Creativity in the Twenty First Century

Ai-Girl Tan
Christoph Perleth *Editors*

Creativity, Culture, and Development

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Creativity in the Twenty First Century

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This volume is dedicated to W. Stern (1871–1938) *and Anna Craft* (1961–2014) *for their excellent contributions to developing human creativity*

Foreword I

Once Jean Piaget (1896–1980) was asked to say why he neglected the topic of creativity, which was an emergent research issue in that period. He claimed that creativity was just an "American question" in which he was not interested, because in that field, investigators failed to give reasons of the core problems of mental development, which instead he aimed to address. According to Piaget, development is, in a certain sense, always "creative," since children's thinking changes continuously by transforming preexisting mental schemata into new ones in order to face the problems rising from the environment (see, e.g., Piaget 1962). Thus, it seems that, in Piaget's view, the title of a Shakespearian play could be associated to the topic of creativity: "Much ado about nothing."

It is true, as it has been often acknowledged, that the first impulse to investigate creativity through a scientific approach came from North American researchers (see e.g., Guilford 1950), who also drew the conceptual coordinates underlying the subsequent attempts to assess and improve creative skills and personality traits. So, the "American question" became a "Western question" since also most European investigators shared the same assumptions underpinning the original concept of creativity. Also nowadays in experimental studies about creative processes, the definitions of creativity and the instruments which are applied to measure it and the tools which are devised to improve it are based on that concept. It is worth noting, for example, that in one of the most advanced research field about creativity—that is, the investigation of the neurobiological correlates of the creative act—the traditional tests devised by Joy Guilford (1897–1987) and Ellis Torrance (1915–2003) are still employed.

Can theorizing and investigating about creativity become a "global question"? Yes, if some emerging challenges are seriously taken into account. The classical views of creativity are focussed on individual characteristics and on the "inner work" of the mind. In this perspective, indeed, radical new theories failed to emerge

in the last decades. It seems rather that the novel frameworks which have been presented in recent years are refinements, variations, or integration of previous theories and that no revolutionary paradigm has been proposed. May be that innovation in the conceptualization of creativity can be prompted by starting from very different assumptions as the traditional ones. For instance, in some non-Western cultures what we connect to creativity, even though in those contexts the term "creativity" does not exist or has different meanings and connotations, is linked to the environment—or to the system of relations between the individual and the environment, intended both as physical/technological and social—and to body experiences. Definitions and concepts concerning creativity might be revitalized if broader perspectives, encompassing also the interaction with the environment and the embodied nature of cognition and affects, will be developed.

As far as the assessment of creativity is concerned, it is a widespread feeling that the well-established ways to measure divergent thinking and personality dimensions are inadequate. However, it is not easy to find alternative procedures which are reliable and viable. Also in this case, a contamination of insights coming from different cultures and the criteria of validity based on a long-lasting history of improvements of scientific standards might be beneficial.

Lastly, quite early, in the investigation of creativity, the acquired knowledge about the mental mechanisms involved in the generation of new ideas and artifacts was applied in order to devise tools and training programs aimed at enhancing the creative potential of persons and groups. Most of these techniques failed to reach their goals since their alleged efficacy was not supported by empirical evidence. Moreover, they need, in order to be implemented properly, some conditions (commitment, time, financial resources, and so on) which are not available in current instructional or work settings. Different approaches appear to be needed. It is so understandable why methods grounded on very different backgrounds, apparently "exotic," are successful, at least at the level of the enthusiasm which they can elicit in the trainees. This is another field in which the hybridization of suggestions coming from endeavors outside the traditional training frameworks and the common ways to conceive creative education might be productive.

Research about creativity is faced to a series of challenges, which concern theories, assessment procedures, and training programs. The present book may be meant as an attempt to address such challenges. It is remarkable since it tries to raise crucial questions about both some fundaments of the conceptualization and investigation of creativity and the practices which have been developed to foster it. The volume is intriguing because of the intention to prompt the cross-fertilization of different traditions of research. It is insightful since it encourages to be flexible in thinking about what creativity is and how it can be cultivated. For these reasons, at the end the reader should be convinced that creativity is no more only an "American question."

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Foreword II

Sea of Learning

Upon the face of the deep,

The Sea of Learning knows

No bounds. No shore in sight,

To return to land.

We drift on, lost

In her bosom—only

To be awakened, to taste

The Creative Spirit that moves

Upon the face of the waters.

To write a foreword for the present volume is as much an honor as a challenge: honor, because the editors have invited me to be counted among knowledgeable contributors to their volume; challenge, because the title of the volume is rather intimidating. Creativity, culture, and development are three encompassing domains of knowledge, each of which demands volumes to cover. Imagine the challenge that the editors face in bringing together these three domains in a single volume. They conclude that "creativity, culture, and development represent a unified triad." But what does this unified triad entail? The present volume is devoted to answering this question.

By development, the editors mean "human development." This, of course, delimits the scope of the volume immensely and renders my task of writing the foreword less intimidating. However, this delimitation raises an issue: As noted by the editors, "cultural systems themselves develop as well"; thus, the concept of development applies also to culture. The implication is that human beings are both the products and the creators of culture. In line with Bandura's (1978) concept of reciprocal determinism, the relation between individual behavior and culture is best

conceived as one of the continual interactions. There is no intrinsic reason why culture has to be treated as the cause, and individual behavior as the effect. If culture is defined as that part of environment created by human beings, then we create environments that, in turn, make us human. Creativity plays a key role in this process of continual interaction.

The concept of development should encompass socioeconomic aspects as well. Economic viability in the twenty-first century depends on knowledge as a human resource. Nations that invest in this resource will thrive; nations that fail to do so imperil their own survival. Thus, reforming education is a key for moving ahead in international economic competition; it is essential for national transformations toward a knowledge economy. In Singapore, for instance, the need for educational reform in response to economy-driven imperatives is explicitly and repeatedly articulated. In particular, impressive is the commitment to back policy with massive investment of resources (e.g., treating student teachers as employees of the Ministry of Education, thus enabling them to receive remuneration starting from the beginning of training). Common to calls for education reform in Confucian heritage cultures is the stress on promoting creativity dictated by economic imperatives. Demanded in the new knowledge-based economy are not just the acquisition, but the generation and innovative application of knowledge.

The path to creativity, however, is laden with difficulties and contradictions (Ho et al. 2013). Four of these deserve special attention. In the first place, we note an inherent paradox: A knowledge-based economy requires creativity and ingenuity; it is also driven by avarice that threatens to destroy civil society, social bonds, and state education. Ingenuity and invention are thus in tension with what Hargreaves (2003) has called an irresponsible "hunger for profit."

Second, scientific, technological, and problem-solving innovation is universally welcomed by political authority, not so for innovation in artistic, literary, philosophical pursuits, and the like. The utilitarian or practical value of these pursuits is in doubt—hence endangered? Moreover, they thrive on individualistic values of the free thinker and have thus the propensity to cause "trouble"—hence dangerous?

Third, we may trace the difficulties and contradictions to the ideological conservatism in Confucianism. There is a basic contradiction between creativity promotion and authoritarian social control. Those ideologically bent on control may be tempted to restrict the definition of creativity to mean innovation in the service of a knowledge-based economy, exclusive of innovation that goes counter to societal order. The trouble is that a tightly controlled society does not foster creative entrepreneurs, let alone creative scholar-teachers. Hence, loosening control is a precondition for fostering creativity. A study of Chinese history substantiates this statement, when we compare the creative Tang dynasty, a period of openness, receptivity, and cross-cultural fertilization, with the uncreative Ming and Qing dynasties, during which China turned inward and shut itself from foreign influences.

Fourth, creativity, ingenuity, and invention can hardly be promoted in educational systems where examinations are the preoccupation of educators, parents, and students. A popular saying in mainland China states "Exams, exams, exams, the magic weapon of teachers; marks, marks, marks, the lifeblood of students."

The Japanese term *examination hell* expresses similar sentiments of awe. In Japan, Taiwan, and South Korea, the socioeconomic importance and fierce competition related to secondary school and university entrance examinations have led students and their parents to seek spiritual support through prayer and religious rituals. Japanese students leave donations and written prayers and promises to the gods at Shinto shrines specifically dedicated to academic success. All these are manifestations of what I and my colleagues have characterized as "examination superstition" (Ho et al. 2001). In short, examinations constitute the focus of academic anxiety, which rob students of the joy of learning, throughout Confucian heritage cultures. I end this paragraph with a prompt for the long-suffering Asian students: Of what use is a pen to a student, if he cannot beguile examiners *creatively* with it to win high marks?

I dwell upon formidable barriers to creativity for a good reason. It is ironic that programs aimed at promoting creativity are often singularly uncreative in their approach. Under pressure to meet economic imperatives, teachers and educators charged with the promotion of creativity often confuse *creative* teaching with *teaching* creativity through direct instructions on how and what to think creatively. Teaching creativity degenerates all too easily to a cookbook approach, in the manner of "An Idiot's Guide to …" or providing formulaic answers in the form of do's and don'ts. Witness how bookstores hungry for profit are flooding the market with books aimed at gullible Tiger Moms bent on "*making* their children more creative." Hopefully, the present volume will restore creative teaching and counter these pernicious trends.

Creative teaching and teaching creativity rest on fundamentally different views of human development. Teaching creativity assumes that creativity has to be instilled or inculcated from without. In contrast, creative teaching places trust in the human propensity toward creativity: For adults, creativity begins with undoing most of what we have internalized in our educational history. For young children, creativity is as natural as breathing; all that educators and parents need to do is to respect the Dao of human development, provide the milieu to foster its growth, and above all refrain from crushing it (see Sundararajan and Raina 2014).

The editors have invited "like-minded researchers" to share their views and their fruits of labor. In all likelihood, however, researchers can be like-minded in only in a broad sense, to promote the realization of the human potential for creativity. Beyond that, there is no necessity to be like-minded in their conceptualization and research methodology. A case in point is the expansion beyond the traditional conception of creativity as a matter of personality development. I discern a counter voice to conceptualizing creativity as within persons in the notion of "societal creativity" (Chap. 12, this volume). According to the editors, "Creativity is conceptualized within the persons, their sociocultural and developmental milieu." This milieu is clearly more encompassing than that of the school or family.

In the introduction to the volume, the editors make clear that creativity is a potential to be cultivated for all persons; it is not an asset of the privileged few, geniuses and artists. A perusal of its table of contents reveals a sizable coverage of diverse topics. The book is addressed, therefore, to a wider audience than teachers

and educators; it appeals also to providers of human services (as in Chap. 13, this volume) as well as business managers.

Contributors to the volume cannot be held solely accountable for how it will impact the development of creativity. Readers must also bear responsibility for how they will apply the knowledge they glean from the book creatively in actions.

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Chapter 1
An Introduction to the Volume of Creativity, Culture and Development

Ai-Girl Tan and Christoph Perleth

Creativity is an ability to generate new and novel idea, a life skill, and an (r) evolution-machinery deserves our continual attention. For the past decades, there has been nation- and continent-wide effort to search for collective wisdom to address nurturing creativity of all, in schools, at work, and after retirement. Creativity in the twenty first century is fundamental, to all. We believe that with creativity we see possibilities, we construct meanings, we create tools, and we attain good life in our ever changing societies and cultures. Given the importance of creativity in our life, we wish to pose some questions which guide our understanding of creativity in everyday, cultural life. How relevant is our knowledge of creativity to understand complexity of our life? How comprehensive is our expertise in guiding our young to meet current and future challenges in life? How useful are our skills in dealing with ambiguity in life? What shall we do if we wish to ensure that what we learn today is relevant, useful, and comprehensive enough for the future world and for what we shall do tomorrow?

To provide some insights into these questions, there have been numerous research projects, governmental initiatives, policies and programs for children in their early years, school-age children, adults at work, and retirees and the old age. Creativity is no longer an asset of the few geniuses or artists. It is a potential of all. In line with this open and broad understanding of creativity, creativity is conceptualized within the persons, their social-cultural and developmental milieu. It is timely to revisit our conceptions of the person in the developmental and cultural contexts. It is imperative to include all persons regardless of backgrounds to all nurturing and fostering creativity for good life projects, studies, policies, and programs. The volume of "*Creativity, Culture, and Development*" is an urgent assignment as it creates space for us to relook, reflect, and revise our views on creativity for the lived experiences in the twenty-first century. The volume is dedicated to two great scientists whose conceptions of the person are futuristic, revolutionary, and relevant to our

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aspirations. William Stern (1871–1938) advocated integration of disciplinary sciences (psychology and philosophy). He is regarded as a father of developmental sciences. His conception of the person as a multiple in unity creature (Stern 1917) is worthwhile revisiting (see Chap. 4, this volume). His pioneer research on and theory of child development has taught us that scientific investigations can start from home, in everyday life, and with reference to cultural practices. With the assistance of his wife, as a researcher who collected data, the studies of young children were embarked at home. Sterns investigated development of their own children. The Sterns adopted the diary method in their research, a cultural activity of many families. They co-authored valuable writings documents scientifically development of children from 0–18 years. Anna Craft (1961–2014) coined the term "possibility thinking" and popularized the concept of "little c" or everyday creativity. She studied extensively the phenomenon of creativity of young children (3–6 years old). Possibility thinking (PT) is a framework of creativity development (Craft 1999). There are three principles of PT, namely, using imagination to find ways around a problem, continuing posing questions naturally, and engaging in combinatory, social, experimental play that is non-structured and that is with multi-purposes (see Epilogue, this volume). Practical implications of PT for education include encouraging children to engage in making meaning, connections, and stepping beyond what is to what could be, providing opportunities and models for playing together and playing independently, creating time for playing during lessons, play-times, at the playground and dinner halls, and knowing some children will find it easier than others in engaging in PT. Both Stern and Craft show us that creativity research is a continual effort of scientists to understand how we develop competencies to live well. Creativity is within the young and the adults. They represent scientists who lived well with their visionary views in their life. W. Stern survived the world wars and Anna Craft the complex post-modern world. They were determined, hopeful, and creative people, seeing the world thoroughly, ahead of us and their life time. Their works were original and human-centered, relevant to address our urgent needs to nurture creativity of all in the twenty first century.

"Creativity, Culture, and Development" comprises original writings of creativity researchers of the present time. The volume invited like-minded researchers to share their conceptual frameworks, theoretical and research orientations in the fields of creativity, culture and human development. The volume has three objectives. First, the volume emphasizes the importance of promoting creativity in all cultures and through all educational opportunities. Such an objective can be achieved by continuous dialogues and discourses on establishing theoretical relationships between creativity and culture, understanding the significance of culture in creativity development, and the reciprocal role of developing creativity and enriching cultural activities. Second, the volume provides spaces for clarification for authors to reflect on contemporary creativity theorizing and practices (e.g., cultural, relational). Theorizing practicing creativity considers collective growth taking human relations, organization, and societal development. Third, the volume collects write-ups of research into developing human creativity in everyday life and in collective settings such as team, organization, and society.

This volume comprises three parts

Part I "Conceptions of Creativity, Culture, and Development" Comprises Four Chapters

In Chap. 2, Glaveanu presents his notion of relational thinking by examining the interrelation between development, creativity, and culture. There is little doubt that creativity, culture, and development are deeply inter-related phenomena. For most, a quick assessment of their relationship takes the form of 'creativity develops within a cultural context', which is certainly true. At a deeper level however we can notice that cultural systems themselves develop as well and creativity is a key agent of this macro-social transformation. Also, creativity and development are two sides of the same coin, in the words of Feldman (1999, p. 170), "creativity is quintessentially a development al matter". It could be equally argued that culture is quintessentially a developmental matter as humans' relationship to their cultural context is marked by the gradual accumulation, preservation and change of existing patterns of thinking and acting in the word. What we are left with is therefore the conclusion that creativity, culture, and development represent a unified triad but what exactly is the nature of each element as expressed through its relationships with the others and how can these relationships be conceptualised? The present chapter aims to address this fundamental question by proposing an analytical exercise of unpacking the meditational triangle in which each term mediates (here in the sense that it intervenes and shapes) the connection between the other two terms. Three main claims can thus be put forward. 'Culture mediates the development of creativity'. This assertion will be considered in light of Vygotsky's (1931/1997) research on the development of higher mental functions and his work on creativity and imagination in children and adolescents. 'Development mediates the relation between creativity and culture'. For Winnicott (1971), creativity and culture are twin-born in the first uses of the symbolic function, a developmental achievement that marks early childhood. 'Creativity mediates the development of culture'. This important observation can be traced back to Baldwin's (1903) discussion regarding the development of imitation and the two principles of habit and accommodation, central to the existence of cultural phenomena. This chapter will build on the scholarly writings of the three authors cited above and relate them to current research within the psychology of culture and creativity development. In the end, consequences of considering creativity, culture, and development as a triadic unit in theory and research will be considered in an effort to go beyond present dichotomies and advance forms of relational thinking (Glăveanu 2012).

In Chap. 3, Dai presents his view with the Needham Question that why China, with its seemingly advanced development of science and technology, failed to develop the modern science as we know of in the West, epitomized by Newtonian physics. The failure is often attributed to the Chinese culture, particularly its organismic, hence indivisible, view of the universe. While fully acknowledging the advantages of modern analytic science, with its mechanistic worldview, I shall point out that its reductionist epistemology and methodology is encountering serious difficulties in explaining, predicting, and controlling complex phenomena,

physical, biological, and social. In this regard, I argue that indigenous epistemologies of dynamism and emergentism, reflected in Chinese medicine, the game of Go, and Chinese philosophy, can be a source of inspirations for a non-reductionistic epistemology, which shows how everything is related to everything else, where causality is non-linear and complex, and when situations can be undetermined or underdetermined. The epistemic and instrumental value of the indigenous Chinese epistemology is its emphasis on cognitive flexibility, sensitive and adaptive to changing conditions. Given the dominance (or even monopoly) of the Western mechanistic worldview in the scientific and technological discourses, the indigenous epistemology of holism and dynamism may prove valuable as a source of inspirations for scientific endeavors, technological innovations, and practical decision making.

In Chap. 4, Tan-A outlines the understanding of the person as conceptualized by William Stern (1871–1938), a forerunner of integrative human sciences and a founder of psychology. It reviews influences of W. Stern's work on theories of the person in the social-cultural contexts as proposed by eminent scientists such as L. Vygotsky (1879–1934), and G. Allport (1897–1967). It concludes by emphasizing the urgent need to attend to neglected areas of human sciences such as life-span development, creativity development, and cultural methodology.

In Chap. 5 Tan-C and Li provide a comprehensive overview of the relationship between affect and creativity. Numerous studies have shown that affect such as mood and emotion can influence creativity. Despite studies generally suggest that positive affect is conducive to creative performance, contradict findings have also been documented. Indeed, negative affect has been found to enhance creativity whereas positive affect has been found to impair creativity in some studies. Different theories and frameworks have been proposed to understand the underlying mechanism though none of them can fully explain the phenomena. Based on the literature, we propose that how affect influences creativity depending on individual's personal interpretation of the affective state and personal interpretation of the task demand rather than the affect per se or the task demand per se. Furthermore, individual appraisal is the underlying mechanism that incorporates and compares individuals' personal interpretation of the affective state with personal interpretation of the task demand. As a result, appraisal mediates the relationship between affect and creativity. Theoretical and practical implications of this model are discussed. Taken together, our review calls for a novel angel to examine the link between affect and creativity.

Part II "Empirical Evidence and Practice" Comprises Six Chapters

In Chap. 6, He, Wong, and Hui investigated gender differences in means and variability on creative thinking. Gender differences in creative thinking remain an unresolved research question. Researchers have increasingly recognized that both mean and variability analyses should be conducted to uncover a complete picture of gender differences. Moreover, it has been suggested that gender differences in intellectual abilities are dynamic across age, and gender differences needs to be analyzed developmentally. This study aimed to reframe the study of gender

differences in creative thinking by (1) using both mean and variability analyses, and (2) employing a developmental perspective. Creativity was assessed with the Test for Creative Thinking–Drawing Production (TCT–DP) which was developed based on the componential model of creativity. The TCT–DP scores of four age groups (N = 2,219), which included participants of ages 3–7 years, 9–13 years, 14–18 years, and 19–23 years, were analyzed. Results showed that while mean analyses generally revealed trivial gender differences, variability analyses tend to support great gender differences. Furthermore, developmental data demonstrated that the magnitude and the direction of gender differences change across age. While greater female variability (favoring girls) was observed in young children, a reverse pattern that was found in adolescents and emerging adults. The findings shed lights on the different developmental trajectories of boys and girls in creativity.

In Chap. 7, Chung, Leong, Fun, Loo, and Yan reported on a study that explored Creativity in Preschoolers through Chinese Reading Comprehension ebooks. The aim of their study was to explore how Chinese reading comprehension skills develop in bilingual children in Singapore and if language abilities were related to dimensions of creativity. The sample consists of 17 pre-school students with an age range of 4–6 years old. The students first took a placement test to find out their level of reading comprehension. Then, they were given selected ebooks to read. After they read each ebook, they were asked to draw a picture related to the ebook theme. The drawings were then analyzed against seven dimensions of creativity. We found three areas for further, larger scale investigation, namely, how synthesis, integration and originality develop in bilingual children, how children integrate concepts from reading and from illustrations in books, and whether inference skills influence coherent drawings in children.

In Chap. 8, Tan-R and Tan-A investigated children's affectivity and efficacies. A total of 123 students in Singapore filled out a survey which comprised two affectivity scales and four creativity efficacy scales. Measures for affectivity were the Positive and Negative Affect Scale for Children (PANAS-C), the Multidimensional Students' Life Satisfaction Scale (MSLSS). Measures for efficacies were the creativity self-efficacy scale in cognitive style, creativity self-efficacy scale in working style, intercultural efficacy, and civic efficacy. Individual differences for highly creative and less high creative participants of the study on affectivity and efficacy were investigated. Correlational and regression analyses were performed. Suggestions for future studies are presented.

In Chap. 9 Dziedziewicz, Gajda and Karwowski report on a program that aimed to develop children's Intercultural Competence and Creativity. The chapter presents the results of an intervention study examining the effectiveness of the Creativity Compass program, aimed at developing intercultural competencies and creativity in children. One hundred twenty-two children, age 8–12 years old, took part in the intervention. The results indicate the high effectiveness of the program in stimulating creative abilities and intercultural skills. The analysis provides arguments that effective stimulation and development of both creative abilities and intercultural skills is possible and may form a response to the need to prepare students for a globalized and multicultural world.

In Chap. 10, Hennessey presents her view on assessing Schools on Creativity. She shares a Toolbox for U.S. Teachers and Policymakers and a To-Do List for Researchers Worldwide. Over the past 35 years, the U.S. educational pendulum has swung from one teaching approach and agenda to the next. Each new reform has brought with it at least as many problems as solutions, and schools have been in almost a constant state of flux as they strive to meet an ever-changing set of goals and criteria. Most recently, a new national "crisis" has been identified. Educational analysts and policymakers now worry that the standardized tests that have come to dominate the instructional landscape are based on far too narrow a measure of student success. Also needed, say the experts, are indicators of the opportunities provided by schools for students to engage in creative work. Importantly, the response to this criticism has not been to abolish high-stakes tests. Instead, the proposal is to augment the existing tests with creativity rubrics. Massachusetts will be the first state in the U.S. to institute a creativity index against which all public primary schools will be judged. Based on what is known about the social psychology of creativity, however, it is not at all clear that it will even be possible to legislate creativity in the schools. A call is made for educators and policymakers to become familiar with the research literature and the lessons it offers about the intersection between the classroom environment, the creativity demonstrated by students and their motivational orientation. Towards this end, two toolboxes are offered, one for classroom teachers, school administrators and evaluators and the other for investigators and policymakers worldwide.

In Chap. 11, Hui reviews the prevalent trend of promoting creativity education in four Chinese societies (China, Hong Kong, Singapore, and Taiwan). The relational theory of creativity proposed by Glăveanu (2012) provides a critical basis for analyze the five dichotomies of creativity include individuals versus society, Big C versus little c, evolutionary versus revolutionary, domain generality versus domain specificity, and product versus process in the Chinese context. The relational perspective offers and extends an interdependent and interactive approach to the study of creativity. In parallel, the action theory of Brandtstadter on the convergence of action, culture and development will be adopted as a theoretical framework to investigate how creative self-efficacy in a sample of about 1729 Hong Kong adults is related to psychological and sociocultural factors across the lifespan aged from 18 to 60 above. Regression analyses have shown that both psychological factors (perceived desirable gains in creative personality, perceived losses in creative personality and self assessed creative personality) and cultural factors (normative belief in creativity, and rewards for creativity in society) explained a significant variance of 44 % in predicting creative self-efficacy. The cultural factors mediated the effects of psychological factors on creative self-efficacy. Results supported that cultural factors emphasized in the relational perspective were as important as the individual psychological factors in building up creative self-efficacy in individuals. Implications and limitations will be discussed.

Part III "Valuing Creativity" Comprises Four Chapters

In Chap. 12, Glaveanu conceptualizes societal creativity. According to him, we are used to thinking in psychology about creativity as an individual type of phenomenon and, as such, we tend to formulate questions and create methodologies that focus primarily on the individual person (even within studies of group creativity). At the same time, some the most popular criteria used for recognising and validating creativity have to do with novelty, originality and social utility. And yet, the 'social value' of creative acts is measured again against the performance of individuals in privileged domains such as the arts and sciences. However, the world today faces as, collectively, with increasing demands and challenges: from global warming and the effects of economic meltdowns, to creating more inclusive and democratic societies. The way in which we (as individuals and as groups and communities) respond to such difficulties is proposed as a general domain of reflection for creativity researchers—the sphere of 'societal creativity'. Why is this area so much less visible in psychology and related disciplines than other traditional domains of creation? There are multiple reasons for this, including the fact that acts of societal creativity are typically attributed to individuals, like scientists or inventors, and that a construct like this is difficult to operationalise and study within the narrow confines of psychometric or experimental approaches. Societal creativity collapses the sharp differences set between individual and collective creativity, between revolutionary and everyday creations. This talk will elaborate a cultural psychological account of this 'creative domain' and illustrate its relevance for both creativity theory and society development in the context of today and for the world of tomorrow.

In Chap. 13 Wong considers the potential of carrying capacity of the agencies serving the visually impaired and how organizational creativity can be leveraged to foster networking to better serve the community. The classical economic problem is the question of allocating scarce resources to unlimited wants. This problem is no different, and is arguably more pronounced when considering the needs in the charity, or social service sector given their nonprofit status. In response to the limitations, the study of community carrying capacity examines 'the number of organizations that can be supported by resources in a particular environment'.

In Chap. 14 Mito explored professional musicians' notions of creativity in musical performance. Seven musicians who specialized in Western classical music, jazz, Indian classical music, and Japanese traditional music were interviewed. Their conceptions of creativity were investigated by asking questions concerning originality, tradition, and value of musical performance. All of the participants placed high value on the traditions of their musical genre and considered that creative performance is created on the foundation of the fundamental rules and conventions of the genre. However, the analysis revealed that the notions of creativity were different among the musicians in different genres, which led to different views on how to develop creativity.

In Chap. 15 Hui, Yeung, and Sue-Chan presented a study that adopted an interactional perspective to examine the team processing of working adults in both

creative and non-creative industries in Hong Kong. Participants included 737 individuals across different industries (advertising, performing arts, information technology, and other non-creative industries). Factor analysis has yielded 4 factors in team processing, including creative synthesis, norm for team, teamwork, and reward for team creativity. Team process and perceptions of mini-c and Pro-c creativity in creative industries were higher than those in non-creative industries. Results from hierarchical regression revealed that team process (creative synthesis, norm for team, and reward for team creative) and mini-c (social axioms of creativity, and creative personality) were significant predictors of creative self-efficacy after controlling for age, gender, educational attainment, income level and nature of industries. Team processing variables had greater effects on creative self-efficacy. Implications and limitations were also discussed.

Understanding creativity in the past decades has ensured us that creativity is within every person, society and culture. Creativity broadens perspectives in life, thinking of possibilities, and inclusive of all members of the societies for good life. Understanding of and nurturing creativity of all shall go on at the multiple levels of theorizing, researching and practicing beyond the genius and individual paradigms towards inclusion of the cultural and systems paradigms. Accordingly the next leap of inquiries into life shall relate to creative synthesis of our understanding and knowledge of creativity. We may pose questions, such as: How could we be creative? How could familial, school, and social institutional policies, as well as culture of a community influence styles of interactions, learning, creativity, and development of people or groups? We may engage in seeing possibilities in life, creating inclusive communities in our societies, and transforming cultures for humanistic future. Nurturing creativity is cross-curricular, including playing through for example "puppetry, dramatic play, role-play, open-ended scenarios, improvisation, empathy work, …brainstorming, storytelling." (Craft 1999, p. 146). The list of activities that nurture creativity is preliminary. The readers and contributors of this volume are invited to share theirs and are encouraged to suggest more.

