2011) utilize this state variation and general health as an outcome found little impact of the EITC. More recent work, however, has utilized an alternative identification strategy that captures larger changes in benefits. In short, the largest increase in benefits associated with the EITC are related to the 1993 expansion, which expanded benefits more significantly for those with two or more children as compared to those with one child or no child. Utilizing the variation in benefits over time associated with family structure, the strongest evidence regarding the health impacts of the EITC focus on low-birth weight. For example, Hillary Hoynes and colleagues (2012) find that an increase in \$1000 worth of income leads to a 1.6–2.9 % reduction in the low birth weight rate, with the largest impacts reserved for African American mothers. A central mechanism appeared to be a reduction in maternal smoking; other research also found improvements in health behaviors (Rehkopf et al. 2014). There is also evidence that EITC benefits reduced child neglect (Berger et al. 2013).

Second only to the EITC, SNAP (or what we think of as Food Stamps), has had a large impact on the economic security of poor Americans and especially poor children. Between the ages of 1 and 20 nearly 50 % of all children will receive food stamp benefits. It is estimated that the program lifts nearly 2.5 million children above the poverty line. The SNAP program originated in the mid 1960s as a part of Lyndon Johnson's Great Society agenda. And most evidence indicates it has had a large impact on food insecurity

and the consequent health of infants and children (Cook et al. 2004). A study using state and county variation in the implementation of the food stamp program found large reductions in low birth weight and smaller reductions in neonatal mortality associated with the implementation of the program (Almond et al. 2011). While concerns have been raised in recent years that SNAP may encourage obesity via the consumption of high caloric non-nutritional foods, there is little evidence of any meaningful effect in this direction (Kaushal 2007). An associated program, Women, Infants and Children (WIC), which provides nutritional supports and education to pregnant women and new mothers finds a positive impact of the program on reducing low birth weight and also on breastfeeding, though these studies have not been able to utilize exogenous variation in benefit receipt and instead have attempted to rely on careful controls for observable measures that might confound their findings (Rossin-Slater 2013; Bitler and Currie 2005).

While there is an increasingly richly detailed exploration of how the EITC, SNAP, and WIC influence childhood health, the evidence regarding how these programs might influence adult health is far more limited. One important exception to this is a study by William Evans and Craig Gerthwaite (2010), which examined how EITC benefits impact mothers' health. They focused on the large expansion of the program that occurred in 1993 and then considered changes in health for women with very limited educational attainment and two or more children (the group of women most likely to be affected by the policy change) as compared to those with one child. These women experienced a reduced likelihood of poor mental health and improved measures of general health, including measures that captured biomarker data, such as C-Reactive protein, a marker for inflammation that is implicated in diseases ranging from cancer to cardiac disease. In terms of SNAP, one study did consider whether the use of the program increased the risk of obesity outcomes for immigrant adults and found little evidence of an effect (Kaushal 2007). There is no existing evidence examining how WIC influences mothers' health outcomes.

A key social welfare policy that could influence adult health is unemployment insurance. There is an enormous literature that documents the largely negative effects of unemployment on adult health, which a remarkably common experience for most individuals (for a review see Roelfs et al. 2011; Dooley et al. 1996). Over 90 % of individuals will have at least one unemployment spell, that is a uninterrupted period of 1 or more months in which an individual was unemployed, across their life and 70 % will have three or more spells. Further, it is an experience that disproportionately impacts those with low levels of educational attainment. Those without a high school degree will have an average of 8 spells compared to 3 spells for those with a college degree. Unemployment duration varies widely, but has been increasing from a low of 10–15 weeks from the 1950 to the 1980s to 32 weeks in 2014—though this may decline as the effects of Great Recession subside. Despite the commonness of the experience and the well-documented health impacts, there is only one existing study that looks at the effect of unemployment insurance on offsetting the negative health effects of unemployment. This study finds evidence that while unemployment increases the risk for poor mental health outcomes, access to unemployment insurance softens these effects. However, its effect is reduced if there is evidence of long-term unemployment (Tefft 2011).

While income support policies exert important impacts for children and adults, the largest income support policy, specifically Social Security, is targeted at older adults—though they do also serve those under age 62 who are blind, disabled, or a survivor of an individual eligible for Social Security. Focusing on the health effects of income support policies targeted at the elderly is especially sensible given that there are no other points in the life course when incomes are so extensively supplemented by income support policies. Indeed, in 2013, the U.S. delivered \$814 billion in Social Security benefits, which was approximately 25 % of overall federal spending. On average, Social Security comprises 40 % of annual incomes among those aged 65 and over. Moreover, it comprises 80 % of incomes for one-

fifth of those aged 65 and over (SSA 2014). Furthermore, for those that fall below eligibility guidelines for Social Security or those whose incomes fall well below the poverty threshold, there is another safety net to offset extreme poverty; Supplemental Security Income (SSI) subsidizes incomes for about 6 % of elderly Americans.

Indeed, Social Security and SSI have offset the most severe forms of economic deprivation among the elderly. This is critical from a health perspective because almost all prior evidence shows that the largest reductions in health are associated with changes in income among those with the most limited incomes (e.g., Backlund et al. 1996). Social Security has been remarkably effective at reducing poverty rates among the elderly. Between 1960 and 2005 the elderly poverty rate dropped from almost 30 to 10 % (Engelhardt and Gruber 2004). Almost all of this decline can be attributed to rising Social Security benefits (Engelhardt and Gruber 2004). SSI helps to further protect the very poor. At age 65, one would expect that the combination of eligibility for full Social Security benefits and SSI would further reduce poverty. Indeed, the percentage of those aged 65–69 falling below 75 % of the poverty level fell to 4.4 % (compared to 6.6 % among those aged 61). These changes in poverty rates do not prove that Social Security and SSI reduce severe poverty, but given the substantial role that these programs play in providing income for the poorest elderly Americans it certainly supports the point.

There is some evidence as to how Social Security and the Supplemental Security Income (SSI) may affect health. Indeed, Social Security is an obvious place to start given the magnitude of the program, its effect on elderly peoples' incomes, and its impact on poverty among elderly Americans. But it is difficult to estimate whether Social Security affects health. Simply examining whether those with higher Social Security benefits have better health will not indicate whether Social Security benefits improve health because Social Security benefits are based on individuals' prior earnings, which may have been negatively affected by prior health. Thus, lower Social Security benefits may have been determined by prior health status.

One strategy is to examine health impacts of an unanticipated change in income. Snyder and Evans (2006) use this type of design to examine the impact of varying Social Security benefits on mortality. Errant Social Security legislation led to a “notch,” with individuals with the exact same work histories born just before January 1, 1917 receiving higher Social Security benefits in old age than those born just after this date. The experimental group, despite receiving about 7 % higher Social Security benefits than the control group, had higher mortality rates after age 65 than the control group. While highly cited, this paper had two significant problems. First, the poorest beneficiaries, who are most likely to have health effects from income increases, had negligible income increases. For example, a notch beneficiary retiring at age 62 without a high school degree had just a 1 % higher benefit or a \$5 higher monthly benefit. Second, and even more concerning, is a recent paper by Elizabeth Weber Handwerker (2007) that found mortality differences between the experimental and control group previous to when these cohorts began collecting Social Security benefits. Thus, it is possible that the higher mortality rates of the “notch” group likely had little or nothing to do with the Social Security benefits, but rather the fact that they were sicker previous to receiving their Social Security benefits.

While Social Security may have had an important impact on health, it is very difficult to design a study that can appropriately estimate its effect today, if ever, because of its universality and the way an individual’s health affects their choice regarding when to collect Social Security benefits, in addition to the size of those benefits as a function of how health may have influenced earnings over the life courses. SSI, though more limited in the population affected, and its total effects on income, has some advantages for testing the effects of income supports on health. A key advantage is that SSI is targeted at the poorest elderly Americans (though the blind and disabled under age 65 are also eligible), and past research suggests that income supports that raise the incomes of the very poorest should have the largest health effects (Backlund et al. 1996).

The first study that examined the health effects of SSI looked at whether the implementation of the program had any affect on health. Taubman and Sickles (1983) used the Retirement History Survey to examine how the health of elderly recipients changed after they started receiving SSI. Individuals reported how their health compared to those of similar age—better, the same or worse. They found that SSI had a positive impact on the health of elderly beneficiaries. The health of individuals eligible for SSI previous to implementation was statistically significantly worse than the health of those not eligible. In both 1975 and 1977—after SSI was implemented—the difference in health was no longer significantly different between these two groups. There are a few problems with this study, however. First, declining differences in health may have been due to mortality selection—SSI recipients may have reflected a more robust group of survivors. Finally, SSI eligibility also guaranteed access to Medicaid as a supplement to Medicare. Thus, improved health may have been due to Medicaid, not SSI.

Work by Herd and colleagues (2008) sought to build on Taubman’s work, given both its promise and pitfalls, with an alternative empirical design to test whether SSI impacts health. Instead of testing whether the implementation of SSI has an effect on health, they tested whether variation in SSI maximum benefits over time within states predicts changes in health. Though there is a federal maximum SSI benefit, the states can supplement the federal benefit. The federal minimum is set at ~75 % of the poverty line. As with Social Security, SSI is adjusted to account for inflation. In 2000, the federal monthly income minimum was \$532 for single individuals and \$789 for married couples. In 1990 and 2000, 25 and 27 states, respectively, supplemented the federal benefit. Thus, are within state changes in maximum SSI benefits over time correlated with within state changes in disability? They found that increases in the maximum state SSI benefit were correlated with reductions in disability rates among the elderly, net of state and year fixed effects and other controls.

If we look outside of the U.S., however, there are more promising ways to test the causal effects

of income transfer policies on the health of the elderly. Indeed, some of the most promising studies have been in developing countries, though admittedly the extent of their applicability to the developed world is unclear. Under an income support experiment, titled PROGRESSA, the Mexican government has been providing since 1997 about \$800 million in aid to almost one-third of all rural families. The program has certain conditions that families must meet to obtain aid. Families must seek preventative health care, children up to age 5 must have their growth monitored in clinic visits, and mothers must receive prenatal care and receive health education counseling. Additional income supplements were also available if school age children attend school. Finally, the income was distributed directly to mothers, an important distinction in a patriarchal culture (Gertler 2000).

The results showed striking improvements in health for children, adults, and those over age 50. Those over age 50, whose only requirement for participation was a yearly preventative check up, had significant reductions in activity limitations due to illness, fewer days bedridden due to sickness, and more generally an increase in energy levels as measured by their ability to walk distances without significant fatigue. Children and adults also showed improved outcomes. But it could not be proven that income had an independent effect on the children's health, due to the medical care requirements linked to the receipt of income benefits. Because of its success the program is now being generalized to urban Mexico and adopted by Argentina, Columbia, Honduras, and Nicaragua.

4 Future Research Directions

The gap between the literature focused on the health effects of social welfare policies and life course research focused on health disparities has left some important lingering questions as to how health disparities develop and evolve over the life course. While examining how social welfare policies influence childhood health has proved to be important for understanding how economic and

social resources influence health, this literature could benefit from a life course perspective. How might we improve our understanding of health disparities by conducting social welfare policy research in the context of a life course perspective?

The first area of research that remains undeveloped is the extent to which the influence of policies on childhood health lingers across the life course. Do children who are exposed to lower levels of economic distress as a function of policy supports become adults with fewer health problems? As discussed above, the combination of the EITC and SNAP exerts significant and large impacts on poverty rates among children and families—and there is evidence of childhood health effects. But we don't know whether these effects continue to hold later in life. An analogous comparison would be the experimental literature regarding how preschools influence long-term education and earnings outcomes. There is evidence that these effects subside as individuals age (Shager et al. 2012).

More broadly, the debates among life course theorists regarding the relative influence of early, as compared to mid life, socioeconomic resources on later life health outcomes raises questions regarding the relative influence of social policies depending on the point in the life course at which these policies targeted. It may be that childhood is a sensitive period and improvements in economic security associated with social welfare policies have a greater cumulative influence on health across the life course as compared to social welfare policies targeted at adults, such as Social Security. Alternately, perhaps socioeconomic resources, improved by social welfare policies in adulthood, may offset the influence of early life deprivation on mid and later life health.

A key tenet of life course theory is the concept of linked lives and social ties. We do not exist in isolation from each other—policies not only influence individuals, they influence families. For example, policies targeted at children, like SNAP and the EITC, may improve both parent and child health via relational mechanisms. Reduced stress associated with economic deprivation may lead to both direct improvements in health by reduc-

ing individual stress, but also indirectly by improving cognitive and psychological development in children. There is a growing body of evidence that the stress associated with economic insecurity increases negative interactions between parents and children and negatively impacts brain development (Lupien et al. 2009; Teicher et al. 2003).

Life course theories could also inform existing policy research by focusing attention on the role of broader social ties and how these might influence whether—or how—social welfare policies influence health. For example, a longstanding interest has been whether housing programs that provide vouchers, which allow people to move out of ‘bad’ neighborhoods, can improve outcomes ranging from employment to health. Consequently, an experimental program titled *Moving to Opportunity*, which was sponsored by the U.S. Department of Housing and Urban Development, randomly assigned housing vouchers that allowed people in the experimental group to move to ‘better’ neighborhoods. While there were generally improvements in adult health—the findings were slightly more mixed among children (see also discussion in Browning et al. “*Neighborhood, Place, and the Life Course*”, this volume). In particular, male adolescents increased risky behaviors like smoking. Investigators found these effects surprising and hypothesized it may be that boys and girls socialize in different ways that makes boys more susceptible to negative influences (Ludwig et al. 2013). However, this doesn’t explain why, in some ways, the boys who remained in poor neighborhoods fared better than the boys who moved to neighborhoods with less poverty. A central question regards how the social ties of these children were altered with this move. For example, were they actually more isolated as poor individuals in better off neighborhoods—reducing the degree to which neighborhood parents might help keep negative behaviors in check?

Life course theories might also inform thinking as to how social welfare policies affect transitions, trajectories and pathways across the life course. For example, if policies like the EITC influence schooling transitions by increasing the propensity for children to complete more years of

schooling, this influences long-term health trajectories via the influence of educational attainment on health (Herd 2010). In turn, there is considerable evidence as to how educational attainment influences the entry into—and exits from—marriage. Patterns of coupling and decoupling—pathways into and out of marriage—all have implications for health (Williams and Umberson 2004; Umberson et al. 2006).

More broadly, if we want to understand how health disparities develop and evolve across the life course, it is critical that we understand the role that social policies have played in influencing this process. Would health disparities be even wider if not for the influence of redistributory policies? That is, to what extent are existing findings in the literature, in part, a function of social welfare policies? These questions remain unanswered and hold clues both to what shapes health disparities, but also how to ameliorate health disparities.

The life course literature can also learn from existing policy research lessons about how to identify exogenous factors that influence health. Scholars operating in the life course perspective are interested in how SEP and health affect each other in complex ways over the life course to produce health disparities across the life course. This includes acknowledging that SEP and health likely have reciprocal relationships across the life course, contributing to chains of risk and accumulation of risk that individuals face as they age (Haas 2008; Hayward and Gorman 2004; Robert et al. 2010). The policy literature provides an alternative tool set for identifying, for example, exogenous changes in income (via income support policies) that helps address the underlying reciprocal nature of these relationships to better ensure that results identify a causal impact of income, for example, on health, as opposed to the reverse. The common techniques employed, many of which are discussed throughout this chapter, all rely on variation in the implementation of policies across geographic areas (often states) and time.

It is important to remember, however, that this approach is not without limitations. There are two key issues that can undermine this strategy.

First, other exogenous variables can be correlated with the policy change that may confound results showing a relationship between a social welfare policy and a health outcome. For example, studies focused on the influence of Medicaid expansions on childhood health that failed to address the simultaneous expansion of WIC (an income supplement) for which many individuals were automatically identified as eligible for one program if they participated in the other, make it difficult to assess whether shown health improvements were a function of access to health insurance or income supports. Second, it is also the case that the ‘treatment’ needs to be valid. For example, if one examines the influence of income supports on health, policies that exert a small influence on the low end of the income distribution are unlikely to demonstrate large health effects given the non-linear relationship between income and health (Backlund et al. 1996).

5 Conclusion

More broadly, the research focused on the development of health disparities across the life course needs to theoretically tackle the role that the state has in shaping access to, and the distribution of, economic and social resources via social welfare policies, including more broadly other redistributive systems, especially the tax system. Home mortgage deductions, child care subsidies, health insurance tax subsidies, among others, constitute nearly \$470 billion dollars a year that is redistributed among American taxpayers, which is equivalent to 20 % of federal spending. While we tend to focus on the relative lack of generosity of the US welfare state as compared to our European counterparts and our comparative poor health outcomes, this has possibly led us to underestimate the actual size and influence of the US welfare state—even if it is weaker in a relative sense. Nonetheless, the relative inattention to the state in the context of the life course perspective (notable exceptions including O’Rand and Henretta 1999; Mayer and Schoepflin 1989; Leisering 2003)—as compared to social institutions such as work, family, and education — has undermined

our ability to understand the development and evolution of health disparities across the life course.

References

- Aizer, A., & Currie, J. (2014). The intergenerational transmission of inequality: Maternal disadvantage and health at birth. *Science*, 344(6186), 856–861.
- Almond, D., & Currie, J. (2011). Killing me softly: The fetal origins hypothesis. *The Journal of Economic Perspectives*, 25(3), 153–172.
- Almond, D., Hoynes, H. W., & Schanzenbach, D. W. (2011). Inside the war on poverty: The impact of food stamps on birth outcomes. *The Review of Economics and Statistics*, 93(2), 387–403.
- Alwin, D. F., & Wray, L. A. (2005). A life-span development perspective on social status and health. *The Journals of Gerontology Series B*, 60B, 7–14.
- Backlund, E., Sorlie, P. D., & Johnson, N. J. (1996). The shape of the relationship between income and mortality in the United States: Evidence from the National Longitudinal Mortality Study. *Annals of Epidemiology*, 6(1), 12–20.
- Baicker, K., Taubman, S. L., Allen, H. L., Bernstein, M., Gruber, J. H., Newhouse, J. P., Schneider, E. C., Wright, B. J., Zaslavsky, A. M., & Finkelstein, A. N. (2013). The Oregon experiment—Effects of Medicaid on clinical outcomes. *New England Journal of Medicine*, 368(18), 1713–1722.
- Barker, D. J. P. (Ed.). (1992). *Fetal and infant origins of adult disease*. London: British Medical Journal Books.
- Barker, D. J., Gluckman, P. D., Godfrey, K. M., Harding, J. E., Owens, J. A., & Robinson, J. S. (1993). Fetal nutrition and cardiovascular disease in adult life. *Lancet*, 10, 938–941.
- Berger, L. M., Hill, J., & Waldfogel, J. (2005). Maternity leave, early maternal employment and child health and development in the US*. *The Economic Journal*, 115(501), F29–F47.
- Berger, L. M., Font, S. A., Slack, K. S., & Waldfogel, J. (2013). Income and child maltreatment: Evidence from the earned income tax credit. *Paper prepared for presentation at the 2013 Annual Meeting of the Association of Public Policy Analysis and Management*, Washington, DC.
- Bitler, M. P., & Currie, J. (2005). Does WIC work? The effects of WIC on pregnancy and birth outcomes. *Journal of Policy Analysis and Management*, 24(1), 73–91.
- Blackwell, D. L., Hayward, M. D., & Crimmins, E. M. (2001). Does childhood health affect chronic morbidity in later life? *Social Science & Medicine*, 52, 1269–1284.
- Bradley, R. H., Caldwell, B. M., & Rock, S. L. (1988). Home environment and school performance: A ten-year follow-up and examination of three models of

- environmental action. *Child Development*, 59(4), 852–867.
- Bradley, R. H., Caldwell, B. M., Rock, S. L., Ramey, C. T., Barnard, K. E., Gray, C., Hammon, M. A., & Johnson, D. L. (1989). HOME environment and cognitive development in the first 3 years of life: A collaborative study involving six sites and three ethnic groups in North America. *Developmental Psychology*, 25(2), 217.
- Burchinal, M. R., Peisner-Feinberg, E., Bryant, D. M., & Clifford, R. (2000). Children's social and cognitive development and child-care quality: Testing for differential associations related to poverty, gender, or ethnicity. *Applied Developmental Science*, 4(3), 149–165.
- Case, A., Lubotsky, D., & Paxson, C. (2002). Economic status and health in childhood: The origins of the gradient. *The American Economic Review*, 92, Washington, DC, 1308–1334.
- Case, A., Fertig, A., & Paxson, C. (2005). The lasting impact of childhood health and circumstance. *Journal of Health Economics*, 24, 365–389.
- Center on Budget and Policy Priorities. (2015). Policy basics: Where do our tax dollars go? <http://www.cbpp.org/sites/default/files/atoms/files/4-14-08tax.pdf>. Accessed 6 Aug 2015.
- Chatterji, P., & Markowitz, S. (2008). *Family leave after childbirth and the health of new mothers* (No. w14156). National Bureau of Economic Research. MA: Boston
- Conti, G., & Heckman, J. J. (2013). The developmental approach to child and adult health. *Pediatrics*, 131(Supplement 2), S133–S141.
- Conti, G., & Heckman, J. J. (2014). *Economics of child well-being* (pp. 363–401). Dordrecht: Springer.
- Conway, K. S., & Kutinova, A. (2006). Maternal health: Does prenatal care make a difference? *Health Economics*, 15(5), 461–488.
- Cook, J. T., Frank, D. A., Berkowitz, C., Black, M. M., Casey, P. H., Cutts, D. B., Meyers, A.F., Zaldívar, N., Skalicky, A., Levenson, S., Heeren, T. & Nord, M. (2004). Food insecurity is associated with adverse health outcomes among human infants and toddlers. *The Journal of Nutrition*, 134(6), 1432–1438.
- Currie, J., & Grogger, J. (2002). Medicaid expansions and welfare contractions: Offsetting effects on prenatal care and infant health? *Journal of Health Economics*, 21(2), 313–335.
- Currie, J., & Gruber, J. (1996). Saving babies: The efficacy and cost of recent changes in the medicaid eligibility of pregnant women. *Journal of Political Economy*, 6, 1263–1296.
- Currie, J., Decker, S., & Lin, W. (2008). Has public health insurance for older children reduced disparities in access to care and health outcomes? *Journal of Health Economics*, 27(6), 1567–1581.
- Dagher, R. K., McGovern, P. M., & Dowd, B. E. (2014). Maternity leave duration and postpartum mental and physical health: Implications for leave policies. *Journal of Health Politics, Policy and Law*, 39(2), 369–416.
- Daku, M., Raub, A., & Heymann, J. (2012). Maternal leave policies and vaccination coverage: A global analysis. *Social Science & Medicine*, 74(2), 120–124.
- Danese, A., Caspi, A., Williams, B., Ambler, A., Sugden, K., Mika, J., Werts, H., Freeman, J., Pariante, C. M., Moffitt, T. E. & Arseneault, L. (2010). Biological embedding of stress through inflammation processes in childhood. *Brain, Behavior, and Immunity*, 24, S8.
- Dooley, D., Fielding, J., & Levi, L. (1996). Health and unemployment. *Annual Review of Public Health*, 17(1), 449–465.
- Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2014). Boosting family income to promote child development. *The Future of Children*, 24, 99–120.
- Engelhardt, G., & Gruber, J. (2004). *Social security and the evolution of elderly poverty* (NBER Working Paper No. 10466). Cambridge, MA: NBER.
- Estrada, P., Arsenio, W. F., Hess, R. D., & Holloway, S. D. (1987). Affective quality of the mother–child relationship: Longitudinal consequences for children's school-relevant cognitive functioning. *Developmental Psychology*, 23(2), 210.
- Evans, W. N., & Garthwaite, C. L. (2010). *Giving mom a break: The impact of higher EITC payments on maternal health* (No. w16296). Boston, MA: National Bureau of Economic Research.
- Galobardes, B., Lynch, J. W., & Smith, G. D. (2008). Is the association between childhood socioeconomic circumstances and cause-specific mortality established? Update of a systematic review. *Journal of Epidemiology and Community Health*, 62(5), 387–390.
- Gertler, P. (2000). *Final report: The impact of PROGRESA on health*. Washington, DC: International Food Policy Research Institute.
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (1994). Role of parental motivational practices in children's academic intrinsic motivation and achievement. *Journal of Educational Psychology*, 86(1), 104.
- Guralnik, J. M., Butterworth, S., Wadsworth, M. E. J., & Kuh, D. (2006). Childhood socioeconomic status predicts physical functioning a half century later. *Journals of Gerontology Biological and Medical Sciences*, 61, 694–701.
- Haas, S. A. (2006). Health selection and the process of social stratification: The effect of childhood health on socioeconomic attainment. *Journal of Health and Social Behavior*, 47, 339–354.
- Haas, S. A. (2008). Trajectories of functional health: The 'long arm' of childhood health and socioeconomic factors. *Social Science & Medicine*, 66, 849–861.
- Hayward, M. D., & Gorman, B. (2004). The long arm of childhood: The influence of early life conditions on men's mortality. *Demography*, 41, 87–108.
- Heckman, J. J. (2007). The economics, technology, and neuroscience of human capability formation. *Proceedings of the National Academy of Sciences*, 104(33), 13250–13255.

- Heckman, J. J. (2012). The developmental origins of health. *Health Economics*, 21(1), 24–29.
- Heckman, J. J., Pinto, R., & Savellyev, P. A. (2012). *Understanding the mechanisms through which an influential early childhood program boosted adult outcomes* (No. w18581). Boston, MA: National Bureau of Economic Research.
- Herd, P., Schoeni, R. F., & House, J. S. (2008). Upstream solutions: Does the supplemental security income program reduce disability in the elderly? *Milbank Quarterly*, 86, 5–45.
- Herd, P. (2010). Education and health in late-life among high school graduates cognitive versus psychological aspects of human capital. *Journal of Health and Social Behavior*, 51(4), 478–496.
- Holland, P., Berney, L., Blane, D., Davey Smith, G., Gunnell, D. J., & Montgomery, S. M. (2000). Life course accumulation of disadvantage: Childhood health and hazard exposure during adulthood. *Social Science and Medicine*, 50, 1285–1295.
- Hoynes, H. W., Miller, D. L., & Simon, D. (2012). *Income, the earned income tax credit, and infant health* (No. w18206). Boston, MA: National Bureau of Economic Research.
- Kaushal, N. (2007). Do food stamps cause obesity?: Evidence from immigrant experience. *Journal of Health Economics*, 26(5), 968–991.
- Knudsen, E. I., Heckman, J. J., Cameron, J. L., & Shonkoff, J. P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences*, 103(27), 10155–10162.
- Larrimore, J. (2011). Does a higher income have positive health effects? Using the earned income tax credit to explore the income-health gradient. *Milbank Quarterly*, 89(4), 694–727.
- Lawlor, D. A., Ebrahim, S., & Davey Smith, G. (2005). Adverse socioeconomic position across the life course increases coronary heart disease risk cumulatively. *Journal of Epidemiology & Community Health*, 59, 785–793.
- Leisering, L. (2003). *Government and the life course* (pp. 205–225). New York.
- Luo, Y., & Waite, L. J. (2005). The impact of childhood and adult SES on physical, mental, and cognitive well-being in later life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 60(2), S93–S101.
- Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience*, 10(6), 434–445.
- Ludwig, J., Duncan, G. J., Gennetian, L. A., Katz, L. F., Kessler, R. C., Kling, J. R., & Sanbonmatsu, L. (2013). *Long-term neighborhood effects on low-income families: Evidence from moving to opportunity* (No. w18772). Boston: National Bureau of Economic Research.
- Lynch, J. W., Kaplan, G. A., Cohen, R. D., Wilson, T. W., Smith, N. L., Kauhanen, J., & Salonen, J. T. (1994). Childhood and adult socioeconomic status as predictors of mortality in Finland. *The Lancet*, 343(8896), 524–527.
- Markus, A. R., Andres, E., West, K. D., Garro, N., & Pellegrini, C. (2013). Medicaid covered births, 2008 through 2010, in the context of the implementation of health reform. *Women's Health Issues*, 23(5), e273–e280.
- Marmot, M., Shipley, M., Brunner, E., & Hemingway, H. (2001). Relative contribution of early life and adult socioeconomic factors to adult morbidity in the Whitehall II study. *Journal of Epidemiology and Community Health*, 55(5), 301–307.
- Marr, C., Charite, J., & Huang, C. C. (2014). *Earned Income Tax Credit promotes work, encourages children's success at school, research finds*. Washington, DC: Center on Budget and Policy Priorities. <http://www.cbpp.org/files/6-26-12tax.pdf>
- Mayer, K. U., & Schoepflin, U. (1989). The state and the life course. *Annual Review of Sociology*, 15, 187–209.
- McWilliams, J. M., Meara, E., Zaslavsky, A. M., & Ayanian, J. Z. (2007). Health of previously uninsured adults after acquiring Medicare coverage. *JAMA*, 298(24), 2886–2894.
- McWilliams, J. M., Meara, E., Zaslavsky, A. M., & Ayanian, J. Z. (2010). Commentary: Assessing the health effects of medicare coverage for previously uninsured adults: A matter of life and death? *Health Services Research*, 45(5p1), 1407–1422.
- Mortimer, J. T., & Shanahan, M. J. (Eds.). (2004). *Handbook of the life course*. New York: Springer.
- National Scientific Council on the Developing Child. (2011). *Children's emotional development is built into the architecture of their brains* (Working Paper No. 2, 3rd Printing). Retrieved from <http://developingchild.harvard.edu/index.php?cID=152>
- O'Rand, A. M., & Henretta, J. C. (1999). *Age and inequality: Diverse pathways through later life*. Boulder: Westview Press.
- Palloni, A. (2006). Reproducing inequalities: Luck, wallets, and the enduring effects of childhood health. *Demography*, 43, 587–615.
- Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, 46(2), 205–219.
- Pensola, T. H., & Martikainen, P. (2003). Cumulative social class and mortality from various causes of adult men. *Journal of Epidemiology Community Health Services*, 57, 745–751.
- Petronis, A. (2010). Epigenetics as a unifying principle in the aetiology of complex traits and diseases. *Nature*, 465(7299), 721–727.
- Pianta, R. C., Nimetz, S. L., & Bennett, E. (1997). Mother-child relationships, teacher-child relationships, and school outcomes in preschool and kindergarten. *Early Childhood Research Quarterly*, 12(3), 263–280.

- Polsky, D., Doshi, J. A., Escarce, J., Manning, W., Paddock, S. M., Cen, L., & Rogowski, J. (2009). The health effects of medicare for the near-elderly uninsured. *Health Services Research, 44*(3), 926–945.
- Polsky, D., Doshi, J. A., Manning, W. G., Paddock, S., Cen, L., Rogowski, J., & Escarce, J. J. (2010). Response to McWilliams commentary: “Assessing the health effects of medicare coverage for previously uninsured adults: A matter of life and death?”. *Health Services Research, 45*(5), 1423–1429.
- Power, C., Hypponen, E., & Davey Smith, G. (2005). Socioeconomic position in childhood and early adult life and risk of mortality: A prospective study of the mothers of the 1958 British birth cohort. *American Journal of Public Health, 95*, 1396–1402.
- Quadagno, J. B. (2000). Promoting civil rights through the welfare state: How medicare integrated southern hospitals. *Social Problems, 47*, 68–89.
- Rehkopf, D. H., Strully, K. W., & Dow, W. H. (2014). The short-term impacts of Earned Income Tax Credit disbursement on health. *International Journal of Epidemiology, 43*(6), 1884–1894.
- Robert, S. A., Cagney, K. A., & Weden, M. M. (2010). A life-course approach to the study of neighborhoods and health. In C. Bird, P. Conrad, A. Fremont, & S. Timmermans (Eds.), *The handbook of medical sociology* (pp. 124–143). Nashville: Vanderbilt University Press.
- Roelfs, D. J., Shor, E., Davidson, K. W., & Schwartz, J. E. (2011). Losing life and livelihood: A systematic review and meta-analysis of unemployment and all-cause mortality. *Social Science & Medicine, 72*(6), 840–854.
- Rossin, M. (2011). The effects of maternity leave on children’s birth and infant health outcomes in the United States. *Journal of Health Economics, 30*(2), 221–239.
- Rossin-Slater, M. (2013). WIC in your neighborhood: New evidence on the impacts of geographic access to clinics. *Journal of Public Economics, 102*, 51–69.
- Ruhm, C. J. (2000). Parental leave and child health. *Journal of Health Economics, 19*(6), 931–960.
- Shager, H. M., Schindler, H. S., Magnuson, K. A., Duncan, G. J., Yoshikawa, H., & Hart, C. M. (2012). Can research design explain variation in head start research results? A meta-analysis of cognitive and achievement outcomes. *Educational Evaluation and Policy Analysis, 0162373712462453*.
- Shager, H. M., Schindler, H. S., Magnuson, K. A., Duncan, G. J., Yoshikawa, H., & Hart, C. D. (2013). Can research design explain variation in head start research results? A meta-analysis of cognitive and achievement outcomes. *Educational Evaluation and Policy Analysis, 35*(1), 76–95.
- Sherman, A., Trisi, D., & Parrot, D. (2013). Various supports for low-income families reduce poverty and have long-term positive effects on families and children. Washington, D.C.: Center on Budget and Policy Priorities. <http://www.cbpp.org/sites/default/files/atoms/files/7-30-13pov.pdf>. Accessed 14 Nov 2014.
- Shonkoff, J. P., & Phillips, D. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Singh-Manoux, A., Ferrie, J., Chandola, T., & Marmot, M. (2004). Socioeconomic trajectories across the life course and health outcomes in midlife: Evidence for the accumulation hypothesis? *International Journal of Epidemiology, 33*, 1072–1079.
- Snyder, S. E., & Evans, W. N. (2006). The effect of income on mortality: Evidence from the social security notch. *The Review of Economics and Statistics, 88*, 482–495.
- Strully, K. W., Rehkopf, D. H., & Xuan, Z. (2010). Effects of prenatal poverty on infant health state earned income tax credits and birth weight. *American Sociological Review, 75*(4), 534–562.
- Social Security Administration. (2014). *Fast facts and figures about social security, 2014*. Baltimore: Social Security Administration. http://www.ssa.gov/policy/docs/chartbooks/fast_facts/index.html. Accessed 2 Dec 2014.
- Tanaka, S. (2005). Parental leave and child health across OECD countries*. *The Economic Journal, 115*(501), F7–F28.
- Taubman, P. J., & Sickles, R. C. (1983). *Supplemental social insurance and the health of the poor* (NBER Working Paper No. 1062). Cambridge, MA: NBER.
- Tefft, N. (2011). Insights on unemployment, unemployment insurance, and mental health. *Journal of Health Economics, 30*(2), 258–264.
- Teicher, M. H., Andersen, S. L., Polcari, A., Anderson, C. M., Navalta, C. P., & Kim, D. M. (2003). The neurobiological consequences of early stress and childhood maltreatment. *Neuroscience & Biobehavioral Reviews, 27*(1), 33–44.
- U.S. Census Bureau. (2014). *Health insurance coverage in the United States: 2013* (Current population reports, P60–250). Washington, D.C.: U.S. Government Printing Office.
- Umberson, D., Williams, K., Powers, D. A., Liu, H., & Needham, B. (2006). You make me sick: Marital quality and health over the life course. *Journal of Health and Social Behavior, 47*(1), 1–16.
- Wamala, S. P., Lynch, J., & Kaplan, G. A. (2001). Women’s exposure to early and later life socioeconomic disadvantage and coronary heart disease risk: The Stockholm Female Coronary Risk Study. *International Journal of Epidemiology, 30*(2), 275–284.
- Weber Handwerker, E. A. (2007). *Empirical essays in the economics of aging*. Doctoral dissertation, University of California, Berkeley, 2007. Proquest Dissertations and Theses, 3275438.
- Williams, K., & Umberson, D. (2004). Marital status, marital transitions, and health: A gendered life course perspective. *Journal of Health and Social Behavior, 45*(1), 81–98.

Life Course Risks and Welfare States' Risk Management

Martin Diewald

1 Introduction

For many years, the formative influence of the welfare state on the life course has been subject of life course theory and research (see, e.g., Mayer and Müller 1986). Indeed, the complex intersections between the life course and welfare state were important motivations for the collection of extensive longitudinal data on a large scale. More such data than ever have become available over the last two decades, allowing for in-depth cross-national and historical analyses in this field. But despite the opportunities such data provide, there is still considerable uncertainty about how best to conceptualize the influences of the welfare state on the life course and how to make full use of the concepts that life course research has to offer.

Given that there is no overarching life course theory and that there are a variety of approaches to examine welfare state influences, the question is, what concepts might be most suitable for elucidating features of welfare states and their consequences for the life course? If these concepts are to be used to study welfare states, they must give due consideration not only to the diversification and historical transformation of political economies that result from specific policies, but

also to the fact that such specific policies are embedded within the welfare state agencies that develop and implement them and that consist of relatively stable laws, institutions, and cultures (Kaufmann 2012). If they are also to be used to study the life course, such concepts must give equal consideration not only to the direct and immediate influences of institutions and policies on people but also to the longer-term temporal patterns of influences over and above the immediate intended ones. That is, to the side effects on other life domains, and possible consequences for the significant others of the individuals to whom policy interventions are aimed. In other words, researchers must take into account the fundamental principles of the life course approach to be able to study the causal nexus between states and events over lifetimes, interdependent developments in different life domains, and linked lives (see Elder 1995).

In this essay I use the concepts 'life course risks' and 'risk management by the welfare state' because they offer a promising approach to study the relationship between welfare states and life courses in general and the production of social inequalities in particular. The life course risk concept is not new; rather, it is based on the work of several scholars whose concepts I will develop further, with a focus on how the life course risk concept can contribute to our understanding of the mechanisms behind the major impact the state has on stratification. I first introduce the life

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course risk concept and its distinction from life course adversity (Part 2). I will give particular attention to life course concepts that relate to longer-term impacts on the distribution of life chances. I then discuss approaches that embed the risk concept in a broader framework of mechanistic approaches to stratification and relational inequality theory (Part 3). Following this discussion, I introduce risk management as an important part of welfare states' agency that has not yet been given the attention it deserves in life course research (Part 4).

2 Life Course Risks and Adversity

The term 'risk' is often used in a rather vague and ambiguous manner or is used to define merely statistical relationships, but it can also help us develop theory in life course research (Mayer 2009: 424). The terms 'risk' and 'adversity' are often confused and used interchangeably. Schoon and Bynner (2003), for example, note that adversity, or risk, 'can encompass genetic, biological, psychological, or socioeconomic factors that are associated with increased risk of maladjustment' (Schoon and Bynner 2003: 22). In contrast, Ferraro et al. (2009: 422) explicitly advocate a conceptual distinction between 'risk' and 'adversity,' defining 'risk' as the probability of a hazard or negative event occurring in the future, stating that "once a risk eventuates in a negative outcome, it becomes a disadvantage [or adversity]" (see also O'Rand 2003: 694). Events and states that may not be perceived as adverse or disadvantageous can increase the risk of later adversity. For example, parental pampering of children is often perceived as comfortable but might at the same time prevent the development of tenacity and necessary adaptive skills. Furthermore, adversity may or may not create risk for future adversity, depending on the availability of coping resources and successful coping strategies.

These considerations explicitly connect risk and adversity to the agency of individuals, networks, organizations, and institutions. Ferraro

et al. (2009: 425) specifically mention the role of the individual's social, economic, and psychological resources and the mobilization of these resources in shaping life trajectories (see also O'Rand 2001; Schoon and Bynner 2003). All of these resources (e.g., significant others, like parents or friends, and organizational supports) may help to prevent risks from turning into adversity. The individual's agency, likewise, can prevent exposure to risk and disrupt the association between risk exposures and actual adversity.

The same is true for state agency, the state's purposive actions to shape the lives of its citizens. According to DiPrete (2002: 268) risky life events do not necessarily lead to adverse living conditions because the possible adverse consequences of risky life events may be mitigated by welfare states to a considerable degree. He demonstrates the striking differences between welfare state regimes in shaping risks in terms of the incidence of risky life events and of buffers against their adverse consequences. For example, some welfare states, like the German one, discourage a decision to divorce in order to avoid this risky event, but, if it occurs, they fail to compensate for adversities such as divorce's negative consequences for income. Other welfare states, like the Swedish one, do not try to discourage divorce, but, if it occurs, they buffer effectively against negative financial consequences. Thus, both the person and state need to be conceptualized in terms of preventing risks and, should they occur, preventing adversity.

A multidisciplinary life course framework acknowledges that causal factors for life course risks and adversity may be the result of specific developments at several levels over time. The starting point is the fundamental question of how society affects the individuals who live within its boundaries: Whom does the state favor? To identify possible causal nexuses that might create risks over individuals' life courses, I distinguish, for heuristic purposes, among three levels of development, each with two possible outcomes (see also Diewald et al. 2015):

- (a) The development of favorable or unfavorable physiological or mental characteristics,

- often, to some degree, as a result of genetic variation;
- (b) the manifestation of such embodied characteristics in favorable or detrimental decisions and behaviors;
 - (c) the transformation of behavior into unequal life chances—risk and exposure—as a result of these characteristics and behaviors.

The definition of risk starts with heterogeneity in the genetic propensity and physiological processes to exhibit certain “embodied” characteristics that play a role for advantage and disadvantage. A definition of risk at the level of individual development has to be aware that general skills may be relevant for a number of outcomes in several life domains and life phases. For example, early self-control appears to be related to many outcomes in later life. And contrary to the conventional view, this understanding of ‘risk’ should not be limited to the emergence of negative characteristics and behavior (e.g., aggression, anxiety). Risk also involves low or no propensity to exhibit favorable and protective characteristics (Nisbett et al. 2012). Finally, the blocking of detrimental characteristics and behaviors and the activation of favorable ones is conducive to socio-economic attainment.

In addition to these levels of development, we must still identify possible additional factors “outside the individual” that may mediate or moderate these interrelated developments, namely on the levels of families, social networks, neighborhoods, and wider social contexts such as organizations and national and supranational societies. For example, genetic risk for deviant behavior may be counteracted by effective social control (Shanahan et al. 2008), perhaps by the family or state interventions (e.g., mentoring programs).

There may be a tendency of risks to generate more risks and of advantage to create more advantage over the life course. Trajectories may, however, be altered by the mobilization of individual and social resources and by the activation of individual agency (Ferraro et al. 2009). However, the empirical results on the long-term influence of early-life events on later-life events

are mixed and do not support assumptions of continuity as unambiguously as life course researchers might wish (see Mayer 2009: 417–418 for an overview). Obviously, there is also room for reversion to and compensation for early risk and adversity, and it appears that the mechanisms that cause perpetuation or reversion are quite specific depending on different antecedents, outcomes, and times and places. This point is illustrated by research on unemployment and the question of why unemployment leads to future unemployment. Heckman and Borjas (1980) observe that a continuation of unemployment risk may be due to already existing and enduring skill or motivation deficits that repeatedly lead to such adversity. Insofar as it is due to such individual heterogeneity, it is unlikely that adversity will be compensated later on but rather will continue due to the same reasons of skill or motivation deficits, leading repeatedly to unfavorable behaviors. The emergence of these characteristics themselves—the first of the three level risk concept displayed above—then becomes a major task in identifying the ‘risk chain’ over the life course. The same is true for the transmission of risk across family generations (see chapter “Three Generation Studies: Methodological Challenges and Problems” by Thornberry, this volume). Thus, what appears to be risk and adversity may in fact be endogenous to very early developmental patterns. This is not a statistical point but rather a substantive one: a life course approach to risk and adversity must begin with the developmental emergence of basic behavioural patterns and decision-making resources that the person will then bring to subsequent situations.