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Part I
Conceptions of Creativity, Culture, and Development

Chapter 2
Unpacking the Triad of Creativity, Culture, and Development: An Exercise in Relational Thinking

Vlad Petre Glăveanu

Human development is perhaps one of the most fascinating areas of study within psychology since it not only addresses a phenomenon that describes our existence as living beings, marked by the passing of time, but also helps us understand our own psychology for, to really understand human nature, one necessarily has to consider it developmentally. And yet, the study of development has been for long subjected to a narrow reading of what it means to exist as a child and grow into adulthood. A persistent commitment to theories that proposed a more or less fixed, unilinear, timeless, ethnocentric and a-cultural view of development (Burman 1994) was characteristic of theorising in this field and, unfortunately, did not completely disappear. This is despite radical transformations in the 1980s that Bruner and Haste (1987, p. 1) rightfully called the signs of "a quiet revolution" taking place in developmental psychology.

The main shift has been towards considering the child as an active, agentic, competent social being, and not one that is only in the process of becoming, subjected to external influences, powerless in the face of biology or the environment. To know children means, in this new context, not only to experimentally study their cognitive development. It requires one to pay attention to their constant processes of sense making, "an activity that is always situated within a cultural and historical context" (Bruner and Haste 1987, p. 1). Therefore, the child is not an isolated unit that starts off in the domain of the purely biologically to only gradually move into the sphere of society and culture. The process of development is, from the onset, as much cultural as it is biological and trying to determine percentages in this regard is both futile and misleading. Moreover, development is by excellence a creative, constructive process in both a biological and cultural sense. If creativity etymologically derives from the Latin *creatio*, to make or grow, and culture from the Latin *cultura*, to cultivate, then development should be rightfully considered the cultural/cultivation process that helps humans create/make and grow within a world of other cultured, creative agents.

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On Development, Creativity, and Culture

The aim of this chapter is to consider precisely the interrelation between development, creativity, and culture. Although the development of creativity has been a topic of interest for decades in psychology and increasingly more authors raise the issue of development and culture, joining the three together, as the present book does, is not exactly common. This is all the more surprising considering my basic premise here: *not only that development, creativity and culture are deeply connected, but that to understand one without the others is virtually impossible*, *or at least reductive*. In making this claim I rely on previous scholarship, old and new, that focuses on the relation between development and culture on the one hand, creativity and development on the other. For example, Josephs and Valsiner (2007, p. 49) explicitly state that human development is *culture-inclusive*. For Valsiner (1989, p. 5), "culture-inclusive developmental psychology is a research paradigm that is primarily directed towards explaining how culture organizes the conditions for children's development, and how children assimilate these conditions, and simultaneously accommodate to them". For Keith Sawyer, on the other hand, both creativity and development are "processes of emergence in complex systems" (Sawyer 2003, p. 5), which, coupled with the statement above, we can define as complex cultural systems. Through this, Sawyer points to a key binding element in the interrelation of development, creativity, and culture: *Emergence*. The generation of new processes and structures is indeed the defining characteristic of living organisms, from the individual to the collective level, and corresponds to the core of what we understand by creativity. But, one might argue here, development is not only about novelty, it is equally about order and stability, otherwise it would be a chaotic, amorphous reality. This is precisely so and, in agreement with Oliveira and Valsiner (1997, p. 119), I subscribe to the idea that "the basic problem of developmental psychology is how to explain the persistent construction of novelty in the context of the relative conservatism of the developmental process".

Relational Thinking

The first thing to rethink when approaching this central dilemma is the relationship between novelty and conservatism, between change and stability, the new and the old. A binary, dichotomic type of logic generally drives us to the conclusion that these are opposite processes or states. A relational way of thinking however (see Glăveanu 2012a), encourages a more complex and systemic perspective. Cultural psychology's view of development illustrates this perfectly as its main concern resides not in delineating the new and the old but theorising their continuous interplay. The essence of development is change over time, but this change is

neither random nor disconnected from the past, it effectively constitutes a creative *continuation* of what exists in ways that constantly bridge the gap between performance and potential, between the here-and-now and the not-yet-here. In the words of Josephs and Valsiner (2007):

> Within a truly developmental approach a stable and enduring 'present' is a fiction, as what we call 'presence' is in fact a steady state, relying on ongoing processes of active generation and regeneration. In other terms, from a developmental perspective a phenomenon never 'is', but always 'becomes', even if it appears to be identical to itself over time. True stability marks not only the end of any developmental approach, but is in fact absent in any living organism, including human beings and their psychological functioning. This simple insight has far-reaching consequences for psychological research in general, which are, however, to a great extent completely overlooked. (p. 48)

Dynamism needs to be understood at multiple levels, from the microgenesis (emergence in the moment-to-moment course of action and thought), to the ontogenesis (emergence at the level of the life course), socio or culture-genesis (emergence of shared cultural frameworks), and finally phylogenesis (emergence of biological structures). Rather than treating these developmental processes separately, for as different as they are in 'space' and 'time', we should develop relational, integrative models that reveal how the four 'paths' of development are intertwined. Following Valsiner (1997), "through microgenetic processes, ontogenesis is regulated—under the influence of culture-genesis, and on the basis of the species-specific developed biological organism that has emerged in phylogenesis" (p. 169). In this sense, the border between biology and culture becomes blurred when considering them within the genesis of individuals, groups, societies. As Rogoff (2003, p. 3) asserts, "as a biological species, humans are defined in terms of cultural participation". And it is this perspective of development that I will also take here as a starting point, one that is less concerned with supposed stages or phases and 'inner' functions like cognition, emotion, motivation, etc. Instead, together with Rogoff, I will take development to be reflected in, carried by and expressive of the cultural practices and circumstances of the communities children, adults, and elders grow into and participate to.

If human development is necessarily cultural in its unfolding, what exactly is the part creativity plays in this context? To begin with, several authors pointed to the intrinsic nature of this connection by subscribing to Moran and John-Steiner's (2003, p. 63) observation that development and creativity are dialectically interrelated. In fact, this relation is so deep that Feldman (1999), a well-respected scholar in this area, remarked that "creative accomplishment, after all, is nothing if not a developmental shift (…). Creativity is quintessentially a developmental matter" (Feldman 1999, p. 170). Looking at this relationship from the perspective of development, the focus of any researcher should be on the "emergence of a new structural order of the phenomena from the previous state" (Valsiner 1997, p. 3), in other words, creative production. But is it possible or desirable to *equate* all

development with creativity and the other way around? Is there development that is uncreative or acts of creativity with no developmental consequences? To answer this question we need of course to bring to light our implicit assumptions about both phenomena.

Granting Children Creativity

One typical objection towards considering creativity as development is related to the supposed intentionality of creative acts compared to the less controllable nature of developmental changes. While it is true that deliberate novelty is an example of creative work, perhaps the most visible and/or celebrated work of this type, creativity exists also in acts of improvisation and habitual activity (see Glăveanu 2012b). To reduce creative expression merely to what the person wants or intends to do means to ignore the role of accidents, of serendipity, of chance, as well as isolate creativity at the level of visible outcomes that tend to radically depart from what already exists. Equally, to consider development unintentional altogether would suggest that the person has no role to play in this process, that to develop is something that 'happens to' the person rather than engages the person in relation to his or her community, as argued above. If education is what we plan and development is what happens then a huge disconnection is created between human activity and growth. Moreover, children at early stages in their life end up being completely denied any creativity. Vygotsky (1930/1967, cited in Smolucha 1992) was of the opinion that "one of the most important questions of child psychology and pedagogy is the question about creativity in children" (p. 51). And yet, this question has not only been put aside for a long time (Feldhusen 2002), neglected in favour of other topics, like theory of mind, but also often answered in the negative (see Feldman in Sawyer et al. 2003; Csikszentmihalyi in Sawyer et al. 2003). Even today, from a psychological standpoint (perhaps less so for parents and educators), the very notion of the creative child remains controversial (Gardner 1982). Elsewhere (see Glăveanu 2011a), I addressed this issue at length and it suffices to say here that not only for theoretical but practical reasons we need to grant children (the right to) creativity. The alternative would be to perpetuate an image of the passive child, subjected to universal developmental 'laws', waiting to grow the necessary abilities of a 'full' human being.

Creativity as the Rule of Culture and Development

Curiously, several of these misconceptions derive from a particular way of theorising culture, especially in its relation to development and to creativity. When culture is understood as an external factor, an accumulation of 'things' (be they norms, values, practices, objects, and so on), it becomes easy to believe that

children, subjected to this external environment, start 'assimilating' cultural artefacts, material and symbolic, and, in time, become better equipped to create new ones. What this conception overlooks is the fact that children do not grow into a culture, they *exist* within culture from the moment they are born and, arguably, long before that (think, for instance, of how future parents construct meaning about their child, how society creates a 'place' for children, etc.). When culture is not a thing but a relational process (see also Valsiner 2007), children's role as actors within this process becomes visible. Age and biological development are certainly crucially important for the 'parts' a child can play within his or her immediate sociocultural environment (like the family, the school, the peer group), but the child never fails to participate and ultimately contribute to cultural processes. If culture is indeed an open system (Valsiner 1997), this means that its nature is defined by dynamic relations within and between its components and processes. The cultural system, as a whole, is not only marked or transformed by the revolutionary acts of (adult) creativity; it is continuously re-created by participation in social practices, the defining feature of development as described above. Creativity is not the exception but the *rule of development*. Indeed, we can agree with Jerome Bruner that "the power to recreate reality, to reinvent culture (…) is where a theory of development must begin its discussion of mind" (Bruner 1986, p. 149).

It is this theoretical background that supports the model proposed below (see Fig. 2.1). In this simple depiction, creativity, development, and culture form a triadic, integrated and dynamic unit instead of three separate 'entities'. Despite its simplicity, there are deep implications for those who try to systematically unpack this unit and understand how it 'holds together' and changes over time. My own understanding of these issues, elaborated below, starts from the (cultural psychological) notion of *mediation*. Mainly associated with the work of Lev Vygotsky (1896–1934), the concept of mediation has both a long history and multiple connotations. Sidestepping a lengthy discussion, I will simply consider an element as mediating a relationship when it intervenes, shapes and, most of all, makes possible that very relationship. Following this understanding it becomes clear how, in fact, each one of the three phenomena in Fig. 2.1 actively mediates the connection between the other two. Put simply, the resulting arguments are that: (a) culture mediates the development of creativity; (b) development mediates the creativity–culture relation, and (c) creativity mediates the development of culture. Each one of

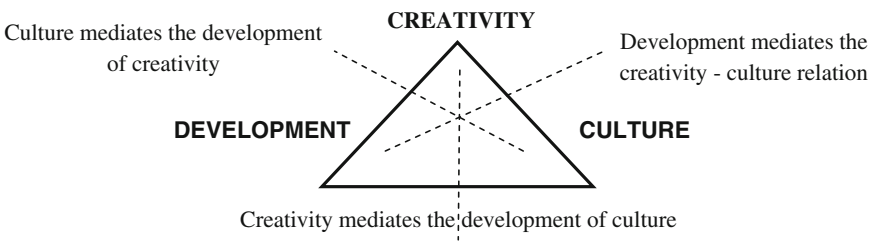

Fig. 2.1 Unpacking the creativity–development–culture triad

these arguments will be discussed in some detail as follows, drawing on foundational scholarship in the field of developmental and cultural psychology, namely the work of Lev Vygotsky, Donald Winnicott, and James Mark Baldwin. All three theorists contributed greatly to our understanding of the child (and adult) as a cultural and creative being.

Culture Mediates the Development of Creativity

There is little doubt today that culture plays a significant part in creative production (Lubart 1999), influencing the resources one uses, the paths taken to generate a creative outcome, and its final reception by the creator and his or her group. Culture is more than a mere context for creativity though, and creativity more than an individual's contribution to culture. To create means to perform *a cultural act* (see Glăveanu 2011b), to be an actor of culture and not just within a culture. This is valid for children as well as adults, all across the developmental spectrum. What does it mean for culture to mediate the development of creativity? First of all, it signifies the fact that creative expression, considered developmentally, is not universal but context-specific. There is no one 'formula' for how children for example employ their creativity, no absolute law escaping the mediating influence of culture and society (in their manifold 'incarnations': as parents and peers, as school topics, as video games and mealtime rituals, etc.). On the other hand, culture fundamentally makes possible the development of creativity by freeing the child and the adult from the immediacy of their surroundings. Symbolic aspects of culture, like language and signs, are crucially important for the very emergence of creative expression and shape its lifelong trajectory. Lev Vygotsky, the Soviet psychologist who is acknowledged as a founding figure of both developmental and cultural psychology, is rightfully considered a champion of this line of theory and research.

The use of Signs and Tools in Symbolic Play

One of Vygotsky's central contributions to our understanding of development more generally can be summarised by his well-known statement that "the path from object to child and from child to object passes through another person" (Vygotsky 1978, p. 30). Making development a social, and by this cultural and historical, affair, Vygotsky managed to challenge individualistic and exclusively cognitive accounts of what it means to mature. He pointed to the role played by others not only for taking care or teaching the child, but effectively mediating his or her connection to the world and its objects. This is why the emergence of signs and symbols and the acquisition of language were a key field of investigation for Lev Vygotsky. Until him, people observed children's first forms of speech and considered them to reflect an egocentric activity, something that is individual and

gradually becomes social, facilitating interpersonal communication more effectively. However, this view falls prey to the misconception of the strict border or demarcation between what is 'individual' and what is 'social'. In fact, language originates *outside* the child and is gradually internalised in interaction with others, becoming inner speech, and not the other way around. Vygotsky's novel perspective changed not only the direction of this trajectory but our view of one crucial 'moment' in the development of any human being: The first use of signs to regulate one's own action, and of tools to master the external world. In his words:

> The child's use of tools resembles the tool activity of apes only while the child is at the pre-speech stage of development. As soon as speech and the use of symbolic signs are included in the manipulation, it is transformed completely, superseding the former natural laws and engendering for the first time properly human forms of using tools. From the moment the child begins, with the help of speech, to master situations, having preliminarily mastered his own behavior, a radically new organization of behavior arises, as well as new relations to the environment. Here, we are present at the birth of specifically human forms of behavior that, having broken away from animal forms of behavior, subsequently create intellect and then become the basis for work (Vygotsky 2004, p. 525).

For Vygotsky, thus, cultural mediation (with the help of signs and tools) shapes the development of all higher mental functions and forms of activity. Creativity makes no exception in this regard. Its origin is located in the first episodes of symbolic or pretend play, where objects begin to stand for something else, to *symbolise* more than what is immediate in perception. These first signs of creative behaviour are what Vygotsky referred to above as 'specifically human' action. In play, "action according to rules begins to be determined by ideas and not by objects themselves" (Vygotsky 1978, p. 97). At the same time, "play is the path of the child's cultural development and specifically the development of his sign activity" (Vygotsky 2004, p. 564). The first signs used by the child are a mark of culture and it is the increased use of and contact with culture's multiple resources, within interaction with others, that facilitates the development of creative expression. In essence, the symbolic universe specific for any cultural system frees the child from the here-and-now and creates the possibility for imaginative (re)constructions of the world. Vygotsky was concerned with the issue of imagination and considered it "the basis of any creative activity (…), equally part of all cultural life, including artistic, scientific, and technical creativity" (Vygotsky 1930/1967 cited in Smolucha 1992, p. 52). But what exactly is the developmental path of imagination?

Internalisation and the Zone of Proximal Development

For Vygotsky, it is precisely pretend play and object substitution that become internalised in the form of fantasy and imagination (Moran and John-Steiner 2003, p. 68). Moreover, the child's capacity to imagine doesn't reach its peak, as lay understandings claim, during preschool years, only to be later on suppressed by schooling and socialisation. On the contrary, it is when imagination and thinking in concepts become articulated, something characteristic for adolescence and

adulthood, that significant artistic and scientific creative outputs become possible (Smolucha 1992). What is important to note, for our discussion of creativity and culture, is the role of *internalisation processes* for the development of a fantasy world in the case of children. It would be highly misleading to consider internalisation the process by which something from the 'outside' (a sign or a capacity exercised interpersonally) gets 'brought into' the psychological system of a person by means of an almost passive act of copying. Many authors corrected such a misunderstanding by consistently underlining the active and creative nature of both internalisation and externalisation processes. For Lawrence and Valsiner (2003), the interplay between the two, which essentially captures the dynamic relation between person and environment, "guarantees both innovation and predictability in human minds and in their social contexts" (p. 749). This kind of perspective differentiates between a deterministic and constructivist model of development and socialisation. For Corsaro (1997, p. 18), children's socialisation is described by what he called 'interpretive reproduction', a phrase that integrates both the creative and normative aspects of learning one's culture and contributing to it.

In concluding, culture, as expressed in the use of signs and tools, mediates the development of creativity. In fact, as Vygotsky rightfully points out, there would be no creative or imaginative expression outside the acquisition of symbolic forms of action and their development over time. Play has a crucial role in this process and, as we will see in the next section, it bridges the gap between early acts of the child and celebrated creations of humankind, all grounded in the capacity to culturally mediate our contact with the world. But this mediation is not deterministic. Children are, from the very beginning, agentic users of signs and tools aimed at controlling both self and the environment. "The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" is what Vygotsky (1978, p. 86) famously referred to as the '*zone of proximal development*'. This powerful metaphor captures the enormous area of potential or possibility characteristic for human action at all ages, and its reliance on social interaction and cultural resources. It is also a metaphor for creativity, which can be said to emerge when children and adults make developmental breakthroughs but also, as a function, itself represents "a lifelong zone of proximal development" (Moran and John-Steiner 2003, p. 78) and, I would argue, anticipating the next sections, a zone of proximal development for culture itself.

Development Mediates the Relation Between Creativity and Culture

Creativity and culture are related developmentally. The only way to understand how creative acts are cultural acts is to consider them in their evolution and dynamic over time. In fact, the study of creativity as a purely individual, largely a-cultural function goes hand in hand with its understanding as a universal, static,

thus a-developmental phenomenon. In contrast, a study of the socio, onto, or micro-genesis of creativity necessarily considers its dependence on and contribution to a cultural system (again at a macro or micro level). This is clear for ontogenesis or the developmental history of the person and the scholarship of Donald Winnicott makes here a significant contribution to our understanding of the creativity–culture dyad at an early age. Winnicott, an English paediatrician and psychoanalyst, was concerned with the first stages of development in the case of children, and their gradual emergence as cultural actors. His writing reveals thus "the infant's journey from absolute dependence, through relative dependence, to independence, and, in parallel, the infant's journey from the pleasure principle to the reality principle, and from autoerotism to object relationships" (Winnicott 1960, p. 42). This is the path leading the child towards the *non-me* world of object and others, towards decentering his or her own perspective and understanding the existence of other positions. Precisely at the moment when children are capable of symbolic mediation, when they start using the first signs (something that Winnicott describes as transitional objects, see below), both creativity and culture become possible. Culture since the contact with the world is marked from then on by the use of signs, and creativity because the defining characteristic of the creative act is its capacity to create, combine and manipulate signs.

The Third or Potential Space

Fundamental for the psychology of Winnicott (1971) is the notion of a *third or potential space*. Sidestepping an old and harmful dichotomy in the discipline between the psychological, inner world, and the outside environment, he points to a third area of experience specific for what it means to exist as a human being. "The place where cultural experience is located is the potential space between the individual and the environment (originally the object)" (Winnicott 1971, p. 100). This third space is the world of cultural symbols and norms that, from a Vygotskian perspective (see previous section), come to regulate both the 'inner' and 'outer' worlds. This is also the space of creativity since this third area of existence is associated also with the "intense experiencing that belongs to the arts and to religion and to imaginative living, and to creative scientific work" (Winnicott 1971, p. 14). In other words, cultural production is placed at the intersection between person and world, it is precisely the *encounter* between the two that never fully takes place 'within' the person just as it doesn't happen 'outside' of the person either. The important question is how, developmentally, does this third space come to be?

> The baby's confidence in the mother's reliability, and therefore in that of other people and things, makes possible a separating-out of the not-me and the me. At the same time, however, it can be said that separation is avoided by the filling in of the potential space with creative playing, with the use of symbols, and with all that eventually adds up to a cultural life. (Winnicott 1971, p. 109)

For Winnicott, just as for Vygotsky, the developmental path from child to world goes through another person, in particular the caretaker (he refers mostly to the role of the mother). However, if Vygotsky emphasised the mediating nature of this relationship, Winnicott is fundamentally concerned with its emotional quality. As the passage above reflects, he considered that the most important characteristic to be developed in the child–adult relationship is *trust* (in the mother's love). The separation from the mother causes anxiety and it is a first evidence of the fact that the child exists within a non-me environment that is not always ready to satisfy his/her needs. The only way this 'traumatic' experience can be surpassed is by developing a symbol of the union with the mother, effectively the first expression of symbolic activity, which comes to constitute the potential space. This symbol of union is typically an object (toy, blanket, etc.) the child becomes attached to, that stands in for the mother's breast. It is a deeply emotional symbol of overcoming distance or absence. The toy becomes what Winnicott famously referred to as a 'transitional object', a first possession with a crucial developmental role. Between 4 and 12 months, broadly (Winnicott deliberately left room for plenty of inter-individual variations), transitional phenomena stand at the root of symbolism and, later, of creative activity. For him, "when we witness an infant's employment of a transitional object, the first not-me possession, we are witnessing both the child's first use of a symbol and the first experience of play" (Winnicott 1971, p. 96).

Creativity and Culture in Play

Again in a striking parallel with Vygotsky's thinking, Winnicott believed that there is a direct connection between play and cultural experience. Also, for him, "in playing, and perhaps only in playing, the child or adult is free to be creative" (Winnicott 1971, p. 53). This is how, once more, the three elements that concern us here are reunited: Creativity, culture, development. What is essential for the scholarship of this author though is the idea that creativity and culture are *twin-born* in the first uses of symbolic means during episodes of play. They share the same developmental origin. In his words: "cultural experience begins with creative living first manifested in play" (Winnicott 1971, p. 100). The way in which Winnicott understood creativity however differs from what is commonly referred to when using this term: accomplished creators and creations with a visible social value. The creativity that concerned him was universal and belonged to being alive, it was in fact an expression of being a living organism capable of signification and existing within the world of culture.

I discussed Winnicott's contribution to our understanding of both creativity and culture elsewhere (see Glăveanu 2009) and here what is important to emphasise are his ideas about how, developmentally, creative expression relates to cultural experience. A key role in this intersection is played by the first use of signs, what Gardner also rightfully called "the greatest imaginative leap of all" (Gardner 1982, p. 170). The psychoanalytical tones of Winnicott's thought are obvious and they

add to our conception the centrality of emotional connections between self and other, the very relation that facilitates this notable achievement. Since "a baby cannot exist alone, but is essentially part of a relationship" (Winnicott 1978, p. 88), we need to focus also on what Winnicott described as the 'good-enough mother' or parental figure, adaptive for the child's development because of love. The consequences of poor parenting are enormous for the development of the child, including his or her capacity to create and, ultimately, to participate in and contribute to culture. It is, finally, this role of creativity to shape the cultural environment and its development that I turn to in the next section.

Creativity Mediates the Development of Culture

Completing our inquiry into the triadic and mediated relationship between creativity, development, and culture, we need to consider lastly how creative expression actively shapes cultural phenomena and their unfolding in time. From a sociocultural perspective, people inherit practices invented by others. People also contribute to these practices, perfect and master them, and, at times, transform them (Rogoff 2003). Moreover, if enculturation from early ages of development presupposes 'acquiring' meanings, values, action scripts and so on, this process is never without a potential for 'inquiring', for changing them more or less radically (Shimahara 1970). What is important is that inquiring happens *during* acquiring and so there is no disjunction between learning and practicing, including at the level of childhood. It might be difficult for some to conceive of children as active and creative social agents in the cultural arena (Corsaro 1997), but this becomes clearly obvious for a cultural psychologist who understands development through the prism of participation in social practices. It is indeed the case that,

> as children move across settings that involve different formats for participation, they actively engage in variable way relating their own repertoire of practice. This concept helps to focus on children's own agency in selecting, rejecting, and transforming multiple ways of engaging in the world. In the process, children in turn contribute to the formation of the routines and practices available to the next generation. (Rogoff 2003, pp. 491–192)

In order to appreciate this perspective we need to return, once more, to Vygotsky's emphasis on processes of internalisation and consider them, as Lawrence and Valsiner (1993, p. 152) do, "not seen as an automatic copying or transmitting operation, but, instead, as one involving coordination of the new with the old, and restructuring of both". From early on, children prove to be both active and constructive in their interaction with the cultural world (Valsiner 1997), which does not mean that they are not actively shaped by it in turn. In fact, a *bidirectional model* of socialisation (Kuczynski et al. 1997) describes best this dynamic reality by pointing to the double exchange taking place between person and environment. As such, by adopting these theoretical lenses, socialisation becomes "not only a matter of adaptation and internalization, but also a process of appropriation, reinvention, and reproduction" (Corsaro and Eder 1990, p. 217).

Persistent Imitation as Creative Action

While all of these points about the role of creativity within the development of cultural practices are informative in their own right, what we need is an actual theoretical framework that can encompass the *whole* range of cultural changes, from micro alterations to macro transformations, within a developmental perspective. This is what the American philosopher and psychologists James Mark Baldwin offered as a seminal contribution at the turn of the last century. To understand how this bridging of levels is possible we need to start first from Baldwin's description of early development which, complementing Vygotsky and Winnicott's interest in the emergence of the symbolic function, focuses on the *action* of the child. What Baldwin (1894) noticed is that young children distinguish themselves as great imitators. They imitate by repeating actions, something he referred to as 'circular reactions', which reproduce their own stimulus. For as simple and repeated as these expressions seem, they are in fact crucial for the development of the mind and Baldwin famously considered imitation as the law of the progressive interaction between organism and its environment. What is important to note here is the word 'progressive'. Indeed, a circular reaction is as much a re-enactment of an action (a re-action) as it is a form of *pro-action* (Valsiner 2000). In reality, a close look at this fundamental process would show us that there are no two repetitions alike since the first act changes the context for the second act. This is how, instead of falling prey to an easy association between imitation and lack of creativity, Baldwin's insightful writings describe precisely the opposite, that circular reactions constantly produce novelty, especially when they take the form of 'persistent imitation', a form of constructive experimentation with the elements of the environment. The outcomes of persistent imitation are not reproductions of a model but variations of it, a clear proof of the creative potential embedded within children's action.

Habit and Accommodation

Baldwin did not end his developmental theory at the level of early childhood though. Instead, he offered a broader framework into which imitation and creativity (or, better said, imitation *as* creativity) can be integrated. At a higher level he identified and studied the interplay between two general principles, that of habit, grounded in the repetitive cycles of action referred to also above, and that of accommodation, the innovative breaking of habit (Baldwin 1903). Once more, these terms seem at first to resonate with a certain understanding of habit as the antithesis of creativity (see Glăveanu 2012b), the principle that leads to stability, even stagnation within the life of individuals and of the society. And yet, for Baldwin, accommodation can only take place on the basis of habit, being "in each case simply the result and fruit of the habit itself which is exercised" (Baldwin 1903, p. 117). And he goes on to say that "every new thing is an adaptation, and

every adaptation arises right out of the bosom of old processes and is filled with old matter" (p. 118). We can notice the same logic of the circular reaction applied, on a much larger scale, to the dynamic between habit and accommodation, something that comes to reinforce the idea that creativity is an ever-present potential in human action, including in the seemingly imitative gestures of children. Indeed, "the child, or the man, must be a facile imitator before he can be an inventor. (…) He must, by constant self-imitation, practise the combinations he already knows, and by so doing come to see the possible forms of novelty into which the materials may be cast" (Baldwin 1902, p, 572).

To sum up, how can these actions have the potential to shape the development of culture? For Baldwin, the child is neither imitator nor inventor, it is *both* at once. Moreover, what we tend to look down on as simple reproductive behaviours on the part of children (or adults), are in fact precious stepping stone on the path to high-level creativity. Baldwin's (1902) inspiring metaphor for this is that imitation is the natural schoolmaster of invention. This is valid both in the case of personal and societal creativity and the development of any cultural system, from that of a family or classroom to that of a whole community, depends on this developmental accumulation of habits and repetitive gestures, especially since all repetition is, in practice, repetition with a *difference*.

Conclusion: Thinking Relationally About Development, Creativity, and Culture

In a recent article (see Glăveanu 2012a) I argued that what we need in the psychology of creativity is more relational thinking and the overcoming of a series of deeply seated dichotomies that prevent us from observing the actual continuities and holistic nature of the phenomena we study. When it comes to considering the triad between development, creativity and culture, some of the most harmful dichotomies we need to challenge are those discussed in the previous sections: individual versus social, symbolic versus material, inner world versus outer world, imitation versus invention, and so on. The model proposed in Fig. 2.1 starts by positioning all three elements in relation to each other and continues with a discussion of how each one has a determining role to play in the inter-relation between the other two. Drawing on the foundational scholarship of important figures within psychology, psychoanalysis and philosophy, like Lev Vygotsky, Donald Winnicott, and James Mark Baldwin, we were able to observe how the child's development of the capacity to symbolise, having a strong emotional basis and a deep connection to action (e.g., circular reactions), constitutes *simultaneously* a creative and cultural achievement. We might even push this argument further and conclude that one can never conceive of creativity without culture and the other way around, and cannot think about their interdependence outside a developmental perspective.

To think relationally means to think *developmentally*. It also means to accept paradoxes and even entertain contradiction as a way of productively dealing with complex, real-life phenomena. And what can be more complex than the development of creativity within a cultural context? Valsiner (1997, p. 323) shrewdly notes that the course of human development is "deterministically indeterministic", it specifies constraints which are, in the end, the basis for novel, surprising constructions and trajectories. There is both stability and instability, familiarity and unfamiliarity, permanence and change across the lifespan, and the necessary interplay between the two can only be fruitfully theorised in a relational manner, as phases of a unitary process. Following Baldwin, we can go even further and say that these stages hold in fact the kernels of the opposite tendency.

What is the practical relevance of this inquiry? Adopting a sociocultural perspective on development, creativity, and culture has deep implications not only for how we get to understand children and their activity, but also how we relate to them and foster their creative expression. For a long time our image of the development of creativity has been marked by the notion of '*creativity slumps*' once children enter school and particularly during the fourth grade (Torrance 1967). While there are some individual differences in this regard (Charles and Runco 2001), the general view of artistic development, for example, takes the shape of a U curve, going from high potential during preschool years, to a decrease in creative expression from which only a few children later 'recover' (Gardner 1982). To begin with, this perspective doesn't account for the "multiple trajectories of development" (Valsiner 1997) available to the person or the role the person has as an agent of his/her own development. The path of creativity might present slumps and peaks (Charles and Runco 2001), or proceed in zigs and zags (Gardner 1982), but these stand out so radically only when we are unable to see that creativity never 'disappears' but changes its quality of expression during development to accommodate changing ways of relating to the social and cultural world.

In the end, developmental, cultural, and creativity theory have a deep impact on the very reality of growing up by making us more sensitive to certain aspects of this reality and oblivious to others. But what we must remember at all times is that psychological theory itself "grows out of the life and the conditions of culture" (Bruner 1999, p. 232) and this is very much valid when it comes to ideas about children's development (Valsiner 1997). Theorising childhood is not only a scientific but a cultural, historical, institutional, and political act and this observation is not to be denied, hidden or fought against but carefully reflected upon. The greatest danger lies in the perverse tendency of developmental models to pass from describing what '*is*' to deciding what '*ought to be*'. There is never a 'more' versus 'less' correct perspective on development but there are views that actively fail to grasp the creative and cultural nature of what it means to be human, including to be a child. Towards dispelling such misconceptions, the present chapter hopes to have made a modest contribution.

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Chapter 3
Indigenous Chinese Epistemologies as a Source of Creativity

David Yun Dai

Introduction

Indigenous Chinese Epistemologies as a Source of Creativity

The last two centuries or so have witnessed the huge success of the reductionist epistemology in modern science in the West. As a painful reflection, many Chinese scholars have attempted to explain how indigenous elements in the Chinese cultural beliefs impede similar advances ("自然辩证法通讯"杂志社; Communications on Dialectics of Nature 1983). However, the high power of modern science and technology also seems to have created an illusion of its omnipotence, whereas in fact it is not without its own pitfalls. In this article, I argue that while modern analytic science has been the engine that has driven new discoveries and inventions for more than two centuries, its shortfalls have also revealed themselves, particularly its inadequacy in accounting for complex, emergent, dynamic phenomena, such as real-time weather changes, complex bio-chemical processes, and social behaviors. In this regard, indigenous Chinese epistemologies of dynamism and holism provide valuable heuristics and tools for managing complexities and uncertainties that abound in reality, and even for new scientific insights, as they did in modern history.

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The Needham Question: Indigenous Culture as an Impediment to Scientific Creativity

Up to the 16th century, China had enjoyed prosperity as well as great success in science and technology compared to the backwardness of Europe. However, why did modern science occur in Europe, not in China? This is the famous Needham Question. Decades of efforts have been devoted to addressing this question ever since Needham raised the question in his ground-breaking book "*Science and Civilization in China*." Many explanations pertain to differences in social and political systems (e.g., 金观涛, 樊洪业, 刘清峰; Jin et al. 1983); some focused on how cultural-psychological factors might have stood in the way of modern scientific thinking (e.g., 刘吉; Liu 1983). A most recent book on the topic appeared in 2009, entitled "*Legacy and Rebellion: Why Modern Science Occurred in the West*" (reviewed by 余英时; Yu 2009). Chen argued that the right question is not why China failed to produce modern science, but why and how the Western tradition gave rise to the modern science as we know of. Then what is modern science? Chen suggested that the milestones of the modern science include the works of Kepler, Galileo, and Newton, with physics and mathematics as its ultimate foundation (more elaboration in the next section).

Whether the Needham Question is a pseudo-question or not (Yu 2009), reflections on impediments of indigenous culture for scientific creativity are a valuable exercise. For instance, Franklin (Chen-Ning) Yang, a Nobel laureate in physics in 1957, commented that traditional Chinese thinking shows distinct weaknesses in deductive logic, an essential element for modern science. He also criticized the tendency in the Chinese tradition to associate efforts of scientific inquiry, such as Chinese medicine, with metaphysics exemplified in 《易经》 (Yi Jing or I Ching, "the Book of Changes"), which prescribes an Ying-and-Yang dialectic or logic for changes of the universe (see Yang 2005). Yang's warnings quickly drew criticisms from the champions of the Chinese way of thinking and living (see 毛嘉陵; Mao 2005). It is important, for the sake of intelligible discussion of pluses and minuses of traditional cultures for modern scientific thinking, to discern what exactly are essentials of modern scientific thinking exemplified by Kepler, Galileo, and Newton. Furthermore, it is crucial to understand the strengths and limits of modern science as a way of thinking and knowledge construction so that we don't tout it as the only way of gaining authentic, reliable knowledge.

Triumphs and Perils of Reductionism in Modern Science

In my characterization, reductionism lies in the heart of modern science. Reductionism can be seen as both a philosophic orientation (e.g., the Pythagorian notion of the universe operated based on mathematical relations and regularities), a methodological approach (e.g., isolation of variables or basic elements through experimentation), The most successful story of reductionism in history is classical

physics, which achieves a level of mathematical and empirical certainty unrivaled by any other disciplines. Thus physics is the envy of not only other physical sciences as such chemistry and earth science but biological and human sciences as well (e.g., economics and psychology). Although reductionism manifests itself in many ways (see Searle 2004 for a general discussion of reductionism), I identify three main tenets of scientific reductionism:

(A) *Elementism or atomism*: Reducing complex matters into their basic operating elements (i.e., building blocks) through analytic techniques (including partition and experimentation), for example, atoms and sub-atomic elements in physics, chemicals in chemistry, cells, tissues, and organs in biology, neurons and neurotransmitters in neuroscience, viruses, bacteria, and antibodies in medicine (i.e.,).
(B) *Positivism*: Mapping out the relations and causality of these isolated components in terms of mathematical regularities, verified through experimentation.
(C) *Deductive logic*: Generating a set of first principles that govern the operation of these elements in a variety of situations. Newtonian physics, with its first principles, has attested to the magical power of reductionism. As a matter of fact, it was so powerful that brilliant physicists such as Planck and Einstein all aspired to unify physical sciences under an even more basic, foundational theory. Planck, for example, warned that "physical research cannot rest so long as mechanics and electrodynamics have not been welded together with thermodynamics and heat radiation" (in Holton 1981, p. 18).

In short, analytic technology (experimentation), quantification (mathematization), and deductive logic (generality) are three basic constituents of scientific reductionism. Despite the unsuccessful attempt at a unified field theory in Einstein's later life (Kumar 2010), reductionism has proved highly effective when used in physics, but less so in biology and life science (Gottlieb 1998), and increasingly controversial in psychology (see Koch 1992) and economics (see Akerlof and Shiller 2009). As a matter of fact, it is facing increasing challenges even within the fields of mathematics and physics in light of new understandings of complexity (see Cornwell 1995; Prigogine and Stengers 1984). In the following section, I will discuss some of the triumphs and difficulties scientific reductionism has experienced in physics, medicine, and economics, with a caveat that the discussion is by nature illustrative rather than comprehensive.

Modern analytic science has enjoyed huge success in understanding both micro physics and astrophysics, enabling us to build computer chips as well as sending space shuttles to designated orbits with high precision. Yes, first principles have proved insufficient for working with physical realities that have complex structural and functional self-organization and endure dynamic changes over time (e.g., certain chemical bonding processes, dynamic formation of crystals). To illustrate the point, Newtonian physics seems to have worked out everything we need to know about gravity, yet it is not as helpful in predicting the trajectory of a falling leave, for which a different science is needed (e.g., aerodynamics). Meteorology is another example of tackling real-world complexity for which first principles are not

very helpful; even with the real-time satellite information and simulation of changes based on carefully formulated mathematical equations, long-range prediction of weather conditions is still difficult to do due to complex real-time interaction of multiple factors. The famous example of Butterfly Effect illustrates non-linear dynamic change that defies any reductionistic prescription.

Reductionistic approaches to biology and life science have also produced enormous success in finding cures for many diseases and preventing endemics through finding proper vaccines. But it is still baffled by the complexity of even a seemingly simple phenomenon of metabolism or protein synthesis. The reductionistic temptation of seeking answers to health problems from the human genomics project is likely to lead to disillusion, as the genesis of many health problems is likely to be diverse and complexly determined. The modern bio-chemical model of medicine is good at attacking local problems whose nature and boundary are well defined (brain tumor, or leukemia), but not as good at attacking problems whose origins and boundaries are ill-structured (e.g., hypertension, which might be symptomatic of a range of problems; see Spiro et al. 1988, for a discussion of ill-structured problems). More broadly, the bio-chemical model of diseases and illness in the Western medicine espouses a dualist position on the mind-body issue and thus does not treat the health problem at hand as complexly determined, for which psychological factors (e.g., stress) are often involved.

Reductionistic approaches to human conditions and changes have yielded disciplines of psychology and economics. For the former, the doctrine of controlled experimentation makes it more akin to physics. For the latter, the doctrine of mathematical formulations gains itself a higher status of science compared to other social sciences. However, while experimentation in psychology historically has produced a fragmented psychology (Bruner 1983), the oversimplified assumptions of economic rationality and measurement continuity create an illusion of the ubiquity of economic principles so generated, which may appear mathematically elegant but vastly overlooks the complexity of human cognitions and motivations (Akerlof and Shiller 2009).

Taken together, reductionism in modern science faces serious challenges because it fails to capture the complex and dynamic nature of many physical, biological, and psychosocial processes. Its doctrine of controlled experimentation, which takes thing apart to see how each piece works, falls short because the sum of the parts does not equal the whole. Its doctrine of mathematization breaks down in the face of emergent properties, qualitative differences, and measurement discontinuities. And finally, its doctrine of deductive logic fails as things get more complex and dynamic (and involving randomness as well; see Dai 2005, for more discussion).

Epistemic Stances and Cognitive Strategies

When discussing the influence of Greek thought (e.g., Democritus and Pythagoras) on the Western axiomatic thinking that carries formal, deductive logic in its full

force as to eliminate all contradictions, Hideki Yukawa, the first Japanese who won a Nobel Prize in physics, commented that Orientals, particularly the Chinese do not seem to be as strong: "a thoroughgoing rationalism eludes them" (Yukawa 1973, p. 56). However, Yukawa quickly pointed out that the Chinese (and Japanese) seem to excel in intuition (or the Japanese *kan*). It is probably oversimplistic to argue that Chinese are more intuitive and Westerners are more analytic. A deeper question is why the Chinese places more trust in intuition and the Westerners in analysis. Here lies the crux of the matter: These cultures have developed differing epistemologies. As a saying goes, the Chinese are too rational to be rationalists. They suspect that over-analysis of a phenomenon would kill the whole. Intuition by nature is holistic, thus retaining the gist of the matter at hand, as fuzzy-trace theory (Brainerd and Reyna 1990) explains. Henri Poincaré, another renowned mathematician and physicist, said that "it is by logic we prove; it is by intuition we invent…Logic, therefore, remains barren unless fertilized by intuition" (quoted in Miller 1996, p. 351). But even this characterization of scientific endeavor misses the point of why intuition plays a vital role in science and other human practices. By analysis (the basic reductionist tactic), we naturally adopt a divide-and-conquer strategy, taking a system apart and looking at one thing at a time. In contrast, by intuition, we get a sense of how an object works as a whole. Intuition by nature is boundary-crossing and often analogical (mapping the workings of a concrete, familiar object onto an abstract, unfamiliar one). Many scientific discoveries were made that way (see Holyoak and Thagard 1995; Miller 1996). Sometimes it is even achieved through empathy; as a Nobel laureate chemist said, when he was trying to understand the inner workings of a chemical process, he often imagined himself living through the life of a chemical. Therefore, the question is not whether an analytic, reductionist or intuitive, holistic approach is better, but where and when they help us get a firmer grip on realities, intellectually and practically. To do this, it is meaningful to resort to the notion of worldviews, which can be traced back to Pepper's (1942) world hypotheses.

Pepper opposed the objectivity premise of logical positivism by arguing that there is no such thing as "pure" factual data free from interpretation. He outlined four worldviews or conceptual systems formism, mechanism, contextualism, and organicism that serve as "root metaphors" for interpreting a variety of natural phenomena and world affairs. Of the four metaphors, the first two are reductionist and the last two are non-reductionist. Similarly, Dennett (1987) identified three epistemic stances: understanding and predicting behavior of an object as *physical*, as involving *design*, or as *intentional*. Treating an object as physical is the most concrete; things can be predicted based on mass, velocity, energy, force, etc. The domains of physics and chemistry take this *physical stance*, a distinct reductionistic stance. In comparison, looking at an object from a design point of view is more abstract: we infer its structures, functions, and purposes. Disciplines that characteristically take a *design stance* include biology and engineering, which help us understand, for example, how a bird is designed, in a evolutionary sense, for flying, or how a clock is designed, mechanically or electronically, to tell time. The design stance can be reductionistic when design is considered innate or preordained, but

can be non-reductionistic if a design is dynamically shaped through development and use (i.e., self-organized). The most abstract stance is *intentional stance*: we have to infer desires, thoughts, and feelings or various mental states in order to make good predictions about the behavior of a given object. Minds and some software have this intentional property. Intentions are emergent from person-situation interactions and thus contextual and reductionistic. Utilities of the three epistemic stances are not just about their predictive efficacy with particular objects or behaviors; a proper epistemic stance helps us grasp the inner workings of a thing, and an improper stance obscures its essence. Joseph Needham, for example, in his research on embryo development, found the Western mechanical model wanting, and resorted to Chinese organismic thoughts for inspiration (王, Wang 2005). Thus, I am not discussing possible cross-cultural differences in cognitive styles per se such as holistic versus analytic, which might exist between the East and West (see Masuda and Nisbett 2006). I am focusing on differences in epistemologies: what we believe are the reliable and viable ways or strategies to apprehend the realities.

Indigenous epistemologies are folk and informal beliefs and ideologies embedded or encrypted in a culture's natural language and social practices. Although they are implicit (Peng and Nisbett 1999), they can be systematically expounded by scholars of an indigenous culture, as in Taoist writings and classic texts on Chinese medicine. In the following section, I discuss indigenous epistemologies reflected in Chinese medicine, the game of Go, and Taoism.

Indigenous Epistemologies of Change and Dynamism as a Source of Creative Insights

Chinese medicine, the game of Go, and the Taoist philosophy have more than two thousand years of history. Moreover, they are still very much alive and well in the contemporary Chinese culture. Chinese medicine is still an institutionalized practice in China; the game of Go is still quite popular as a national pastime as well as profession, not only in China but in Japan and Korea, among other places. Taoist writings are still in school texts as well as featured on national TV. I suggest all three provide a rich source of epistemological insights regarding how to understand and deal with the dynamic, changing nature of the world in which we live.

Chinese medicine. Chinese medicine reveals a distinct indigenous aspect of the Chinese epistemology that emphasizes the intuitive grasp of inner workings of a human body. Thinking in Western medicine is thinking in basic entities that constitute the body, such as cells, tissues, organs, and chemicals. In contrast, thinking in Chinese medicine is thinking in manifest states of a living person (e.g., pulses, tongue colors, complexions) and probable causes (Zhu 2005), which may be called "symptomatic thinking" "象的思维." (Wang 2005, p. 151). Instead of getting blood cell counts or measures of critical bio-chemical indicators, symptomatic thinking would lead to a hypothesis of how the body as a whole "malfunctions" that

produces the symptoms rather than reducing the problem to some material causes, deficiencies, or disorders. Using a number of key concepts (e.g., the central concept of "qi" 气 or energy, its ups and downs, and ying-yang dynamics), Chinese medicine explains how the harmony and balance of dynamic states get disturbed. While the conceptual system derived from Chinese metaphysics, which has questionable origins in ancient mysticism, the functionality of these concepts makes them good tools for characterizing a person's state of health and well-being. It treats the person as a whole, and thus avoids the pitfalls of Western medicine, which tends to treat local problems (标) without getting to the roots of most medical problems as fundamentally a regulatory one at the system level (本).

Epistemically, the conceptual system in Chinese medicine is not really a system of "objective realities" out there, but represents a doctor's perceptual simulation of how a living being functions or malfunctions, and thus retains its dynamic properties, which would be lost when a medical problem is subjected to a purely bio-chemical analysis. For example, the system of channels and subsidiary channels (经络系统) is a unique invention of Chinese medicine that led to acupuncture, among others, as a treatment technique. The material existence of such a system is controversial for the lack of solid evidence. However, search for its anatomic locality might miss the point, as the system can only be understood more dynamically in its functionality and pathways (Zhu 2005). A more viable approach is to test whether treatments based on such a theory yield desired effects in a controlled experiment. From a practical point of view, the conceptual system used in Chinese medicine represents a form of embodied cognition; it is not a system of representations of anatomic structures and functions and bio-chemical systems but a system of representations of perceived or intuited functional states of a living person. It better fits with Clark's (1997) vision of cognition: "The internal representations the mind uses to guide actions may thus be best understood as action-and-context-specific control structures rather than as passive recapitulations of external reality" (p. 51).

Compared to the universal or nomothetic approach adopted by Western medicine, Chinese medicine insists on an idiographic approach, treating each patient as having his or her own unique health history and trajectory. As Chen Yinque (陈寅恪), a famous scholar of sinology, said, "Chinese medicine has cures for diseases, but not universal principles to follow." (quoted in Yu 2009). From a nomothetic point of view, the same cholesterol level or blood pressure measure should have the same interpretation across individuals. From an idiographic point of view, however, it carries different meanings for different individuals. This insistence on individuality is consistent with the holism: the cholesterol level or hypertension is meaningful and interpretable only in the context of the individual as a living system with its unique pattern of symptoms and probable causes. The emphasis on individuality also makes Chinese medicine more akin to an art than a science, as it relies more on case-based knowledge and expert intuition and judgment rather than general rules and principles, and biological and medical statistics.

The holistic emphasis of Chinese medicine also makes the mind-body relationship more intimate. In the Cartesian dualism, mind is separate from body; it can only use its power to understand the body; but by no means can it influence bodily processes. In ancient Chinese medicine as well as philosophy, mind and body are intimately connected through "qi". Highly sophisticated techniques of mental concentration (i.e., meditation, 打坐) and breathing ("qigong," 气功) have been developed to literally move the body energy ("qi", 气) and regulate the physical and biological processes (e.g., slowed metabolism). The boundary between mind and body is crossed when intentional regulation of bodily processes is exercised.

All in all, the Chinese medicine provides an understanding of bodily functions that is distinctly non-reductionistic. What is interesting from an epistemological perspective is its insistence on maintaining a dynamic view of a living system as consisting of various changing states of bodily functioning, and its insistence on "qi" as the central concept of such a living system, rather than bio-chemical elements that make up the system. What sustains health is not the sum of these elements functioning in an isolated way but the emergent higher-order properties (e.g., unbalance of ying and yang) out of the complex interaction of these elements. Cognitively, well-trained medical intuition, rather than general rules and principles, plays a key role in diagnosis.

The game of Go. Like Chinese medicine, Go is an ancient Chinese game with a distinct modern appeal: its complexity. The goal of the game is to compete for space or territory. It is played by two players adding stones in turn on a 19 × 19 grid board, with a state space of roughly 10^{170}, compared to 10^{50} in chess. What makes the game fascinating is that it starts with an empty board, which evolves from an unconstrained, undetermined nothingness to ever increasing complexity as stones are placed on the board to form and compete for territories. The game was seen as analogous to the cosmos in the ancient literature (see 何, He 2003, pp. 3–4, for the remarks of 班固 Ban Gu 32–92, ad). Interested Westerners are often taking an analytic approach to the game of Go, such as figuring out the deep mathematical rules of the end game (Berlekamp and Wolfe 1997), or solving a smaller-scale game of Go mathematically (van der Werf; see http://erikvanderwerf.tengen.nl/). For the Chinese, ancient and modern alike, finding a solution to the game of Go once and for all has never been an attractive idea. Wu Wenjun (吴文俊), a renowned mathematician, warned that mathematically tackling the game of Go may be fundamentally wrongly headed (Wu 1993). In other words, they are somehow wary of radical reductionism, such as a mathematical solution to the game of Go. Instead, the Chinese are more interested in how to cope with the enormous complexities and uncertainties the game poses to the player.

Similar to Chinese medicine, the community of Go players has developed a rich repertoire of concepts and heuristics to deal with game situations that are more or less ill-defined. One of those key concepts is *taste*, bad taste, good taste, awesome taste, lingering taste, etc. It is a fuzzy concept meant to capture undetermined or undetermined good and bad possibilities with particular game positions. It is a similar kind of symptomatic thinking used in Chinese medicine that permits detection of opportunities and vulnerabilities without getting unnecessarily to the

details when situations not fully unfolded. It reflects the principle of cognitive economy as prescribed by fuzzy-trace theory (Reyna 2008; Reyna and Brainerd 1995).

In chess, leverage points and tipping points are relatively clear (e.g., positional advantage, or materials loss). In Go, they are much more subtle; detailed analysis and extensive look-ahead do not help much in critical decision making (e.g., war or peace, containment or invasion). Shi Dingan (施定庵), the author of A Guide to Principles of Go, used water flowing through a riverbed to describe a playing style that goes with the flow of the game rather than forcing a play (Shi 2003). Wu Qingyuan (吴清源), one of the best Go players in history, compared his own trust in intuition concerning move selection with the highly analytic approach used by Minoru Kitani (木谷实), another top player in history, and had this to say:

> I, from the very beginning, held it to be true that human beings are not omnipotent; no matter how much calculation we do, we would still not get the clear results and answers…If you put too much faith in calculation, you might lose sight of the global dynamics of the game (Wu 2003, p. 60)

Following up on the best hunches and verifying the most promising lines seem to be a successful coping strategy in the face of numerous possibilities and uncertainties. A fascinating tactic of reducing uncertainties and facilitating decision making used in the game is Testing the Opponent's Response (试探应手); that is, when a situation is murky and unclear, try to force the opponent to make a move first that helps clarify the situation, before you make a decision as to in what direction you want to move the game.

Another area in which Go poses a serious challenge is evaluation of gains and losses. In chess, for example, what constitutes gains and losses, advantages and disadvantages is relatively clear. That is why Deep Blue, the computer chess that arguably beat a world champion, can easily implement a couple of evaluation parameters. For the game of Go, gains and losses are always intertwined. Immediate gains may have a hidden loss down the road, local territories may be gained at the cost of global strategic positioning. The player has to maintain a delicate balance between short-term gains and long-term development, efficiency and safety, tactical and strategic considerations. In history, "ten principles," a set of heuristic rules, were developed to guide players. They were designed to deal with, rather than eliminate, complexities and uncertainties.

In sum, the game of Go provides rich insights as to how to deal with ill-structured problems (Spiro et al. 1988) and make rational decisions in the face of enormous complexities and uncertainties.

Taoism. Why is it that the Chinese do not seem to care as much about "ultimate truth?" There could be many reasons, such as they are more likely to show pragmatic interests rather than purely intellectual ones in dealing with the world (李泽厚, Li Zehou, Li 2008). But one epistemic reason is the perceived impermanence of the cognized truth, as expressed by Laozi (老子):

> The way can be charted is not a constant way; an identity that can be named is not a constant identity. (道可道, 非常道; 名可名, 非常名).

Diametrically different from the Greek thought that seeks an essence or fixed identity for everything, Taoists were convinced that if there is anything constant in the universe, that is change, and that the human cognitive apparatus (e.g., language and thinking), however sophisticated, cannot capture all the nuances of the pervasive and ubiquitous changes.

Quantum mechanics provides a classic example of why the Taoist humility is justified. It is said that Niels Bohr's theory of complementarity was in a way inspired by the Chinese philosophy, particularly the complementarity of Ying and Yang, which Bohr used as a symbol of complementarity. The complementarity principle, in its most general form, states that some objects have dual or multiple properties that appear to be contradictory but actually reflect the complementary nature of things. I venture to argue that the complementary principle Bohr developed was revolutionary as far as the epistemology of science is concerned. This revolution was at least in part inspired by Taoism, among other influences. Here was how.

First of all, complementarity itself, as Bohr made it very clear in what is now known as Copenhagen Interpretation, is an intuition of how the university manifests itself. It is a model-based intuition of the workings of the atomic world, rather than an axiomatic truth. By declaring complementarity on the particle-wave duality regarding physical properties of electrons and photons, Bohr insisted that its paradoxical or seemingly contradictory nature is not to be explained away by a deeper unity (or essence), but rather should be seen as how the universe shows its non-deterministic, probabilistic nature. While Albert Einstein unrelentingly sought the singular axiomatic truth (e.g., his attempt at unified field theory) to eliminate the contradictions and redeem a deterministic universe (recall his famous line: "God does not play dice with the universe" in response to Bohr and Heisenberg). The complementarity principle made Bohr side with Laozi that indeed the way that can be charted is not a constant way; the nature would show its other face as well.

Second, electrons behave either like particles or like waves under differing experimental conditions, but do not display wave-like and particle-like properties simultaneously under any experimental condition. It resembles Heisenberg's uncertainty principle that when measuring an electron there is a tradeoff between the precision of its position and momentum; one cannot get a good measure of both simultaneously. This led Bohr to declare "the impossibility of any sharp distinction between the behaviour of atomic objects and the interactions with the measuring instruments which serve to define the conditions under which the phenomena appear." (quoted in Kumar 2010, p. 244). In other words, equipments and instruments we use always influence what gets observed and measured. This argument challenges the deeply entrenched positivist assumption that the observed is independent of the observer. It (along with Pepper 1942) affirms the Taoist conviction that, very often, the certainty and objectivity of knowledge is purchased at the cost of overlooking the complexity and uncertainty of the world. To paraphrase Laozi's remarks, "The truth discovered by the right instrument not a constant truth."

Third, formal logic fails in capturing the complexity and changing nature of the universe at the micro or macro level. Concepts themselves undergo changes rather

than always holding their identities. For example, concepts like particle and wave have different referents in classical physics than at the quantum level. In articulating truth through language, it is often difficult to capture the nuances of the truth. This is the distance Bohr identified between clarity and truth, echoing Laozi that "An identity that can be named is not a constant identity." This is ultimately why an intuitive solution based on a broader, more inclusive perspective, such as the complementarity solution to the participle-wave duality, is often better than an axiomatic one, which is stringent in formal logic but narrow and exclusive in perspective.

In sum, it was not merely the aesthetic appeal of the Ying-Yang logo but the deep complementary logic behind it that resonated with Niels Bohr while attempting to fashion an explanation of the puzzling issue of the particle-wave duality. As I said earlier, holism and dynamism (emphasizing change) is at the heart of Chinese epistemology. Zhuangzi, another major figure in the history of Taoism, shows through a fable how a mechanistic, reductionistic view kills the integrity of a dynamic system (or life).