Accordingly, risk analysis must also involve taking into account an individual-development perspective in addition to examining events and trajectories alone (see Diwald and Mayer 2009). However, this chain of risk is also due to how experiences of unemployment alter skills and motivation and how they lead to unfavorable behaviors. These can be considerably mitigated through state agency, avoiding such a downward spiral. Gangl (2004) showed that higher unemployment benefits prolong the duration of

unemployment but, at the same time, allow workers to sustain their search for adequate jobs, which ultimately avoided longer-run scarring effects. Gangl showed that avoiding such scarring effects is a major advantage in Germany in contrast to the US. Thus, policy regimes play a critical role in shaping the individual's developmental and life course patterns.

To summarize thus far: Risk and adversity are two interrelated but distinct concepts. Whether a risk leads to adversity is dependent on intervening forces at the levels of the individual, significant others, social contexts, and the mitigating role of welfare state policies and institutions. Over the life course, the emergence of risk starts with the development of unfavorable characteristics reflecting early biological differences (e.g., genetic and intrauterine experiences), as precursor of unfavorable decisions and behaviors, which finally may lead to adversity. However, risk is not only the probability that unfavorable characteristics, behaviors, and adversities occur but also the probability that, against the odds, genetic propensities to favourable characteristics do not unfold, that favourable characteristics do not lead to favourable behaviors and, finally, do not lead to advantage.

3 Risks and Relational Theories of Stratification

Although the circumstances by which risk occurs might indeed be complex and specific for every single risk (divorce, unemployment, serious illness), there continues to be a remarkable gap between such life course risk concepts and theories that could put the risk and adversity generating steps described above into a coherent theoretical framework of stratification. Here, I propose taking mechanistic explanations of relational inequalities for such a framework. Relational inequality theory (Tilly 1998; Avent-Holt and Tomaskovic-Devey 2014) deals with the question of why some people get more respect, resources, and rewards than others. 'Relational' means that inequalities are not characteristics situated in people or status positions but are

negotiated in relationships between people and status groups. Diewald and Faist (2011) distinguished four major groups of attributes of negotiations that characterize relational inequalities: (1) ascriptive attributes such as distinguishing physiological features, gender, age, nationality, and ethnicity; (2) cultural preferences, ways of life, lifestyles, attitudes, and orientations; (3) competencies, qualifications, and characteristics that are regarded by a society as legitimate mechanisms for the allocation of opportunities or that are at least discussed as such; and (4) the differentiation of activities in the context of social division of labor.

How does the emergence of inequalities out of such heterogeneities fit into the risk and adversity framework developed above? This is illustrated in Fig. 1: The risk pathway outlined in the previous section characterizes processes over the life course shaped by social mechanisms that create inequalities between such related groups—in our case with respect to the emergence of risk and adversity. The most prominent and quite universal social mechanism found in the literature is social closure. Social closure means conscious or unconscious attempts of one group to exclude other groups from access to scarce cultural and material resources, like occupational positions, income, respect, citizenship rights, welfare state benefits, or education. Social closure comprises mechanisms that are often discussed with different labels, like boundary making, stereotyping, stigmatization, or opportunity hoarding (Tilly 1998; Reskin 2003; Diewald and Faist 2011; Tomaskovic-Devey 2014).

The basic idea is that relational group membership (e.g., low and high SES groups) moderates risk pathways, as shown in the figure. For example, Guo and Stearns (2002) compared the levels of realized genetic potential for intellectual development across different social groups. They showed that children from disadvantaged social backgrounds have lower chances to realize their genetic potential than those from a social background with more resources and no ethnic discrimination. In other words, children from disadvantaged backgrounds are excluded from opportunities to develop their genetic endowments.

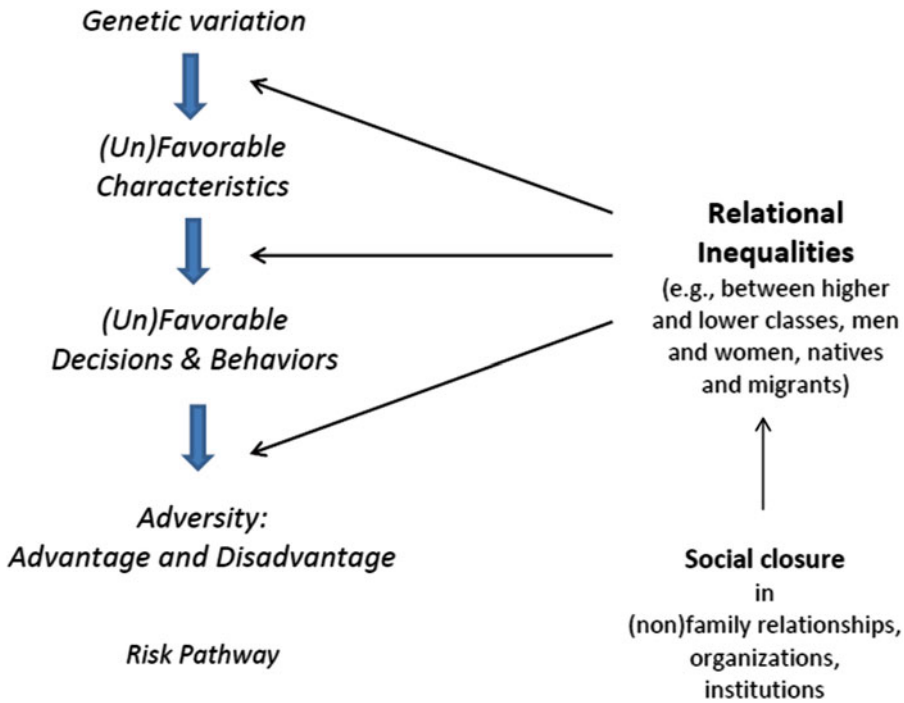


Fig. 1 Risk, adversity, and relational inequalities

This example shows in addition that advantage and disadvantage are not only a possible consequence of risk but can themselves become a risk for further developments in a longitudinal perspective.

A similar inequality in risk exposure can be demonstrated for the path from characteristics to decisions and behavior. According to Breen and Goldthorpe (1997) children with the same ability and the same school performance have different chances for higher educational tracks dependent on the social class of their parents. The reason is a ‘relative risk aversion’ mechanism: Educational decisions are ultimately motivated by the desire to avoid downward class mobility, and this motivation is stronger than the desire to reach upward mobility. For higher class families this means that children have to reach higher educational degrees than it is necessary for lower class families. In other words, the motivation for higher educational degrees is stronger in higher than in lower classes where the costs of pursuing further education outweigh the utility of acquiring more education earlier in the school career. In conse-

quence children from lower class background obtain less education than those from higher class backgrounds with the same ability and school performance.

That is, life-time patterns of risk and adversity are shaped by membership in relational groups. Moreover, we have an important starting point from which state agency can be evoked: equal opportunity at all steps in the development from genetic variation to adversity (see Roemer 1998 for an extensive discussion about how this could be operationalized). If we use a risk framework as outlined above, the question is not simply whether or not one can escape from the class or socio-economic status of origin but whether social closure based on unequal distribution of risk exposure, risk compensation, and risk accumulation contributes to shaping the reproduction of social origin or downward and upward mobility, respectively.

Schoon (2006) has shown that socio-economic adversity in the parental home is a factor that persistently presents significant risks for a variety of outcomes over at least the early life course, with

the term ‘persistent’ referring not only to lifetime but also to historical time, meaning that favorable economic conditions did not diminish social origin inequalities in risk and adversity.

The ubiquitous and astonishingly robust impact of social origin on risk development has to be explained better than has been done in existing research. One possible explanation is that mechanisms considered to be specific are more general than has been assumed. To give an example, Cardona and Diewald (2014) found that parents obviously followed similar considerations not only in school decisions but also in supporting their children’s skill development: children from lower classes are promoted only if they display high skills, both in the case of skill production at home and in pursuing higher educational tracks. Parents’ support for children from higher classes is in both cases significantly less dependent on children’s skills and school performance. In other words, the same mechanism leads repeatedly to similar inequalities.

To summarize: Integrating relational inequality theory in research on risk pathways over the life course makes evident that these risk pathways are not the same for different groups in the society, like women and men and people from different social backgrounds. Relational inequality theory provides a rich and growing body of research on social mechanisms that create risk pathways for different groups. Especially variants of social closure are important to link life course research on risk and adversity to social stratification, social justice considerations, and welfare state intervention.

4 Welfare States’ Risk Management

Existing research in the field of the state and the life course reflects two different streams. Social policy analysis concentrates on specificities of the institutional design or single, specific measures. For the most part, this research centers on incentives and disincentives that are set by policies, and the direct consequences they bear for citizens, such as whether and to what degree

the introduction of paternity pay raises parental leave for men. This strand of research often falls short in covering longer life course trajectories, instead concentrating on immediate effects. The other tradition sees the state as an overarching agency that covers the entire life course from birth to death. In this view, the governments of different societies shape different life course patterns, which correspond to different holistic welfare state “regimes” or political economies. This idea assumes that governmental institutions and agency are shaped by an identifiable overall logic that shapes the entire life courses. However, as Mayer (2005: 33), a major proponent of such holistic ideas himself notes, such abstract types are ideal types that may be too reductionist to encompass the more differentiated actual regulations in different subsystems and life domains. The constructs of both the life course and the welfare state are too complex for a uniform correspondence to be likely (Leisering 2003: 215).

Even more elaborated typologies (Mayer 2005: 33) cannot take into consideration the important and influential differences between nations and policies within such country clusters and the changing policies that do not follow a simple path dependence of established institutions in the face of new paradigms and new risks. The liberal ‘Agenda 2010’ launched by the Social Democrat government in Germany may serve as a prominent example. Although status maintenance is a core principle of conservative welfare state regimes like Germany, the ‘Agenda 2010’ explicitly restricted status maintenance as a guiding principle, for example, in the case of unemployment benefits, which proved to be a major distinction between Germany and the US in Gangl’s study (discussed above) before the ‘Agenda 2010’ came into being. Nevertheless, the idea of overlapping guiding principles should not be hastily abandoned.

In historical perspective, the welfare state can be seen as an answer to emerging risks of the industrial society. In different countries different aspects of these risks were identified as the central theme, and differences in the setting of priorities also led to different institutional designs. Whereas in Germany the industrial

working class was at the center of social political debates, in Great Britain poverty was the central social question, in Sweden it was equality, and in France it was family and fertility. Also the more recent discussion about 'new' risks emerging and challenging the existing welfare state institutions focuses on developments in the labor market and the family system. New risks in the labor market reflect the need for more flexibility in the workforce, resulting in job insecurities and the insufficient inclusion of the workforce in the labor market. New risks in the sphere of private life are disruptive family events that threaten the role of the family as a buffer against market failure (Esping-Andersen 1999). Again, countries differ in what risks are given priority and what 'institutional filters' they choose to use to protect groups against these risks (Hofäcker et al. 2010). It is evident that a lot of attention in discussions about the future of the welfare state is devoted to the management of risk.

Leisering (2003) proposed risk management as an important part of welfare states' agency alongside education and old-age pensions. He concedes that this part has been largely neglected by life course researchers (p. 213). According to Leisering's conceptualization, risk management comprises all measures of social assistance, social insurance, and social services meant to bridge life's discontinuities and transitions. To do so, agencies of risk management react mainly to risky events in a short-term perspective, as situational programs. Thus, they constitute only a particular part of comprehensive welfare state regimes. They are tied to specific institutions, whereas education and the old-age pension system form another part of governmental policy. Nevertheless, risk management is said to "shape the expectations of the citizens and thus secure the unity of the life course as a whole" (ibid.).

How can 'risk management' be fleshed out as a useful concept to capture influences of the welfare state on life course inequalities over and above specifying the single assistances, insurances, and services? As outlined above, cultural foundations of different welfare states set different preferences about which risks are perceived as salient and which are given priority over oth-

ers. Making reference to Fig. 1, risk management systems can be distinguished in three respects concerning what and whom they address: firstly, whether they focus more on risks or more on adversity; secondly, which type of risk or adversity is addressed; and thirdly, which relational groups are in the foreground when risks are addressed. At all three levels, it is important to note that we should not only look at what is addressed but also what is not addressed—as the negation of the relevance of risks or relational groups (Leisering 2003: 217).

To make the first distinction of whether welfare states prefer to address the emergence of risk or the buffering of adversity, DiPrete (2002) and Mayer (2005) describe risk management as a prevention strategy that in the first case influences decisions and behavior with incentives or disincentives with the aim that risks should be avoided (step 2 in Fig. 1). In the second case, we can speak of an adversity-oriented, mostly insurance-based compensation strategy. We learn from DiPrete's (2002) comparison among the US, Germany, and Sweden that Germany in general stands out for the first strategy: risky decisions are discouraged by the state and risky behaviors should be avoided. In contrast, Sweden stands out for buffering adversity while not trying to prevent risk. The US is often low on both dimensions. Neither are risky events suppressed, nor are negative consequences effectively buffered. However, as the example of worker displacement shows, these distinctions are not completely valid for any risk. The risk of worker displacement is very similar in all three societies, and only for buffering negative consequences in the form of poverty the expected pattern was found.

From DiPrete's (2002) comparison of life course risks in different welfare state regimes, another component of risk management which is more on the side of risk orientation than adversity orientation can be borrowed (p. 278): the extent to which the opportunity for rapid recovery from adversity provided by "counter-mobility events" is institutionally facilitated or supported by specific policies such as reemployment after unemployment, upward occupational mobility after downward moves, or remarriage after

family dissolution. The strong links between education, training, and employment as well as the high level of job stability and security in the German welfare state normally provide an exceptionally high level of predictability and continuity over the life course. However, if risk occurs, it may be especially difficult to correct for it and consequently, in such cases, lead to more downward mobility than is seen in less continuity-oriented welfare states.

Such a longitudinal perspective focusing on the duration of risk and possible interruptions of vicious circles is extremely important. As Schoon and Bynner (2003) conclude from existing studies, a high-risk individual is characterized not so much by exposure to a single situational risk factor but rather by a life history characterized by long durations of risk exposure or multiple disadvantages.

The first step in risk development can be seen as a variant of the prevention strategy located earlier in the chain of risks, which focuses on individual development instead of behavioral incentives. Though the development of risky and favorable characteristics has largely been neglected in comparative welfare state research, it can be easily rooted in early work on the emergence of the modern welfare state. Mayer and Müller (1986) in particular have argued that the modern welfare state, while regulating the individual's decisions, has to address the responsibility of the individual self. A first question relates to the importance of skill development and the avoidance of adverse characteristics for the emergence of risks. Over the last few decades, the discussion about new risks and a redesign of the welfare state has fueled debates about the ever-growing importance of self-responsibility and other cognitive and noncognitive skills for minimizing risk and maximizing personal opportunities (see, e.g., O'Rand 2001). Yet substantiated empirical evidence is still missing, as it is for international comparisons between welfare states with respect firstly to the degree that different skills matter, and secondly, to which policies are used to produce these skills.

The second question is how and how much the government invests in the production of these

personal capabilities instead of simply assuming that the person possesses them. In interdisciplinary life course research, the role of individual development in shaping life chances, the possible lifelong impact of early life phases, and the 'discovery' of skill production (see Cunha et al. 2010) became driving forces in the production of life course theory and data. However, these developments have not yet found their way into comparative welfare state research and the question of how risks of failure in skill development and chances to block unwanted characteristics are distributed across societies owing to welfare state agency.

The discussion about the role of early individual development leads us immediately to the third question: whom a specific risk management favors or disadvantages, thus producing relational inequalities. If the role of general skills for attainment is growing, then the question of whether these competences are produced in the systems of education and training or left to the initiative and ability of the parental family is of paramount interest for the intergenerational transmission of advantage and disadvantage (see chapter "Three Generation Studies: Methodological Challenges and Problems" by Thornberry, this volume). The growing significance of such competencies, which is not taken up by a corresponding governmental agency to produce them within the formal systems of education and training, may help to explain why the direct link between social origin and destination is so persistent even if the transmission pathway over education is controlled for (Jackson et al. 2005). In other words, welfare states that focus on equalizing educational opportunities alone may fail to reach their goal of an open society. The failure of governments to focus on general skills is predominantly a risk for the lower classes and the unemployed who do dispose these resources much less than higher social classes. In other words it is a mechanism of social closure in keeping considerable parts of the population away from the possibility of acquiring characteristics relevant for achievement, and this is due to circumstances for which the disadvantaged cannot be held responsible.

Relational inequalities are not only created with respect to skill development but also when the welfare state shapes decisions and behaviors. This becomes especially visible in the field of work-life interference and the division of labor between the sexes. The welfare state agency is formulated to be gender-neutral but in fact ignores the existing gender differences in the division of labor. Thus, even policies designed to support mothers' employment prospects may in fact undermine them. Instruments of work-family reconciliation may even aggravate employer discrimination against women insofar as they erode their attractiveness as employees and restrict women's career mobility (Mandel and Semyonov 2005).

A more complicated pattern arises if sex and class are jointly taken into consideration. It becomes clear that, in addition, the influence of different family and labor market policies on women's employment is markedly dependent on their class position (Mandel and Shaley 2009): whereas maternity leave policies and childcare facilities shelter lower-class women from employment risks, the same policies are rather a handicap for women who compete with men for higher-class jobs, because they are perceived as risky and vulnerable instead of powerful. In addition, extended maternity leaves and related policies are not as important because these women are, especially in liberal market societies, able to purchase necessary services in a low-wage labor market.

Finally, at the most basic level, risk management systems start with the question of who should have access to (full) citizenship at all in the context of international migration. With the increasing share of different groups of migrants within the population, the legal status that should be granted to them and the degree to which welfare benefit entitlements compared to natives differs and the maintenance of such is discussed even in universalistic welfare state regimes.

Disruptive employment and family events bear the risk of not only socioeconomic adversity but also social and emotional stress (see, e.g., Kalil and Wightman 2011). There is, however, no comparative research to show how different risk

management systems address possible social and emotional consequences even though they might impinge severely on the development of children in the household, which later on might influence their mobility chances.

5 Summary and Outlook

Taking together the evidence presented here about differences in welfare states' risk management calls into question whether it is appropriate to limit this concept to a distinctive part of welfare institutions that target adversity rather than risk. In contrast, I advocate a broader view on all policies that influence the life course for better or worse. Examples were presented to demonstrate that different welfare state regimes and policies can be differentiated along three lines: (1) whether they focus more on avoiding risk or on buffering adversity; (2) which specific risks or adversities are focused on; and (3) which relational groups are addressed and then favored or disadvantaged with respect to risk. Differences between risk management systems based on these three lines of distinction form patterns that are greater than the impact of single policies. At the same time, they are more comprehensive than those suggested by DiPrete (2002) insofar as they include a usually neglected part of risk emergence, namely skill production, which is increasingly advocated as an efficient risk avoidance strategy.

This plea is backed by advances in life course research stressing the pivotal role of cognitive and noncognitive skills for the understanding of risk chains, their emergence early in the life course, and their conceptual significance for understanding the emergence of new individualized risks and corresponding ideas for a redesign of the welfare state agenda. Though there are several new studies that look at skill development in an internationally comparative perspective, the integration into a more comprehensive risk management framework is missing. Thus, a fuller account of life course concepts and general theory of stratifications seems more fruitful than the view on institutional differentiation for studying welfare states' risk management.