> The Emperor of the South was called Swift and the Emperor of the North, Fast. The Emperor of the Center was known as Chaos (混沌). One time, the emperors of the North and South visited Chaos's territories. Where they met with him. Chaos made them heartly welcome. Swift and Fast conferred together as to how they could show their gratitude. They said, "All men have seven apertures-the eyes, the ears, the mouth, and the nose-whereby they see, hear, eat, and breathe. Yet this Chaos, unlike other men, is quite smooth with no apertures at all. He must find it very awkward. As a sign of our gratitude, therefore, let us try making some holes for him." So each day, they made one fresh hole; and on the seventh day Chaos died. (Zhaungzi:, 庄子《应帝王》 "混沌")

The logic of the Swift and Fast is a mechanical one: once we get a handle on all parts of a machine, we can get it running. However, it violates the logic of Chaos that the dynamic whole runs by its own logic and cannot be reduced to functions of its parts. Hideki Yukawa, on his mulling over this story, commented that scientists often try to find more particles, more basic form, beyond what have been already found, a natural reductionist temptation. However,

> it is more likely that the most basic thing of all has no fixed form and corresponds to none of the elementary particles we know at present. It may be something that has the possibility of differentiation into all kinds of particles but has not yet done so in fact. Expressed in the familiar terminology, it is probably a kind of "chaos." It was while I was thinking on these lines that I recalled the fable of Chuangtse (Yukawa 1973, pp. 65–66).

Zhuangzi in effect was illustrating the pitfalls of the mechanistic, reductionistic worldview, as if once all bits and pieces of the universe are localized or fixated, we will get the whole picture of the universe since the whole universe can be understood by the bits and pieces. Alas, accordingly to Zhuangzi, one would miss the essential of what makes the whole work and kill the dynamics. In hindsight, Yukawa's comments predict the birth of string theory in physics, which sees all manifestations of particles, not as materials, but as notes, as it were, (i.e., effects) of

music played out on a proverbial string of a string instrument such as violin. How string theory follows the logic of dynamic whole is beyond the scope of this paper (and the author's expertise), but that the ancient Chinese philosophy still resonates with modern scientists such as Bohr or Yukawa suggests its potential to inspire creative thoughts that transcend mechanical reductionism.

Summary. The essence of indigenous Chinese epistemologies is its special attention to movements and changes and the ensuing uncertainties in physical, biological, and social systems. It rejects the mechanic view of the world as a machine-like or clockwork cosmos, which is fully determined in terms of its components and operating rules. In that manner, they insist that the key to understanding the dynamic world is not to figure out its starting point, basic elements, and general rules governing their operation, but to capture its dynamic properties and changes through flexible, adaptive cognitive control.

Implications for Nurturing Creativity

Before discussion of implications of indigenous culture as a source of creativity, a disclaimer is in order. I am not saying reductionism is categorically ill-informed or Newton and Einstein were wrong. Without reductionism, we would not have had space shuttles, nanotechnology, vaccines, or neurosurgery technique. The divide-and-conquer strategy in science is still an effective one in many situations. However, it is also clear that reductionistic approaches have not been very successful in dealing with problems that involve dynamic changes and complex self-organization of physical, biological, and social systems over time. The prevalence and dominance of reductionsim in all areas of science for the last two hundred years can be attributed to success of classical physics; as commonly perceived, God created the world, and Newton (and Einstein) found out the formula of God's creation. If it is so good for physics, it should be good for chemistry, biology, psychology, economics, sociology and political science. Alas, even God would be puzzled as to how the world has evolved since His creation into such a dazzling complexity!

Given the diversity and complexity of the physical, biological and social processes, alternative perspectives become increasingly important. Western thinking is predominantly mechanistic one. In psychology, for example, behaviorist and information processing theories have been dominating the field because they both provide mechanical models of behavior and cognition with a strong reductionist flavor (e.g., mind as an input-output data crunching machine, or operant conditioning as a mechanical law). In contrast, non-mechanical models, such as gestalt theory (Duncker 1945) or "fuzzy trace theory" (Brainerd and Reyna 1990; Reyna and Brainerd 1995), which pay special attention to the role of intuition and holistic processing, have struggled to be part of mainstream psychology at least in North America, despite the overwhelming evidence that everyday cognition as well as

scientific thinking relies on intuition (Miller 1996) and related processes such as metaphors (Lakoff and Johnson 1980) and analogy (Holyoak and Thagard 1995).

Root-Bernstein and Root-Bernstein (1999) found in their research on scientific creativity that eminent scientists use a variety of thinking tools to tackle problems they are facing. These "tools" range from the most intuitive (maintaining the integrity of the whole) to the most analytical (collapsing a system to its basic components). Most scientific endeavors are model-based rather than axiomatics-based, and thus have an intuitive basis at its core (root metaphors or an implicit or explicit epistemic stance; see Dennett 1987; Pepper 1942). The process of scientific discovery starts with intuition of the inner workings of a system, and proceeds with imagery, modeling, simulation, bootstrapping, testing-modifying, means-ends analysis, so on and so forth, until a relatively satisfying solution is reached. Without an intuitive basis, a theoretical model simply cannot be derived from deductive or inductive logic itself.

Furthermore, since many physical, biological and social processes are self-organizing with emergent properties and organizational principles (Prigogine and Stengers 1984), there are emergent new approaches that are non-reductionistic, non-axiomatic, non-deterministic, allowing for perturbation, randomness, and errors, adaptive to real-time changing conditions, non-linear causal relations, diversity, probabilities, and variations, and uncertainties (e.g., Barabási 2003; Strogatz 2003). Theories so developed should be judged by how well they represent dynamic changes and governing principles, conceptually as well as empirically, rather than how formal (i.e., mathematical) they look. For instance, the quantification of economic science per se does not make it more "scientific."

How useful are indigenous epistemologies in this modern context? To be sure, some indigenous concepts and theories in the ancient Chinese culture can be outdated, and some part of its metaphysics borders on superstition. Granted they might have been detrimental to modern scientific advances. With that said, however, the vision of the Chinese sages took a direction drastically different from that of the Greek sages, and still shows their deep insights and wisdom even after more than two thousand years (recall how prophetic Zhuangzi was with the fable of "Chaos"). Chinese medicine still teaches us how to treat human body as a living whole rather than its stripped-down version with only tangible tissues and chemicals dictating diagnosis. The game of Go still teaches us how to make rational decisions under enormous complexity or in the face of "surplus of choice." The Taoist teachings still teach us about the fundamental limitations of human cognitive apparatus (e.g., language) and how we make most of it. Their voices found echoes today among those who have come to recognize the shortfalls of technical rationality meant to rule the world by the "book", and realize the importance of personal reflection on and insights into one's practice in situ (Polanyi 1974; Schön 1983).

In the educational context, Peng and Nisbett (1999) found that Chinese college students are more receptive to dialectic logic, and American college students more inclined toward formal logic. Likewise, Masuda and Nisbett (2006) found

consistent differences between Japanese and American students on picture processing: the Japanese are more likely to move back and forth between foreground and background, whereas Americans stayed more focused on the foreground objects, suggesting a more analytic stance. Given these differences, my suggestion is to get more cross-cultural experiences and develop cognitive flexibility, which has been shown to improve creativity (Leung et al. 2008). This way, students will see both the advantages and disadvantages of a particular epistemological orientation regarding a phenomenon. The complementarity principle Bohr used to resolve the particle-wave duality is relevant even to productive and creative thinking.

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Chapter 4
The Person in Creativity, Development and Culture from the Perspective of William Stern (1871–1938)

Ai-Girl Tan

Introduction

The Person in Early Studies

In the history of modern time, the two World Wars of the last century have deprived humanities and resulted in a great loss of compassionate creativity and wise practices. These man-made disasters disrupted scientists' efforts to continuously develop sound methodologies for a deep understanding of the person in the world. To a great extent the situations of the pre- and immediate post-war periods created chaos in life and disabled open sharing of new knowledge. After World War II (1939–1945), the circumstance in the United States of America (U.S.) permitted some researchers and scientists to conduct studies on identifying creative talents in sciences and engineering. The then president of the American Psychological Association (APA), Joy Guilford (1897–1987) led a task force in constructing assessments for identifying creative talents. The subsequent year, Guilford (1950) delivered the APA presidential address with a title of creativity. He articulated explicitly the timely revival of the study of human creativity which was a long, overdue, and neglected endeavor among psychologists and scientists.

In his address, J. Guilford conceptualized creativity with reference to characteristics of creative people. He suggested immediate attention to discovering creative potentiality in children and youth and to promoting development of creative personality. Creative personality, which he humbly termed in a "narrow" sense (Guilford 1950, p. 444), referred to the unique patterns of traits that are relatively enduring ways in which creative persons differ from the others. To Guilford, behavioral traits are traits that manifested in performance such as attitudes, interests,

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aptitudes and temperamental qualities. He outlined some creative abilities such as analyzing, synthesizing, reorganizing or redefining, and evaluating abilities, as well as sensitivity to problems, ideational fluency, flexibility of set, ideational novelty, and span of ideational structure. Realization of creative abilities to actual performance depends particularly on motivational and temperamental traits. Creative patterns are manifested in behavior, which include such activities as inventing, designing, composing, and planning.

The subsequent decades and century, the effort to search for appropriate ways to identify creative talent persisted. In the 1950s, defeated nations of the World War II such as Japan and Germany rebuilt their countries swiftly. In Southeast Asia such as Malaysia and Singapore there raised a strong awareness among the residents to gain independence from their colonized governments. Soon after, these countries have focused on developing human resources and education, as well as have established sound systems in the domains of economics, science and technologies. By the middle of 1980s, psychologists and researchers have built up some scientific knowledge base of creativity. Among others, Teresa Amabile studied creativity from the social psychological perspective (Amabile 1982). She proposed a consensual assessment technique (CAT) which involves independent experts of the field to perform subjective assessment on creative products. She believed that a creative product of the field has the characteristics of novelty and social acceptance that can be recognized by the experts of the field.

The social psychological approach to creativity considers interrelations among components of creativity such as personal characteristics, cognitive abilities, and social environments. Apart from the CAT, Amabile (1983) proposed a componential model of creativity (CMC) comprising three sets of interactive processes, i.e., creativity relevant processes, domain-relevant processes, and task motivation (Amabile 1983). At the general level, creativity relevant processes include cognitive styles, implicit and explicit heuristics for generating novel ideas and good working styles. The processes depend on possibilities to receive training, experiences in divergence cognition, and personality characteristics such as self-discipline, delayed gratification, and perseverance. Domain-relevant processes are at the intermediate level including knowledge about the domain, technical skills, special talent (innate abilities) of the domain. They depend on innate cognitive abilities, perceptual and motor skills, and formal/informal education. Task motivation is at the specific level. It is related to attitudes toward the task, perceptions of motivation for undertaking the task. It depends on intrinsic motivation toward the task, the presence/absence of extrinsic constraints in the social environment, and individual abilities to cognitively minimize extrinsic constraints. The CMC model suggested that task motivation initiates and sustains the creative problem solving process. Domain relevant processes determine the selection of the pathways and criteria for assessing the response possibilities. Creative relevant processes determine how the search for responses will proceed.

In the first decade of the twenty-first century, two annual reviews on creativity were published (Hennessey and Amabile 2010; Runco 2004). Runco (2004) refers to a componential framework of four Ps (person, process, product, and press-environment) suggested by Rhodes (1961) to organize knowledge of creativity. A multi-componential representation of confluence models of creativity (e.g., Amabile's three components and Csilszentmihalyi's three systems) suggests the presence of possible simultaneous processes, of which each process comes with its unique functionality (or *differentiation*). In reviewing contemporary literature on creativity, Hennessey and Amabile (2010) constructed a systems model to organize multiple perspectives of knowledge of creativity (e.g., the neurological, psychological, social, and cultural). In their model, each perspective is represented in a layer embedded within another perspective, and so on. A multi-layered representation of creativity knowledge construction (e.g., Hennessey and Amabile's systems in multilayer) suggests that cultural mediation in human development involves a *hierarchical integration*. The understanding of human creativity shall consider the person in interaction, and shall see componential and systemic views of creativity as complementary views of creativity. In relation, understanding of creativity shall include among others understanding the role of culture in constituting human nature and the importance of inter-disciplinary collaboration for synthesized methodologies (Cole 2011). To Csikszentmihayi (1934–) creativity emerges from interactive processes of personal-social-cultural open systems (Csikszentmihalyi 1996). Flow is a state of creative experience.

Scope of the Chapter

This chapter outlines the understanding of the person as conceptualized by William Stern (1871–1938), a forerunner of integrative human sciences (DeRebertis 2011) and a founder of psychology (Kreppner 1992). It reviews influences of W. Stern's work on theories of the person in the social-cultural contexts as proposed by eminent scientists such as Vygotsky (1879–1934), and Allport (1897–1967). It concludes by emphasizing the urgent need to attend to neglected areas of human sciences such as life-span development, creativity development, and cultural methodologies.

W. Stern was born in the third quarter of the 19th century, before World War I (1914–1918), and died in the first quarter of the 20th century, before the end of World War II (1939–1945). It was during the period of life of eminent scientists such as Albert Einstein (1879–1955), the Nobel Prize winner in physics and Marie Curie (1867–1934), the first female Nobel Prize winner. Predecessors of W. Stern in the field of psychologists included Wilhelm Wundt (1832–1920), Ivan Palvov (1849–1936), and Sigmund Freud (1856–1939). W. Stern studied under Hermann Ebbinghaus (1850–1909). Successors of psychologists of W. Stern included Lev Vygotsky (1896–1934), Jean Piaget (1896–1980), and Gordon Allport (1897–1967). W. Stern's eminence lied in his systemic thinking on the person.

Who Are the Sterns?

William Stern and his wife Clara Stern (1877–1948) contributed creatively to the growth and advancement of developmental sciences. Their research and publication with children deepened our understanding of who the person is and what personality constitutes. Both C. and W. Sterns were born and raised in Berlin. They lived in Berlin, Breslau and Hamburg until they were forced to emigrate before the World War II (1939–1945). After leaving Germany, W. Stern failed to obtain a professorial position in the Netherland. A year later, W. Stern was secured a professorship at a university in the United States of America (US). He lived there until his "pre-matured" death of illness in Durham, North Caroline. After World War II, Sterns' children, Hilde (1900–1961), Guenther (1902–1992), and Eva (1904–1992), returned to East Germany, Austria, and Palestine. The short life-span of W. and C. Sterns did not shadow the significance of their creative works. Like the unfortunate fate of some eminent scientists, W. Stern's creativity has been silent and did not receive sufficient social recognition in his life time. Sterns' publications and diary notes were made available by their descendants and made known to the English speaking readers long after their death by among others DeRebertis (2011), W. Deutsch (1947–2010, Deutsch and El Mogharbel 2011), Kreppner (1992), Lamiell (2009).

The Person and Personalistic Influences

The Person

W. Stern was a systemic thinker (MacLeod 1938). He conceived the person's action in the environment (see Kreppner 1992). The individual's inborn dispositions and the environmental conditions are interdependent. Their interplay influences the individual's development (Kreppner 1992). Development is mediated by *interaction* and *introspection*. In the "*personaler Nahraum*" (proximal space), the mutual exchange or interplay of the person and the environment could take place. The continuous exchange process is constructive as in the process of exchange, both the person and his(her) world are being shaped. The process of *interaction* between the person and the environment in which the person, by his(her) actions in the proximal space, reconciles the incongruities between expectancy sets and the results of actions, which in turn, create new experience and new sets of expectancies (Kreppner 1992).

In the "*Erlebnisrraum*" (experiencing space) the representation of cultural norms, values and rules passed to the next generation. *Introspection* is a process where there is a permanent fight between the individual's own vital needs and wishes and the culture's and society's formats. Introspection creates tensions and frictions, and promotes developmental shifts as it contributed to the awakening and differentiation of conscience. In turn, values and norms are incorporated into

the person's action system. Dialectics is defined as a "developmental transformation which occurs via constitutive and interactive relationships." (Basseches 1984, p. 22). From the cultural-historical perspective, dialectics, an art of discourse, is a valuable cultural product. It internalizes into human thought processes via the mediation of signs (Wong 2006).

The world is part of the person's goal system and a co-determination (convergence) of his(her) doing and being (Stern 1916/2010, p. 132). Deutsch and El Mogharbel (2011) cite two examples of converging experience. When more nouns than verbs are spoken to children; children use more nouns than verbs. An infant's babbling is highly expressive of emotion. Babbling induces adults to mirror children's syllables back in a conventional phonological manner and filled with a meaning that corresponds to the infant's emotional state. The infant's vocalization has an effect that leads him to develop a symbolic use of his(her) sound production.

W. Stern broadened the concept of egocentrism by including gestures, mimics and actions as main instruments that mediate mutuality among playing children (Kreppner 1992). Expressive movements are immediately understood. Actions are mirrored or even continued. The spoken words have more character of accompanying decoration. Spoken language differentiate and diffuse from body language gradually, the isolated medium of thinking and transmission of thoughts.

In the *proximal space* of the virtual world, children and adolescents in the digital age expand their emotional and cultural life. Infants who begin to crawl, walk, and speak expands their spaces of play and opportunities to learn when they move their figures in the digital devices of their parents (i.e., portable mobiles). They co-participate in selecting their desirable music videos. They move their body with the music and dance showed in the portable template. Young children who have acquired some literacy skills join social networks and send text messages to each other or to their family members. Creativity in the digital era shall appropriate wise and humanizing creativity which is ethical, mindful, and futuristic. Digital media expand spaces of imagination, opportunities to engage, socialize, and create multiple identities. In social networks, children play games, co-create and co-own new contents, co-participate in doing with others (enacted imagination), and let their voices heard (Craft 2012).

Unitas-multiplex. A person is *psychophysical-neutral,* and *unitas-multiplex* (Stern 1916/2010). There are three basic characteristics that are attributed to a person (Stern 1916/2010): Unity (unitary), goal-directedness (goal-oriented), and uniqueness (self-activated) (Lamielle 2012; Wong 2001). A person is different from a thing (e.g., a picture). The elements of the person can be psychological or physiological, and momentary or enduring. A person has the individuality or indivisibility as a prerequisite, so that *unitas multiplex* can be actually *unitas* (Renner 2010, p. 178) or be the "world of its own". "A person is an entity that, though consisting of many parts, forms a unique and inherently valuable unity and, as such, constitutes, over and above its functioning parts, a unitary, self-activated, goal oriented being." (Stern 1906, p. 16). Every individual is indivisible on the inside and contrastive on the outside (Stern 1923). "Multiplex implies a hierarchical realization of multiplicity to unity within an individual." (Renner 2010, p. 178).

Humans possess "many-layered" awareness of self and world. A person is a vast multiplicity of elements, with spatial (psychological, physiology) and temporal (enduring, momentary) dimensions, gathered into a unified whole (Stern 1916/2010). The *multifold-unity* of a person is conceived as a (hierarchical) layered system (Stern 1927). Phenomena (mental experiences) or data of consciousness is the lowest layer of multiplicity. They are unified by personalistic acts (doing), which in turn unified by dispositions (strivings, capacities). Dispositions represent the potentiality of the various partial purposes of the person. They are flexible and goal-directed entities which link to the environment. The unity of the dispositions of the I is *teleological* (Stern 1916/2010). All teleological acts are purposeful.

Purposeful unity. W. Stern's system-level thinking is related to the person as a real, unique, and intrinsically valuable unity who achieves a real, goal-oriented self-activity (Stern 1916/2010, p. 113). There are two categories of purposes: *Autotelie* (within oneself) and *heterotelie* (extending beyond the self), which are subordinate to a goal synthesis.

The *autotelie* belongs to the immediate self-oriented purposes of the personality. The person who pursues only the narrow goals within (*autotelie*) would not live in coherence with the world. S/he focuses on maintenance of the content or the relationship of the personality to the world. Self-maintenance is conservative. The person engages in self-development related to maturation of the forms and functions present in the species, and in development toward a goal previously not present (*productive*). In development, the person shall be guided by social values and norms to develop relationships of their personality to the world.

To live well and in coherent with the world, humans possess goals that extend beyond the self (*heterotelie*) and that give them the content of the world (Stern 1917). There are three subcategories of goals originating from without (*heterotelie*) (Stern 1917): Super-ordinate personal goals (*hypertelie*), parallel personal goals (*syntelie*), and super-ordinate object goals (*ideotelie*). Every individual is a member of higher unities such as family, folk, humanity, and Deity. The person is serviceable to the super-ordinate personal goals. A mother who hears her new born cries likely initiates creative behavior of hers (with a *hypertelic* goal). She likely extends her arms to reach her baby to give her warmth of a human being. She likely holds her baby in her arms and breast feeds the newborn who likely to be hungry. Baby cries serve as initiatives of the mother's creativity. The maternal anticipations give meanings to the infant's behavior in an interactive context. Her intuitions and interpretations of the infant's sensations can transform these sensations to some form of competence (Lebovici 1995).

The goals of parallel unities such as fellow persons are not indifferent from the individual. Peer cultures are developed when children and adolescents creatively appropriate information from the adult world to produce their own peer culture (*with syntelic goals*). They transform information from the world to meet the concerns of the peer world and produce their own peer cultures (Corsaro and Eder 1990).

The Method

C. and W. Sterns studied development of their own children. They adopted the then familiar and emerging scientific method of study, *a diary method.* Like educated families of their time, Sterns kept diaries of their children. Sterns were not the pioneers of diary recording (Deutsch and El Mogharbel 2011). The culture of keeping diary "*Tagesbuch*" of newborns was employed as a method of scientific study. Sterns recorded verbatim of their own three children's developmental phrases, systematically, from zero year to 18 years old (see Lamiell 2009). They noted profound observations of the children's language and communication development. Their data provided support to their theories in early childhood, language, lying, communication, and other forms of human development.

W. Stern was ahead of his time in adopting an engaged role as a father. C. Stern was ahead of her time as a mother, and a collaborator of her husband. She assisted W. Stern in observing, documenting, and later publishing notes of their three children. Psedonames of the three observed children were Ursel for Hilde, Heinz for Guether, and Aennchen for Eva. At the end of the day, C. Stern recorded her observation of the child and his(her) interaction in verbatim. The record of the first child was detailed. The record of the second and their children were less detailed, as there were similar patterns of behavior emerging in children's development. Sterns' recorded diaries included the children interaction with the caregiver (the mother and the nurse, Toni Meyer) and with their siblings. The analyses of the diaries resulted in releases of publications: Early childhood, speech, lying, and sibling effect.

The Personalistic Influences

Stern's personalistic way of thought is an opening to interdisciplinarity, systems-level thinking, and the diary method (Lamiell 2009). The release of his book "general psychology" in the English language was well received (see e.g., Allport 1937). To Stern (1916/2010), "(b)asic philosophical convictions determine … the preconditions and the general conceptual basis of psychological work, and … are … contained within specific conceptualization and interpretations of psychological phenomena …" (p. 111). He believed in psychology as an instrument for confronting and contributing to the solutions of social problems. He had faith in psychology as a tool of human enlightenment. To him, "(p)sychology is a road leading toward an understanding of man, and ultimately toward an understanding of the universe." (MacLeod 1938, p. 349).

Evidently, Stern's conceptual, theoretical and empirical investigations have had significant impact on his contemporaries and successors' thinking such as L. Vygotsky, and G. Allport. Bozhovich (2004) elaborates Vygotsky's cultural-historical psychology and extends to personality. He acknowledges the influence of W. Stern in Vygotsky's psychology, and recognizes the distinct

differences between personality and individuality. A human being as a personality is characterized by a set of his(her) own views and attitudes, his(her) own spiritual requirements, and the define life goals that s/he strives to attain (Bozhovich 2004, p. 32). Bozhovich (2004) proposes the act as a unified hierarchical system for studying personality. An act includes internal motivation (hence is different from action and activity) and is accompanied with a competitive motive and the making of a decision.

Vygotsky (2004) conceptualized creativity with the characteristic of a human being who orients toward the future and who creates the future by altering the present. Two complementary abilities of a human being are memorization and imagination. Humans recall the past that is sustainable for the present. Imagination is an important component of all aspects of cultural life. It is a prerequisite of creative activities. There is a reciprocal relationship between imagination and experience. Experience is based on imagination, and imagination is itself based on experience. Imagination broadens humans' experiences vice versa. We can imagine what we have not seen, and conceptualize something based on other people narrations and descriptions. Realities of creative imagination include the person's own experience, imagination, emotion, and social-cultural experiences of other people that s/he comes across. Cultural development is cyclical, dialectical, and converging, from externalization (combining experiences observed) to internalization (integrating experiences) (Vygotsky 2004).

The fundamentals of human science perspectives of child development advocated by W. Stern emphasize the child as a whole, selfhood, or the child's lived world. Child development is inherently worldly and contextual. Inherently goal oriented nature of childhood is indicative of the active, creative nature of child development (DeRebertis 2011, p. 165). Children combine experiences that they know in new ways (Vygotsky 2004). Combinatory creativity can be seen in play, drawing, dramatization (theatrical creativity), and writing (literacy creativity). Children's play is imagination in action, and literacy creativity is imagination without action. In play, children experience intensity of emotion when they undertake the role of another person or adult they observe in real life. They rework, recreate, and transform experiences they observe in real life to new experiences and realities. Their emotional life is deepened, expanded and purified. Using their creative skills and tendencies, children master language, a tool for forming thoughts, feelings and inner world.

W. Stern's approach to psychology is seen in one of his students, Gordon W. Allport's work and in the field phenomenology. Gordon W. Allport, who authored Stern's obituary, elaborated his conception of a person as an open system using an interdisciplinary and cross-cultural approach. Gordon W. Allport defined a system as "a complex of elements in mutual interaction." (Allport 1960, p. 302). He proposed four criteria of open systems; of which the first two emphasize stability, maintenance, or *being,* and the next two emphasize growth, change, and *becoming*. The first criterion of open systems is related to the intake and output of matter and energy, and the second criterion is about achievement and maintenance of steady (or homeostatic) states. The third criterion of open systems is "the tendency of such

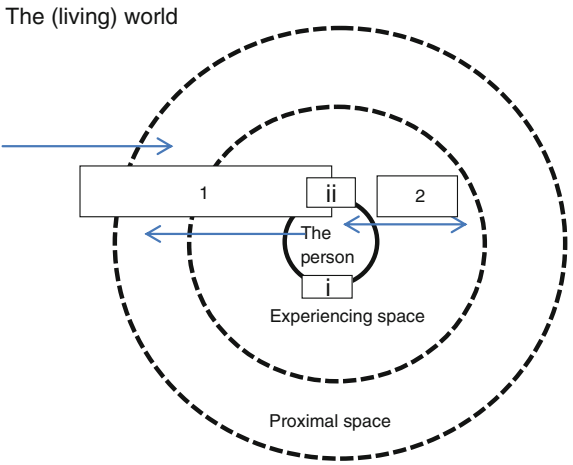

Fig. 4.1 Stern's *unitas-multiplex* approach in a pictorial representation. Process: *1* Interaction, *2* introspection; goal: *i* heterotelie, *ii* autoteile

systems to enhance their degree of order and become something more than at present they are." (Allport 1960, p. 305). In explaining this criterion, Allport referred to *Hindu*'s stages of development: The desire for pleasure, success, and duty. The forth criterion of open system is about the transactional of open-systems in the contextual. For an explanation of this criterion, Allport referred to insights of *Shito* philosophy that stresses on how the person blends with the society and with the nature. Both W. Stern and G. Allport referred to philosophical or metaphysical understanding of humanness and its process of becoming. G. W. Allport credited his contributions in the field of personality psychology in the US partly to Stern's influence on him, in conceptualization of a person in the context. Figure 4.1 and Table 4.1 outline main points of W. Stern's approach in a pictorial and tabulated representations.