References

- Avent-Holt, D., & Tomaskovic-Devey, D. (2014). A Relational Theory of Earnings Inequality. *American Behavioral Scientist*, 58, 379-399.
- Breen, R., & Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society*, 9(3), 275-305.
- Cardona, A., & Diewald, M. (2014, May). *Opening the black box of primary effects: Relative risk aversion and maternal time investments in preschool children*. Paper presented at the spring meeting of the RC 28 in Budapest.
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the technology of cognitive and noncognitive skill formation. *Econometrica*, 78(3), 883-931.
- Diewald, M., & Faist, T. (2011). *From heterogeneities to inequalities: Looking at social mechanisms as an explanatory approach to the generation of social inequalities*. Bielefeld: SFB 882 Working Paper Series No. 1.
- Diewald, M., & Mayer, K. U. (2009). The sociology of the life course and life span psychology: Integrated paradigm or complementing pathways? *Advances in Life Course Research*, 14(1-2), 5-14.
- Diewald, M., Baier, T., Schulz, W., & Schunck, R. (2015). Status attainment and social mobility—How can genetics contribute to an understanding of their causes? In K. Hank & M. Kreyenfeld (Eds.), *Demographie. Kölner Zeitschrift für Soziologie und Sozialpsychologie*, Special issue 55. doi: 10.1007/s11577-015-0317-6
- DiPrete, T. A. (2002). Life course risks, mobility regimes, and mobility consequences: A comparison of Sweden, Germany, and the United States. *American Journal of Sociology*, 108, 267-309.
- Elder, G. H., Jr. (1995). The life course paradigm: Social change and individual development. In P. Moen, G. H. Elder, & K. Lüscher (Eds.), *Examining lives in context. Perspectives on the ecology of human development* (pp. 101-139). Washington, DC: APA. doi:10.1037/10176-003.
- Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. Oxford: Oxford University Press.
- Ferraro, K. F., Shippee, T. P., & Schafer, M. H. (2009). Cumulative inequality theory for research on aging and the life course. In V. L. Bengtson, D. Gans, N. M. Putney, & M. Silverstein (Eds.), *Handbook of theories of aging* (pp. 413-434). New York: Springer.
- Gangl, M. (2004). Welfare states and the scar effects of unemployment: A comparative analysis of the United States and West Germany. *American Journal of Sociology*, 109(6), 1319-1364.
- Guo, G., & Stearns, E. (2002). The social influences on the realization of genetic potential for intellectual development. *Social Forces*, 80, 881-910.
- Heckman, J. J., & Borjas, G. (1980). Does unemployment cause future unemployment? Definitions, questions, and answers from a continuous time model of heterogeneity and state dependence. *Economica*, 47, 247-283.
- Hofäcker, D., Buchholz, S., & Blossfeld, H. (2010). Globalization, institutional filters and changing life course patterns in modern societies: A summary of the results from the GLOBALIFE project. In R. Silbereisen & X. Chen (Eds.), *Social change and human development: Concept and results* (pp. 101-125). London: SAGE. <http://dx.doi.org/10.4135/9781446252161.n5>
- Jackson, M., Goldthorpe, J. H., & Mills, C. (2005). Education, employers and class mobility. *Research in Social Stratification and Mobility*, 23, 3-33.
- Kalil, A., & Wightman, P. (2011). Parental job loss and children's educational attainment in black and white middle-class families. *Social Science Quarterly*, 92, 57-78.
- Kaufmann, F.-X. (2012). *European foundations of the welfare state*. New York: Berghahn Books.
- Leisering, L. (2003). Government and the life course. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 205-225). New York: Kluwer Academic/Plenum Publishers.
- Mandel, H., & Semyonov, M. (2005). Family policies, wage structures, and gender gaps: Sources of earnings inequality in 20 countries. *American Sociological Review*, 70, 949-967.
- Mandel, H., & Shalev, M. (2009). Gender, class, and varieties of capitalism. *Social Politics*, 16, 161-181. doi:10.1093/sp/jxp006.
- Mayer, K. U. (2005). Life courses and life chances in a comparative perspective. In S. Svallfors (Ed.), *Analyzing inequality: Life chances and social mobility in comparative perspective* (pp. 17-55). Palo Alto: Stanford University Press.
- Mayer, K. U. (2009). New directions in life course research. *Annual Review of Sociology*, 35, 413-433. doi:10.1146/annurev.soc.34.040507.134619.
- Mayer, K. U., & Müller, W. (1986). The state and the structure of the life course. In A. B. Sorensen, F. E. Weinert, & L. R. Sherrod (Eds.), *Human development and the life course: Multidisciplinary perspectives* (pp. 217-245). Hillsdale: Lawrence Erlbaum Associates Publishers.
- Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F., & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. *American Psychologist*, 67, 130-159.
- O'Rand, A. M. (2001). Stratification and the life course: Life course capital, life course risks, and social inequality. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and social sciences* (pp. 145-162). San Diego: Elsevier.
- O'Rand, A. M. (2003). The future of the life course: Late modernity and life course risks. In J. T. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 693-701). New York: Plenum.

- Reskin, B. (2003). Including mechanisms in our models of ascriptive inequality. *American Sociological Review*, 68, 1–21.
- Roemer, J. E. (1998). *Equality of opportunity*. Cambridge, MA: Harvard University Press.
- Schoon, I. (2006). *Risk and resilience: Adaptations in changing times*. Cambridge: Cambridge University Press.
- Schoon, I., & Bynner, J. (2003). Risk and resilience in the life course: Implications for interventions and social policies. *Journal of Youth Studies*, 6(1), 21–31.
- Shanahan, M. J., Vaisey, S., Erickson, L. D., & Smolen, A. (2008). Environmental contingencies and genetic propensities: Social capital, educational continuation, and dopamine receptor gene DRD2. *American Journal of Sociology*, 114(Suppl), S260–S286.
- Tilly, C. (1998). *Durable inequality*. Berkeley: University of California Press.
- Tomaskovic-Devey, D. (2014). The relational generation of workplace inequalities. *Social Currents*, 1, 51–73.

Longitudinal Studies and Policy for Children in Low- and Middle-Income Countries: Evidence from Young Lives

Paul Dornan

1 Introduction

While cohort and panel studies have come to be an established element of the social science infrastructure of OECD countries, such data and life course approaches are much less common in low- and middle-income countries. Yet such countries face many development challenges that longitudinal approaches can help illuminate. There is growing global interest in life course approaches and these can help inform policy towards the achievement of the global Millennium Development Goals (MDGs) and the proposed Sustainable Development Goal commitments.¹

The aim of this chapter is first to reflect on policy implications from the Young Lives cohort study, particularly for mitigating inequalities and, second, to discuss the relationship between research and policy. Young Lives is a four-country

cohort study, set up to extend understandings of childhood poverty in low- and middle-income countries. Low- and middle-income countries are somewhat analogous to the UN Population Fund classification of ‘less developed countries’² which covers 6.0 of the world’s 7.2 billion people (UNPFA 2014). The grouping of low- and middle-income countries is therefore broad and used here to identify countries which typically have less established data sources, lower access to sets of cohort or panel data, and research capacities to create and use such evidence to inform policy.

The chapter is structured as follows. First, the chapter identifies inequalities between groups of children within countries, with socio-economic inequalities clear between groups of children at very young ages while inequalities by gender widen particularly through adolescence. Second, while inequalities emerge early there is also evidence of change in individual children’s developmental trajectories after the earliest period of life, highlighting the combined importance of early intervention and sustaining such investments. Third, the chapter identifies interdependencies between domains of children’s development, whereby earlier good physical or cognitive test

¹ Following the Millennium Declaration, the world’s governments agreed to a series of Minimum Development Goals to improve human development by 2015 (including, for example reducing extreme poverty, reducing preventable child mortality, and increasing school enrollment). MDG progress is reported by United Nations (2014). At the time of writing in 2015, new Sustainable Development Goals are being proposed, which will both address the human development agenda, and combine this with a stronger focus on sustainability.

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² The UN Population Fund use the term less developed to encompass African countries, most of Asia (excepting Japan), Latin America and the Caribbean, plus Melanesia, Micronesia and Polynesia (see UNPFA 2014). It is therefore somewhat analogous to the low- and middle- income categorisation used by the World Bank.

scores are associated with later effects on children's development. The chapter then steps back from research findings, to discuss the research-to-policy process, identifying the contribution that life course studies can make in supporting better policy development, and some of the challenges in achieving that objective. The chapter concludes with key implications both for policy and for the use of longitudinal evidence to inform policy development.

2 About the Young Lives Study

The Young Lives study has collected data on children, their households and communities in Ethiopia, the former State of Andhra Pradesh³ in India, Peru and Vietnam since 2002. The World Bank classifies Ethiopia as a low-income country, India and Vietnam as lower-middle-income countries and Peru as an upper-middle-income country.⁴ These countries demonstrate a range of historical experiences and current development pressures (see Box 1) and provide a microcosm of circumstances faced in many developing countries. In recent decades, many low- and middle-income countries have been going through rapid technological, economic and social change – for example with children spending longer periods in school, later entry to the labor market, and later marriage and child bearing (Lloyd 2005; see also UNGA 2014). The individual experiences highlighted in this chapter are being experienced within a context of rapid social change.

The cohort study collected quantitative and qualitative information from children, household members, and in the school and community. The study was set up with a primary aim to understand the causes and consequences of child poverty and collects multi-purpose data on a range of different domains of life, including household poverty and socio-economic position, service

³The State of Andhra Pradesh, divided in June 2014 into the States of Andhra Pradesh, and Telangana. Since the data used here was collected prior to the division the old State name of Andhra Pradesh is used.

⁴Using figures from 2013, classifications are available at http://data.worldbank.org/about/country-and-lending-groups#Low_income

Box 1: Ethiopia, India, Peru and Vietnam: National Stories with Global Resonances

Different national contexts frame experiences of children, but there are also marked similarities among these countries, including the rising importance of schooling, improving infrastructure, but ongoing economic and social vulnerability.

Ethiopia. Recent decades have seen economic growth, improvements in infrastructure, urbanization, and rising population. The country has implemented rapidly increasing school enrollment but learning levels are often low. Despite social change, child marriage and female genital mutilation still persist in some regions. Famine and food insecurity linked to drought has been a key concern, however in the past decade the Government implemented the Productive Safety Net Programme, which provides support in return for work in food insecure areas.

India. India has seen a rapidly rising GDP per capita in recent years, but faces the particular challenge of spreading economic and technological advance across the population. The study sites are in South India. India faces concerning levels of exclusion of women and marginalized social groups. India has well-established public policies, including the pre-school Integrated Child Development Service, and Public Distribution System. In recent years India implemented key large-scale social policy reforms such as the Right to Education Act and Mahatma Gandhi National Rural Employment scheme, which extends social protection in rural areas.

Peru. Peru has the highest GDP per capita of the four countries. The Shining Path insurgency severely affected the country through the 1980s. The country continues to see high economic and social inequality, including between Spanish-

(continued)

Box 1 (continued)

speaking and indigenous communities in different parts of this diverse country. Key social policy interventions include the Juntos conditional cash transfer scheme and pre-school interventions. However there are concerns over the effectiveness of schooling and other social policies in reducing inequalities.

Vietnam graduated to middle-income status after rapid progress following the devastation of wars in the 1970s and before. Social and economic progress has been fast and comparatively equitable, with social policy designed to reduce inequalities between groups. Disparities remain between the marginalized and poorer ethnic minority populations, and the more advantaged majority Kinh. Economic and infrastructure development has been fast especially in urban areas, but in line with the other countries, there are big differences between urban and rural areas. As a lower-middle-income country, Vietnam faces the challenge of maintaining economic growth towards industrialization, with developing the skill base of the country.

access, and indicators of children's physical development, cognitive development and subjective wellbeing. The study design is summarized in Fig. 1, with further technical and sampling detail available on the study website.⁵

The four country design is an important feature of Young Lives, since the use of similar instruments at the same age points across contexts enables us to test the broader relevance of results by considering the similarity or difference of findings across the four countries. The samples are broadly representative of the population groups (for example by urban/ rural location and by ethnicity) within each country but are not con-

structed to be statistically representative of the country. The strength of the data therefore is to enable study within each country first, and then to consider similarities and differences in what seems to matter for children at a country level across the study sites.

3 How and When Inequalities Are Formed Through Childhood

In this first section, the chapter begins to unpack life course evidence on how inequalities between children are established. At a global level, while there has been considerable recognition of the differences *between* countries, increasing attention is being drawn to *within* country differences. A powerful criticism made of the Millennium Development Goals is that by typically measuring average progress in development indicators, the MDGs encouraged a focus on where the quickest gains could be made, rather than on those most in need. Accordingly this concern has motivated a focus on equity, notably from the United Nations Children's Fund (UNICEF 2010). Concerns over inequalities in a range of social and economic indicators have been picked up in debates about the proposed global Sustainable Development Goals (SDGs) and are supported by wider recognition of economic inequality (e.g. Pickety 2013; Ostry et al. 2014) and gender inequality (UN Statistics Division and UN Women 2014). Life course analysis can identify when differences emerge as children age and so help to identify opportunities to mitigate such differences as early as possible. So what does life course analysis suggest for when and how inequalities between groups of children develop?

Across the four countries there are relatively consistent patterns that emerge as to the systemic differences between social groups within countries. Across the four countries, household expenditure or wealth levels, and access to basic services (sanitation, water and electricity) tend to be lower in rural areas, for those with less

⁵ www.younglives.org.uk

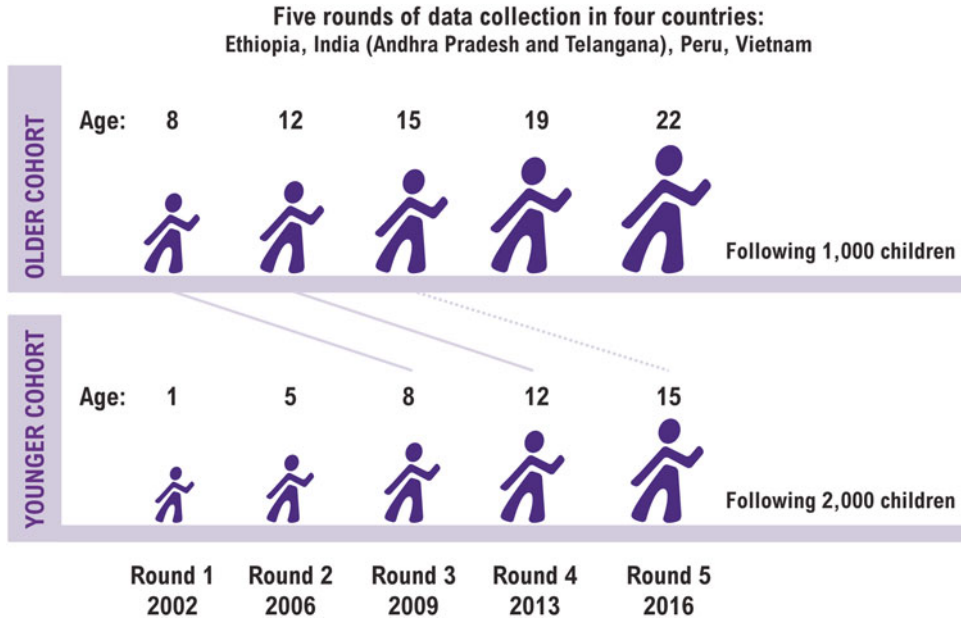


Fig. 1 Young lives study design

educated parents, and for those from disadvantaged minority groups (with such groups often comprising the same children) (Cueto et al. 2011; Galab et al. 2011; Le et al. 2011; Woldehanna et al. 2011). Children from rural and poorer backgrounds also tend to have lower access to key services, including pre-school (Woodhead et al. 2009). Households in rural communities also tend to experience more risks such as drought or flooding (Woodhead et al. 2013a, p. 13). The first message to emerge is therefore how social and policy ‘inputs’ to children’s development vary sharply between groups.

Inequalities in children’s outcomes by socio-economic status, ethnicity, and location appear while children are very young. In infancy, child development inequalities can be measured using information on children’s physical development. Examining such measures shows that across the four countries at age 1, the poorest third⁶ were between 1.7 (Ethiopia) and 3.1 times (Peru) more likely to be short for their age (i.e., stunted, dis-

cussed in Sect. 4) than the least poor third (Dornan and Pells 2014: p. 7). Differences between social groups in height trajectories persist through childhood (see Sect. 4). Inequalities by socio-economic status in children’s performance on simple cognitive tests are evident at 5 years, the first time test data are available, and typically before children have started school. Such socio-economic related gaps tend to widen within each country between 5 and 8 years of age (Woodhead et al. 2013a: p. 17). Differences in physical development and cognition therefore appear very early in life, reinforcing the central importance of the early years to strong foundations for later development.

While inequalities by socio-economic status are somewhat similar across the four countries, there are important policy differences which affect learning during the school years. There is a general trend across developing countries of rising school enrollment. UNESCO estimates an average 90 % net enrollment in primary school in 2011. This represents a generational shift for many countries and has been particularly dramatic in Ethiopia where enrollment increased from 37 % in 1999 to 87 % in 2011 (UNESCO

⁶Ranked by household wealth using a measure which summarises housing conditions, key service access and ownership of consumer durables.

2014: pp. 388–390). However, within overall increased enrollment, important questions remain over differences in the effectiveness of education policies across countries.

In the samples from Ethiopia and Andhra Pradesh, on average children tend to score more poorly on cognitive tests than in Peru and Vietnam (Singh 2014; Rolleston 2014). Comparing the gain in cognitive test performance, while differences between countries exist before school age, the greatest widening between countries occurs during the school years (where Vietnam pulls ahead), and seems linked with the different productivity of school systems (Singh 2014). There are also differences in how the school system affects existing inequalities within the countries. In Peru analysis links early socio-economic status with later opportunities to learn, evidence that the schooling system can reinforce existing inequalities (Cueto et al. 2014). Similarly in Andhra Pradesh, increasing use of private schools in India has been associated with widening inequalities by socio-economic status and gender (see Woodhead

et al. 2013b). By contrast there is more encouraging evidence of the effects of some schools in narrowing existing test score gaps between ethnic groups in Vietnam during primary school, linked with a focus on all children reaching ‘minimum standards’ (Glewwe et al. 2014; Rolleston et al. 2013). Therefore, while education is a key policy instrument to extend opportunities, performance varies across countries both in the level of learning produced and in whether school systems reinforce or disrupt existing social differences.

Through adolescence, school remains important but socio-economic pressures increase as families’ need for children to work grows, which then can affect when children stop schooling. Figure 2 examines socio-economic gaps in school enrollment rates between the poorest and least poor third of households. In Ethiopia at age 8 the large gap exists because poorer children typically enrolled later and the enrollment gap then reduces by age 12 as children have entered the schooling system. Across the four countries the gap widens at older ages as poorer children leave school

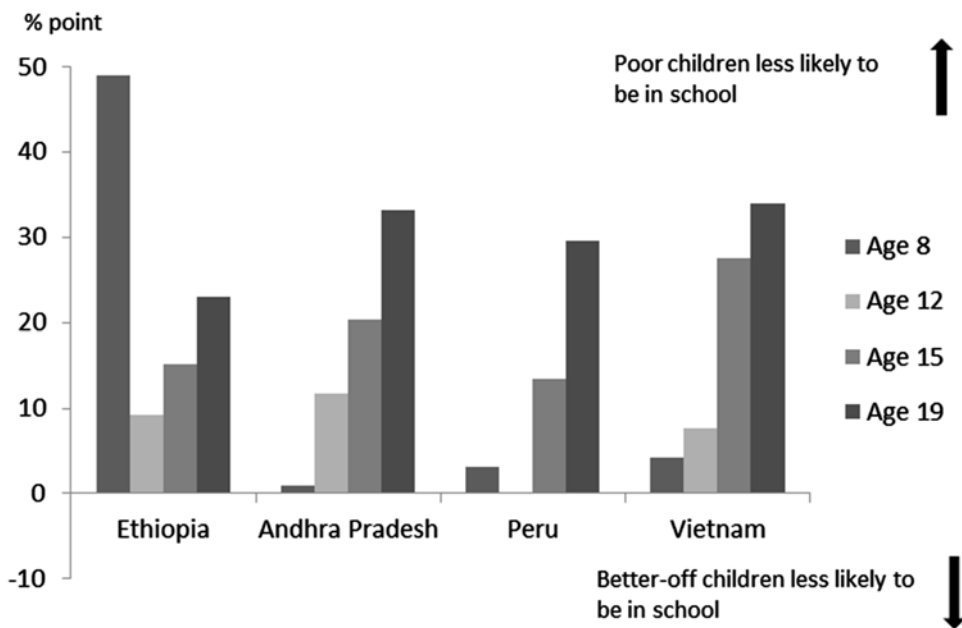


Fig. 2 Education enrollment gaps by household socio-economic status and age (Note: education covers pre-school, formal school and later vocational forms of education and training. Socio-economic status is measured by household wealth, comparing the poorest and

least poor third of households. The chart deducts the reported enrollment rate of the poorest third from the least poor third to show the difference in enrollment rate (Dornan and Pells 2014))

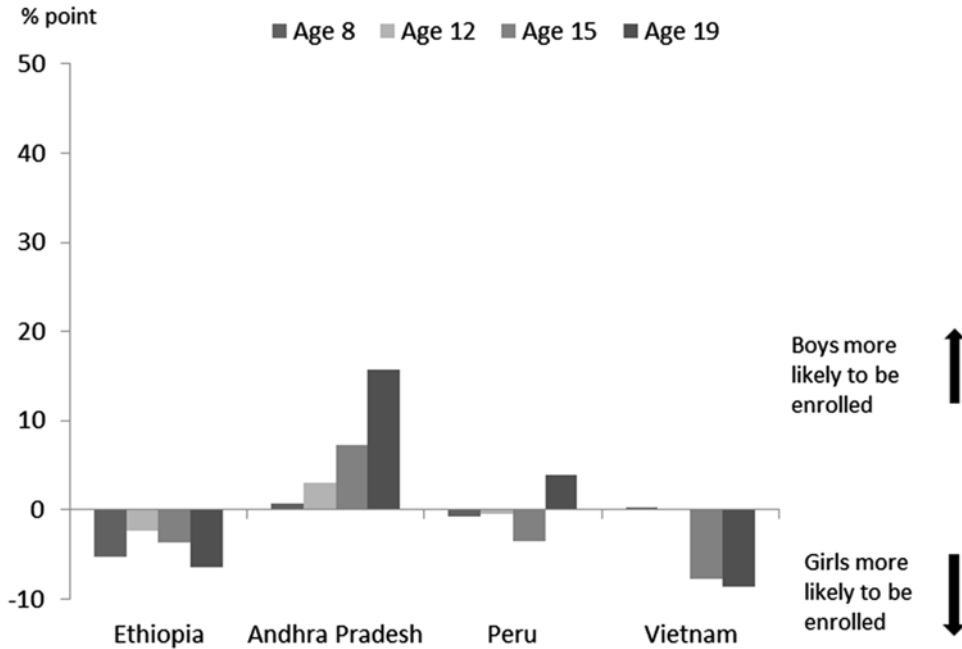


Fig. 3 Education enrollment gaps by gender and age (Note: education covers pre-school, formal school and later vocational forms of education and training. The chart

deducts the reported enrollment rate of the girls and young women from boys and young men to show the difference in enrollment rate (Dornan and Pells 2014))

sooner. Gender differences, shown in Fig. 3, tend to be comparatively small during early and middle childhood in Young Lives data but widen during adolescence with the pattern varying across the countries (Dercon and Singh 2011). As Fig. 3 demonstrates, the direction of bias in enrollment by gender varies between the countries, underscoring the importance of understanding different life course trajectories within the country context.