Understanding the Person in Culture for Creativity Development

This chapter hopes to create spaces of sharing and reflections on the relationships among the three constructs, creativity, development and culture. A critical reflection on Guilford's (1950) remark: "(T)he psychologist's problem is that of creative personality" (p. 444) and the subsequent confluent theories of creativity (e.g., Amabile 1983; Csikszentmihalyi 1996) calls for a renewal in deep understanding of creativity from personalistic perspectives. W. Stern's belief in integrative sciences of psychology was pioneering as it paved a path of integrating disciplinary knowledge for deep understanding of human behavior. Kitchener (1983) in reviewing the relevance of philosophy of science and developmental psychology

Table 4.1 Main-points of Sterns' approach

	Dialectics	Mechanism	Conceptualization
Discipline	Diversity-integration	Integration: realization and manifestation of a whole, a unity of merging on the basis of some complexity	A tool for enlightenment, social reform, and an instrument to confront and contribute to solutions of social problems
Human/person	Unitas-multiplex	Convergence: organizing and layering	A person is psychological-neural
Humanness	Being-becoming	Goal-directedness: Striving to achieve goals and to meet needs guided by social values and norms	A person is an intrinsically, self-activity
Self	Autoteile-heteroteile	Synthesis: overcoming *autoteile* (self-preservation) and *heteroteil*e (self-unfolding)	Personality: an ultimate synthesis
Space	Proximal-experiencing	Interaction: Reconciling incongruities between expectancies and results of actions; introspection: transmitting values to the person	A person is embedded in the world
Time	Differentiation-diffusion	Egocentrism: moving from bodily gesture to vocalization	Developmental phases
The diary method	Cultural materials to support theorizing	Observation: recording universal and unique changes in behavior	Developmental theory

made the following remarks: "One of the keynotes … is the new sense of the relevance of psychology to philosophy of science … This include …. in particular, the areas of concept formation, problem solving, decision theory, creativity, …" (p. 25). In an obituary, a student of W. Stern, G. Allport denoted the futuristic impact of W. Stern's personalistic thought: "… (the) personalistic way of thought … will be long and bright." (Allport 1938, p. 773). W. Stern's conception of personality is profound and revolutionary. Personality is an undivided and indivisible; comprising countless organized characteristics. "A personality is an entity

that we encounter as a living whole which, that in and of itself strives for and is capable of realizing the enduring purposes of that whole" (Stern 1916/2010, p. 130). The person is a whole entity with organized characteristics in his(her) living world (*gelebte* Welt). To attain deep understanding of the person researchers consider inventing methodology of integrative and cultural sciences.

Creativity Development

The focus of creativity theories and research is the child or the individual who creates new emotional, social-cultural experiences, who aspires, who wishes to master and to mould his(her) environment (see Allport 1967, p.23). "If we were to study creation as a holistic phenomenon … the individual who creates must be the focus for studying the unity of the 'process and the event of creation.'" (Safarov 2003, p. 112). Creativity sciences in the twenty-first century shall adopt Stern's integrative psychological sciences approach to understanding the persons and their creative construction of the lived world.

Worthwhile mentioning in this chapter are works of an eminent Russian psychologist I.a.A. Ponomarev in the 1950s, whose writings on creativity development released to the English language readers, a couple of years ago. In his early years of education, I.a.A. Ponomarev majored in physics and psychology, and chose to continue his studies and career in psychology. He was influenced by systems theories in the German speaking countries such as Kant and Hegel. Using interdisciplinary and systemic level of thinking, I.a.A. Ponomarev proposed theory and research in creativity development. His conceptions of creativity development did not pose contradiction but instead extend Vygotsky's views of creativity by addressing the roles of intuition and non-directed behavior in creativity development.

With reference to the systems branches Ponomarev (2008a) advanced the conception of creativity as a source and mechanism of movement, interaction, and development. Ponomarev (2008a) outlined essential features of systems. A system comprises various parts which are interactive. Parts of the interactive system relate to each other. A change in any part of the system results in a change of other parts of the system. He introduced the concept of the collateral product, which considers not only the perceived but also the unperceived part of the result of a person's action. To him, the unperceived part of the result of a person's action is crucial for creativity development. Both intuition and goal-directedness are essential in developing human abilities. Especially, the former is essential for developing creativity. Development is temporal and spatial. *Interaction* precedes and mediates *development.* The child develops the internal plan of action or what is their heads gradually. Initially, the child reproduces in his(her) head the results of the actions. The child reproduces on the external plan with ready-made solutions. S/he then solves problems by manipulating representations of objects. Referring to the

previous path found, the child constructs a plan of action and solves the problem. Finally, the child constructs a plan or a program with each action is correlated with the requirements of the problem. The child is consciously control his(her) actions. In this manner, creativity development is temporal and hierarchical, moving from using the external plan of action to constructing the internal plan of action.

In human and creativity development, hierarchical integration is a complementary process of differentiation (Siegel et al. 1983). *Differentiation* refers to the components of "the whole" (i.e., any structure, e.g., a physical entity with components, e.g., cucumber, tomato, or a mental process with components, e.g., sad, happy) which become distinguished from each other. *Hierarchic integration* is the process by which these components relate to one another in a hierarchical organization. In semantic development, the concepts "cucumber" and "tomato" become distinct in meanings and integrated into a superordinate conceptual category "vegetable". Similarly, the concepts of "sad" and "happy" are integrated into a superordinate conceptual category "feeling". In biological development, after fertilization, an embryo with a single cell divides into distinct cells that form bodily tissues, which the later integrates into the digestive, respiratory, and other systems (Siegel et al. 1983).

To elaborate the processes of differentiation and hierarchic integration in development, we refer to three types of knowledge construction in creativity development (Ponomarev 2008b): The contemplative-explanatory knowledge, empirical knowledge, and the active-transformative knowledge. The contemplative-explanatory knowledge grows directly out of practice, commonsense, life experience, works of literature and arts. It is descriptive knowledge and knowledge for social needs. The empirical knowledge is characterized by the fact that the investigator intervenes actively and purposively in the course of the events under study. The active-transformative knowledge is featured by replacing subjective criteria for phenomena (in empirical knowledge) with objective criteria or structural levels of the organization of the phenomena. It involves abstract-analytical investigations, as the empirical models of phenomena transforms to abstract-analytical models and the object of investigations. The many-sided approach is required to solve creative problems. In the abstract synthetic stage, the strategy returns to the starting point, fine-tuning a condition that can serve as a reliable and direct guide to the practical activity.

Cultural Development

Valsiner (2000) adopts the definition of culture as the semiotic (sign) mediation, which is a part of organized psychological functions. These functions can be intra-psychological, i.e., the person experiencing the world with feeling, thinking, memorizing, forgetting, planning, and so on. They can be interpersonal when two persons involving in some domains of experience such as chatting, fighting, persuading each other, or avoiding one another. Culture is seen a tool of goal-directed

actions (e.g., transitions) by social institutions to regulate the intra- and inter-psychological functions. Education as a cultural tool is a means toward personalized transformation. Combining Valsiner (2000) and Stern's (Kreppner 1992) conceptions, we may suggest that in the personal and experiencing spaces culture and education are tools of goal-directed actions that regulate intra- and inter-psychological processes within and across the personal and experiencing spaces. The person is guided toward the path of ethical personhood by the teacher and his(her) teaching in the communities. The process of personalized development is two-pronged, i.e., cultivation of the mind-body (修身) so as developing the personality-character (养性). Confucian teaching espoused enlightenment of a person with reference to characters of a learned man or *junji* (君子) (Chen 2012) moving away from characters of the unlearned man, *xiaoren* (小人). The person in becoming (做人, *zuoren*) experiences character transformation. On becoming a person, the goal of personhood is to attain the character of a learned man (humanity, 仁, *ren, hierarchical integration*) who internalizes four moral codes (*differentiation*): Code of celebration (礼, *li*), code of conduct (仪, *yi*), compassion (廉, *lian*), and humbleness (耻, *che*) (Lai 2007).

Methodology for Developing Knowledge

W. Stern and his students convince us that in knowledge construction it is essential to substantiate conceptualization of phenomena with real life experiences. To elaborate this statement, we refer to Valsiner's (2000) *a cycle of methodology,* a cycle of general knowledge construction. Accordingly, methodology is viewed as a process of human mental constructions of generalizations. Methodology entails mutually linked components at different levels of generality. A researcher is a human being living in the world. S/he possess conceptions of phenomena which are contextual and cultural (Sternberg 1985). The researcher like most of us refers to his (her) intuitive experiences or conceptions when s/he evaluates situations, makes decisions, and solves problems. The cycle of methodology assumes that the researcher's subjective preferences and positions become the target of his(her) research. The researcher intuitively experiences the phenomena in connection with his(her) axioms and constructs a theory from their personal standpoint. According to Valsiner (2000), the general assumptions of the world at large (axioms) is more general than specific constructed theories of the given target area. Scientists, in addition to intra-psychological reflections on their own intuitive experience and conceptions, embark on designing empirical studies and on gaining knowledge from the other. In other words, scientists verify their implicit theories with empirical evidence. Reflection and empirical analysis are reciprocal towards a converging goal to construct general knowledge of development. The process of reflection and confirmation from external evidence continue, or discontinue when inconsistency between values of the scientists and data from the other exist. The cycle of methodology begins again. According to Valsiner (2000, p. 64), the specific

constructed theories are more general than understanding of pertinent phenomena, which in turn is more general than ways of constructing specific methods to transform some aspects of the phenomena into purposefully derived data.

Final Words

Readings on W. Stern's work can be a first step toward reconnecting creative contributions that have been neglected or isolated from the community of practice and interest. It is also a significant step toward continuity in a flourishing journey of mankind and the universe. To move forward, scientists shall make references to comprehensive conceptions of the person *in* culture, to understanding of methodology *in* knowledge construction, and to creative syntheses of disciplinary knowledge.

In retrospect, the field of psychology in the U.S. in the 1940s (Bruner and Allport 1940) showed an upward trend in terms of the percentage of articles published between 1888 and 1938 in the use of statistics (5.5 % in year 1908 to 43.5 % in year 1938) and personality studies (from 4.8 % in the year of 1908 to 9.5 % in the year of 1938). There was a downward trend in the use of cultural references (14.5 % in 1908 to 9.5 % in 1938) and the study of social problems (21.4 % in 1908 to 3 % in 1938). Across the world, somewhere in Russia, L. Vygotsky made reference to W. Stern's work (Vygotsky 1928/2012) in resolving the crisis of psychology that seemed to be departed from unity in the presence of different analytical and explanatory orientations.

The misfortunate sentiments and politics during the World War II and the direction of the field of psychology toward positivist sciences were not in favor of W. Stern's creative contributions to human sciences. James Mark Baldwin (1861–1934), an eminent American psychologist, experienced the similar misfortune in his career. Valsiner (2000) records Baldwin's studies on his own daughters and his contributions in creating concepts by reconstructing their meanings with reference to the data. The child imitates the world in play, which is crucial for his(her) development. In play, the child engages in persistent imitation. The child constantly creates novel versions of the imitated behavior of a person in mind. Both J. Balwin and W. Stern advanced their conceptual frameworks of children development with sound empirical evidence. The re-emerging of their work in the recent time has given us an opportunity to reflect on the significance of their theories in human development, approaches to knowledge creation, and interdisciplinary attitudes toward sciences.

Lived around the same period, Alfred Whitehead (1861–1967), a British philosopher and mathematician used an integrative approach, philosophy and mathematics, to create knowledge in mathematics that is useful and joyful in life. His knowledge is widely accepted in both philosophy and mathematics. His creative understanding of learning is contextual and cultural. Whitehead (1929) proposes the theory of organic learning with the cycles of romance, precision, and generalization.

Freedom to inquire on one's own or with the other is essential during the circle of the joy of discovery (romance, in Whitehead's term; Woodhouse 2012). The learners feel free to pose questions, seek answers, and enhance interest in learning for a relatively long period of time. The next cycle is termed precision or knowledge acquisition. The learners develop discipline within and gain the ability to pursue knowledge. The cycle lasts for a relatively short period of time. In the cycle of generalization, the learners with the ability to gain knowledge generalize content knowledge and relate abstract contents to concrete experiences in life. Freedom of learning broadly and deeply lasts for a long period of time (Whitehead 1929; Woodhouse 2012).

Born one year after the death of W. Stern, a life span developmental scientist, Paul Baltes (1939–2006), proposes a meta-theoretical strategy of development, but neither addressed the issues of creativity nor made reference to W. Stern's work. In Baltes' (1987) framework of the incomplete architecture of human beings, intellectual abilities and wisdom were investigated empirically with elderly people aged 60s and above. Baltes' theoretical conceptions of development integrated multiple disciplinary knowledge of development. He suggested a meta-theory of development of selection, optimization, and compensation (SOC) embedded in action-theoretical framework. The SOC describes how human beings reach a balance in life between gains and losses throughout their life span developmental processes. Under selection goals or preferences there are elective selection which includes specification and contextualization of goals, goal commitment, and hierarchical goal systems. Loss-based selection includes focusing on most important goals, searching for new goals, reconstruction of goal hierarchy and adaption of standards. Optimization refers to using goal relevant means such as practice of skills, acquiring new skills and resources, modeling successful others, time allocation, attentional focus, motivation for self-development, and putting in effort and energy. Compensation are means or resources for counterbalancing loss or decline in goal relevant means such as increased attentional focus, effort, energy, time allocation, use of external aids or help of others, therapeutic intervention, activation of unused skills or resources, acquiring new skills or resources, and modeling successful others who compensation.

Half a century after W. Stern's creative contributions to the field of developmental sciences, in the 1950s, the social-politics granted the start of modern creativity research in the U.S. This chapter reviews the conception of the person in the environment pioneered by W. Stern and hopes to rejoin the neglected "dots" of conceptions of the person, which emerged before the World War II. Some "dots" of conceptions of the person were disconnected during the devastated period before and during World War II. They were forced out of the knowledge construction continuum by the unfavorable circumstances imposed on sound and humanistic practices. Scientists such as W. Stern lived in exile and forced to re-start their works in unfamiliar environments. The communities of practice selectively "muted" W. and C. Stern's creative contributions. This chapter in its small way hopes to remove the situation-imposed discontinuity in human sciences. It wishes to link some, if not all, missing "dots" in human sciences during and after World War II to those in the

contemporary societies. Human knowledge is accumulative. Human creativity works against odds and emerges with futuristic insights. Adhering to John Dewey's (1859–1952) principles of interaction and continuity (Dewey 1938/1997), the compilation of this chapter serves as a reflective process of the author and an encouragement to creativity researchers to uncover deep understanding of the persons within their cultural and developmental contexts for possibilities in everyday life and for flourishing humanities.

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Chapter 5
Affect and Creativity: An Old Topic and New Direction

Chee-Seng Tan and Li Qu

Introduction

Affect is an enduring and seemingly "stable" personal emotional experience. Although it has been widely documented that affect can influence cognitive processes including perception (e.g., Gasper and Clore 2002), attention (e.g., Rowe et al. 2007), association (e.g., Bar 2009), problem solving (Pham 2007), and decision making (e.g., Cahir and Thomas 2010; Isen and Daubman 1984), the impact of affect on creative thinking, the process to generate new and useful products (Runco 2004; Sternberg and Lubart 1999), is still unclear. Generally speaking, positive affect, such as happiness and elation, enhances creative performance (Baas et al. 2008; Gasper and Middlewood 2014; Isen and Daubman 1984; Tan and Qu 2015). Previous work has shown that positive affect can impair creative performance (e.g., Jausovec 1989; Kaufmann and Vosburg 1997) and negative affect such as sadness and anger can improve creative performance as well (e.g., Akinola and Mendes 2008; Baas et al. 2011; George and Zhou 2002; Kaufmann and Vosburg 1997). In the past two decades, many theoretical hypotheses (see Table 5.1 for the summary) have been proposed to explain how indeed affect can influence creativity. The field of emotion still calls for a more comprehensive framework to capture the underlying mechanism.

To facilitate the theoretical debate on this issue, in the current chapter, with a comprehensive review of the literature, we list the factors that may influence what impacts affect has on creative performance. Then based on previous theories, we propose a new direction to integrate the inconclusive findings in the past and bring

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Table 5.1 Summary of theories for the facilitation effect of affect

Theory/approach		Argument
Flexibility hypothesis	Isen (1987, 2008)	Positive affect fosters retrieval of positive materials in memory. The abundance of positive materials leads people to generate more associations between ideas
Dopamine hypothesis	Ashby et al. (1999)	Positive affect is associated with dopamine level and mildly high dopamine enhances cognitive flexibility
Broaden-and-build theory	Fredrickson (1998), Fredrickson and Branigan (2001, 2005)	Positive affect broadens cognitive abilities and enhances thought-action repertories
Feeling-as-information theory	Schwarz (1990, 2012)	Affect convey different signals and these signals influence people reactions to the affect and their performance
Mood-as-input model	Martin and Stoner (1996), Martin et al. (1993)	The signals conveyed by affect are context-dependent. Individual differences in interpreting the signals determine impact of the affect
Motivational compatibility hypothesis	Friedman et al. (2007)	People tend to have higher motivation when working on tasks that are compatible with their affective states, and have lower motivation when tasks and affective states are incompatible
Regulatory focus hypothesis	Higgins (1997), Idson et al. (2000)	Promotion-focused and activating affect promotes creativity, whereas prevention-focused and activating affect impair creativity
Dual pathway approach	Baas et al. (2008)	Activating affect, regardless of valence, is assumed to be conducive to creativity via different methods. Specifically, positive and activating affect enhances fluency through cognitive flexibility, while negative and activating affect enhances originality via persistence
Dual competition framework	Pessoa (2009), Pessoa and Engelmann (2010)	Affect influences the allocation of cognitive resources and affect can influence performance depending on how relevant affect is to the task and how intense the affect is

forward research in future. In particular, we propose an appraisal compatibility hypothesis. We emphasize the role of appraising, processes in which individuals evaluate their internal affect and external task demands, and comparing their evaluation of internal affective states with their evaluation of external task demands.

When the evaluation of internal affective states matches with the evaluation of external task demands, regardless of the valence of the affect and the characteristics of the task, creative performance will increase.

Valence of Affect

It has been widely reported that regardless whether affect was naturally recorded or experimentally induced, positive affect can increase whereas negative affect can decrease creativity. For instance, Vosburg (1998a) measured university students' affect and then gave them four real-life divergent thinking tasks (i.e., two problem-solving and two problem-finding tasks) in which these participants were supposed to generate as many solutions as possible. Results showed that the more positive feelings the participants reported initially, the more solutions they generated, and the more negative feelings the participants reported initially, the fewer solutions they generated. This relationship was replicated in Vosburg's (1998b) following study with the alternate use task of Wallach and Kogan Creativity Tests (WKCT; Wallach and Kogan 1965). In addition to these correlational studies, experimental studies in which researchers induced affect in participants have shown similar findings. For instance, Isen et al. (1987) induced positive affect via presenting a gift and watching a comedy film. They found that the participants in the positive affect condition successfully solved the Duncker's (1945) candle task, a classic creative problem-solving task (also see Greene and Noice 1988; Isen 2008). The facilitation effect of positive affect has also been found in a group context (Grawitch et al. 2003; Isen et al. 1991). It appears that positive affect helps individuals to integrate information from various perspectives.

It has been proposed that positive affect can promote people's ability to identify similarities and merge the differences (Filipowicz 2006; Mikulincer and Sheffi 2000). For instance, after inducing participants to feel positively, negatively, or neutrally, Isen and Daubman (1984) gave participants a list of words and asked them to rate how closely these words belonged to a given category. The results revealed that the participants with positive affect were more able to see the commonality among diverse stimuli, compared to their counterparts in negative and neutral affect conditions. Murray et al. (1990) asked undergraduate students to sort television programs based on the similarities or differences between the programs, after reading a series of positive, negative, or neutral statements. It was found that regardless of the type of stimuli (i.e., positive or neutral TV shows), participants in positive affect generated more creative and diverse criteria to compare similarities and differences of the TV shows.

Additionally, positive affect can increase remote association (Estrada et al. 1994; Hirt et al. 1996, 1997; Mikulincer and Sheffi 2000; Ziv 1976, 1980, 1983). For instance, Isen et al. (1985) found that compared to their counterparts in other affect conditions, individuals in positive affect generated more unusual associations to target words regardless whether they were exposed to positive words, received

candies, or watched a comedy film. These suggest that positive affect can change individuals' semantic networks including how information is related to each other. These findings were replicated with Remote Associates Test (RAT; Mednick et al. 1964) (e.g., Isen et al. 1987; Rowe et al. 2007) and fluency tasks in which participants were instructed to generate as many exemplars as possible for a given category (Greene and Noice 1988; Hirt et al. 2008). In particular, Hirt et al. (2008) have found that even when the target category was on the causes of death and participants reported to feel less interested in the task, the participants in positive affect still scored as more fluent, flexible, and original than their counterparts in other affective states.

Linking the facilitation effect of positive affect with neurological findings, Ashby et al. (1999) proposed that dopamine, which is associated with positive affect, enhances cognitive flexibility and creative problem solving by facilitating attention, consolidation of long-term memories, and working memory. Dopamine projects from the ventral tegmental area into anterior cingulated and facilitates selection process in the prefrontal cortex. Similarly, dopamine projection from substansia nigra into striatum facilitates the switching process. The improvement in selection and switching processes further promote execution attention and cognitive flexibility and, in turn, leads individuals to go beyond the dominant cognitive sets and discover more alternatives. Supportive results have been found for the dopaminergic theory of positive affect (Akbari Chermahini and Hommel 2010, 2012; Ashby et al. 2002). It has been reported that positive affect increases attention span as well as semantic thinking (e.g., Rowe et al. 2007). Positive affect can promote individuals to engage in elaborative thinking while retrieving relevant information from long-term memory (Isen et al. 1978; Laird et al. 1982; Nasby and Yando 1982; Teasdale and Fogarty 1979; Teasdale and Russell 1983). Furthermore, people in positive affect appear to be more flexible during task switching (Yang and Yang 2014).

Following the lead of the flexibility hypothesis, Fredrickson (1998, 2001) has proposed a broaden-and-build theory stating that individuals in positive emotion may have a broader range of atypical thoughts and actions. According to Fredickson (1998, 2001), positive emotions can increase instantaneous thought-action repertoires. In particular, "positive emotions broaden the scopes of attention, cognition, and action, widening the array of percepts, thoughts, and actions presently in mind." (Fredrickson and Branigan 2005, p. 315). Moreover, according to Fredrickson (1998, 2001) and Fredrickson and Branigan (2005), the broadened thought-action repertories promote the building of different kinds of personal resources, for example, physical resources (e.g., health), social resources (e.g., social support network), intellectual resources (e.g., knowledge), and psychological resources (e.g., resilience, creativity). These resources can further promote creative thinking (Amabile 1983; Kéri 2011).

Taken together, these findings consistently show that the valence of the affect is important in determining how affect influences creativity.

Task Demands and Personal Interpretation of Task Demands Matter

Task demands matter Previous work has shown that regardless of test stimuli, people in positive affect outperform those in other affects (e.g., Hirt et al. 2008; Murray et al. 1990). More and more studies show that positive affect does not always improve creativity. As reviewed by Kaufmann (2003), in previous studies, "tasks of creative thinking may be particularly mood sensitive" (p. 131). The pattern may change when tasks are changed. For instance, Jausovec (1989) has found that the influence of positive affect depended on the characteristics of the problem and the form of presentation. Positive affect was found to facilitate performance in ill-defined problems but impair performance in well-defined problems. The results suggest that task characteristics may influence the effect of positive affect. Nouri, Erez, Rockstuhl, and Ang (as cited in Erez and Nouri 2010) replicated the findings. Nouri and colleagues found that, compared to a well-defined and strong structure (i.e., with detailed instructions) task, an ill-defined and weak structure task is positively associated with originality of ideas. Compared to well-defined tasks, ill-defined tasks have relatively ambiguous information and do not provide clear cues for reference, which allow individuals to express their personal thoughts. As a result, ill-defined tasks encourage the exploration of novel ideas (Erez and Nouri 2010).

Vosburg (1998a) emphasized that whether positive or negative affect facilitates creative performance depending on the interaction between task requirement and problem-solving strategy used by individuals. When there is only one acceptable solution for a task, under satisficing conditions, positive affect promotes whereas negative affect reduces creativity. Conversely, under optimizing conditions in which there are more than one possible solution for a task, positive affect impairs whereas negative affect increases creative performance. Positive affect is detrimental to performance because optimizing conditions require systematic processing and individuals in positive affect tend to have broad loose attention and may encounter difficulties to scrutinize possible alternatives.

Likewise, time pressure is another type of task demand that may interact with individuals' problem-solving strategies. Mackie and Worth (1989) found that when participants knew that they could take as much time as they want to finish the task, although participants in both positive affect and neutral affect engaged in system processing equivalently, the participants in positive affect took more time to complete the task than their counterparts in neutral affect. Melton (1995) found that when being told that they need to finish the task in certain amount of time, compared to those in neutral affect, the participants in positive affect performed significantly worse, more often drew unqualified conclusions, and spent less time evaluating their solutions systematically and critically. Possibly because positive affect broadens their attention and, in turn, reduces their ability to focus on task (Isen 2008; Rowe et al. 2007), participants in positive affect condition "wanted,

needed, and used" more time to compensate for their "reduced capacity" in order to engage in systematic problem-solving approach (Mackie and Worth 1989, p. 32). In this case, task demands and structures can influence how affect influences creativity.

Pessoa (2009) and Pessoa and Engelmann (2010) have proposed a dual competition framework, which is insightful in understanding how the effects of affect on cognitive performance can vary by task contexts and demands. According to this framework, affect can influence the allocation of the limited cognitive resources via stimulus-driven and state-dependent manners. More specifically, the model affirms that the impact of affect depends on specific situational demands. For instance, affect is assumed to impair performance when it is irrelevant to the task.

Personal interpretation of task demands matters Pessoa's (2009) theory nicely explains some findings. The theory did not further state when affect is relevant or irrelevant to a task. It seems that personal interpretation should be the key criteria. For instance, Zenasni and Lubart (2011) found that individual's performance was associated with their own perceived pleasantness of task. In particular, participants generated more responses for a divergent thinking task when they perceived the task as more pleasant. Likewise, in Hirt et al.'s (2008) study, similar to the counterparts in other affective conditions, the participants in positive affect condition reported that they were less interested when being asked to generate causes of death. Different from their counterparts, the participants in positive affect condition might enjoy the process and hence performed better on the task.

Schwarz (1990, 2012) and Schwarz and Clore (1983, 1988) have proposed a feelings-as-information theory, also known as cognitive tuning theory in some studies, to link people's interpretation of affect with task demands. According to this theory, affect conveys important information about the current environment. In particular, positive affect is an indicator of safe and satisfactory state, whereas negative affect warns people that the current situation is problematic, dangerous, or stressful. These signals may influence how people react to the situation or the task. For instance, people in positive affect are prone to feeling relax, using heuristic style of information processing (Hirt et al. 2008), exploring alternatives and novel ideas (Fiedler 1988; Ruder and Bless 2003), and adapting a playful approach. Negative affect, in contrast, leads individuals to adopt more effortful and detailed information-processing style and to narrowly focus their attention on the problem as well as the external information (van Steenbergen et al. 2011). Thus, individuals in positive affect perform superiorly when dealing with tasks that require flexibility. As a contrast, individuals in negative affect tend to perform superiorly in tasks in which optimized solutions are needed (e.g., insight problem solving tasks). Such proposal can nicely explain some of the findings (e.g., Kaufmann and Vosburg 1997) that negative affect facilitated creative problem-solving performance, and positive affect inhibited creative performance. This theory has inspired researchers of the filed to examine the informational function of affect and investigate how individuals' interpretation and attribution of the affect can influence creative performance together.

More Than Valence Alone

Traditionally, affect is categorized in terms of their hedonic tone (see the meta-analysis of Baas et al. 2008). However, affect can be described along multiple dimensions such as activation, certainty, pleasantness, attentional activity, control, anticipated effort, and responsibility (Frijda 1987; Smith and Ellsworth 1985; Weiner 1985). In particular, Barrett (2006; also see Heller and Nitschke 1997) has categorized affective states into four types: Positive and activating (e.g., happy, elated), positive and deactivating (e.g., calm, relaxed), negative and activating (e.g., anger, fear), and negative and deactivating (e.g., sad, depressed). Moreover, activation has been found to be associated with the release of dopamine, which is related to the improvement of certain cognitive activities. Hence, it is suggested that activating affective states regardless of hedonic tone, compared to deactivating affective states, are more likely to promote creativity. Indeed, studies have found that negative affect such as anger can also increase creativity (e.g., Baas et al. 2011).

Apart from hedonic tone and activation, affect can be categorized on the basis of self-regulation: Promotion focus versus prevention focus, according to the regulatory focus theory (Higgins 1997; Idson et al. 2000). Promotion focus can increase expand memory search for new responses (Friedman et al. 2007). Combining the activation dimension of affect, these scholars have proposed that promotion-focused and activating affect promotes creativity, prevention-focused and activating affect impairs creativity, whereas deactivating affective states regardless of the focus of self-regulation have little impact on creativity.

Van Dijk and Kluger (2011) showed that deactivating affective states can also improve creativity when participants are given an opportunity to regulate their behaviours. Unlike previous work, in their study, in addition to manipulating their participants' affect and task demands, Van Dijk and Kluger (2011) gave their participants either positive or negative feedbacks about their performance. They found that, when working on tasks requiring eagerness and flexible thinking, participants who received positive feedback showed higher level of motivation and indeed outperformed those who received negative feedback. However, when performing on tasks requiring vigilance and rule following, the participants who received negative feedback had higher level of motivation and outperformed those who received positive feedback.