Increasing differences in trajectories of school access associated with both socio-economic status and gender are shaped, and punctuated, by key transitions. Identifying the transitions associated with widening inequalities may provide intervention options for policy. Trajectories associated with socio-economic status are frequently marked by transitions to work (for instance following family illness) as well as by exam failure ‘pushing’ children out of school, each against a background of likely rising economic returns to work with age, for boys particularly. Concerns of sexual violence particularly facing older girls at, or travelling to, school, were frequently reported

as girls graduate to secondary schools and as a barrier pushing girls from the education system (Dornan and Pells 2014: p. 12). Also notable at this older age and as children approach adulthood is the growing importance of social reputations, particularly for marriageability and how this shapes decision-making by and for boys and particularly for girls. In Ethiopia for example, such ‘future facing’ concerns affect whether young women undergo female genital mutilation (Boyden et al. 2013). In India, girls need to have learned the skills and retained the social reputation to be a ‘good wife’ (Morrow 2013). Social pressures in adolescence add to disadvantages associated with socio-economic status and produce differences by gender in young people’s trajectories.

In summary, this section has sought to identify general patterns of inequalities between social groups within countries, whilst recognizing wider differences between countries. Three broad messages emerge. First, inequalities in children’s physical development and cognition are evident from early ages by location, socio-economic sta-

tus, parental education and ethnicity/caste status. Second, school can have a moderating influence on pre-existing inequalities, but in practice may well reinforce existing gaps, with different opportunities to learn. Schooling is marked by institutional gateways (such as transitions between schools or exams) that affect the chances of continued engagement. Third, across the countries differences by gender emerge later, widening particularly as children near adulthood. The way in which gender inequities emerge is very dependent on the society in which young people are growing up, with opportunities shaped by social norms and expectations of roles in adulthood.

4 The Extent of Resilience and Faltering in Physical Development Beyond Infancy

The previous section identifies processes by which inequalities accumulate with age. A key benefit of longitudinal data, with repeat observations, is also to be able to test the extent of change within the life course. To examine this, we consider the specific example of children's height trajectories. Consensus has emerged in recent years about the importance of the early stage of children's lives to later life (Grantham-McGregor et al. 2007). It has also been argued that early nutritional deprivation during the first 1,000 days after conception leads to irreversible consequences for later life (UNICEF 2013). In low- and middle-income countries low height provides an important proxy for chronic under-nutrition. Height is measured as 'height-for-age', i.e. converted to express how far (in standard deviations) the child's height is from the reference population (called height-for-age z-scores, HAZ). This process allows the tracking of changes in height trajectories with age. Recent insights from cohort data show there is change in such height trajectories after the infancy period, which poses a question of whether such changes are associated with other impacts on children's development and of what can be done to protect early gains, and support recovery.

Height-for-age averages across the Young Lives samples are comparatively low at -1 HAZ across the countries between 1 and 8 years (Lundeen et al. 2013). This finding is consistent with deprivations experienced in many low- and middle-income countries, where lower food quantity and quality combine with greater exposure of young children to disease, resulting in high rates of under-nutrition. Stunting provides a summary measure of HAZ (defined as a child having a HAZ below -2). Across the four countries, lower wealth levels are consistently associated with higher stunting rates (Petrou and Kupek 2010). Figure 4 presents height-for-age in Ethiopia for children at age 8, disaggregated by poverty, location and gender. Zero on the chart is the reference population norm, and -2 the definition of stunting. Average height-for-age are consistently well below zero for all groups, but particularly so for the poorest fifth of children and those in rural areas.

Low height-for-age early in life has been associated with a range of negative outcomes for children's development, including increased chance of mortality, poor health, brain and cognitive development (UNICEF 2013). Analysis of the Young Lives cohorts has also linked stunting in infancy with negative impacts on children's cognition at 5 years (Le 2011; Sanchez 2009), and demonstrated some evidence of a link between height in middle childhood and later aspirations, self-efficacy and esteem in adolescence (Dercon and Sanchez 2013). The association between socio-economic background and the chances of having a low height-for-age, and the associations between height-for-age/stunting and children's wider development, highlight this as a key mechanism by which early inequalities are reinforced.

Therefore, there are important reasons to improve child nutrition, and to reduce child stunting from the earliest point in life. It has often been assumed that children's height trajectories are comparatively 'fixed' at 2 years, with little chance for later improvement (see UNICEF 2014; Alderman and Walker 2014). However analysis of Young Lives cohort data suggests later change in height trajectories between 1 and 5, and between 5 and 8 years (Lundeen et al.

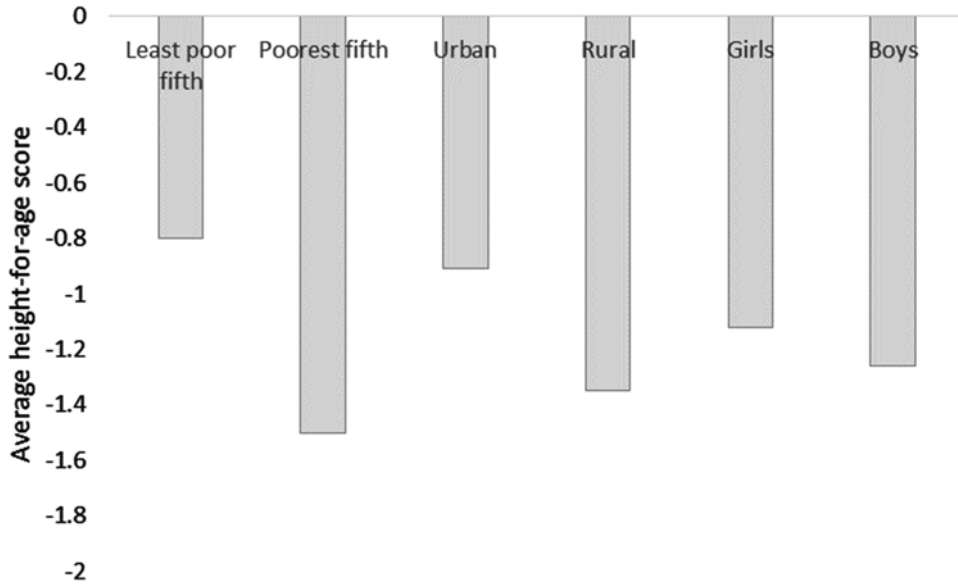


Fig. 4 Variation in average height-for-age at age 8 in Ethiopia (2009) (Note: poor/least poor is categorized based on an indicator of household wealth (comprised of

housing conditions, service access and durables. Categorization is based on data collected when children were aged 1, with HAZ measured at 8 years)

2013). Figure 5 demonstrates change between 1 and 5 years across the four countries. The height of the bar is the percentage of children that were stunted, or not-stunted, in infancy. The divisions within the bar show whether these children remained so by 5 years. Across all four countries there is evidence of change, with both recovery and faltering in growth trajectories. Analysis between 5 and 8 years also demonstrates change, though the level is smaller than occurs at the earlier point. Analysis of the size of change shows these can be quite large; between 1 and 8 years those who recovered on average gained between 1.1 (Vietnam) and 1.9 (Ethiopia) height-for-age z-scores. Those who faltered lost between 1.5 (Ethiopia) to 0.9 (Peru) height-for-age z-scores (Crookston et al. 2013: p. 2). Recalling that 0 is the central norm, and -2 the definition of stunting, such average changes are substantial. Evidence of such change raises questions both of whether children can be supported to recover from early deprivation, and whether other children can be helped not to falter in their growth, to avoid losing initial gains.

While the evidence presented in Fig. 5 is important, there are reasons for a cautious interpretation of findings of post infancy height recov-

ery. Height is important in itself but it is also used as a proxy for impacts on other aspects of children's development (including health and cognition). It does not necessarily follow that recovery in height will extend to these other domains of life which may have been compromised by early deprivation, effects which may show up much later in life (for example see Roseboom et al. 2001). Analysis has, however, found that across the Young Lives countries that higher early HAZ (around 1 year) and HAZ gain (between 1 and 8 years) were both associated with better reading, mathematics and children's receptive vocabulary test scores at 8 years (Crookston et al. 2013). In other words both higher early HAZ and physical recovery in HAZ were associated with better test scores, suggesting cognitive gains associated with physical recovery.

If there are such wider gains for children's development, a key question becomes whether or not policy can support recovery. This question can be informed by using multivariate techniques to model what predicts height recovery (using available child-level, household and community data). While analysis of the factors associated with height recovery between 1 and 5 years highlights mothers' height (suggesting the impor-

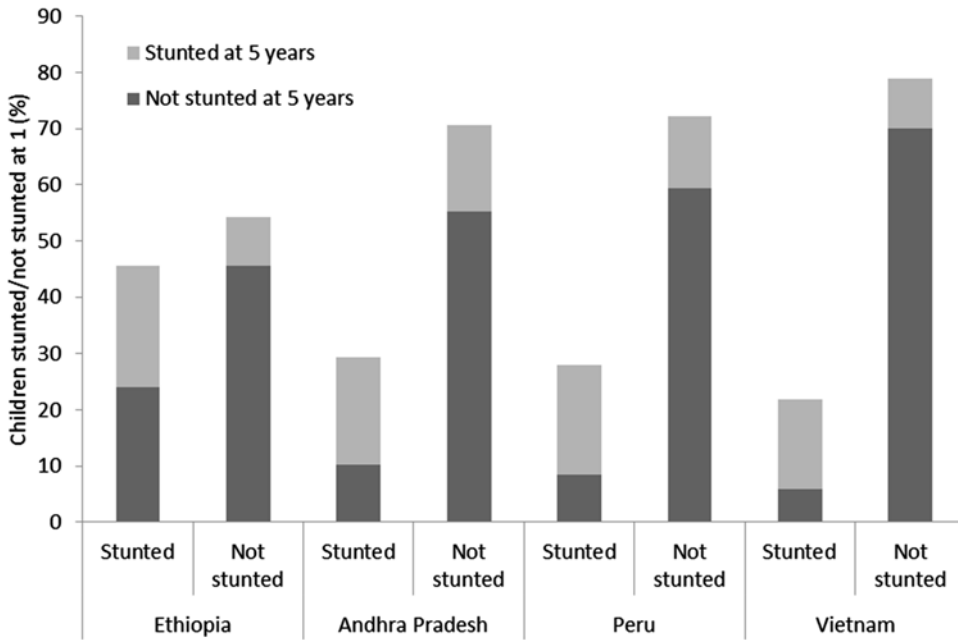


Fig. 5 Percentage of children stunted at 1 year old, by whether or not they remain stunted at 5 years (Source: Lundeen et al. 2013: p. 5, Table 3. Reproduced from Dornan and Woodhead 2015)

tance of biological inheritance or maternal health), this also shows that higher household expenditure was predictive of improved height gain, and provides some weaker evidence for the role of parental education and community health infrastructure (Schott et al. 2013). Separate analysis for India identified that receipt of the midday meal school feeding program in drought-affected communities was linked with recovery (Singh et al. 2012). So while more analysis is needed to inform whether or not policy interventions can redress early deprivations, both household expenditure levels and public policy seem to be important.

In summary, life course analysis suggests that early circumstances matter critically, but also highlights change in children’s development after the earliest period of life. Neither the change in individual trajectories nor the factors associated with such change would have been apparent in cross sectional data. There is evidence of later change in height trajectories, and that such improvements in height trajectories may lead to cognitive test score gains. Investments beyond the very earliest period of life are consistent with

protecting and building on the gains of the first thousand days of life, and to do so may bring wider gains for those who experience early deprivation.

5 Taking Account of Children’s Multidimensional Lives

While life course analysis demonstrates the holistic nature of the experiences of and influences on children’s lives, policy responses are more typically focused on specific dimensions of children’s lives – learning, health, protection – which are addressed through policy ‘sectors’. It does not automatically follow that the best policies for improving education results will always be found within the education system if, for example, it is poverty or illness that is keeping children away from school, or hunger that prevents them from learning. What then does the evidence highlight for how such domains of development interact?

Longitudinal evidence enables analysis of these links between key domains throughout

children’s development. Young Lives evidence contains information on children’s physical development, cognitive skills, and psychosocial development domains at different age points. Figure 6 reports the conclusions of multivariate analysis that modelled whether earlier performance on particular domains was then associated with effects on later performance on that domain or others. As well as the listed domains, the analysis controls child’s year of birth, maternal schooling in years, and whether the child is growing up in a rural area. The four-country design allows us to see the similarity of patterns emerging across countries. The basis of the analysis involves constructing measures of each domain, using factor analysis of existing scales to produce cognitive skill and psychosocial development measures from wider scales. For cognition these include vocabulary and math. Psychosocial development is a particularly complex set of competencies to measure (see for example

Gutman and Schoon 2013; Dercon and Krishnan 2009, appendix 1). The analysis here includes measures that tested concepts including self-esteem, self-efficacy and self-respect.

While not causal, this analysis gives an indication of where the associations between domains of children’s development are the strongest. Across all four countries, earlier height predicts later height, and earlier cognitive test performance predicts later test performance. These are both the strongest statistical links, and the most substantively important. By contrast, there is rather weak evidence (one country only) that earlier psychosocial development independently affects later psychosocial development. Given this is multivariate (not descriptive) analysis, this is not to say that the same children did not report similar psychosocial development at 8 and 12 years, but rather that the source of such feelings was not explained by earlier psychosocial development, a finding consistent with these

Predicted by?	Height-for-age at age 12	Cognitive skills at age 12	Psychosocial development at age 12
Height-for-age at age 8	Predicts later height in all four countries	Predicts later cognitive skills in Ethiopia and Vietnam	Predicts later psychosocial development in Peru and Vietnam
Cognitive skills at age 8	Do not predict later height	Predicts later cognitive skills in all four countries	Predicts later psychosocial development in Peru, India and Ethiopia
	Height-for-age at age 15	Cognitive skills at 15 years	Psychosocial development at 15 years
Height-for-age at 12	Predicts later height in four countries	Predicts later cognitive skills in Ethiopia, India, Vietnam	Does not predict later psychosocial development
Cognitive skills at 12	Predicts later height only in Vietnam	Predicts cognitive skills in four countries	Predicts later psychosocial development in India and Peru
Psychosocial development at 12	Does not predict later height	Predicts cognitive skills in Peru and Vietnam	Predicts later psychosocial development only in Vietnam

Fig. 6 Life course interdependencies amongst developmental domains (Source: Sanchez 2013: p. 22, Table 9. All results quoted are from multivariate regression analysis and are significant at the 90 % confidence interval or higher)

competencies being malleable. Such evidence seems to suggest that while physical development and cognitive development appear to be, somewhat, linearly produced through childhood, psychosocial development appears to be less stable, potentially being continually open to influence through childhood.

There is also evidence of associations across domains of development, as summarized in Fig. 6. Earlier height tends to predict later cognitive test performance, as is observed in the relationship between very early height in infancy and cognition in early childhood (see Le 2011; Sanchez 2009) though these relationships are weaker in significance and size than those found between earlier height and later height. There is also evidence at age 8 that height is associated with later psychosocial development (see also Dercon and Sanchez 2013), but this is only found for the younger age point, and only in two countries. There is less evidence that earlier cognitive skills were associated with effects on later height (one country only, and for the older age points). However there is more consistent evidence that cognitive skills were associated with later psychosocial development, and also that psychosocial development is associated with improved later cognitive skills (for the older age points, this is found in two countries). Such relationships across children's development domains are suggestive that there are both vicious and virtuous cycles, whereby performance in one domain promotes or undermines performance on other domains also.

Figure 6 demonstrates the holistic nature of children's development, as domains interrelate. Identifying how such domains interrelate may be instructive to identify policy intervention points. Height is assumed to be a proxy for wider deprivations to health, and so the links between height and cognition may reflect these wider deprivations. The controls used in the analysis reported in Fig. 6 should minimize that effect, but since this is non-causal analysis we cannot rule out such unobserved effects. Children being short for their age may affect how children were treated in school. Stunting is linked with later enrollment in Ethiopia, for example, where short

stature has been used as a proxy for school readiness (Woodhead et al. 2009). Stunting is also linked with greater risk of illness which then could reduce learning or attendance (Dewey and Begum 2011). The central role which schooling now occupies within children's lives (Camfield and Tafere 2009; Boyden 2013) suggests links between how well children do within school and wider psychosocial indicators. Similarly, psychosocial competencies (higher aspirations, self-esteem and so on) may plausibly affect how children engage with the school and develop cognitive skills or, relatedly, experiences of stigma or shaming may undermine how children are able to engage with educational services (Dornan and Ogando Portela *forthcoming*). While there are many possible reasons for why links exist between domains of development, a key point is simply that policy in one sector may be supported (or undermined) by activities in another.

In summary looking across different domains of children's lives highlights the interconnections of children's development. Height is associated with effects on learning; learning with effects on psychosocial development and vice-versa. For policy, this reinforces conclusions that, for children, delivering the objectives of one policy sector requires inputs from beyond that sector, highlighting the importance of service delivery coordination/ integration (Woodhead et al. 2014). Since it is typically the same groups of children – the poorest, those in rural areas, with less educated parents, and often minority groups – who are most likely to do less well in cognitive tests and who are more likely to be stunted, such coordination and coverage between sectors are particularly important for reducing inequalities.

6 Closing the Gap Between Life Course Studies and Policy Debates

In this final substantive section, the chapter steps back from research findings to consider the context around research and of how this may affect the uptake of evidence. First, the section

discusses some of the potential for longitudinal approaches to inform key global policy debates. Second the section discusses some of the key challenges to linking research and policy. Third the section finishes off by discussing potential ways in which the process of research can affect its relevance and uptake in policy debates.

First, we have already noted the lack of life course evidence within low- and middle-income countries, but there is increasing interest within international organizations in life course perspectives and in increasing the availability of panel and cohort data. Life course approaches are well embedded in many international organizations' thinking. The World Health Organization has used both life cycle and life course approaches to identify, for example, how earlier life events shape non-communicable diseases such as heart disease or stroke (Aboderin et al. 2002) and ageing processes (Stein and Moritz 1999). This approach, influenced by epidemiology, seeks to identify how earlier physical and social risk factors impact later health. Both UNDP and UNICEF have recognized life course approaches as helpful to policy and programming interventions to support human development across age phases (Malik 2014; Banati and Alexander 2012). UNICEF has brought together those working on cohort and panel studies to identify how such studies can contribute to better policies for children in low- and middle-income countries (UNICEF 2014). The debate over Sustainable Development Goals (SDGs), has brought with it proposals for a 'data revolution' to support development objectives (UNSG 2014). But for such a data revolution to extend beyond improved monitoring and towards evaluating and informing policy choices, longitudinal as well as cross-sectional approaches will be needed. While capacity for life course studies may be tight, building greater space for longitudinal approaches in low- and middle-income countries is a key element of designing more effective policy approaches.

Second, while the case for evidence-based policy making is constant across countries (Sutcliffe

and Court 2005; UK Cabinet Office 2013; Newman 2014), the challenges to move towards evidence informing policy are greatest where capacity is least (Crivello and Murray 2012; Porter and Feinstein 2014; Newman et al. 2012). Evidence is only one input into decision-making (Newman 2014) and will also be influenced by political interest, ideology and feasibility considerations (see also Laub, chapter "Life Course Research and the Shaping of Public Policy" this volume). The timescales by which research is produced tend to be longer than those in which policy decisions are taken. Not all research is necessarily communicated in a way that can easily be picked up by policy audiences. But in low- and middle-income countries such challenges are increased by the typically lower capacity to create and use data (for example see IEAG 2014). An additional difference is that while in OECD countries the state will itself be a key research funder, in developing countries key funders may be external donors, raising issues of how to ensure national ownership of research. Such research scarcities are likely to be particularly acute for longitudinal research, given its greater complexity (Lawlor et al. 2009; McKinnon and Campbell 2011; Scott and Mariotti 2014). Indeed, where resources are particularly tight, it may be easier to make the case for specific evaluation studies of existing policy approaches, with tangible, shorter term, benefits, than approaches such as cohort or panel studies which take longer to pay off.

Third, greater attention needs to be given to the research process itself, in order to overcome some of the typical barriers between research and policy (Dhaliwal and Tulloch n.d.). As evidence is only one of several inputs into decision-making, it needs to be produced and provided in a way that is most effective. Researchers need to be mindful and responsive to the wider context of likely interest, or demand, potential stakeholders and time windows of policy interest – surrounding decision-making (Crivello and Murray 2012; Start and Hovland 2004). Where there is potential policy interest in research topics, strategies to

support policy engagement include involving policy actors early and throughout the research process (for example in choices over specific research questions, through advisory groups, more informal channels and early dissemination of findings before formal publication). A Young Lives study of barriers to research uptake in Ethiopia and India highlighted barriers to overcome, including that decision makers may both be overwhelmingly busy and not be equipped with skills to interpret complex research. This study suggests the importance of tools such as evidence briefs which succinctly communicate key messages (Crivello and Murray 2012). Strategies to provide good quality research evidence in accessible and timely ways to policy-making cycles increase the chances of such evidence being made use of in policy debates.

7 Concluding Discussion

Debates about the proposed Sustainable Development Goals, have highlighted the need for data to ‘lighten the way’ for policy (UNSG 2014). This context, is therefore one of the recognition of the importance of evidence to inform policy. In this concluding discussion we summarize and reflect on the implications of the findings reviewed, and the potential contribution of longitudinal studies to this agenda in low- and middle-income countries.