In addition to feedbacks, what types of outcomes that people are expecting can change how affect influences creativity (e.g., Qu et al. 2012). For instance, George and Zhou (2002) used employees' self-report data on their affective states, clarity of feelings, and perceived rewards for creative performance as the predictors, and the supervisors' ratings of employees' creativity as the outcome measurement. Their analyses revealed a three-way interaction effect: Depending on the context, both positive and negative affect could facilitate or hinder creative performance respectively. In particular, when employees perceived that creativity was important and they were very clear about their own feelings, negative affect was conducive to creativity whereas positive affect was detrimental to creativity. On the contrary,

when employees did not regard creativity was an important feature emphasized by the companies and they were very clear about their personal feelings or when employees did recognize the importance of creativity but were not very clear about their feelings, their positive affect was found to be associated with their creative performance. Taken together, it is important to examine how individuals understand task demands, their own affective states and motivation when analyzing the impacts of affect on creativity. Indeed, several theories have been proposed on this issue.

For instance, mood-as-input model (Martin and Stoner 1996; Martin et al. 1993) can partially explain the results. Building upon Schwarz (1990, 2012) and Schwarz and Clore (1983, 1988) feelings-as-information theory, Martin et al. (1993, 1996) have posited that people's interpretation of affect potentially can also serve as a drive force in people's behaviors. In particular, this model states that positive affect elicits safety signal and the signal, in turn, encourages people to explore for alternations. On the contrary, problem signal elicited by negative affect leads individuals to work harder to avoid problems. Moreover, emphasizing the match between the context and the signal, this model further states that "positive relative to negative affects should bolster creative performance on tasks viewed as 'fun' and 'silly' and in situations in which the enjoyment of a task is being emphasized" (Baas et al. 2008, p. 783). In contrast, negative affect is beneficial to tasks that are viewed as serious and important and in a situation where the top priority is to meet certain performance standards. To examine their theory, Martin and Stoner (1996) gave participants a word association task. After generating the initial response, Martin and Stoner (1996) asked their participants to evaluate their responses before generating a second response. Specifically, half of the participants were instructed to ask themselves "Is my initial response a good one?", whereas the other half was instructed to ask themselves "Can I come up with a better response?" The researchers found that when asking themselves "Can I come up with a better response?" the participants in positive affect were more likely to give a second response than those in negative affect. Conversely, when asking themselves "Is my initial response a good one?" participants in positive affect were less likely to generate a second response than those in negative affect. These findings suggest that the effect of affective states depends on both the interpretation of affect, "*How do I feel about it?*" and the interpretation of motivation, "*What I need to achieve in this given situation?*"

Based on Martin and colleagues' work, Friedman et al. (2007) have added motivation as the link between interpretation of affect and task demands. In particular, the motivational compatibility refers to the way individuals perceive the task (i.e., task construal) that they are dealing with is congruent with the motivational signal conveyed by the affect that they experience, such as working on a fun task when experiencing positive affect. In this case, affect is conducive to creative performance only when affect is motivationally compatible with the task demand. To examine their hypothesis, Friedman et al. (2007) framed the target task as either fun or serious. They have found that participants showed high creativity when affect and task construal were compatible in terms of motivation. In line with Murray et al.'s (1990) proposal "intrinsic interest in a task may mediate the effects of

positive mood on cognitive flexibility" (p. 421), it appears that people tend to be more motivated when working on tasks that are compatible with their affective states, and be less motivated when tasks and affective states are incompatible. For instance, compared to somber activities such as listening to a sad song participants in positive affect showed more interest in fun activities such as hearing a good joke, and reported higher intrinsic motivation and enjoyed the task more (Friedman et al. 2007). These results indicate that motivation may mediate the interaction effect between affect and task construal on creative performance. The Friedman's model, however, is not without limitation. For instance, motivation is only measured by a single item. Given that motivation is multidimensional (Ryan and Deci 2000, 2007), little is known about what particular aspect of motivation mediates the relationship between affect and creative performance and whether the mediating role of motivation can continue to emerge when focusing on specific dimensions of motivation, instead of general motivation. Additionally, the model says little about why and how motivation mediates the relationship.

Instead of including motivation in the link between affect and creativity, De Dreu et al. (2008) emphasized that affect is a two-dimensional construct and creativity is a function of cognitive flexibility and persistence. Specifically, they stated that positive and activating affect can enhance originality through cognitive flexibility, whereas negative and activating affect can increase fluency via cognitive persistence. This dual pathway approach highlights that affect is not just about valence and creativity can be achieved via more than cognitive flexibility alone. This model has some issues unanswered such as what roles task demands play in the link between affect and creativity and how valence and activation of affects are processed.

In sum, previous theories have well documented that affect can influence creativity and factors other than the valence of affect may influence the impact of affect on creativity. The impact of affect on creativity is not purely an emotional process. It involves the process and interpretation of affective signals, task demands, the comparison between external demand and internal capacity, and motivation. Many theories have been proposed to describe some parts of this process, so far, there has not been a theory linking these parts or describing how the whole process comprehensively. In terms of process, it is still unclear how affect interpretation, motivation interpretation, and task demand interpretation are conducted, how these three types of interpretation are compared and integrated, and further how the final analysis influences creative performance.

The Missing Piece Between Affect and Creativity: Appraisal

We propose that appraisal is the missing piece linking affect, task demand, and creativity. As a metacognitive process (Krueger et al. 2011), appraising is the "the complex, judgmental, and conscious process" when individuals are making an evaluation about the situation that individuals encounter and making plans

accordingly (Lazarus 2001, p. 51). Previous work has suggested that appraisal, as the outcome of appraising, can influence people's reactions to the immediate condition as well as to future situations (Lazarus 1991, 2001). Broadly speaking, the process of appraising includes two stages: Primary and secondary (Lazarus and Folkman 1984). Primary appraising is the analysis of how the event relates to one's goals, intentions, beliefs, and values. According to Lazarus' (1991) summary, there are three appraising components during this stage, including how relevant the situation is to the individual's goal in general, whether the situation is harmful or beneficial currently, threatening or advantageous for the future, and whether the situation enhances or impairs an individual's identity. As a result, individuals can make a judgment such as "I like or dislike the event" or "the situation is good or bad".

Secondary appraising involves making plans regarding what actions individuals need to take (e.g., Lazarus 1991). During this process, individuals make judgments on whether they are responsible for the outcomes, whether they are capable to control behaviors associated with the outcomes, whether they can improve the relationship between individuals and the situation, and whether the situation will become better or worse. For instance, if individuals are blamed for the failure, they believe that they can do nothing to change the outcome and that this type of situation will bring more trouble if it happens again. Individuals may respond negatively and feel unpleasant, anxious, or even ashamed (Folkman and Lazarus 1985). They may not be able to function appropriately and fail to solve the problem raised by the situation (Folkman 1984). In contrast, if individuals think that they are not being blamed for the trouble, they can help fix the problem, they estimate that this type of situation will bring more opportunities if it happens again, and they would respond positively by feeling pleasant and being eager to find solutions for the situation (Folkman and Lazarus 1985).

Depending on appraisal, individuals may engage in different strategies to cope with the current situation as well as future situations. In this case, appraising is the complex process involving cognitive evaluation and interpretation. During appraising, individuals can evaluate task demands, generate and process their affect, generate and process their motivation, and further make a decision on what actions need to be taken (see Fig. 5.1).

During appraising, individuals evaluate their external situation—the task demand, and their internal situation—their own capacity. For example, Lazarus and Folkman (1984) have found that how individuals appraise the situation can influence how they cope with the situation eventually. If they appraise the situation as highly demanding and exceeding their resources, they fail the task whereas if they appraise the situation as controllable and the challenge can be solved, they perform well on the task. Appraisal can influence how people respond to an event. Furthermore, Ohly and Fritz's (2010) found that workers who reported having more time pressure and control over their job were more likely to display creativity and proactive behavior than those who experienced lower level of work characteristics. More importantly, the relationship between work characteristic and creativity and proactive behavior is mediated by individual's appraisal of challenge. Individual's

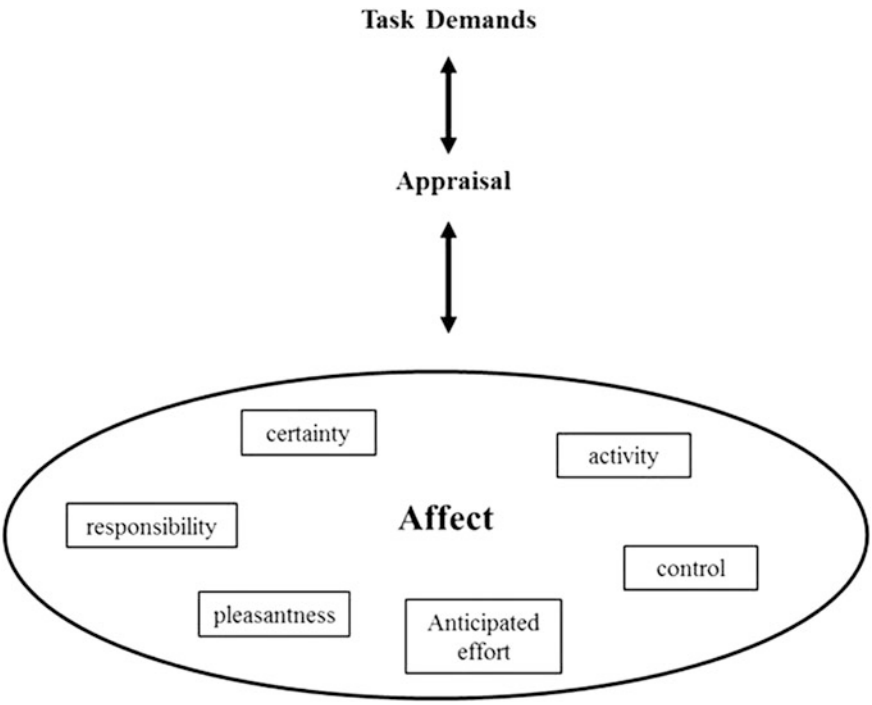

Fig. 5.1 Appraisal compatibility model. *Note* The affect dimension is based on Smith and Ellsworth's (1985) proposal

subjective interpretation of the time pressure and job control leads to the enhancement of creativity by converting the negative effect of those work characteristics (e.g., time pressure) to a positive factor. In line with this notion, Silvia and Phillips (2004) found that although self-evaluation is detrimental to creativity because focusing on self-performance may constrict the range of thought and further interfere with the divergent thinking process, when participants believed that their performance could be improved, these participants did perform well on the Guilford's (1967) unusual uses task.

Furthermore, previous work has shown the strong link between appraisal and affect. During appraising, individuals evaluate their personal feelings and adjust their feelings accordingly. Emotional feelings result from individual's assessment of antecedent events (Fredrickson 2001; Ray et al. 2010; Tong 2010). Appraisal is not just about the pleasantness of personal feelings, also about the other dimensions of affect such as certainty, attentional activity, control, anticipated effort, and responsibility (e.g., Smith and Ellsworth 1985). Furthermore, affect may exert influence on appraisal as well. The unique pattern of each emotion (i.e., relatively high or low intensity) in cognitive dimensions may influence subsequent responses, which is called an appraisal tendency. It is assumed that "each emotion activates a cognitive predisposition to appraise future events in line with the central-appraisal

dimensions that triggered the emotion" (Lerner and Keltner 2000, p. 477). That is, appraisal of situation can elicit affect and the affective state in turn influences individual's evaluation and judgment (Lynn et al. 2012). Locher et al. (2008), for instance, have shown that affect can influence personal evaluation of a product regardless of personal experience. In this study, they manipulated participants' affect by presenting them a small bag of candy or not. Additionally, they chose participants who had special training on product design or did not have such experience. They found that regardless of their experience in design products, participants in positive affect rated the product more appealing than their counterparts who did not receive candy though participants who had no design experience generated more positive comments about the product, whereas those who had design experience generated more evaluations to the product. These results suggest that positive affective state can influence people's appraisal, thinking style, and the depth of evaluation.

Schwarz (1990, 2012) and Schwarz and Clore (1983, 1988) has proposed that appraisal is essential for understanding emotions and their impacts. He indicated that individual's appraisal of a specific event is the cause of emotions and therefore, a specific emotion occurs only when a particular set of appraisal criteria is met. More importantly, Schwarz also contended that the impact of affect is a function of appraisal. In particular, affect will only influence the person when he or she perceives that the informational value (of affect) is relevant to the task and attributes the value to the experiencing affect. Consistent with this notion, Beer et al. (2006) indicated that the impact of affect on task performance depends on the extent to which affect is relevant to the task. Beer et al. (2006) have found that the activation of inferior frontal gyrus/lateral orbitofrontal cortex is responsible for the computing of the contextual relevance of affect. In their study, participants were asked to indicate the amount they would bet in a gamble game with different risk and payoff levels after watching a negative or neutral picture prime. The researchers found that, when they were instructed to ignore the negative emotional primes (i.e., emotion is irrelevant to task), participants who showed activation of the inferior frontal gyrus/lateral orbitofrontal cortex were found to inhibit the influence of the negative emotion. In contrast, when participants were asked to use the emotional primes as a cue for determining the amount of betting, the activation of these brain areas was positively associated with how much the participants incorporated the emotion into decision making (i.e., bet less in negative priming condition than neutral condition). The results indicate that the frontal cortex plays a role in determining the impact of affect by judging how relevant the affect is. People tend to incorporate the affect when it is relevant and ignore the affect when it is not relevant. Accordingly, the findings suggest that appraisal not only evokes affect but also determines whether or not the induced affect has impact on performance.

Previous work has suggested various factors that in addition to task demands, various dimensions of affect including the valence, the activation, the controllability, the responsibility, and the expectation of future outcomes can all influence how affect influences creativity. Based on research in the past, we propose an appraisal compatibility model. According to this model, appraisal is the key

mediator. In particular, the model postulates that affect influences individual's appraisal of the affective signals. At the meantime, individual generates a subjective interpretation of the task. When appraisals of the affective signals and task demands are compatible, affect, regardless of valence, can enhance performance.

Our model can explain why depending on the task context, individuals' motivation, and task demand, affect improves, impairs, or does not influence creative performance. This appraisal compatibility model has great potentials in both theoretical research and practical application. For instance, in addition to examining whether positive affect or negative affect that can enhance creativity, the model suggests that both of the affects are conducive to creative performance when individuals' perceived affective signal compatible with their appraisals of the task. The model also fits perfectly with previous theories including feeling-as-information (Schwarz 1990, 2012; Schwarz and Clore 1983, 1988), mood-as-input model (Martin and Stoner 1996; Martin et al. 1993), motivational compatibility (Friedman et al. 2007), the dual pathway approach (De Dreu et al. 2008), and dual-competition hypothesis (Pessoa 2009). This model provides a comprehensive explanation to the underlying mechanism of the affect-creativity link. The model, however, is still in her infant stage. More experimental validations are necessarily needed to verify and improve the model. Additionally, our model does not examine whether the impact of affect on creativity is stable or may vary over time (Kaufmann and Vosburg 2002; Tan and Qu 2015). Furthermore, whether appraisal would mediate the link between affect and self-reported creativity also deserves future exploration (e.g., Baer and Kaufman 2005; Kaufman and Beghetto 2009; Maier 1970; Tan and Qu 2012). Lastly, future research can also examine how individual differences in biological disposition (e.g., Akinola and Mendes 2008), personality (e.g., Ng and Diener 2009), and arousal (e.g., Hutton and Sundar 2010) may influence individuals' appraisal and further influence the link between affect and creativity.

Conclusion

The influence of affect on creative performance has interested researchers for decades. Although there is ample evidence that affect is conducive to creativity, numerous studies have shown that the impact of affect on creativity depends on many factors including task demand and individual's appraisal. Researchers have proposed different theories and models to resolve the mixed findings. The models, however, are not able to fully account for the mechanism underlying the linkage of affect and creativity. In this chapter, we propose a conceptual model that highlights the role of individual appraisal to account for the mixed findings. In particular, we propose that the appraisal of affective signals need to be compatible with the appraisal of task. We believe that appraisal is the key to help explain previous contradictory findings and settle the long lasting theoretical debate. Furthermore, this model provides some references for improving creativity in daily life. Therefore, our review calls for a novel angel to examine the link between affect and creativity.

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Part II
Empirical Evidence and Practice

Chapter 6
Gender Differences in Means and Variability on Creative Thinking: Patterns in Childhood, Adolescence, and Emerging Adulthood

Mavis Wu-Jing He, Wan-Chi Wong and Anna Na-Na Hui

Gender Differences in Creativity: From Mean Analysis to Variability Analysis

Gender differences in creativity have long been a question of research interest. Researchers conducted extensive reviews on the issue and concluded that there were no consistent differences between the genders in creativity (e.g., Baer and Kaufman 2008; Kogan 1974). However, it is worth noting that such conclusions were drawn based on the results of mean analyses alone. More and more researchers have highlighted the importance of conducting both mean and variability analyses to uncover a more complete picture of gender differences in intellectual and cognitive abilities (e.g., Feingold 1992; He and Wong 2011, 2014; He et al. 2013; Hedges and Nowell 1995; Johnson et al. 2008; Martens et al. 2011; Strand et al. 2006; Vista and Care 2011). In their study on gender differences in creative thinking among the participants of 9–15 year olds, He and Wong (2011) revealed interesting findings of gender differences by employing both mean and variability analyses. Results of their mean analyses suggested trivial gender differences, and generally supported the gender similarities hypothesis, which states that both genders are alike on most, but not all, psychological variables (Hyde 2005). However, results of their variability analyses suggested great gender differences, and supported the greater male variability hypothesis, which posits that males show greater interindividual variability than females do in many human abilities,

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including intellectual abilities (Ellis 1894/1934). The paradoxical results generated from the mean analyses and the variability analyses in He and Wong's (2011) study provided supporting evidence to the idea of analyzing both mean and variability scores to enhance a more complete understanding of gender differences.

A Developmental Perspective on Gender Differences

While He and Wong's (2011) study has lent support to gender similarities hypothesis by mean analysis whereas to greater male variability hypothesis by variability analysis, their findings are limited to the population of young people in the developmental stage of early adolescence. The present study aimed to take a further step toward examining the issue of gender differences in both mean and variability by incorporating a wider spectrum of age groups.

Developmental theories in relation to gender differences have suggested that gender differences in intellectual abilities are not stable over time; rather they are dynamic in nature: They appear during a specific stage of development and change in magnitude, and even in direction, with age. Hence, it has been increasingly recognized that the issue of gender differences needs to be analyzed developmentally (e.g., Arden and Plomin 2006; Eriksson et al. 2012; Hyde 2005; Martens et al. 2011). For example, the developmental theory of sex differences in intelligence (Colom and Lynn 2004; Lynn 1999) explains the age-related sex difference patterns with regard to different rates of brain maturation between the sexes. Girls usually showed faster brain maturation during the early years of their lives, whereas the brains of the boys caught up with the maturation pace of the brains of the girls beginning in adolescence and eventually even surpassed them (also see Colom and Lynn 2004; Lynn et al. 2000). From a socio-cultural perspective, the social-developmental theories also posit that boys and girls learn gender-role-consistent behaviors overtime through cognitive learning, socialization, and experiences (e.g., Bandura 1969; Liben and Bigler 2002), which may account for the gender differences associated with specific developmental stages.

The developmental dynamics of gender differences have been shown in various intellectual and cognitive abilities (e.g., Halpern 1997, 2000; Halpern et al. 2007). In a recent study, Arden and Plomin (2006) performed both mean and variability analyses in studying gender differences in general intelligence in children at ages 2, 3, 4, 7, 9, and 10 years. Their results suggested that no significant gender differences in variability in the youngest age group (i.e., the 2-year-olds) despite the significant results that were found in the older groups (i.e., ages 3–10 years). An analysis of the gender proportions in the lower and upper tails further revealed a female advantage in the young age groups: whereas girls of ages 2, 3, and 4 years were significantly overrepresented in the upper tail, boys were overrepresented in the lower tail. Only at age 10 did male advantage appear; at this age, the boys' intelligence scores had a significantly higher mean and greater variance, and boys were overrepresented in the upper tail of the intelligence score distribution.

While the developmental dynamics of gender differences have been found in various intellectual and cognitive abilities, it has been rarely investigated in creative thinking. Furthermore, although He and Wong's (2011) study has lent support to gender similarities hypothesis by mean analysis whereas to greater male variability hypothesis by variability analysis, their findings are limited to the population of young people in the developmental stage of early adolescence. Hence, the magnitude, consistency and stability across time of between-sex differences in both means and variability remain a question. The present study aimed to extend He and Wong's (2011) study on gender differences in creative thinking through the lens of a developmental perspective. Specifically, we adopted He and Wong's (2011) methodology of using the TCT–DP to assess creative thinking and to conduct both mean and variability analyses of the data. However, relative to the age group that was studied in their report, we extended the age group of our study sample to include both younger (i.e., kindergarten-aged children) and older participants (i.e., late adolescents and emergent adults).

Method

Participants and Procedure

Participants included 2219 individuals from four age groups: 624 children (44 % female, age range = 3–7, M_{age} = 5.30, SD = 0.76), 540 early adolescents (50 % female, age range = 9–13, M_{age} = 11.6, SD = 0.77), 565 adolescents (52 % female, age range = 14–18, M_{age} = 15.6, SD = 1.14), and 490 emerging adults (52 % female, age range = 19–23, M_{age} = 21.0, SD = 1.61). The children group was recruited from seven kindergartens in various districts of Hong Kong. Data on their creativity scores were part of a larger project on arts education and creativity. The early adolescent and the adolescent groups were recruited from five primary schools and four secondary schools, respectively in various districts of Hong Kong. Data on their creativity scores were part of a larger project on music listening and creativity. Regarding the emerging adult group, it was recruited from two tertiary institutes in Hong Kong. All of the participating students belonged to the Chinese ethnic group, and they were mostly from middle-class to lower-middle-class socio-economic backgrounds.

An exploration of the thinking process was explained as the main objective of the present study. Informed consent was obtained from the participants or the parents of the children who participated. All joined on a voluntary basis. The participants were assured that all information gathered during the study would be kept strictly confidential and would only be used for research purposes. The TCT–DP was administered in a group setting with standard instructions; approximately 20–35 participants were tested at a time.

Instrument

In the present study, the Test for Creative Thinking–Drawing Production (TCT–DP, Form A, Urban and Jellen 1995/2010) was adapted and translated into Chinese via a back-translation procedure to test students' creative thinking. The TCT–DP was developed based on a holistic and gestalt-oriented conceptualization of creativity (see Jellen and Urban 1986; Urban 2004; Urban and Jellen 1995/2010). It assesses creativity with a drawing task on an A4 sized testing sheet that contains six intriguing figural fragments: (a) a semicircle, (b) a point (c) a 90° angle, (d) a curved line, (e) a broken line, and (f) a small open square. The drawing can be completed using any combination of the six figural fragments in a wide variety of ways ranging from simple, conventional, and disjointed completions to thematically complex, unconventional, integrated, and aesthetically interesting completions (Dollinger et al. 2004).

The criteria for assessing creativity in this test include the following: (1) *Continuations* involve any use or extension of the six fragments; (2) *Completions* involve any additions to the six continuations; (3) *New elements* refer to any new figures or symbols; (4) Connections that are made with a line (*Connections[Line]*) are scored on the basis of the physical linkages between the continuations or completions of the given fragments and the new elements; (5) Connections made to produce a theme (*Connections[Theme]*) involve any element or figure that contributes to a compositional theme; (6) *Boundary breaking [Fragment-dependent]* involves the use of a small open square that is located outside of the large square frame; (7) *Boundary breaking [Fragment-independent]* involves non-accidental drawing outside of the frame, excluding the use of the small open square; (8) *Perspective* is scored on the basis of the inclusion of three-dimensional compositional whole or elements; (9) *Humor and Affectivity* is scored on the basis of a drawing that expresses humor or other emotions; and (10) *Unconventionality* is scored according to four subcategories on the basis of (a) manipulations of the materials, (b) surreal or abstract drawings, (c) atypical combinations of figures and symbols, and (d) non-stereotypical use of a certain element. The final criterion, Speed, was not applied because the test was administered in group mode. A composite score was obtained by summing the points that were scored for each of the aforementioned 10 criteria with no transformation. The possible score range was 0–6 points for each of the first nine criteria. Each of the four subcategories of the tenth criterion (Unconventionality) was scored according to a possible score range of 0–3 points. Thus, the total possible score range of TCT–DP excluding the criterion Speed is 0–66 points; a higher score indicates better creativity.

The test is regarded as a promising tool for assessing creativity. Its reliability and validity have been established (see Dollinger et al. 2004; Lubart et al. 2010); its applicability to a Chinese sample has also been supported (Rudowicz 2004). We also obtained a reasonably good Cronbach's alpha ($\alpha = 0.79$, $N = 2219$) for the TCT–DP for the whole sample in the present study. The Cronbach's alphas for the

children, early adolescents, adolescents, and emerging adults were 0.82, 0.86, 0.76, and 0.71, respectively. All of these values are within the range of values (α = 0.46–0.92) that were reported by Urban and Jellen (1995/2010). Moreover, two raters who were blind to both aims and the design of the study were asked to score a randomly selected sample of the drawings (n = 330, 14.9 % of the sample) to assess the interrater reliability of the TCT–DP. All of the raters underwent intensive training according to the TCT–DP manual prior to performing the ratings. As shown in Table 6.1, the inter-rater correlation coefficients that were obtained for the TCT–DP scores were generally good, with r ranges between 0.67–0.98.

Results

Mean Analysis: Gender Differences in Means and Their Age Patterns

Table 6.1 shows the means and standard deviations of the TCT–DP composite and subscale scores across the age groups that were tested. A multivariate analysis of variance (MANOVA) was performed on the data from each of the age groups to examine the gender differences in the TCT–DP composite and subscale scores. Overall, the effect of gender was statistically significant in all of the four age groups. The F values ranged between 1.87 and 3.96 (all ps < 0.05), and η_p^2 values ranged between 0.04 and 0.06 which suggest a small effect size. Subsequent univariate analyses were then applied to the data from these four age groups to study the specific gender effect in each of the TCT–DP composite and subscale scores, and Bonferroni procedures were used to adjust for multiple comparisons. The results of the mean analyses are summarized in Table 6.2.

For the composite TCT–DP scores, significant gender difference was only observed in the children group (ages 3–7), in which girls significantly outperformed boys (t = 13.2, p < 0.001). Specifically, girls significantly outscores boys in three subscales, including New elements, Boundary breaking[Fragment-dependent], and Boundary breaking[Fragment-independent] (all ts ≥ 4.18, p < 0.05). For the other three age groups, no significant gender difference was observed in the composite TCT–DP scores. Moreover, with reference to the gender effects in the subscales, significant gender differences were only observed in a small number of the subscales and mixed gendered-pattern was shown. For example, in the early adolescent group (ages 9–13), while girls scored significantly higher on Continuations and Connections[Theme] (ts ≥ 4.13, ps < 0.05), boys outperformed girls on Boundary breaking [Fragment-dependent] (t = 4.45, p < 0.05). In the adolescent group, while girls obtained significantly higher score on Connections[Theme] (t = 8.05, p < 0.01), boys outperformed in the two Boundary breaking subscales (ts ≥ 4.77, ps < 0.05). In the emerging adult group, male superiority was only observed on Boundary breaking [Fragment-independent] (t = 4.87, p < 0.05).