First, the chapter identified increasing attention to inequalities within countries. The particular power of longitudinal studies is to link earlier circumstances and later outcomes, and so such studies have much to contribute in considering how policy may mitigate the development of inequalities. The conclusions from the studies reviewed highlight that both early socio-economic and locational-related inequalities in children’s development are observable in infancy and early childhood. As such, social policies, such as social protection and early childhood interventions, which can help

households to support children are important. In the data reviewed, inequalities between boys and girls emerge strongly in youth and adolescence, shaped by wider norms prevalent within society.

Second, as well as showing inequalities are evident early in life, longitudinal evidence of the development of height trajectories also shows change with age. Such analysis shows again the particular advantage of cohort approaches since change is inherently underestimated within cross sectional data, and which would therefore mask the correlates and implications of such change. Physical recovery and faltering is associated with socio-economic circumstances, identifying a process by which change over the early life course may widen inequalities. While the chapter emphasizes that more analytic work is needed on post-infancy recovery and faltering, these initial findings highlight an important addition to messages about early intervention: early is best but sustained policy intervention is needed to secure early gains and such an approach may also support some recovery.

Third, the chapter highlights a disjuncture: children’s lives are multidimensional, with interdependencies between domains of children’s lives, whereas public policy approaches are typically organized in policy ‘sectors’ to address health, education or protection concerns. While such approaches are administratively efficient, they may not be as effective as would be combining efforts across sector areas in securing gains in child wellbeing. Approaches within the early childhood field towards greater integration give some indication of both the potential gains, but also the delivery challenges of greater integration (Britto et al. 2014). Approaches to greater integration span from joint delivery of services on the ground to joint planning of services nationally. Given that the most marginalized children are also most likely to be multiply deprived, with potentially compounding results, improving the synergies between service areas is likely to be particularly important in helping reach the most marginalized children.

Finally, the chapter identifies the need not only to consider research findings, but also the process of research generation, in order that such evidence is most useful for policy development. In doing so the chapter identified commonalities across countries in the circumstances in which research is influential on policy decision-making. Beyond effective and simple communication of often complex research findings, the chapter emphasized the need for choices over research questions to be informed by an understanding of policy needs and interests, and for the involvement of policy makers within the process of research to help ensure research 'supply' meets policy 'demand'.

While capacity challenges are real, the chapter ends with a couple of points looking to the future. There is considerable interest from international organizations in life course approaches and a recognition these can improve policy and programming impact. Considerable efforts are being made across research programmes to create research in ways which are accessible for busy and non-research trained policy makers to use. Finally while the 'pure' aim of evidence-based policy seems naïve in politically orientated policy-making, such improved approaches to the research process and communication show how the research community can improve the chances of evidence playing a greater role.

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References

Aboderin, I., Kalache, A., Ben-Shlomo, Y., Lynch, J. W., Yajnik, C. S., Kuh, D., & Yach, D. (2002). *Life course perspectives on coronary heart disease, stroke and*

- diabetes: Key issues and implications for policy and research*. Geneva: World Health Organization.
- Alderman, H., & Walker, S. (2014). *Enhancing resilience to nutritional shocks. 2020 conference brief 17*. Washington, DC: International Food Policy Research Institute.
- Banati, P., & Alexander, G. (Eds.). (2012). *The structural determinants of child well-being*. Florence: UNICEF Office of Research.
- Boyden, J. (2013). 'We're not going to suffer like this in the mud': Educational aspirations, social mobility and independent child migration among populations living in poverty. *Compare: A Journal of Comparative and International Education*, 43(5), 58–600.
- Boyden, J., Pankhurst, A., & Tafere, Y. (2013). *Harmful traditional practices and child protection contested understandings and practices of female child marriage and circumcision in Ethiopia*. Oxford: Young Lives.
- Britto, P., Yoshikawa, H., van Ravens, J., Ponguta, L., Reyes, M., Oh, S., Dimaya, R., Nieto, A., & Seder, R. (2014). Strengthening systems for integrated early childhood development services: A cross national analysis of governance. *Annals of the New York Academy of Sciences*, 1308, 245–255.
- Camfield, L., & Tafere, Y. (2009). 'Children with a good life have to have school bags': Diverse understandings of well-being among older children in three Ethiopia communities. Oxford: Young Lives.
- Crivello, G., & Murray, H. (2012). *Why strengthening the linkages between research and practice is important: Learning from Young Lives*. Oxford: Young Lives.
- Crookston, B., Schott, W., Cueto, S., Dearden, K., Engle, P., Georgiadis, A., Lundeen, E., Penny, M., Stein, A., & Behrman, J. (2013). Post-infancy growth, schooling, and cognitive achievement: Young Lives. *American Journal of Clinical Nutrition*. doi:10.3945/ajcn.113.067561.
- Cueto, S., Escobal, J., Penny, M., & Ames, P. (2011). *Tracking disparities: Who gets left behind? Initial findings from Peru, round 3 survey report*. Oxford: Young Lives.
- Cueto, S., Guerrero, G., Leon, J., Zapata, M., & Freire, S. (2014). The relationship between socioeconomic status at age one, opportunities to learn and achievement in mathematics in fourth grade in Peru. *Oxford Review of Education*, 40(1), 50–72.
- Dercon, S., & Krishnan, P. (2009). Poverty and the psychosocial competencies of children: evidence from the Young Lives sample in four developing countries. *Children Youth and Environments*, 19(2), 138–163.
- Dercon, S., & Sanchez, A. (2013). Height in mid childhood and psychosocial competencies in late childhood: Evidence from four developing countries. *Economics & Human Biology*, 11(4), 426–432.
- Dercon, S., & Singh, A. (2011). *From nutrition to aspirations and self-efficacy: Gender bias over time among children in four countries*. Oxford: Young Lives.

- Dewey, K., & Begum, K. (2011). Long-term consequences of stunting in early life. *Maternal and Child Nutrition*, 7(3), 5–18.
- Dhaliwal, I., & Tulloch, C. (n. d.). *From research to policy: Using evidence from impact evaluations to inform development policy*. Cambridge, MA: Abdul Latif Jameel Poverty Action Lab/Massachusetts Institute of Technology.
- Dornan, P., & Ogando Portela, M. (forthcoming). *Do feelings of shame undermine children's development?* Oxford: Young Lives.
- Dornan, P., & Woodhead, M. (2015). *How inequalities develop through childhood*. Florence: UNICEF.
- Dornan, P., & Pells, K. (2014). *From infancy to adolescence: Preliminary findings from round 4*. Oxford: Young Lives.
- Galab, S., Kumar, V., Reddy, P., Singh, R., & Vennam, U. (2011). *The impact of growth on childhood poverty in Andhra Pradesh: Initial findings from India*. Oxford: Young Lives.
- Glewwe, P., Krutikova, S., & Rolleston, C. (2014). *Do schools reinforce or reduce learning gaps between advantaged and disadvantaged students? Evidence from Vietnam and Peru*. Oxford: Young Lives.
- Grantham-McGregor, S., Cheung, Y., Cueto, S., Glewwe, P., Richter, L., & Strupp, B. (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*, 369, 60–70.
- Gutman, L., & Schon, I. (2013). *The impact of non-cognitive skills on outcomes for young people*. London: Institute of Education.
- Independent Expert Advisory Group Secretariat (IEAG). (2014). *A world that counts mobilising the data revolution for sustainable development*. Report prepared at the request of the United Nations Secretary-General, www.undatarevolution.org
- Lawlor, D., Andersen, A., & Batty, G. (2009). Birth cohort studies: Past, present and future. *International Journal of Epidemiology*, 38, 897–902.
- Le, T. D. (2011). Height and cognitive achievement of Vietnamese children. *World Development*, 39(12), 2211–2220.
- Le, T. D., Nguyen, T., Nguyen, V. T., Mai, T. H., & Vu, T. T. T. (2011). *How do children fare in the new millennium? Initial findings from Vietnam*. Oxford: Young Lives.
- Lloyd, C. (Ed.). (2005). *Growing up global, the changing transitions to adulthood in developing countries*. Washington, DC: The National Academies press.
- Lundeen, E., Behrman, J., Crookston, B., Dearden, K., Engle, P., Georgiadis, A., Penny, M., & Stein, A. (2013). Growth faltering and recovery in children aged 1–8 years in four low – and middle-income countries: Young Lives. *Public Health Nutrition*, 17(9), 2131–2137.
- Malik, K. (Ed.). (2014). *Safeguarding human progress: Reducing vulnerabilities, building resilience*. New York: UNDP.
- McKinnon, R., & Campbell, H. (2011). Systematic review of birth cohort studies in South East Asia and Eastern Mediterranean. *Journal of Global Health*, 1(1), 59–71.
- Morrow, V. (2013). Troubling transitions? Young people's experiences of growing up in poverty in rural Andhra Pradesh, India. *Journal of Youth Studies*, 16(1), 86–100.
- Newman, K. (2014). *What is the evidence on the impact of research on international, development*. London: DFID.
- Newman, K., Fisher, C., & Shaxson, L. (2012). Stimulating demand for research evidence: What role for capacity building? *IDS Bulletin*, 43(5), 17–24.
- Ostry, J., Berg, A., & Tsangarides, C. (2014). *Redistribution, inequality, and growth*. Washington, DC: International Monetary Fund.
- Petrou, S., & Kupek, E. (2010). Poverty and childhood undernutrition in developing countries: A multinational cohort study. *Social Science & Medicine*, 71(7), 1366–1373.
- Pickety, T. (2013). *Capital in the twenty-first century*. Cambridge, MA: Harvard University Press.
- Porter, S., & Feinstein, O. (2014). *Demand for and supply of evaluations in selected Sub-Saharan African countries*. Johannesburg: Graduate School of Public and Development Management, University of the Witwatersrand.
- Rolleston, C. (2014). Learning profiles and the 'skills gap' in four developing countries: a comparative analysis of schooling and skills development. *Oxford Review of Education*, 40(1), 132–150.
- Rolleston, C., James, Z., Pasquier-Doumer, L., & Tran Ngo Thi Minh Tam. (2013). *Making progress: Report of the Young Lives school survey in Vietnam*. Oxford: Young Lives.
- Roseboom, T., van der Meulen, J., Ravelli, A., Osmond, C., Barker, D., & Bleker, O. (2001). Effects of prenatal exposure to the Dutch famine on adult disease in later life: An overview. *Molecular and Cellular Endocrinology*, 185(2001), 93–98.
- Sanchez, A. (2009). *Early nutrition and cognitive achievement in pre-school children in Peru*. Oxford: Young Lives.
- Sanchez, A. (2013). *The structural relationship between nutrition, cognition and non-cognitive skills: Evidence from four developing countries*. Oxford: Young Lives.
- Schott, W., Crookston, B., Lundeen, E., Stein, A., Behrman, J., & the Young Lives Determinants and Consequences of Child Growth Project Team. (2013). Periods of child growth up to age 8 years in Ethiopia, India, Peru and Vietnam: Key distal household and community factors. *Social Science & Medicine*, 97, 278–287.
- Scott, L., & Mariotti, C. (2014). *A place for panel data in the 'data revolution'*. London: Overseas Development Institute.
- Singh, A. (2014). *Emergence and evolution of learning gaps across countries: Panel evidence from Ethiopia, India, Peru and Vietnam*. Oxford: Young Lives.

- Singh, A., Park, A., & Dercon, S. (2012). *School meals as a safety net: An evaluation of the midday meal scheme in India*. Oxford: Young Lives.
- Start, D., & Hovland, I. (2004). *Tools for policy impact: A handbook for researchers*. London: Overseas Development Institute.
- Stein, C., & Moritz, I. (1999). *A life course perspective of maintaining independence in older age*. Geneva: World Health Organization.
- Sutcliffe, S., & Court, J. (2005). *Evidence-based policy-making: What is it? How does it work? What relevance for developing countries?* London: Overseas Development Institute.
- UK Cabinet Office. (2013). *What works: Evidence centres for social policy*. London: HM Government
- UN General Assembly (UNGA). (2014). *Status of the convention on the rights of the child report of the secretary-general*. New York: UN.
- UN Secretary General (UNSG). (2014). *The road to dignity by 2030: Ending poverty, transforming all lives and protecting the planet*. New York: UN.
- UN Statistics Division & UN Women. (2014). *Millennium development goals gender chart*. New York: UN.
- UNESCO. (2014). *Teaching and learning: Achieving quality for all, education for all global monitoring report*. Paris: UNESCO.
- UNPFA. (2014). *The power of the 1.8 billion, adolescents, youth and the transformation of the future, State of the World's Population 2014*. New York: United Nations Population Fund.
- UNICEF. (2010). *Progress for children: Achieving the MDGs with equity*. New York: UNICEF.
- UNICEF. (2013). *Improving child nutrition: The achievable imperative for global progress*. New York: UNICEF.
- UNICEF. (2014). *International symposium on cohort and longitudinal studies in low and middle income countries (Meeting Report)*. Florence: UNICEF.
- United Nations (UN). (2014). *The millennium development goals report 2014*. New York: United Nations.
- Woldehanna, T., Guidisa, R., Tafere, Y., & Pankhurst, A. (2011). *Understanding change in the lives of poor children: Initial findings from Ethiopia*. Oxford: Young Lives.
- Woodhead, M., Ames, P., Vennam, U., Abebe, W., & Streuli, N. (2009). *Equity and quality? Challenges for early childhood and primary education in Ethiopia, India and Peru*. The Hague: Bernard van Leer Foundation.
- Woodhead, M., Dornan, P., & Murray, H. (2013a). *What inequality means for children: Evidence from Young Lives*. Oxford: Young Lives.
- Woodhead, M., Frost, M., & James, Z. (2013b). Does growth in private schooling contribute to Education for All? Evidence from a longitudinal, two cohort study in Andhra Pradesh, India. *International Journal of Educational Research*, 33(1), 65–73.
- Woodhead, M., Feathersone, I., Bolton, L., & Robertson, P. (2014). *Early childhood development: Delivering intersectoral policies, programmes and services in low resource settings*. Oxford: Health & Education Advice & Resource Team.

Lags and Leaps: The Dynamics of Demography, Economy and Policy and Their Implications for Life Course Research

Angela M. O’Rand and Amie Bostic

1 Introduction

Two decades ago Matilda White Riley proposed that the idea of *structural lag* best characterized the relationships of social structures, policies and culture to population aging in the U.S. She and her colleagues (Riley et al. 1994) argued that social institutions, organizational arrangements and cultural stereotypes were lagging behind demographic change, especially the extension of life expectancy (including healthy life expectancy), the gender revolution, and medical-scientific knowledge about population aging from birth until death, among other trends. Unlike earlier times, most people live to be old, with life expectancies reaching 85 or more among the healthiest subgroups. Yet, social institutions have not evolved to incorporate these groups in mainstream life. Similarly, the lives of young adults have become more unpredictable and vulnerable to changes in economic institutions that no longer accommodate easy entry into lifetime work or assure pay-offs to education. Finally, women’s lifetime patterns of labor force participation still do not fit well with institutional arrangements that continue to challenge their childcare, educational, and work demands. Riley’s argument brought renewed attention to the dynamics among demography, economy and policy, which

continue as fundamental to the future of life course research across the life span.

While today the challenge of this provocative view remains, it must also be framed by a global perspective on population aging and be focused on the entire life course, not just the older years. At least three related demographic patterns coincide to present this new challenge. First, life expectancy has doubled around the world over the last 200 years, with remarkable increases (i.e. a near doubling) in life expectancy in the last half century in the developing world (Uhlenberg 2009). These *leaps* in population aging along with the longer-developing demographic transitions in advanced economies present new challenges for social policy, especially social welfare (including education) and employment policies that lag behind demographic change, and raise new questions for social science. Second, as life expectancy has generally increased across countries, gender differences persist in life expectancy while the shapes of gendered lives reflect both remarkable changes and continuing inequalities. Fertility decline and the expansion of educational opportunities have improved and extended women’s lives, but longer lives continue to be associated with disability, loneliness and the higher risks for poverty. Third, migration patterns across countries and regions have differentiated the cohort-compositions of many advanced societies especially in race/ethnicity/nativity mix and now challenge intergenerational and inter-cohort relationships and the social policies that regulate them.

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These major population trends have been accompanied by transformations in the global economy. The twenty-first century global economy is characterized by a division of labor and a system of financial control that are redefining employment and family security across societies and creating a new risk environment, both for individuals and their families, and for national policies. This environment brings greater uncertainty to the conduct of daily lives and to short- and long-term policymaking, respectively. The ascendance of market institutions has reorganized the global labor market and redefined work and work careers across countries. It is also imposing pressures on public policymaking across countries to privatize the financing and the delivery of educational and other welfare services and to narrow the eligibility for these services across the life span through such mechanisms as educational vouchers and means-testing for income support within national populations. Population aging is independently exerting financial pressures on public policymaking and, interdependently with global economic restructuring, having an impact on educational and employment policies affecting all age groups. The most recent economic crisis starkly illuminated what has otherwise been a long developing restructuring of economic life with implications for the economic independence of individuals and families and for sustainable public policies with relevance for the life course from childhood through old age. As such, these large-scale trends are having on-the-ground impact on institutional arrangements that affect educational opportunity, job security, health care eligibility and access, and individual and family well-being across the life span.

This chapter will identify selected areas of life course research that should be motivated by these considerations. The selection is far from exhaustive, but illustrates some directions for the future of research in this area. Three areas for future research are proposed. The first is a more conceptual proposal to guide life course research in general. It focuses on *the life course as a continuous manifold process with diverse temporality in a population*. Age-graded, phasic constructions of the life course are treated as too restrictive to

account for growing variations in life transitions and the pace of aging, including both older and younger cohorts in advanced countries but also extending to developing countries. The second focuses on the ascendance of market institutions, especially financial institutions, in the maintenance of individual and household financial and health decision-making. *Financial and health literacy are new life course risks* which pervade the life course. Third, increased migration levels over recent decades, especially to some advanced countries, are changing the demographic compositions of successive cohorts who face changing educational opportunities and workplace protections. The *life course implications of migration* are now matters of speculation, which life course research should address in the future as data permit.

2 The Macrosocial Foundations of the Life Course

The dynamics among global economy, social policy and demography are complex, variable and usually asynchronous across countries with different development histories, demographic compositions, and policy legacies. Each trend has had unique recent effects on the development of the life course that are very briefly considered below. These unique effects can be countervailing within contexts—yielding leaps and lags. For example, globalization processes pressure employers to reorganize their workforces through reduction and/or relocation, while demographic pressures such as population aging pressure employers to retain workers and governments to extend retirement ages to relieve welfare state budgets (Blossfeld et al. 2011). Similarly, economic shocks that erupt and spread in the global economy place pressures on families to limit fertility, which in turn affects the prospective sizes of future tax bases to support long-term welfare policy planning to support aging populations. These complex dynamics, arguably, do not support the expectation of a convergence in the construction of the twenty-first century life course as

such. Everyone will not age in the same way or at the same pace. On the other hand, clearly predictable specific patterns of divergence or heterogeneity in the future life course within and across countries are also problematic.

Economic Restructuring Three aspects of economic globalization with life course influences are reviewed below. First, the global division of labor differentially distributes work across employment sectors and differentially concentrates financial, manufacturing, service, retail, and research and development sectors across countries and regions resulting in the displacement of once relatively stable manufacturing and related employment sectors from advanced economies to developing countries (Berg and Kalleberg 2001). This has been occurring over four decades, and has been punctuated by recessions which have become more frequent, and recently more severe. Job loss in the U.S. in the recent Great Recession reached more workers at all educational levels; was the highest since the 1980s; and was followed by lower rates of reemployment and lower earnings after reemployment partly as a result of part-time employment following earlier fulltime employment (Farber 2011, using the Displaced Workers Surveys, 1984–2010). Also, the typical gap in U.S. job loss rates between older and younger workers narrowed to bring younger workers closer to their older counterparts in vulnerability to involuntary job loss (Farber 2011). Meanwhile, the accompanying decline in job growth has negatively influenced first-job entry rates for young workers across educational levels in advanced countries and increased the likelihood of longer durations of part-time work, underemployment and unemployment in the early career (Blossfeld et al. 2005). The implications for the future careers of these cohorts are not fully known and the impact of the perceptions of the future by these cohorts has gone unstudied.

The second related trend associated with global restructuring is the contraction of the industrial-era employment relationship characterized by long-term, fulltime contracts between

employees and employers with compensation packages for a majority of public/private sector workers that promised job security, income maintenance after retirement with defined benefits, and health and worker compensation coverages while employed. However, employers have retreated from the provision of these packages at accelerating rates since 1980, even for fulltime workers. Nonstandard employment arrangements such as part-time, contract, and temporary jobs have grown dramatically and particularly in unstable sectors in low end services and retail across countries (e.g. Kalleberg 2009). This workplace trend is shifting the full responsibility for protection against income loss and health decline to individuals and their families from an early age (Hacker 2006). This reflects the individualization of risk which was once based on contracts with intermediary organizations, primarily employers in liberal market economies to cover pensions and health insurance. Evidence reveals that subsidiary processes are also being implemented in countries with traditionally more generous welfare systems (O'Rand et al. 2011). Arguably, in the U.S., lower-level governmental bodies (e.g. U.S. state governments) are also pressured to redistribute responsibility for universal elementary and secondary education through mechanisms that encourage individual choice (e.g. charter schools, school vouchers, home schooling). Population aging is making long-term pension and healthcare promises by employers and the provision of adaptive educational systems by the public sector unsustainable under previous arrangements.