Table 6.1 Interrater reliabilities (*r*s) and means (*SD*s) of the TCT–DP scores for males and females in four age groups

	r	Age 3–7		Age 9–13		Age 14–18		Age 19–23	
		Male (n = 349)	Female (n = 275)	Male (n = 271)	Female (n = 269)	Male (n = 298)	Female (n = 285)	Male (n = 247)	Female (n = 251)
TCT–DP	0.89**	12.9	15.2	20.9	21.6	22.7	21.8	26.9	25.7
		(7.50)	(8.65)	(9.25)	(6.84)	(10.2)	(7.47)	(11.5)	(8.44)
Subscales									
Continuations	0.91**	4.17	4.23	4.55	4.63	4.73	4.50	4.85	4.96
		(1.25)	(1.28)	(0.89)	(0.73)	(0.92)	(0.95)	(1.07)	(0.88)
Completions	0.87**	1.63	1.91	3.82	4.03	3.54	3.63	3.98	3.95
		(1.80)	(1.83)	(1.30)	(1.01)	(1.60)	(1.52)	(1.68)	(1.57)
New elements	0.93**	2.25	3.17	1.76	1.97	2.31	2.20	2.97	2.76
		(2.28)	(2.42)	(1.92)	(1.69)	(2.03)	(1.92)	(2.13)	(1.99)
Connections[Line]	0.88**	1.50	1.50	1.78	1.60	1.59	1.41	2.04	1.79
		(1.96)	(1.96)	(1.75)	(1.63)	(1.63)	(1.58)	(1.71)	(1.50)
Connections[Theme]	0.83**	0.60	0.75	2.80	2.46	2.46	2.96	3.38	3.15
		(1.45)	(1.51)	(2.29)	(2.15)	(2.15)	(2.02)	(2.27)	(2.17)
Boundary-breaking [Fragment-dependent]	0.98**	0.56	0.83	0.76	1.41	1.40	0.92	1.84	1.86
		(1.48)	(1.75)	(1.98)	(2.48)	(2.48)	(2.10)	(2.72)	(2.49)
Boundary-breaking [Fragment-independent]	0.97**	0.70	1.06	0.66	1.47	1.47	1.05	1.88	1.41
		(1.53)	(1.98)	(1.72)	(2.48)	(2.48)	(2.08)	(2.58)	(2.17)
Perspective	0.83**	0.04	0.01	0.82	0.68	0.68	0.79	0.82	0.85
		(0.41)	(0.06)	(1.22)	(1.26)	(1.26)	(1.03)	(1.15)	(1.18)
Humor and affectivity	0.67**	0.44	0.58	1.25	1.83	1.83	1.73	2.04	1.89
		(1.10)	(1.20)	(1.28)	(1.99)	(1.99)	(1.85)	(2.28)	(1.97)
Unconventionality	0.78**	0.99	1.19	2.70	2.67	2.67	2.53	3.12	3.05
		(1.70)	(1.99)	(2.55)	(2.33)	(2.34)	(2.42)	(2.67)	(2.60)

Note ** $p < 0.01$

Table 6.2 Cohen's *d*s and the corresponding adjusted *t* values of the TCT–DP scores in four age groups

	Age 3–7		Age 9–13		Age 14–18		Age 19–23	
	d	Adjusted *t*-value	*d*	Adjusted *t*-value	*d*	Adjusted *t*-value	*d*	Adjusted *t*-value
TCT–DP	−0.29	13.2***	−0.09	1.05	0.11	1.69	0.13	1.94
Continuations	−0.05	0.32	−0.10	1.35	0.25	1.02	−0.12	1.81
Completions	−0.16	3.74	−0.17	4.13*	−0.05	0.42	0.02	0.07
New elements	−0.39	23.6***	−0.11	1.71	0.05	0.41	0.11	1.36
Connections[Line]	0.00	0.00	0.11	1.61	0.11	1.82	0.16	3.04
Connections[Theme]	−0.10	1.59	−0.28	10.9**	−0.24	8.05**	0.10	1.29
Boundary-breaking[Fragment-dependent]	−0.16	4.18*	0.18	4.45*	0.21	6.27*	−0.01	0.01
Boundary-breaking[Fragment-independent]	−0.21	6.66**	0.10	1.49	0.18	4.77*	0.20	4.87*
Perspective	0.13	2.50	−0.11	1.54	−0.09	1.22	−0.03	0.09
Humor and Affectivity	−0.13	2.56	−0.06	0.49	0.05	0.41	0.07	0.63
Unconventionality	−0.11	1.85	−0.03	0.09	0.06	0.46	0.02	0.07

Note $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Bonferroni procedures were used to adjust for multiple comparisons

Variability Analysis

Variability analysis was performed to test whether males showed greater interindividual variability than females did. In the current literature, greater male variability has been measured in two ways. The first measure is the male/female variance ratio (VR), which is derived by dividing the male variance by the female variance with respect to a given characteristic (e.g., Feingold 1992; Hedges and Nowell 1995). VRs that are greater than 1.0 indicate that there is more variability among males than among females (although this difference may not be statistically significant); VRs that are smaller than 1.0 show that there is more variability among females than among males (though again, it may not signify that there is significantly greater female variability). VRs that are equal to 1.0 represent equal variances in both genders. The second measure of larger variance among males is the gender composition (i.e., male/female ratio) in the extreme and central regions of the score distribution for a given psychological characteristic.

Gender differences in VRs and their age patterns As shown in Table 6.3, greater male variance as indicated by VRs of greater than 1.0 were not observed in the children group; instead, greater female variance as indicated by VRs of less than 1.0 (i.e., 0.75) was obtained from this group. Greater male variance firstly emerged in the early adolescent group (VR = 1.85), and it remained across the adolescent group (VR = 1.88) through the emerging adult group (VR = 1.85). The results of *F* tests of equality of variance revealed a statistically significant difference regarding the

Table 6.3 *VR*s and the corresponding *F* values of the TCT–DP scores in four age groups

	Age 3–7		Age 9–13		Age 14–18		Age 19–23	
	VR	*F*-value	*VR*	*F*-value	*VR*	*F*-value	*VR*	*F*-value
TCT–DP	0.75	6.65^{**}	1.85	25.6^{***}	1.88	62.2^{***}	1.85	37.1^{***}
Subscales								
Continuations	0.96	0.79	1.47	7.73^{**}	0.95	1.42	1.47	15.9^{***}
Completions	0.96	0.00	1.66	19.4^{***}	1.10	0.28	1.15	0.06
New elements	0.88	4.59^{*}	1.29	5.31^{*}	1.12	1.13	1.15	4.93^{*}
Connections[Line]	1.00	0.02	1.15	1.49	1.06	0.35	1.31	3.05
Connections[Theme]	0.92	4.50^{*}	1.09	0.19	1.14	2.64	1.10	2.88
Boundary-breaking [Fragment-dependent]	0.72	14.4^{***}	1.64	18.1^{***}	1.39	23.8^{***}	1.19	5.91^{*}
Boundary-breaking [Fragment-independent]	0.60	27.1^{***}	1.40	6.09^{*}	1.43	22.1^{***}	1.41	23.1^{***}
Perspective	42.0	10.1^{**}	1.15	0.40	1.49	1.78	0.94	0.01
Humor and affectivity	0.83	5.12^{*}	1.18	0.01	1.15	4.59^{*}	1.34	11.7^{**}
Unconventionality	0.73	5.35^{*}	1.00	0.05	0.93	1.20	1.05	0.29

Note $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

greater female variance in the children group and the greater male variance in the adolescent and the emerging adult groups ($Fs \geq 6.65$, $ps < 0.01$).

An analysis of the male/female VRs of the 10 TCT–DP subscales revealed that greater female variances were consistently observed in the children group; VRs of less than 1.0 were shown in all of the subscales with the exceptions of two (Connections[Line] and Perspective; see Table 6.3). However, in the two adolescent groups and the emerging adult group, the pattern was reversed, and greater male variances (i.e., VRs greater than 1) were consistently observed, with the exceptions of two subscales in the adolescent group (i.e., Continuations and Unconventionality), and one subscale in the emerging adult group (i.e., Perspective).

Gender differences in male/female ratios and their age patterns In addition to the VR statistics, statistics that showed the gender proportions (male/female ratios) in particular regions of the TCT–DP score distribution were also employed to test greater male variance in the present study. Table 6.4 summarizes the statistics of male/female ratios in different regions of the distribution of TCT–DP z-scores according to four age groups, and Fig. 6.1 shows a visual representation of the gender proportion statistics according to age group along with the results of the corresponding chi-squared tests.

In the children group, a significant overrepresentation of females was found in the two upper tail regions where $z \geq 1.0$ (i.e., 1 *SD* or more above the mean) and $z \geq 2.0$ (i.e., 2 *SD* or more above the mean). A male/female ratio of 0.59 and 0.33 was found from the regions where $z \geq 1.0$ and $z \geq 2.0$, respectively, which is smaller than 1.0 and suggesting an overrepresentation of girls in these regions. In the two adolescent groups and the emerging adult group, however, the general pattern of results reveals greater male variance. First, there was a significant overrepresentation of females in the central regions of the distributions (i.e., $-1.0 < z < 1.0$, with all χ^2 values ≥ 3.69, $ps < 0.05$) of all of these three age groups. Second, overrepresentations of males in the extreme regions of the distribution were also observed. Specifically, in the early adolescent and the adolescent groups, boys were significantly overrepresented in both the upper and lower tail regions (χ^2 values ≥ 3.86, and $ps < 0.05$). Regarding the emergent adult group, significant overrepresentations of males were also demonstrated in the two upper tail regions (χ^2 values ≥ 4.21, and $ps < 0.05$). Male/female ratios greater than 1.0 were also consistently shown in the upper and lower tail regions among these three age groups.

Table 6.4 Male/Female ratios in different regions of the distribution of OE z-scores in four age groups

	Age 3–7	Age 9–13	Age 14–18	Age 19–23
$z \geq 2.0$	0.33	2.73	2.48	7.00
$z \geq 1.0$	0.59	1.14	2.61	1.55
$-1.0 < z < 1.0$	1.07	0.73	0.74	0.71
$z \leq -1.0$	1.75	2.59	0.93	0.90
$z \leq -2.0$	1.13	–[a]	4.29	2.37

Note [a]All participants in this region were boys

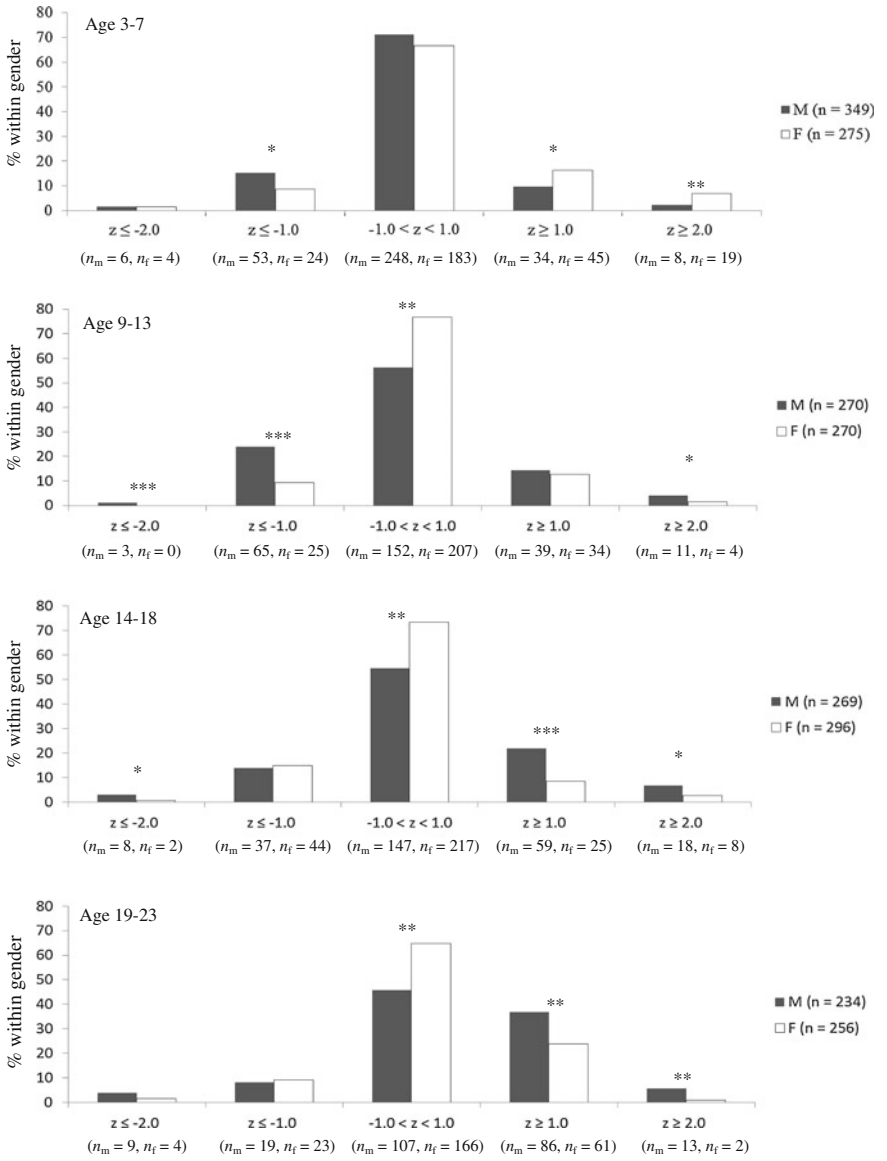

Fig. 6.1 Percent within gender, and the number of boys (n_m) and girls (n_f) in different regions of the distribution of TCT–DP z–scores, with the results of the χ^2 test in four age groups

Discussion

The present study aimed to reform the study of gender differences in creativity by analyzing both means and variability from a developmental perspective. Two important findings in relation to the developmental dynamics of the gender differences in creativity have been obtained. First, results of mean analyses generally showed trivial gender differences in all age groups, except a female advantage in the children group. However, results of variability analyses tend to show great gender differences across age. This finding is in line with past studies which showed that paradoxical results in relation to gender differences might be generated based on mean analyses and variability analyses (e.g., Feingold 1992; He and Wong 2011). We added further empirical evidence based on the developmental data to support the necessity of including both mean and variability analyses in studying gender differences of intellectual and cognitive abilities in all age groups (see also Hedges and Nowell 1995; Martens et al. 2011; Strand et al. 2006; Vista and Care 2011).

Second, our results of variability analyses have revealed a developmental dynamic of gender differences in creativity, in which the magnitude and the direction of gender differences in variability changed across age. Based on the results of gender differences in VRs, greater female variance was shown in the children group whereas a reverse gendered-pattern (i.e., greater male variance) appeared in the early adolescent, adolescent, and the emerging adult groups. Results of the gender proportions (male/female ratios) in the tail regions of the TCT–DP score distribution further revealed whether the greater male (or female) variance is related to a male (or a female) advantage or not. In the children group, overrepresentation of girls was observed only in the upper tail region, which suggests a female superiority. In the two adolescent groups that showed greater male variances, significant overrepresentation of male participants was shown in both of the upper and lower tail regions. These findings appeared not to support the link between the greater male variance to male superiority. Only in the emergent adult group, significant overrepresentation of males was observed solely in the upper tail regions, which suggests a male superiority.

In sum, our results of the variability analyses of creativity generally suggested a trend from female superiority in the younger age group to male superiority in the emerging adult groups. This pattern is somewhat consistent with the prediction of the developmental theory of sex differences in intelligence (Lynn 1999; Colom and Lynn 2004), as well as the findings of previous research in other domains (e.g., Arden and Plomin 2006; Halpern 1997; Halpern et al. 2007). These findings may contribute to resolve the contradictory conclusions with regard to the gender effects on creativity that are drawn from limited age-range samples or collapsed age-groups (e.g., Cheung and Lau 2010; Matud et al. 2007).

Although we have found interesting developmental patterns of gender differences in the variability of creativity, the question of why is a much more difficult one to answer. From a developmental perspective, Lynn and colleagues (e.g., Lynn 1999; Colom and Lynn 2004) proposed that the developmental dynamics of gender

differences in variability may be related to differences in brain development rates across the two sexes. From a socio-cultural perspective, Nodding (1992) postulated that it is related to differences in socialization during which females have been socialized toward behaving in accordance with a "nice girl" norm. On the one hand, females generally develop to conform sufficiently to avoid landing at the very bottom of any distribution. On the other, many of the brightest females feel compelled to hide their talents and actively conform to a model of undifferentiated womanhood. Uncovering the complex etiology of the developmental trajectories of gender differences is a challenging task, however it is a question worthy of research attention and further empirical scrutiny with sophisticated research designs is needed.

When interpreting the data, we must also be cautious about several limitations of the present study. First, due to the cross-sectional design, it is not certain whether the age trends that we observed are related to cohort effects. Future studies that use either a longitudinal or sequential design are needed to uncover the developmental trends of gender differences in both means and variability. Second, although there has been evidence supporting the notion that the TCT–DP is a valid and reliable measure of creativity, which is applicable to a wide range of individuals with various intellectual potentials and who come from a number of age populations as well as socio-economic or cultural groups, our study is the first to have used this instrument in a very young age group, including the 3–4-year-olds. Chae (2003) has supported the applicability of the TCT–DP in the 4–6-years-old Korean children, however, no statistics on the reliability and the validity of the test were reported in this young age group. Although we have found that the inter-rater correlation coefficients and the internal consistencies of the test in the present study were generally good and that they were all statistically significant, the general reliability and validity of the TCT–DP in such young children remains a research question that requires further study. Third, the present sample is limited to regular students with relatively average ability while the variability hypothesis focuses on gender differences in the tails of the distribution. Inclusion of samples with more diverse range of ability (e.g., gifted and special need students) would shed further light on the issue.

Conclusions

This study has been the first one that takes a developmental perspective to study gender differences in creativity based on both mean and variability analyses. The interesting developmental patterns of both the greater female variability and female superiority in the younger age group of kindergarten children, in which the girls showed significantly higher means, demonstrated greater variance, and were significantly overrepresented in the high tails of the TCT–DP score distributions compared with the boys, are particularly valuable and provocative. These findings are in contrast to the pattern of the greater male variability of creativity that was

observed in participants who ranged in developmental stages from early adolescence through adolescence to emerging adulthood. Taken together, these results should provoke the scientific community to further the study of gender differences in creativity with the aim of searching for a more refined explanation. The interesting findings on the developmental patterns of gender differences in creativity, together with the paradoxical findings generated respectively from mean analysis and variability analysis, also serve to highlight the importance of methodological considerations (e.g., methods of analyses, representativeness of samples with diverse age-range) in the research of the gender differences in psychological attributes. The findings may also imply that boys and girls should be given different cultural, societal, and educational opportunities for them to promote their creativity growth across ages.

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Chapter 7
A Case Study to Explore Creativity in Preschoolers Through Chinese Reading Comprehension eBooks

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Introduction

In this chapter, we will investigate how reading comprehension skills and creativity develop in children raised in a bilingual environment. The chapter reports a case study on a small group of 17 pre-school students in Singapore that explores several dimensions of creativity and some possibly of language ability. The study hopes to identify areas for further investigation on a larger scale. Children explore the world around them from the moment they are born. The experiences are shaped by the culture they are born in. Plasticity of the children's brain to retain experience and its ability to reproduce them ensure the passing down of culture (Vygotsky 2004). Vygotsky (2004) pointed out that if the brain merely passively reproduces previous experiences, human beings would always be looking backward. What makes human beings future oriented is the brain's ability to combine elements into new ideas and concepts. The combinatorial ability, which is also known as imagination, is the basis for creativity. If experience is the basis of imagination, then broadening children's experience will provide a fertile ground for imagination, and hence, creativity, to flourish (Vygotsky 2004). The more enriched children's experiences are, the more elements they will have to operate their imagination. Reading, which allows children to explore the world vicariously, is an effective way to enrich children's experience. When children read, they construct meaning from what they read, augmenting and enriching the representations they build from when they

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explore and make sense of the physical world. It allows greater opportunity for imagination and for creativity.

There are children who may be able to read aloud every word in the text but they are unable to make sense of what they read. This is the difference between good and poor readers: Good readers actively construct meaning from what they read (Oakhill 1982) while poor readers may decode words just so that they can pronounce them. The ability to actively construct meaning is a life skill that is critical for understanding both the physical and the vicarious worlds, so a child's performance in this area has an impact that lasts beyond childhood (DeBruin-Parecki and Squibb 2011; Kendeou et al. 2007). For example, students who are poor readers at pre-school often remain poor readers in elementary school, at which time (Grade 3/Grade 4) it is often too late to help them improve (van Kleeck 2008). Therefore, reading programs that encourage reading and improve reading skills need to start early, preferably at prekindergarten years (DeBruin-Parecki and Squibb 2011).

Cultivating Reading Comprehension Skills in Children

Reading comprehension refers to the skills that relate what we understand from reading a book (or other material) to things we have already learned (DeBruin-Parecki and Squibb 2011). Prior experience is what we learned from our socio-cultural environment. When we read, we have to be grounded in prior experience to understand what has been written but things we read reinforce and enrich those mental representations, thereby transforming our perceptions of our socio-cultural environment. Imagination plays an important role is transforming our experience from other people's description and writing. It is the ability to visualize and conceptualize something we have not seen before. Reading provides the impetus for imagination; as it stimulates our imagination—the basis for creativity (Vygotsky 2004).

In reading, Paris (2005) distinguishes between unconstrained skills that we continue to develop throughout our life (e.g., vocabulary and contextual reading ability) and skills that are constrained by the knowledge to be acquired, e.g., the alphabet and phonics. These two types of skills develop independently (Kendeou et al. 2007); children good at constrained skills are not necessarily good at unconstrained skills. DeBruin-Parecki and Squibb (2011) advocated the teaching of unconstrained skills as these can continue to develop and are related to reading comprehension ability at higher-grade levels. These skills include (a) linking ideas in a story to children's prior socio-cultural experience (a teacher can help children develop this skill by highlighting the similarities and differences in their knowledge and connecting that knowledge to the story); (b) prediction (a teacher can help by asking children to predict, e.g., "What do you think will happen next?"); (c) retelling of the string of events of a story (e.g., "What is the story about?", "What was the problem and how was it solved?", or, "What did the character find out?"); (d) vocabulary where a teacher can foster the learning of vocabulary by linking new words to a child's existing experience.

Inherent in the unconstrained skills is the inference skill. It leverages the child's culture to come to a conclusion about what is not explicitly stated in a story or how they can make an educated guess on the meaning of a word new to them. It requires children to activate their prior knowledge as well as to reason from the context of the story. van Kleeck (2008) pointed out that this inference skill is an integral part of reading comprehension and is required for children to understand "even the most basic of stories" (p. 632). Children who are unable to infer are poor readers, and as we said above, if they are poor readers in preschool, they remain poor readers in elementary school. While reading frequently to children and repeatedly reading stories aloud to children reinforce their learning of pronunciation, language grammar and sentence structure, asking questions based on the story grammar, such as what was the character's feeling after it had encountered a challenge, or, predicting what the character would do next to resolve the issue, helps children acquire inference skills (van Kleeck 2008).

Inference is one critical unconstrained skill, while vocabulary is another. Vocabulary reflects culture. A teacher can facilitate the learning of a new word by asking children to guess its meaning from the context. If the children are unable to do it, teachers can provide "think alouds" to demonstrate how it can be done. This will enhance the learning of "vocabulary depth" of words (van Kleeck 2008). According to van Kleeck, inferential questions and questions that help children acquire vocabulary depth should make up 40 % of the questions asked in sharing sessions. In addition, van Kleeck recommends embedding well thought-out inferential questions in storybooks ahead of time rather than relying on a teacher to come up with ad hoc questions during the course of a lesson.

Reading Skills, Bilingualism and Creativity

Children with good reading skills are more creative (Ritche et al. 2013). In a study by Wang (2012) where children of the same level of intelligence were given visual and written stimuli for a creative writing test, those with better reading skills and spelling abilities performed better in the test. Reading exposes children to a wider world, on top of what they experience day-to-day. As Roderick (1968) said, literary experiences "might encourage and cultivate their imagination and sense of wonder" (p. 52). Furthermore, Wang suggested that a positive attitude towards reading and writing as well as spending extensive time reading and writing, especially in different languages, successfully promotes creativity. Vygotsky (2004) explained the relationship between experience and creativity perceptively:

[I]f we want to build a relatively strong foundation for a child's creativity, what we must do is broaden the experiences we provide him with. All else being equal, the more a child sees, hears, and experiences, the more he knows and assimilates, the more elements of reality he will have in his experience, and the more productive will be the operation of his imagination (p. 15).

In 1970, Torrance and his colleagues studied bilingual students in Singapore and found that bilingual students have an edge over their monolingual peers in originality and elaboration. Cummins (1977) reports that *balanced* bilinguals (those equally good in both languages) had better performance in fluency and flexibility on a verbal divergence scale while the matching monolingual participants scored substantially higher than the non-balanced bilingual group. Furthermore, the balanced bilingual participants performed better than monolinguals and non-balanced bilinguals in originality. Cummins suggests that there is a linguistic competency threshold that a child must achieve in both languages before he or she can benefit from the cognitive effects of being bilingual. Similarly, Simonton (2008) found that bilinguals performed better than monolinguals on verbal originality and flexibility. Lee and Kim (2011) found that an individual's degree of bilingualism is positively correlated with creativity. This can be understood in terms of Vygotsky's (2004) theory of creativity: Balanced bilingual children read more and *different* books than their peers but these different books remain grounded in the same cultural representations of the reader. As such, the balanced bilingual reader experiences multiple perspectives distinct and richer than those of the monolingual reader, thus providing more fertile ground for imagination and creativity.

Bilingualism in Singapore

Singapore has an official bilingual education policy. It seems that Singapore has an advantage over many countries in cultivating bilingual students. Singapore is made up of three major ethnic groups, Chinese 77 %, Malays 14 %, and Indians 8 % (Dixon 2005). While English is the working language, Mandarin, Malay, and Tamil were selected as mother tongues. The Ministry of Education directs that the main medium of instruction is English but students are required to learn a mother-tongue language (Ministry of Education Singapore 2012). For example, in primary and secondary school, ethnic Chinese students study all subjects in English and learn their mother tongue as a *Chinese language* subject, very much like a second language. Each week, primary school students spend 5.5 h learning Chinese in school while secondary school students spend 3.5 h.

Are Singaporean students balanced bilinguals? After close to four decades of lopsided bilingual education (Pakir 2008) in which students are educated in English as first language and mother tongue as second language, they are now highly proficient in English. They converse in English with family members and friends. Singaporean Chinese do not need to communicate in Chinese and therefore, they have lost the environment to be engaged with their mother tongue. Their command of the Chinese language is weak and there is little motivation for them to learn the language (Chung et al. 2014). This provides a great opportunity to investigate whether encouraging balanced bilingualism in Chinese children is related to greater creativity.

Chinese Language Teaching in Preschools

The general direction for the respective Chinese curriculum in Singapore preschools is to develop children into confident Chinese language readers and speakers. These Chinese language skills are developed through story-telling and related play activities that encourage them to better appreciate the Chinese culture and the Chinese language. Chinese lessons conducted in pre-schools are usually done in a group where children of the same age would be taught as a group regardless of their language abilities. Although there is a general guideline for Chinese curriculum, there is no national standard for Chinese textbooks or materials. Hence, teachers from different pre-schools use different textbooks and materials that are selected by their organizations. Timewise, Nursery 1 (N1) students spend 1 h and 40 min a week learning Chinese, Nursery 2 (N2) students spend 3 h a week, Kindergarten 1 (K1) students spend 4 h a week and Kindergarten 2 (K2) students study for 5 h.

In this study, we took into account issues teachers and parents faced (e.g., non-graded books, mixed ability students, large class size) and attempted to create a Chinese language-learning environment that can address the needs of individual students and encourage assimilation of experiences from another perspective that is distinctly different from the children's own socio-cultural knowledge. Two issues faced by preschool teachers in Chinese language classrooms include high student teacher ratio, and mix ability students. Parents with preschool children are unsure about their own children's Chinese language ability.

High student teacher ratio The Ministry of Education (2004) recommends a maximum pre-school teacher-student ratio as follows: At nursery level, one teacher and one teacher-aide to 15 students, at Kindergarten 1 level, one teacher to 20 students and at Kindergarten 2 level, one teacher to 25 students. According to the Lien foundation (2012), in the Starting Well study, Singapore was ranked last in the area of *Quality* compared to other areas such as *Affordability*, *Availability*, and so on. *Quality* includes measures such as *teacher student ratio*, *average salary of pre-school teachers*, *pre-school teachers' qualifications* and *linkage between pre-school and primary school*. Compared to the top ten countries in the study that have a ratio of one teacher to a range of five to eleven children, Singapore has an average ratio of one teacher to 20 children. Also, with a large number of students, lessons are often conducted as a group. This results in teachers not having the time to pay attention to individual students, and therefore not being able to meet their respective learning needs, which may vary widely from child to child.

Mixed abilitystudents To add to the above issue, Singapore is a highly globalized country and has experienced an unprecedented population influx from many countries around the world. They come here to live, work, and study. As such, in our preschools, many young children come from non-Chinese speaking homes. This has resulted in Chinese teachers having to deal with students with mixed backgrounds and differing abilities. Students can be categorized into five groups: local Chinese students with Chinese speaking background at home, local Chinese

students with no Chinese speaking background at home, non-local students with Chinese speaking background at home, non-local students with limited Chinese speaking background at home and non-local students with no Chinese speaking background at home. With such large variations in Chinese language abilities, teachers are not able to cater to the different abilities, as learning materials used during lessons are not personalized according to an individual student's needs. Thus, it is common that children with poor Chinese language comprehension are left out during the teaching process.