A third critical component of global economic restructuring is the ascendance of a neoliberal policy model associated with a concentration of the financial sector (Tomaskovic-Devey and Lin 2011). Financialization of the global economy centralizes power in financial institutions such as banks, investment firms, and insurance organizations as opposed to manufacturing, retail or public institutions. The former institutions are more responsive to short-term economic cycles and the rapid distribution of abstracted market data and not embedded in traditional employment or government relationships. Traditional pensions are

disappearing and being replaced by investment vehicles (e.g., 401ks, IRAs) that expose individuals to equities and bonds which carry considerable risks. Importantly, they require a level of financial literacy for their purchase and management that is not equally distributed in populations. And they require the capacity and motivation to plan far into the future.

Hence, the ascendance of new risks is an emergent aspect of everyday life characterized by growing uncertainties about the support of local and national institutions for life course challenges and the increased vulnerability of individuals across the life course to remote shocks. Risks to health and well-being are not new (Graff 1995). Infectious diseases and poverty were risks that prevailed across the twentieth century and were addressed by collective institutional solutions in public health and Social Security. The newer individualization or devolution of risk has spawned pervasive uncertainty and the spread of risk aversion across economic and policy sectors.

Demographic Change Three aspects of variable demographic change reflect both the independent force of collective and cumulative individual decision-making in response to the daily material conditions of life and populations' responses to economic forces and policy environments.

Population aging is occurring across countries, although it varies in its historical legacy (Poterba 2014). The delay or limitation of fertility is the principle mover of population aging. The second factor in this trend is the extension of life expectancy through economic development, improved environmental conditions, and medical innovations that contain or mitigate infectious, chronic and disabling diseases that increase mortality. This is influencing the demographic composition of societies and producing inter-cohort differences in composition, differential exposures to economic shocks across the life span and potentially competing cohort interests in policies that insure against life course risks with age.

The second demographic transition refers to a recent leap and complex extension of the longer-

term demographic transition characterized by new family or household forms that have displaced the nuclear family of the twentieth century in advanced societies. Variable patterns of timing and sequencing of educational completion, work entry, marriage or cohabitation and fertility have developed in advanced economies and appear to be spreading to newly developing economies in distinctive ways (Lestaegehe 2010). The extent to which these patterns are responding to global economic change and variations in the policy environment deserve more attention in comparative perspective. The major hypothesis about the spread of the second demographic transition is cultural: that elements of modernization, especially higher levels of education for women and the diffusion of values related to autonomy and individualization are principle drivers of this trend.

Third, the increased migration of populations from less developed to more developed regions is accelerating rapidly within and across countries. The impact of migration on the life courses of migrating groups and on the policy environments of receiving (host) countries or regions is among the major issues of the twenty-first century. The economic and political arrangements for receiving and integrating non-native populations lag behind the pressures of immigrating populations. Added to these institutional issues are the reactions of native cohorts that vary in their cultural tolerance of new immigrant groups. Even societies like the U.S., which has a history of immigration, are ill-prepared in the new economic and cultural environment to easily absorb new groups.

Social Policy Twentieth century policies with historical relevance for the construction of the life course and protection against life course risks are being challenged by globalization and population changes outlined earlier (Sainsbury 2012). The devolution of risk in social policies is a dominant trend across countries, including those with historically generous welfare states and corporatist economies. The devolution of risk refers to the erosion of inclusive social insurance structures and their replacement with neoliberal selective, privatized and individualized financial mecha-

nisms for the management of life course risks in education, health, and income maintenance. A major result is unequal access to life course resources that yield cumulative patterns of inequality.

Financialization and individualization of retirement are most apparent in liberal market economies where private pension mechanisms have existed for decades, but these are spreading to previous social democratic and corporatist welfare states that can no longer sustain accelerated population aging and volatile global economic shocks. The erosion of the retirement institution is proceeding across advanced economies and its construction in developing economies is being shaped by global economic forces (O’Rand 2011).

3 Exemplary Life Course Processes for Future Research

This section of the chapter will propose examples of major life course processes predicted to continue to be influenced, sometimes in contradictory ways, by the dynamics among economic change, demography and elements of social policy. Notable demographic and economic changes (*leaps*) observable at the micro and macro levels in the last few decades are featured and social policies that enable or challenge these changes (*lags*) are considered in their associations. Selected problematic features of these changes are identified as directions for future research.

3.1 The Life Course as a Continuous Manifold Process with Diverse Temporality in a Population

Longitudinal research over the last two decades has revealed considerable heterogeneity in the temporality of lives that deviates from the strict age-graded, phasic model that guided social science research over most of the twentieth century.

Educational participation, marriage, parenthood, labor market entry and even retirement can occur and recur over the life course at times not predicted by earlier models. Health and illness over the life course add another temporal dimension that has been discovered to be less age-graded than earlier believed. The macro-level trends just discussed have contributed to the changing and variable temporality of lives. But, more comprehensive data collection has also contributed to this observation.

The availability of large representative, maturing samples followed over several decades has made possible finer observations of unfolding lives in the U.S. The introduction and maintenance of similar and sometimes highly comparable panel surveys in other countries are now enriching our understanding of life course processes under sometimes highly variable conditions. Moreover, the increasing collection of biodemographic, biomedical, and administrative (e.g. clinical and death files; school-level records; satellite geographic information) data that are linked to individual survey files brings the field closer to examining lives holistically. Finally, new data collection technologies such as “Ecological Momentary Assessments” (Cain et al. 2009) that use smartphones and other mobile devices present opportunities to conduct deeper studies of the impacts of proximate environments (such as poor or ethnically-concentrated neighborhoods; community patient delivery systems) on life course processes as they unfold.

The life course is a manifold cumulative phenomenon consisting of intertwining processes associated with human development from birth to death, that include biological, cognitive, and social transitions that are interdependent and cumulative in their impact with age and influenced by environmental factors such as macro-economic structures and social policies and meso-level contexts such as family, school, neighborhood and geographic conditions. As such, life course mechanisms include several components: *selection*; *interdependent cumulative impact*; *relative agency within contexts*; and *pervasive heterogeneity and inequality along the way* (Chart1).

Selection	Prior/initial traits, contexts or conditions, especially at extremes, have persistent direct and indirect impact on later outcomes
Cumulative impact	Successive events/transitions are conditioned by earlier ones leading to greater continuity than discontinuity
Agency within contexts	Selected environments provide more choices than others among options that influence later outcomes
Heterogeneity/ inequality	The cumulative biographies across environments yield increasing heterogeneity and inequality in cohorts

Chart 1 Life course mechanisms

Strong *selection* processes pervade the life course, from the earliest environments to successive ones. Gene-environment interactions are possible from conception and gestation and continue throughout life in latent and manifest ways. Childhood environments provide formative contexts, especially family conditions related to social and economic advantage or disadvantage and childhood health, that shape the child's capacity to enter and move through the educational system. The educational system, in turn, is perhaps the most powerful institutional environment outside the family to influence life chances and well-being over the life course for the majority of the U.S. population. The observed empirical impact of educational attainment on *cumulative* adult outcomes ranging from marriage and marital stability to occupational, earnings and wealth attainment and security, to health behaviors and to risks for morbidity and mortality is so widely documented as to have achieved the logical status of a truism.

In spite of the robustness of the association of education with later life outcomes, the selective role of education in the life course is still problematic and will continue to invite further analyses. Two cross-national phenomena associated with global economic and demographic factors that invite such investigation are presented below. The first relates to the recent cross-over of relative educational attainment levels placing women ahead of men in education in recent cohorts across many countries. The second is the growing

pressure for the continuation of (or return to) formal education well into the adult years brought on by technological changes in the workplace as well as by economic shocks that affect job opportunities and job security for workers across ages (Blossfeld et al. [forthcoming](#)). Both of these trends are directly affecting the temporal organization of the life course, i.e. the timing and sequencing of once more tightly scheduled—and gendered—transitions among young adults across educational, family and work roles. They also reflect cumulative and agentic processes operating to move individuals across different successive contexts within which different choices present themselves.

The Gendered Life Course Significant gender cross-overs have been observed in recent decades: (1) women across many countries have equivalent if not higher relative educational achievement than men and nearly equivalent labor force participation rates, yet occupational segregation and wage inequality persist; (2) women's household arrangements have become more variable with implications for lifelong advantage or disadvantage; and (3) women now engage in more risky health behaviors such as smoking and obesity, while men's health behaviors have relatively improved with selective divergent consequences for both. These changes reflect *selective, cumulative, and agentic* shifts that are yielding inter-cohort variations in work, family and health behaviors among women with consequences in adulthood that invite interrogation.

The gender cross-over in educational attainment represents a leap in recent history. In the U.S. context women's and men's college completion rates have risen since 1970; men's from 20 to 27 % and women's from 14 to 36 %, resulting in current comparative rates of completion favoring women by 8 %. Women also complete the majority of master's degrees (60 %) and more than half of doctoral and professional degrees (DiPrete and Buchmann 2013). Also, women are now a majority of tertiary level students in the U.S., Latin American and Western Europe (excluding Germany). Explanations lean towards changing national-level gender ideologies and school cultures at the elementary and secondary levels that retain masculine identity norms among boys (McDaniel 2009; DiPrete and Buchmann 2013). These explanations contain elements of *selection and agency*. Meanwhile these studies, and others, reveal improvements in, but also persistence of, gender earnings differences favoring men cumulatively over the career.

Different levels of educational achievement set women and men on different life course schedules and *cumulative* tracks through adulthood. The most advantaged track is a sequence of educational (college) completion, followed by employment and then family formation. However, the least advantaged track is associated with lower educational attainment, early childbearing, and unstable work and marriage histories (Sawhill 2014). The latter is especially cumulatively disadvantageous for women who carry the heavier childbearing/rearing burdens. Early childbearing has negative consequences for the health and well-being of women and their children, especially in countries whose welfare policies are less generous and based on employment (workfare) policies (Sainsbury 2012).

Meanwhile, the majority fall in between the most advantaged and disadvantaged, have less clearly predictable paths and considerable uncertainty about economic security (Kalleberg 2009; Hacker 2006). Among these majority populations, the early adult life course is reflecting this uncertainty in a complex mix of schedules emerging across countries including the U.S. with some subgroups falling within Lestaege's putative second demographic transition: cohabitation, postponed

marriage, childbearing without marriage, etc., after first leaving school at higher median ages than in the past. Meanwhile, the process of labor market entry from first completed schooling has grown more varied and less orderly for women and men across advanced economies (Buchmann and Kreisi 2011) and job mobility following first job has increased, especially in the U.S. (Royalty 1998). In short, advances for some women in education and work may be offset by new uncertainties associated with economic restructuring, especially if social policies do not provide safety nets.

Finally, another fruitful area of research should address health outcomes related to these cumulative pathways. Projections of life expectancy among women and men suggest some narrowing of the traditional average female advantage, in part as a result of changing health behaviors such as smoking (Preston et al. 2014) but also arguably as a result of generally increased stressful lifestyles related to work-family balance and economic instability. Women are smoking more and the increase in obesity among them has been especially dramatic in most recent decades. But considerable heterogeneity in these behaviors also exists based on education and cumulative disadvantage. Even region of residence, which is highly associated with economic and demographic concentration and differential public policies towards health and income support, has unique effects on health behaviors and outcomes (Boardman et al. 2005).

Extended Work-Education Sequences Across Adulthood Some studies suggest that both the youngest and oldest workers have been especially impacted by economic globalization and the rise of precarious work (Blossfeld et al. 2005; Blossfeld et al. 2011). The most recent unemployment statistics from Eurostat (2014) report the youth unemployment rate (ages 15–24) as double that of other groups and as high as 50 % in some countries (e.g. Italy). Of course, low fertility rates in Europe have made the size of this group relatively small such that the ratio of unemployed youth to all unemployed is less dramatic. Nevertheless, the cumulative life course implications for these future adult populations require some monitoring.

One response to unemployment is to remain in, or return to, school. By 2011, the OECD (2011) reports that approximately 26 % of 20–29 year olds in OECD and G20 countries were enrolled in part-time or full-time education, up 8 % since 1995. However, these unemployment effects of the recent global recession spread to mid-adult working populations across employment sectors and across countries. Adult enrollment in formal coursework increased as well with increases in enrollments among 30–40 year olds reaching double digit levels in many countries (e.g. Australia 12 %; Israel 21 %; U.S. 17 %; Chile 29 %). In the U.S. enrollment by adults in post-secondary education has increased steadily over that last three decades, in part as a response to job insecurity (Elman and O’Rand 2002), or as a catchup strategy to complete earlier postponed credentials (especially among women and minorities) (Elman and O’Rand 2004; Jacobs and King 2002; Maralani 2011), or because within-firm training programs have been severely reduced in response to economic restructuring (Elman and Weiss (forthcoming)). Even older age groups exhibit nontrivial participation rates in work-related education: one-third of adults 45–54 and one-fourth of adults aged 55–64 have annually enrolled in one or more work-related courses since 1990 (Levesque et al. 2008).

Finally, while ages 62 and 65 continue to act as major thresholds for retirement for significant proportions of workers, those working later than the normal full retirement age for Social Security has steadily increased over the decade with more and more working beyond age 70 (O’Rand 2011). Similarly, a new pattern of post-retirement employment, called “unretirement” is also emerging (see Maestas 2010). Still another pattern represented by one-fourth of the population over age 50 is one of a mix of unemployment, underemployment, and disability in the years leading up to retirement (O’Rand 2011; O’Rand and Hamil-Luker 2011). Accordingly, the industrial life course with an ordered sequence of education-work-retirement may no longer reflect actual work lives. Employment security for the majority of workers was the hallmark of industrial societies, and the linchpin of the “social con-

tract” embedded in all twentieth century welfare regimes. In this era, the work career may be increasingly a punctuated and disordered sequence of work, education, unemployment, underemployment, and retirement.

3.2 Financial and Health Literacy Are New Life Course Risks

The individualization of risk and increased responsibility for independent management of expected and unexpected life course challenges requires new forms of knowledge and understanding in the conduct of daily life. Individuals are increasingly confronted with risk assessments and choices in financial planning and in health (including end-of-life) decisions. Besides a fundamental sense of the future—a future time perspective framed by projected time horizons—decision-making in both areas has two other similar cognitive requirements: some level of numeracy and some basic conceptual understandings specific to each situation. Beginning with the idea of future time perspectives, some scholars argue that future planning of the life course somehow goes against our nature (see Carstensen’s (2009) argument that “nature abhors a 401 k”) and, following this assumption, proposes that it is time to stop referring to “old age” and instead to “long life” both in popular and academic discourse. Carstensen’s larger body of work has been distinguished by her nearly unique interest as a life course researcher on changes in temporal orientations with age, which argues that older persons view the future as limited and consequently prioritize more immediate, emotionally meaningful goals while younger persons view the future as more open-ended and prioritize instrumental goals to navigate the future (Carstensen 2006 for summary). Still, she probably does not deny that variations in instrumental future time perspectives probably exist within age groups as well as across them.

Long traditions of research on differences in future time perspectives can be found especially in psychology and in economics. In psychology, the famous “marshmallow” studies started by Robert Mischel in the 1960s established that

children differed in their future time perspectives by their relative willingness to defer gratification by accepting postponed greater rewards instead of immediate lesser rewards (e.g. Mischel et al. 1989). Most of this work has been carried out on children and adolescents (O’Rand and Ellis 1974). In economics, the interest has been in the study of preferences for rewards where the repeated finding is that the tendency is to discount the value of later rewards, and to do so increasingly with the length of the delay. When risks, or “uncertainty” in the rewards, are added to the situation the tendency towards risk aversion is prevalent; study subjects respond more to the probability of loss than to the probability of gain (Kahnemann and Tversky 1979).

While these literatures are substantial and more complex than this summary can reflect, the point for our purposes here is that given these general repeated findings, new demands for individual planning in matters of health and wealth across the life course must confront the observed central tendency to resist such planning and the patterns of heterogeneity in the population to do so from childhood forward. Yet, choices have to be made. Adults who need to plan for their retirements may also be managing the cost of education for their children (or for themselves) and have to navigate the world of educational loans, choices between loans, and trade-offs between retirement accounts and educational savings accounts or loans. The seemingly odious burden of financial life course choices is a paramount feature of modern life.

Numeracy and the specific conceptual requirements of financial and health literacy are the other cognitive elements of these life course risks. In the case of financial literacy, the capacities to understand and to calculate such constructs as compound interest, inflation and risk diversification in investment portfolios are fundamental skills for investment (retirement) planning. Accounting for interest and inflation are also critical for the management of debt (i.e. the costs of borrowing, making minimum payments, incurring fees for late payments and over-limit expenditures, etc.). Lusardi and Mitchell (2013, 2014) developed measures of some of these phenomena

(compound interest, inflation, stock diversification) in several surveys (starting with the HRS in 2004) and find that approximately one-third of the population answers correctly to all three questions; three-fourths correctly answer the inflation question; two-thirds, compound interest; and half, stock diversification. In the case of the third question, one-third of respondents answer “Don’t Know.” More “sophisticated” aspects of financial literacy have also been identified. One is the understanding of the structure of mortgages and mortgage payment schedules, clearly evident by its poignant absence during the recent Great Recession brought on, in part, as a result of widespread misunderstanding of these structures and schedules. Another is the understanding of asset pricing, and the widespread ignorance of the inverse relationship between bond prices and interest rates (Lusardi and Mitchell 2014). The latter has special relevance to portfolios of many aging investors who are confronted with changing the mix of bonds and equities in their efforts to avoid outliving their savings.

The recognition of the new demand for financial literacy is not limited to U.S. populations (Organization of Economic Cooperation and Development 2005). Studies conducted in other countries find low levels of financial literacy, but variations across countries in the familiarity of these concepts based on national economic experiences and policies. For example, German and Dutch respondents understand inflation better than the other two concepts; the Japanese understand deflation; and Russians scored lowest of all in the questions. The urgency of these observations was recognized by the OECD Programme for International Student Assessment (PISA) which added financial literacy questions in 2012 to its annual educational assessment of 15 year olds (Lusardi and Mitchell 2014).

Numeracy and conceptual knowledge vary in the health domain as well. The Institute of Medicine (2004) defines health literacy as the capacity to obtain, process and understand basic health information and services needed to make health decisions. Research in this area suggests that health literacy is the product of both individual capacities and motivations and the resources

provided from multiple environments, including the health system and other sectors involved with insurance and related supports of health (see Baker 2006 for review). Some aspects of medical literacy have been well-known for decades, among them the literacy associated with patient communication of symptoms as well as understanding written medical documents and prescription labels and complying with prescriptions and directives.

These core long-term problems have been identified as related to basic vocabulary and the numeracy associated with following prescribed treatment regimes. For these reasons clinical tests of medical literacy have been developed to emphasize vocabulary and numeracy, e.g. The Rapid Assessment of Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adults (TOFHLA). However, more sophisticated and long-term issues of medical literacy have emerged. Faced with technical, probabilistic diagnosis and prognosis information regarding health, choices are presented to patients who often bring little, if any, prior probabilistic knowledge and understanding to make health care decisions. Decisions regarding health insurance coverage are equally challenging and often beyond reach. Relatedly, the emergence of preventive medicine is centrally a life course issue. As in the case of financial literacy, choices (many life style or health behavior choices) regarding health maintenance and disease prevention now pervade the life course, not just the older years. Not coincidentally, the Educational Testing Service has developed a Health Activities Literacy Scale (HALS) that measures prose, numeracy, and knowledge in five areas (health promotion, health prevention, disease prevention, health care and maintenance, and systems navigation).

By all accounts, a key correlate of financial and health literacy is level of education (years of schooling). The robust correlations between level of education and economic and health outcomes across the life course are perhaps the most well-established in the epidemiological literature. But the correlations are not sufficient explanations. Financial and health literacies may represent

some of the mechanisms through which education influences health and wealth outcomes. But, some evidence regarding financial literacy suggests that other contexts also serve to transmit knowledge that lends itself to greater literacy. Workplace experiences appear to be important for financial literacy (McArdle et al. 2009) especially to the extent that workers are covered by and educated or motivated to understand their pensions. Workers covered under traditional defined benefit (DB) pensions had little understanding of their pensions other than their entitlements upon retirement. Workers in occupations covered by defined contribution (DC) plans that require more year-to-year decision-making about their plans have, on average, greater financial literacy than their older counterparts, but still vary widely in their levels of understanding (Helppie et al. 2010). Because younger workers have been less motivated to participate in DC plans, pension legislation in the 2000s introduced mandatory enrollment in DC plans with "opt-out" options. However, the behavioral inertia of aging workers *not* to make changes in their investment mixes once they are enrolled is another indicator of financial illiteracy that has led to devastating losses during economic downturns or market dislocations.

A final reference here must be made to the role of *non-cognitive factors* or what some economists call "soft skills" (Heckman and Kautz 2012; Shanahan et al. 2014) on life course outcomes. Personality matters for economic achievement and health maintenance. Conscientiousness and self-control, specifically, are persistent individual traits that appear to be particularly important. An exemplary study in this regard has demonstrated the long-term impact of measured childhood conscientiousness and self-control on adult health. The Dunedin Longitudinal Study has recently reported that credit scores are significantly associated with cardiovascular disease risk, and that both are directly influenced by human capital factors that include educational attainment, cognitive ability and self-control (Israel et al. 2014). It follows from these findings that both financial and health literacy are probably linked to non-cognitive as well as cognitive factors.

3.3 Life Course Implications of Migration

Migration across countries and regions for economic and political reasons is growing. According to the UN Population Fund, approximately 3 % of the world's population in 2010 lived outside of their countries of origin. *International migrants* are typically defined by organizations that document these movements as persons living for 1 year or longer in countries other than the ones in which they were born. They include foreign workers, international students, refugees and their families. According to the Pew Research Center, the general pattern of migration is overwhelmingly to the U.S. and other wealthy countries (69 %) by a growing share of persons born in “middle-income nations” such as India and Mexico (60 %), as classified by the Pew Research Center (2013).¹ We add, however, that immigrants to the U.S. from Asian countries come from higher income groups in their native countries.

The scale of this phenomenon alone is worthy of serious consideration by social scientists. However, from the vantage point of life course research in the context of population aging patterns, the long- and short-term influx of younger adult immigrants introduces new patterns of heterogeneity and inequality. Selection and survival of immigrant groups is a growing focus of attention in life course research, though facing analytical challenges associated with causality. This selection-survival focus, which arguably can be considered a supply-side approach, tends to ignore “demand side” factors that vary widely across countries and have independent implications for both selection and survival.

U.S. and European studies suggest that *immigrants*—those migrants who seek to settle in their

destination countries—tend to be positively selected, that is they are healthier, more talented as measured by educational and occupational backgrounds, and intrinsically more ‘*agentic*’ by choosing to migrate. Consequently, it is argued that they can catch up to and, in some cases, overtake the native population (in educational attainment or in earnings, as examples). However, catching up and overtaking are not the typical experiences of all U.S. immigrant groups. In the U.S. context the debate over the Hispanic paradox confronts this issue directly. The Hispanic paradox is based on observations over two decades of the apparent health advantages among Hispanic groups compared to their white counterparts. This was initially (and intuitively) consistent with the selectivity hypothesis. However, closer scrutiny of the elements of selection among Hispanic groups in the recent decade has uncovered the diverse experiences of different Hispanic groups and the role of immigrant cohort survival underlying the paradox. When the Hispanic population is differentiated into the subgroups of Mexicans, Puerto Ricans, Cubans, and other Hispanic groups (Central and South Americans) different patterns emerge. When mortality is the outcome of interest, only foreign-born Mexican and non-Puerto Rican and non-Cuban Hispanics exhibit an advantage. And in the case of Mexicans this advantage is significantly attributable to the return migration, or the loss, of less healthy migrants from the study (Palloni and Arias 2004).

These kinds of observations have raised cautions regarding standard research designs and modes of data analysis in immigration research across countries. Patterns of return migration and other bases of attrition are now taken more seriously (Bulatao and Anderson 2004). Research designs that depend on data collection on variables measuring immigrant traits *only* and ignore information about the origin communities and families of immigrants are being challenged. The obstacles to pursuing alternative designs to collect data on both sides of the border are daunting, but successful examples exist. Such examples include the Mexican Family Life Survey (MxFLS) and the Mexican Health and Aging

¹According to the World Bank, India is also defined as a middle-income economy, albeit a lower-middle-income economy. The World Bank classifies a country as lower income if the GNI falls below \$1,045. We follow the World Bank's guidelines, which have also been adopted by the Luxembourg Income Study (<http://www.lisdatacenter.org/working-papers/country-income-classifications/>).

Study (MHAS). The MxFLS includes a number of socioeconomic, health and fertility indicators over time in Mexico during the first wave and follows respondents in subsequent waves including those who emigrated to the U.S. (<http://www.ennvih-mxfls.org/english/introduccion.html>). The MHAS focuses on health outcomes among Mexican-born respondents both in Mexico and the U.S. offering multiple comparisons regarding selection and outcomes (<http://www.mhasweb.org/StudyDescription.aspx>).

The more focused study of destination contexts of host communities as sources of heterogeneity and inequality is gaining currency. Besides the economic opportunities and social costs of this demographic behavior, some environments into which migrants arrive present cultural-political obstacles related to discrimination, racialization and social exclusion. These experiences can have negative effects on life course outcomes. Different immigrant groups arrive with varying levels of education and financial and medical literacy that select them into different cumulative pathways of integration and mobility in their new home countries. However, most lack nation-specific institutional knowledge, leading to social exclusion. The lengthy, costly and challenging process of becoming a citizen usually limits the level of immigrant political incorporation. Immigrants, therefore, often lack the same rights as natives and face greater challenges to confronting anti-immigrant sentiment and policies through traditional means (like voting). This likely has spillover effects, particularly economic effects. For example, immigrants are typically less incorporated into political institutions such as the welfare state. Both visa type and country of origin is profoundly influential on access to the welfare state. This lack of access has been linked to higher rates of poverty among immigrants (Sainsbury 2012).

Supply-side characteristics are variously associated across studies with a number of alternative contextual (demand-side) contingencies, including cohort quality (immigrant groups vary in educational, occupational and class backgrounds giving some relative advantage from entry); economic cycle of host country upon arrival (arrival

during an economic downturn constrains immigrant incorporation into the economy); language barriers (immigrants arriving in host communities where the language of their home country is spoken benefit from more support for integration); sector (or region) of employment (employment sectors and regions with higher demand for workers who match these needs provide earlier opportunities for integration); cohort category (immigrants admitted as workers as opposed to reunited family members or political refugees have an advantage); and tenure in destination country (longer tenure facilitates integration and achievement). These contingencies are nontrivial insofar as they can differentiate immigrant experiences and life course outcomes. For example, apropos the earlier review in this essay about women's educational advantage, immigrant women, who now represent about half of all immigrants in advanced countries, benefit more from educational attainment, while men benefit more from overcoming language barriers (Adsera and Chiswick 2007).

The global perspective that this essay has adopted requires that some attention be paid to some national-level factors of the major host countries besides their global economic positions. One category of national level factors is cultural and represents variations in how symbolic "ingroup-outgroup boundaries" serve to frame attitudes towards immigrants. A recent study, using the European Social Survey of 21 countries on this specific topic deserves attention by life course researchers (Bail 2008). An item in the survey asked respondents to evaluate the desirability of a hypothetical immigrant on six traits: race/ethnicity; religion; language; culture (commitment to the host country's "way of life"); education; and occupation. Using a fuzzy-set analysis based on the distances of specific country averages from all-country averages on each item, three configurations of countries emerged: one is represented mainly by southern and eastern European countries with the most recent immigration influx and exhibited relatively stronger religious, racial, educational and occupation boundaries; the second represented mainly the core of Western Europe with historically longer

immigration histories from Africa, Asia and the Middle East and exhibited stronger language, culture and educational boundaries and weaker racial and religious boundaries; the third represented Scandinavian countries and exhibited relatively weaker boundaries on all items. Timing of immigrations, origins of immigrants and other factors varied in importance for the symbolic boundaries differentiating the three configurations. Citizenship policies of the host country configurations did vary. Arguably, these are the institutional extensions of cultural preferences. They include the importance of laws regulating antidiscrimination, naturalization, family reunion, long-term residence, and labor market inclusion (Bail 2008). While this study did not intend to go further in examining the impact of these laws on immigrant outcomes, evidence from other policy analyses have. Sainsbury (2012) has examined immigrant rights across welfare states. Adding criteria for inclusive versus restrictive immigration policies to Esping-Andersen's widely applied typology (1999), she has among the most detailed comparative analyses on this subject. Among her findings are (1) a dualization is evident across welfare states in which immigrants have lower access to major insurance and pension benefits primarily as a result of lower earnings; (2) immigrant households have access to unemployment and family benefits and social assistance due to their precarious status in the employment systems; and (3) the immigrant-native poverty gap varies across welfare states closely following the Esping-Andersen classifications; the widest gaps are in liberal regimes and narrowest in social democratic.

A global perspective for studying the immigrant life course that links immigrant characteristics with host country cultures and institutions is overdue and becoming more feasible. Cross-national and comparable survey data that include or target immigrant groups and that are collected and linked to contextual events and factors are the standard to aspire to. Similarly, as biomedical data are added, the triangulation of these data sources brings the study of the immigrant life course to a higher level. Finally, long-term economic restructuring has contributed to these

migration patterns, just as it has relocated jobs once part of the manufacturing sectors of advanced countries to middle-income and developing countries. However, it is not clear yet how the increased frequency and severity of economic crises like the Great Recession will influence migration and host country policies.

4 Summary and Conclusions

Our charge as authors in this volume is to think about fruitful questions for life course research that lie ahead. This essay proposes that the life course be placed within the larger global context to understand the forces of history and social change that bear upon it. The dynamics of social change are characterized by an asynchrony of leaps and lags, which reflect rapid forces of social change met by institutional-cultural forces that resist or hamper change, respectively. In the twenty-first century the life course is caught in the rough currents generated by these leaps and lags. Population aging and global financialization are the major accelerating forces for change over recent decades. Persistent policy legacies across countries and regions lag behind these changes. These dynamics raise new questions for life course research.

The life course itself is not a rigid institution that is immutably ordered by age or social status. Instead, it is perhaps best characterized as a dynamic and cumulative manifold phenomenon that develops with time within diverse contexts of social change as individuals must respond to their material and cultural conditions in the conduct of their lives. The manifold characterization stems from the idea that lives are lived across simultaneously experienced domains, i.e. health, family, education, work, leisure (among others), that are interdependent and mutually influential. The cumulative characterization captures the patterns of path dependency of the life course which is comprised of chains of sequentially contingent transitions. Early life conditions provide opportunities and constraints that select individuals into cumulative manifold pathways through life, in which earlier resources and choices influence

later ones. Individuals do make active choices, especially in contexts where multiple and often competing options exist. These choices are constrained by opportunities but also driven by cumulatively developing identities and personalities. Therefore, agency in the life course also contributes to heterogeneity over time.

These dynamics are evident across many aspects of the life course, but three are selected for consideration here as foundational for future research. The first is diversity in the temporal organization of lives. Longitudinal survey data linked to biological markers, administrative records, ecological momentary assessments, and other innovation data collection strategies is revealing the “long, broad, and deep” contours of lives that produce heterogeneity across contexts. Observations over decades of lives that capture events and conditions related to health, economic resources, educational achievements, family transitions, work careers, and other life contexts reveal that the life course is not organized by strict schedule or biosocial script. The pace of aging varies widely as diverse life conditions and personalities interact over time.

The timing and duration of education in lives offers a critical lens on this phenomenon. Educational attainment, usually measured as years of schooling, is the “usual suspect” to predict diverse life course outcomes. However, the conceptualization of education lags behind observed patterns of learning and does not fully capture the cognitive and non-cognitive aspects of social life. The timing and sequencing of education, family and work do not conform to the twentieth century tri-phasic model. And, status categories such as gender and race-ethnicity often have greater variations within, than differences from, comparison groups. The gendered life course, for example, is changing rapidly. The spread of educational opportunities to women appears to account for changes in patterns of childbearing, marriage and work—often referred to as the second demographic transition. However, dramatic increases in educational attainments among women across societies are associated with global job uncertainties and new stresses, including risky health behaviors, which

suggest that educational attainment may not continue to have the same putative effects on the health and mortality of women going forward.

Similarly, another recent change in the temporal organization of the life course is that across countries younger populations are remaining in educational institutions longer and older populations are returning to school at later ages. Global restructuring has delayed opportunities for the youngest workers and displaced (or threatened to displace) older workers whose skill-sets do not match the new landscape of work. Hence, the tri-phasic organization is replaced by extended work-education sequences across the life course.

The second aspect of the life course that requires future attention relates to new life course risks in the form of increased demands for individual and family decision-making based on knowledge that is not widespread in the general population and only moderately associated with educational attainment. Financial and medical literacy have “colonized” household decision-making on a daily basis. The financialization of the global economy pervades daily decision-making regarding the management of credit, consumption, debt, saving and investing.

Yet, studies in the U.S. and elsewhere reveal startlingly low levels of financial literacy. Basic knowledge of compound interest, inflation and equity investments is restricted in most cohorts to a minority, although younger cohorts maturing in the new environment are more informed on some of these matters. In this climate, rates of indebtedness and bankruptcy have increased in a trend preceding but dramatically illuminated by the recent Great Recession. Life course research points to both cognitive and non-cognitive factors that influence financial literacy. Medical literacy is also implicated in this trend since medical technologies and limited sources for financing medical interventions require individuals to make important life-and-death decisions for which most are not equipped. Faced with technical diagnostic information regarding health, choices are presented to patients who bring little, if any, prior knowledge or understanding to health care decisions. Decisions regarding health insurance coverage are equally challenging and often

beyond reach. Policies for improving financial and medical literacy lag far behind the pressures for decision-making in these areas.

Finally, the third major trend(s) that should motivate future life course research is migration and immigration and their life course implications. Migration across countries and regions for political and economic reasons is a major global phenomenon. Selective, contextual and agentic factors initiate the migration process in the life course and are consequential for later life, and subsequent intergenerational well-being. Besides the economic opportunities and social costs of this demographic behavior, the institutional environments into which migrants arrive present cultural-political obstacles related to discrimination, racialization and social exclusion. These experiences have negative effects on the life course, but go unmeasured (and perhaps sometimes remain unmeasurable). Within the framework we propose here, it is also plausible to consider the reciprocal impact of migration and immigrants on their new political and economic environments, especially as their relative share of the total population increases. These patterns provide the opportunities to examine both the lag of policies and, alternatively, their potential transformations in the face of demographic recomposition (though probably over long periods) and resulting life course outcomes.

References

- Adsera, A., & Chiswick, B. R. (2007). Are there gender and country of origin differences in immigrant labor market outcomes across European destinations. *Journal of Population Economics*, *20*, 495–526.
- Bail, C. (2008). The configuration of symbolic boundaries against immigrants in Europe. *American Sociological Review*, *73*, 37–59.
- Baker, D. W. (2006). The meaning and the measure of health literacy. *Journal of General Internal Medicine*, *21*, 878–883. doi:10.1111/j.1525-1497.2006.00540.x.
- Berg, I., & Kalleberg, A. (Eds.). (2001). *Sourcebook of labor markets: Evolving structures and processes*. New York: Kluwer Academic/Plenum Publishers.
- Blossfeld, H.-P., Klijzing, E., Mills, M., & Kurz, K. (Eds.). (2005). *Globalization, uncertainty and youth in society*. London: Routledge.
- Blossfeld, H.-P., Buchholz, S., & Kurz, K. (Eds.). (2011). *Aging populations, globalization, and the labor market: Comparing late working life and retirement in modern societies*. Cheltenham: Edward Elgar.
- Blossfeld, H.-P., Kilpi-Jakonen, E., de Vilhena, D. V., & Buchholz, S. (forthcoming). *Adult learning in modern societies*. London: Edward Elgar.
- Boardman, J. D., Saint Onge, J. M., Rogers, R. G., & Denney, J. T. (2005). Race differences in obesity: The impact of place. *Journal of Health and Social Behavior*, *46*, 229–243.
- Buchmann, M. C., & Kriesi, I. (2011). Transition to adulthood in Europe. *Annual Review of Sociology*, *37*, 481–503.
- Bulatao, R. A., & Anderson, N. B. (Eds.). (2004). *Understanding racial ethnic differences in health in late life: A research agenda*. Washington, DC: National Academies Press.
- Cain, A. E., Depp, C. A., & Jeste, D. V. (2009). Ecological momentary assessment in aging research: A critical review. *Journal of Psychiatric Research*, *43*(11), 987–996.
- Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, *30*, 1913–1915. doi:10.1126/science.1127488.
- Carstensen, L. L. (2009). *A long bright future: An action plan for a lifetime of happiness, health and financial security*. New York: Public Affairs.
- DiPrete, T. A., & Buchmann, C. (2013). *The rise of women: The feminine advantage in education and what it means to American schooling*. New York: Russell Sage Foundation.
- Elman, C., & O’Rand, A. M. (2002). Perceived job insecurity and entry into work-related education and training among adult workers. *Social Science Research*, *31*(1), 49–76.
- Elman, C., & O’Rand, A. M. (2004). The race is to the swift: Socioeconomic origins, adult education and wage attainment. *American Journal of Sociology*, *110*(1), 123–160.
- Elman, C., & Weiss, F. (forthcoming). Adult educational participation and implications for employment in the US context. In H.-P. Blossfeld, E. Kilpi-Jakonen, D. V. de Vilhena, & S. Buchholz (Eds.), *Adult learning in modern societies*. Cheltenham: Edward Elgar.
- Esping-Andersen, G. (1999). *The social foundations of post-industrial economies*. New York: Oxford University Press.
- Eurostat. (2014). *Unemployment statistics*. Epp.eurostat.ec.europa.eu/statistics_explained/index.php/. Downloaded August 2014.
- Farber, H. (2011). *Job loss in the great recession: Historical perspective from the displaced workers survey, 1984–2010* (Working Paper 17040). National Bureau of Economic Research.
- Graff, H. J. (1995). *Conflicting paths: Growing up in America*. Cambridge, MA: Harvard University Press.
- Hacker, J. (2006). *The great risk shift: The assault on American jobs, families, health care and retirement*

- and how you can fight back. New York: Oxford University Press.
- Heckman, J. J., & Kautz, T. D. (2012). Hard evidence for soft skills. *Labour Economics*, 19, 451–464.
- Helppie, B., Karpinos, K. A., & Willis, R. J. (2010). *Occupational learning, financial knowledge, and accumulation of retirement wealth* (MRRC Working Paper 237). Michigan Retirement Research Consortium. Ann Arbor: University of Michigan.
- Institute of Medicine. (2004). *Health literacy: A prescription to end confusion*. Washington, DC: National Academies Press.
- Israel, S., Caspy, A., Belsky, D. W., Harrington, H., Hogan, S., Houts, R., Ramrakha, S., Sanders, S., Poulton, R., & Moffitt, T. (2014). Credit scores, cardiovascular disease risk, and human capital. *Proceedings of the National Academy of Sciences*, 111(48), 17087–17092.
- Jacobs, J. A., & King, R. B. (2002). Age and college completion: A life history analysis of women aged 15–44. *Sociology of Education*, 75(3), 211–230.
- Kahnemann, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–292.
- Kalleberg, A. L. (2009). Precarious work, insecure workers: Employment relations in transition. *American Sociological Review*, 74(1), 1–22.
- Lestaege, R. C. (2010). The unfolding story of the second demographic transition. *Population and Development Review*, 36(2), 211–251.
- Levesque, K., Laird, J., Hensley, E., Choy, S. P., Cataldi, E. F., & Hudson, L. (2008). *Career and technical education in the United States: 1990–2005, NCES 2008-03*. Washington, DC: U.S. Department of Education.
- Lusardi, A., & Mitchell, O. S. (2013). *Older adult debt and financial frailty* (Michigan Retirement Research Center Working Paper 2013-291). Ann Arbor: University of Michigan.
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5–44.
- Maestas, N. (2010). Back to work expectations and realizations of work after retirement. *Journal of Human Resources*, 45(3), 718–748.
- Maralani, V. (2011). From GED to college: Age trajectories of nontraditional educational paths. *American Educational Research Journal*, 34(4), 1058–1090.
- McArdle, J. J., Smith, J. P., & Willis, R. (2009). *Cognition and economic outcomes in the health and retirement survey* (NBER Working Paper 15266). Boston: National Bureau of Economic Research.
- McDaniel, A. (2009). *Cross-national gender gaps educational expectations: The influence of national level gender ideology and educational systems*. Chicago: University of Chicago Press.
- Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science*, 244, 933–938.
- O'Rand, A. M. (2011). The devolution of risk and the changing life course in the United States. *Social Forces*, 90(1), 1–16.
- O'Rand, A. M., & Ellis, R. A. (1974). Social class and social time perspective. *Social Forces*, 53, 53–62.
- O'Rand, A. M., & Hamil-Luker, J. (2011). Late employment careers, transitions to retirement and retirement income in the U.S. In H.-P. Blossfeld, S. Buchholz, & K. Kurz (Eds.), *Aging populations, globalization and the labor market* (pp. 283–307). Cheltenham: Edward Elgar.
- Organization of Economic Cooperation and Development. (2005). *Improving financial literacy: Analysis of issues and policies*. Washington, DC: Organization of Economic Cooperation and Development.
- Organization of Economic Cooperation and Development. (2011). *Education at a glance: Access to education, participation and progression*. Washington, DC: Organization of Economic Cooperation and Development.
- Palloni, A., & Arias, E. (2004). Paradox lost: Explaining the Hispanic adult mortality advantage. *Demography*, 41, 385–415.
- Pew Research Center. (2013). Changing patterns of global migration and remittances: More migrants in U.S. and other wealthy countries; more money to middle income countries. http://www.pewsocialtrends.org/files/2013/12/global-migration-final_12-2013.pdf
- Poterba, J. M. (2014). Retirement security in an aging population. *American Economic Review*, 104(5), 1–30.
- Preston, S. H., Stokes, A., Mehta, N. K., & Cao, B. (2014). Projecting the effects of changes in smoking and obesity on future life expectancy in the U.S. *Demography*, 51, 27–49.
- Riley, M. W., Kahn, R. L., & Foner, A. (Eds.). (1994). *Age and structural lag: Society's failure to provide meaningful opportunities in work, family and leisure*. New York: Wiley.
- Royalty, A. B. (1998). Job-to-job and job-to-nonemployment turnover by gender and education level. *Journal of Labor Economics*, 16, 392–343.
- Sainsbury, D. (2012). *Welfare states and immigrants rights: The politics of inclusion and exclusion*. New York: Oxford University Press.
- Sawhill, I. V. (2014). *Generation unbound: Drifting into sex and parenthood without marriage*. Washington, DC: Brookings Institution Press.
- Shanahan, M. J., Hill, P. L., Roberts, B. W., Eccles, J., & Friedman, H. S. (2014). Conscientiousness, health and aging: The life course personality model. *Developmental Psychology*, 50(Special Issue), 1407–1425.
- Tomaskevic-Devey, D., & Lin, K.-H. (2011). Income dynamics, economic rents, and the financialization of the U.S. economy. *American Sociological Review*, 76(4), 538–559.
- Uhlenberg, P. (Ed.). (2009). *International handbook of population aging*. New York: Springer.