Chinese language ability Parents are often not sure of their children's level of Chinese reading ability. As there is no standard textbook for Chinese preschool education, different schools have different curricula, different learning materials and different standards for the Chinese language, thus parents become unsure of the type of materials they can purchase to enhance their children's learning. For example, parents are not aware when to start letting their children learn to write Chinese characters or when to start teaching Han Yu Pinyin. Furthermore, Chinese story-books commonly available in local bookstores are often non-graded books, thus making it even more difficult to find books of the right reading level for their children.

The Dudu Reading Program

We designed a program (Dudu, in Chinese, it means take a read) to provide personalized learning for children. The program consists of two seamless components, an adaptive placement test which places children at their reading levels and an accelerated reading system which provides a list of on-level ebooks, where *on-level* means that the children are able to comprehend 75 % of the content of the ebook. There is a five-question quiz at the end of each ebook. The study explored different dimensions of creativity by looking at how children performed in a drawing task after they have read an ebook in Chinese. For this study, we adopted Duffy's (2006) definition that "[C]reativity means connecting the previously unconnected in ways that are new and meaningful to the individual concerned" (p. 19). Operationally, we analyzed the children's drawings by investigating their performance in the following aspects of creativity:

- **Synthesis**: This is how much the child brings new content into his or her world view; We measured how much the children integrated concepts (e.g., ideas, objects, people) from the ebook into the drawings;
- **Richness**: The richness of the child's mental representation of the world. We measured how much they incorporate their own ideas and objects that were not in the ebook into the drawings; If the concepts in the books are already in their mental representations, these will be overlooked;

- **Fluency**: The ability of the child to perform the task in a confident, swift and efficient manner (Dulama et al. 2011). We measured how much they erased and redid their drawings;
- **Execution**: The technical ability of the student in the performance of the task. We measure whether the children color within the outlines of objects;
- **Originality**: This is how well the child is able to deliver new ideas, or creative, unconventional and unusual solutions in performing a task. These differences arise from how the child has assimilated the book into his or her existing culture. We measure whether the drawings contain new, unconventional, useful ideas, or ideas that are different from their peers' (Dulama et al. 2011);
- **Coherence**: This is how well the child brings together different elements to create a cohesive solution to the task. We measured how well the drawing hangs together as a whole (Dulama et al. 2011).
- **Articulation**: This is how well the child is able to verbalize the task that they have performed. We measure how much they tell the teacher about what they have drawn and why.

Method

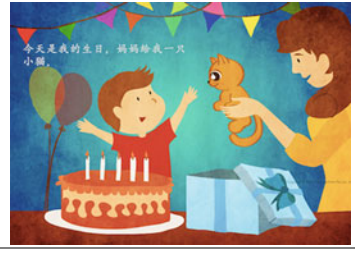
Design and participants A total of 17 children from a preschool participated in the study (Table 7.1). Children were first presented with an adaptive placement test and based on their performance in the test, the program automatically selected ebooks suitable for their reading levels. The ebooks include an audio function that reads the text aloud if required. Children went through the ebook on their own and then attempted questions provided at the end of the book to reinforce their reading comprehension. They were then given a task, e.g., they were asked to draw on a piece of paper their own experience that is related to the theme of the ebook. Instructions were given in Chinese first followed by English to ensure that the children fully understood what they were supposed to do.

Materials The system selected seven ebooks of various themes. Some themes were closely related to the children's experiences and some were unfamiliar to them (Table 7.2).

Table 7.1 Demographics of the participants

Preschool level	Age	Number	Ethnic group	Home language
Nursery 2 (N2)	4	1	Chinese	English
Kindergarten 1 (K1)	5	9	8 Chinese 1 Indian	6 English 1 Mandarin 1 Hindi
Kindergarten 2 (K2)	6	7	Chinese	6 English 1 Mandarin

Table 7.2 Information about the ebooks

Theme	Pre-school level	Content	Illustration	What to draw
Colorful flowers	N1	Red, blue, and white flowers		Could you draw your favorite thing with red, blue, and white colors?
Birthday gift	K1	A birthday celebration. A cat as a gift; and features of a cat		Could you draw your birthday party? What are the birthday gifts you would like to have most?
Pets	N1	Introduction to cat, dog, bird, and fish; as well as the sounds of cat, dog, and bird		What's your favorite pet? Could you draw a house and decorate it for your pet?

(continued)

Table 7.2 (continued)

Theme	Pre-school level	Content	Illustration	What to draw
Stationery	K1	Introduction to school bag, books, stationery case, color pencils, ruler, sharpener, eraser, and school		Could you draw what are in your bag? What are the things you would like to put in your bag most?
My home and my neighborhood	K2	The surroundings of my home, e.g., what's in front, on the left, on the right, behind my home; as well as school, train station, library, and post office		Could you draw your house? Could you draw what are in your neighborhood?
Schoolbag	K2	The concept of schoolbag and what to put in it. A schoolbag does not contain candies, game machines and toys		Could you draw your schoolbag? What can you put in your bag and what you cannot put in your bag?

(continued)

Table 7.2 (continued)

Theme	Pre-school level	Content	Illustration	What to draw
Springtime	K2	The concepts of spring and grassland; sheep and horses; and children's rhyme about spring		Could you draw springtime and your favorite farm animals?

Results and Discussion

Children's drawings were rated to find out how they performed along the seven selected dimensions of creativity. The researcher and the teacher both rated the drawings and the inter-rater reliability was 0.8. Then, a composite score for each child was derived. There was also a write-up for each drawing to help us gain insights into their performance. The analyses of each drawing can be reviewed by the authors of this chapter upon request. The composite scores for the drawing tasks (Table 7.3) indicated that the children performed well in general. About two-third of the children performed very well in the tasks as measured by these seven dimensions, and another 29.4 % of the children performed fairly well. Only one child, namely Peter, did not perform as well.

Balanced bilingual children, that is, children who had a good command of both Chinese and English, were the top 10 % of performers with scores of 90 % or higher. They were Alice (K1), Mike (K2), Dan (K1), and Kathy (K2). These children were able to integrate new experiences they derived from the ebooks with their existing experiences to produce rich and coherent drawings.

Five children, namely, Ivan (N2), Magan (K1), Nat (K1), Benny (K1), Vicky (K2) performed at a moderate level. Ivan's drawing was fairly rich and interesting but it did not hang together well. His performance may be due to his young age (4 years old). The other four drawings were simple and lacked details and had only integrated very few objects from the ebooks. Demographically, none of these four children are good in Chinese or English, except for Nat who is good in English. It could be that there was a language barrier that prevented them from extracting concepts and objects from the ebook. This may have resulted in a paucity of mental representations that limited their imagination and as a result, lack of details in their drawings.

Peter, who was originally from India, speaks Hindi at home. He performed poorly (19 %) due to a severe language barrier. Although he is in Kindergarten 1 and has been studying English and Chinese with his cohort, he can hardly understand Chinese and is also weak in English. The teacher gave him instructions in both Chinese and English about what to draw but he did not seem to be able to grasp what the teacher said (Fig. 7.1).

The performance of Peter indicated that the understanding of the ebook is probably the most important factor relating to our drawing tasks. It is therefore essential for teachers to identify on-level books that the children can read with fairly

Table 7.3 Performance on drawings

Score (%)	Number	% of children	Preschool level
80 or higher	11	64.7	K1 = 5, K2 = 6
Between 60 and 80	5	29.4	N2 = 1, K1 = 3, K2 = 1
Below 60	1	5.8	K1 = 1

Notes K1 kindergarten year 1, *K2* kindergarten year 2, *N2* nursery year 2

good understanding so that the children can perform the drawing tasks with creative abilities. It will be more effective to group students into different ability groups and let each group read books that are at their reading level, instead of letting the whole class read the same book.

Synthesis and Richness

The dimensions of synthesis and richness are directly related to mental epresentations. The factors related to children's performances include difference in richness of the drawings. We noted that all drawings integrated ideas and objects from the ebooks as well as from the children's own experiences although we had not explicitly told the children to do so. Their drawings were influenced by their environment and everyday experiences. When the topic of drawing concerned children's environment, they drew high-rise buildings, cars, small playgrounds that were so typical of how Singaporeans live, as opposed to the tiny townhouse shown in the ebook.

Some drawings were very rich with many interesting objects, some were simple and some contained only a handful of objects. We probed deeper to find what factors could be related to richness in the drawings. An association with the richness of drawings was the competence of the children in *both* their Chinese and English languages. When balanced bilingual children, that is, those who have good Chinese language skills and at least average language ability in English (e.g., Case 1 Kathy, Case 2 Dan, Case 3 Mike, Case 4 Alice, Case 9 Larry and Case 10 Xina), were asked to draw their house and its surrounding, they included the most details in their drawings. They extracted high-level concepts (e.g., surrounding, in front of, beside, behind) from the ebooks and added in many of their own objects (e.g. car park, schools, staircases) to illustrate the concepts. They were also able to go beyond drawing to put in a system to tell the audience what were in their drawings. For example, in the task where they were asked to draw their schoolbags and objects that should and should not be in the bag, they either labeled objects with Chinese or English words or circled the objects that were not supposed to be in the schoolbag. Interestingly, Mike could switch between Chinese and English fairly effortlessly, for example, he labeled 书 on the Chinese book he drew and *wet tissues* on the pack of wet tissue. Concepts from the environment beyond the book came across very strongly in this case. Kathy's drawings indicated that she had assimilated what she learned from the e-books into her existing mental representations. In her drawings the e-books were her points of reference and she added her own ideas and objects into them seamlessly to form an integrated whole (see Fig. 7.1 for an example of Kathy's drawing).

Fig. 7.1 Kathy's drawing based on the Springtime e-book

In contrast to the balanced bilingual children, Lora (Case 11), whose Chinese is above her grade level but is below average in English, did not include much of her own objects although her drawing filled the page. She seemed to be drawing what she saw in the ebook illustrations. It could be that she was occupied by the details from the book instead of abstracting the high level concepts and integrate them with her own objects. To put this in the context of Vygotsky's (2004) theory, Lora was reproducing what she remembered of the book onto paper. Imagination, which requires the integration of the new with existing knowledge, had not taken place yet.

Similarly, children who were average in Chinese but good in English (e.g., Case 12 Nat, Case 14 Rea, Case 15 Gloria) extracted some concepts from the ebook. For example, in the ebook about home and its surrounding, they extracted concepts such as *behind* (in Nat's case); *in front of*, *beside*, and *family* (in Gloria's case); *park* and *family* (in Rea's case) and added in some of their own objects in their drawings. However, the drawings did not contain as much details as those drawn by children with better Chinese skills. It seems that they were able to extract some basic concepts from the ebooks but it might be their Chinese was not good enough for them to extract more complex concepts or details.

Lastly, there were two children who had below average Chinese and English skills (e.g., Case 13 Yei, Case 16 Benny). Their drawings were simple and focused mainly on their house. While Yei, a K1 girl, focused mainly on her house, family members and her soft toy, Benny, a K1 boy, focused mainly on his house and the cars in front of his house. These were the main concepts they abstracted from the ebook.

The above observations lead us to the interesting hypothesis that synthesis of ideas and richness of drawing, which we use as a proxy for the richness of the child's mental representation and the vibrancy of their imagination, may be related to various combinations of language skill competencies. Further investigation in this area may help us understand how synthesis and integration develop in pre-school children.

The amount of the children's own ideas and mental representations that were integrated into the drawings differed. Drawings of the children who were familiar with the themes of the ebooks contained more of the children's own ideas and objects from their daily lives, for example, the content of their schoolbags, items in their birthday parties, as well as the surroundings of their houses. Socio-cultural influence on children's drawing came across clearly in the drawings. The less familiar they are with a theme, the more they reproduce the ebook, (e.g., the objects in Mike's Springtime drawing were almost completely taken from the Springtime ebook).

There was another interesting observation. It seemed that when the children did not have an adequate mental representation of a concept, the mind could force a connection (Moorman and Ram 1994) which may not be adequate to reality, for example, drawing spring with brown grassland, drawing human houses as fish houses. It seems that how much children integrate their own ideas in their drawing is related to how familiar they are with the theme of the book. They integrate ideas and objects from the ebook most when they are new to a theme. As they get more familiar with it, they will synthesize the theme with their own concepts that transform their drawings. As Vygotsky explained that imagination, which is the pre-requisite for creativity, is the *combinatorial* ability that result in transformation of ideas, he clearly stated that imagination requires two types of elements to happen, namely, pre-existing experiences and new experiences. Without any one of them, imagination will not happen. Familiarity of concept and richness of drawing is worth further investigation, as it will allow teachers to understand how children build up mental representations of concepts.

When the theme was very familiar and the task was bounded (e.g. draw objects in our schoolbags), children's drawings were likely to be limited by the concrete reality e.g., the number of things they actually had in their real schoolbags. This did not change when we opened up the task (e.g., we asked the children to draw objects they would most like to put in their schoolbags). We speculated that the mental representation of a schoolbag is stable because the children know it very well. They may not be willing to change even when told specifically to draw something else. In this case again, the reproductive mode is operating, very much like the old saying *old habits die hard*. Imagination could not kick in due to the stable influence of the environment.

Fluency and Execution

When we observed the children along the fluency and execution dimensions, we found that they were generally fluent in their drawing and had fairly good drawing skills. As such, these two dimensions do not seem to lead us to any insightful analyses. We are unlikely to use these dimensions in future.

Originality

Some drawings showed originality. For instance, some children came up with methods to indicate what should not be included in schoolbags (Case 1 Kathy, Case 4 Alice), labeled objects with words (Case 3 Mike, Case 15 Gloria), solved space constraint issue by drawing objects outside of schoolbag (Case 2 Dan), drew blue face sheep for fun (Case 3 Mike), drew smiley faces to represent family members (Case 15 Gloria), and drew mystery gifts in mommy's bag (Case 8 Ivan). These children are at least average in their language skills and understood the ebooks well. Since children from various age groups demonstrated originality, it is probably not age-related. However, originality may be related to language proficiency and how well children understand the materials they read. According to the drawing stages put forth by Vygotsky (2004), these drawings all belong to the first stage or the stage of schemata where drawings are characterized by stick figures and these drawings are not bounded by time and space, for example, children draw what they know about the concepts, not what they actually see, e.g., they will draw a horse with four legs because in their concept of a horse, it has four legs, although in actual fact, they can only see two legs. In addition, because children are not limited by temporal and spatial constraints in their drawings, they may increase, decrease the sizes of objects or exaggerate them. As all our drawings belong to this stage, it follows that differences in the drawings were not due to age differences. Originality, therefore, is unlikely to be age-related.

Coherence

We observed that the drawings were mostly coherent except for three. These were by (a) Benny (Case 16), who was weak in all school subjects. Although his drawing was largely coherent, he mixed night and day in his drawing and could not explain why he did so; (b) Magan (Case 6), who had weak Chinese skills, did not perform well in drawing a coherent picture about objects inside and outside the schoolbag; (c) Ivan (Case 8), a Nursery 2 student who drew a picture about things he likes most and in it, he drew numbers that did not hang together with the rest of the picture. It seems that as children grow older or acquire stronger language skills, their mental representation of the world is more in tune with adult expectations. For the three children described above, they were unable to articulate *why* they drew what they drew, so we are unable to conclude if, in fact, the drawings were coherent (with respect to their world view) to the children themselves.

Articulation

When we asked the children to articulate, it was clear that they were not naturally comfortable with talking about their drawings. Almost all the time, we had to prompt them with specific questions, e.g., "What is this?" to elicit a response. Articulation may be a trainable skill and could give interesting insight into the children's activities, but within the context of this study, there was nothing useful about how the children talked about their drawings.

Conclusion

Takeaways

What are the interesting areas of further investigation that resulted from this study? To summarize, we have identified three possible areas for further investigation. First, we intend to explore how creativity, specifically, synthesis, integration and originality develop in children and how they are influenced by language competencies in a bilingual environment. Second, on a more pragmatic basis, we are interested in how children integrate concepts from reading and from illustrations in books. For example, do books with rich illustrations help children build rich mental representations? Alternatively, what happens when the theme of a book is totally novel to the child, e.g., life on Mars. Third, we know that inference is a critical skill that underlies reading comprehension. We will investigate whether such inference skills also underlie the structure of coherent drawings in children.

We would like to share these suggestions with pre-school teachers. Creativity is related to language competencies. To nurture creativity, it is important to cultivate good reading habits and reading comprehension skills in children. Teachers shall select books that are at a child's reading level so that he or she is better able to build mental representations. Teachers may need to group children that are of similar levels of language competencies and let different groups of children read different books. Teachers shall identify books with unfamiliar themes to expose children to new vicarious experiences, thereby encouraging them to build novel mental representations. Moreover, teachers need to help the children integrate the new mental representations with their prior experience by pointing out how new concepts relate to what they already know (e.g., familiar fruits that are harvested in *spring*). Teachers can also plan activities (e.g., show and tell, drawing) or plan to read more books on the same theme to relate it to children's existing mental structures. Teachers are encouraged to choose books with rich illustrations, especially in books of unfamiliar themes, to help children integrate concepts from the book into their mental representation. Boys and girls tend to extract different concepts from books. Boys tend to focus more on mechanical, physical objects where girls, social relationships. If teachers wish to impart certain concepts, they need to scaffold children

towards the desired direction. Otherwise, students will interpret books according to their own mental orientations. Bounded tasks (e.g., draw things in your schoolbag) will limit what children can draw. Changing the drawing task to something less bounded (e.g., draw what you cannot put in a schoolbag) will encourage children to engage in imagination and hence, draw more creatively.

Final Words

We studied how Chinese reading comprehension skills develop in bilingual children in Singapore and whether performance in drawing tasks, which is a proxy of their mental representations and imagination, was related to various dimensions of creativity. From the analysis of the pictures drawn by the children, we identified three possible areas for further investigation on a larger scale, namely, how synthesis, integration and originality develop in bilingual children, how children integrate concepts from reading and from illustrations in books and whether inference skills underlie the structure of coherent drawings in children. As pointed out in the beginning of this chapter, creativity is closely related to reading. The implication for education is that to cultivate bilingual reading comprehension skills early so that children can have access to reading materials from both English and Chinese as well as developing a habit of reading Chinese. We would like to end with this quote, as eloquently stated by Vygotsky (2004): "[t]he development of a creative individual, one who strives for the future, is enabled by creative imagination embodied in the present." (p. 88)

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Chapter 8
Children's Affectivity and Efficacies

Regina Yew Lin Tan and Ai-Girl Tan

Introduction

This chapter reports a study that examined the relationship between students' affectivity and efficacies. As a skill of twenty-first century the Ministry of Education, Singapore (Tharman 2004) encourages schools to develop and nurture in students, holistically. Constructing an environment that supports emotion in learning and self-efficacy to solve problems creatively is among the core of developing the 21st century creativity skills needed for the world the young people face. This chapter reports a study of affectivity and efficacy among children. We review the role of positive emotions in creative thinking, the theory of self-efficacy and creativity self-efficacy. Amabile et al. (2005) research showed how affectivity relates to creativity at work. The results indicated that positive affectivity has positive indicators to creativity within an organisation. Specifically, this research considered inclusion of emotion in learning as a means to develop efficacy of a person. The researchers believe that development is life long, and is 'multidimensional, multifunctional and dynamic' (Baltes et al. 1999, p. 472). In his presidential address on 'creativity' Joy Guilford (1897–1987) highlighted 'motivational factors (interests and attitudes) and temperament factors' (Guilford 1950, p. 454) as significantly important. Mumford's (2001) commented that there is still 'a need to take a broader, more comprehensive approach in an attempt to understand creativity. According to Mumford (2001) there may be as much creativity in making an idea a reality as there is in the initial generation of the idea' (p. 274).

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Emotion

Affect, emotion and mood exist in creative problem solving (see e.g., Ashby et al. 1999; Fredrickson 1998) and imagination (Vygotsky 2004). To Vygotsky (1896–1934), imagination is the basis of creativity. When we see something, we have an image in our perception or our thinking. This image is the material for the person to be combined with other images that are present, or the experiences or feelings. In imagination, there are feelings. Creativity is a potential of every person. We combine experiences and construct new meanings for them. Children display creative imagination in play. Gradually they engage in dramatization, verbal and written creativity. In play, the child learns to represent problems, generate and 'create' ideas as well to evaluate options and possibilities. Creative imagination allows the child to work and alter her(his) personal and social experiences. Ashby et al. (1999) study highlighted that positive emotions promote and influence creative thinking. Positive emotions are linked with increased levels of dopamine to the brain. The researchers recognised that positive emotions lead to greater cognitive plasticity (see also Baltes et al. 1999) and enable more creative problem solving across different aspects. The research proposed that positive emotions would enhance the cognitive plasticity of an individual's creative competence to multi-task effectively and efficiently. An emerging interest of study is to examine the experience of emotional ambivalence meaning the co-occurrence of non-complementary emotions such as happiness and sadness. According to Fong (2006), the experience of emotional ambivalence (as opposed to e.g., happiness and excitement), is more unusual and hence, this facilitates creative performance by increasing an individual's sensitivity to unusual associations.

Barbara Fredrickson developed the broaden-and-build theory of positive emotions. Positive emotions include 'joy, interest, contentment and love' (Fredrickson 1998, p. 300). Fredrickson (2001) believed that 'experiences of positive emotions broaden people's momentary thought-action repertoire, which in turn serve to build their enduring personal resources to social and psychological resources' (p. 218). According to Frederickson (2001), when an individual experiences positive emotions, his (her) well-being is enriched emotionally, physically and psychologically. Positive emotions produce 'flourishing or optimal well-being' (Fredrickson 2001, p. 218) and not just 'feeling good' for the moment but for over a long-term period. To flourish means to live within an optimal range of human functioning which eventually leads to goodness, generativity, growth and resilience. Fredrickson and Losada (2005) suggested that positive affect to negative affect ratio to be at or higher than 2.9 to indicate a flourishing mental health. Some benefits of the value of positivity (Fredrickson and Losada 2005) include the following: Good feelings likely broaden an individual's attention and hence creativity. Positive affect speeds up recovery, healing and increases immunity, enhances an individual's resilience to challenges in life, and increases his(her) level of happiness and satisfaction.

Efficacy

An individual's self-efficacy beliefs determine 'one's level of motivation and are reflected in how much effort the individual will exert in an endeavour and how long they will persevere in the face of obstacles' (Bandura 1989, p. 1176). It is critical how one perceives goals, tasks and challenges in life. Bandura (1989) emphasized that a highly self-efficacious individual who knows he (she) can do well or excel, is on the higher spectrum of perceiving challenging tasks as something to be solved as compared to avoiding it. He believes that a highly self-efficacious individual will tend to observe the progress s/he makes and sets goals of progressive achievement (Bandura 1978). An individual engages actively in self-development, -adaptation, and -renewal in meeting the constant changes, demands, and changes in life (Bandura 2001). In so doing, s/he increases his(her) quality of life. His engagement includes having intentionality of a plan of action, forward thinking in setting targets for future, self-reactiveness in decision-making and the self-reflectiveness in higher order of thinking and reflection over his(her) self-efficacy. There are multiple modes of agency. In direct personal agency an individual works at the individual level. In proxy agency s/he depends on others to act his(her) interest to get desired outcomes. In collective agency s/he is part of a group working together with a shared vision and a common belief. Investing successfully in the various agencies is fundamental in shaping the individuals' future and what they would become.

A person develops efficacies to respond to available resources by identifying and focusing on the maximization of growth and gains or the minimization of losses in one's life span (Baltes 1997). The concept of plasticity is fundamental to the study of development. It is about the individual as having the capacity to change in response to positive or negative environmental influences, age-related changes. The 'intra-individual plasticity' (Baltes et al. 1999, p. 480) is being responsive to one's experiences and can develop in a variety of ways. According to Ebner et al. (2006) growth-related processes encompass are targeted at achieving higher levels of functioning. It looks at the directionality aspect of development. To achieve the goals that have been selected, the optimization process focuses on acquisition, refinement, and coordinated application of resources (see Wiese et al. 2000).

Beghetto (2006) investigated students' creative self-efficacy using a three item scale focusing on one aspect of creativity, i.e., divergent cognition. The research showed that students in the high creative self-efficacy group were expected to indicate that they had planned to further their studies at the college level as compared to the students in the low creative self-efficacy group. The results provided insights that students who received encouraging feedback had significantly enhanced creative self-efficacy. Caprara et al. (2008) conducted another study in which they investigated the perception of self-efficacy for students who were motivated in their learning and the probability of them continuing with their education. The findings showed that there was a positive corresponding increase in the level of motivational self-efficacy and the probability of students to further their academic studies. Tierney and Farmer (2011) examined the 'development of

creative self-efficacy in an on-going work context' (p. 277). Increased levels in employee creative role identity and in awareness of expectations by the supervisor resulted in a great creative self-efficacy for the employee. In another study, Tierney and Farmer (2002) showed that 'job tenure, job self-efficacy, supervisor behaviour and job complexity contribute to creative efficacy beliefs' (p. 1137).

Tan (2013) acknowledged that the 'creative potential is present in every person' (p. 28) and that 'engagement in creative activities varies according to our needs and phases in development' (p. 29). Tan and her colleagues conceptualised creativity as a 'multidimensional and multi-systemic construct' (Tan et al. 2011a, p. 91). The researchers developed creativity self-efficacy scale with reference to Amabile's (1983, 2001) componential theory. Tan et al. (2007) examined creativity efficacy of Singapore high school students. They developed and validated a 23-item scale to measure creativity efficacy in relation to creativity-relevant efficacies (creativity self-efficacy scales—idea generation and working style) and domain-relevant efficacies (intercultural efficacy and civic efficacy). The items were developed with reference to Amabile's (1983) componential model of creativity and Singapore's globalized and national aspirations for good citizenship (i.e., international friendship day and civic responsibilities). The results showed that Singapore high school students scored moderately high for creativity efficacy.

Salanova et al. (2011) investigated how efficacy beliefs (self-efficacy and perceived collective efficacy) indirectly influence activity engagement (vigor, dedication and absorption) through their impact on positive affect (enthusiasm, satisfaction and comfort) over a period of time. The researchers conducted two longitudinal studies using independent samples. The first study was a two-wave field study that looked at gain cycles with regard to the relationships among 274 secondary school teachers on their self-efficacy, positive affect and work engagement. Questionnaires were distributed to the teachers once at the beginning of the academic year and a second time, eight months later. The study measured efficacy beliefs, positive affect and activity engagement by using a 7-point rating scale (0 'never' to 6 'always'). The results showed all alphas met the criterion of 0.70 except satisfaction (0.69). Correlations were significant and positive. A repeated measures MANOVA test was carried out to assess if there were significant differences in the variables (self-efficacy, positive affect and engagement) depending on time. Their discovery revealed that significant multivariate effects were found for the main effect of time and this indicated the levels of self-efficacy and job satisfaction increased significantly for the teachers over time.

The second study was a three wave laboratory study that examined the gain spirals in the relationships among 100 university students on their collective efficacy beliefs, positive affect and task management. These participants worked on group tasks that spanned over three sessions to perform three tasks. After each task, they filled out a questionnaire that used a 7-point rating scale (0 'never' to 6 'always') which measured efficacy beliefs, positive affect and activity engagement. The findings by the researchers showed that all alpha values met the 0.70 criterion and the correlations were significant and positively related to each other. A repeated measures MANOVA test was conducted to assess if there was significant difference

in the variables depending on time: (collective efficacy, collective positive affect (enthusiasm, comfort and satisfaction) and collective engagement (vigor, dedication and absorption). The results showed that significant multivariate effects were found for the main effect of time. Their study showed at the group level, the pattern of correlations and repeated measures of MANOVA test was consistent and similar at the individual level.

The study by Salanova et al. (2011) showed three important findings. Firstly, efficacy beliefs indirectly influence activity engagement through their impact on positive affect over time and secondly, enthusiasm is the positive affect with the strongest effect on activity engagement. Lastly, a gain spiral exists when efficacy beliefs increase over time due to engagement and positive affect.

With reference to the review above, this study proposed three research questions:

1. What is the relationship between affectivity and efficacies of students in Singapore?
2. Are there individual differences in highly creative and less highly creative students' perceptions of affectivity and efficacy?
3. Are affectivity and efficacies predictors of creative competency?

Methods

Participants

A total of 123 participants in Singapore participated in this study. They consisted of 68 (55.3 %) males and 55 (44.7 %) females. The participants were aged between 9 and 20 years old and mean age was 12.85 (*SD* = 2.96) years old. They were students either in Singapore's schools or in Singapore's higher educational institutions. The nationality of the participants consisted of Singaporeans: n = 117, 95.1 %, and Others: n = 6, 4.9 %. They were from a tuition centre in Singapore that provides educational programs for children (n = 77) and from the researcher's personal contacts who are either from primary, secondary or tertiary institutions (n = 46).

Measures

The survey in this study consisted of two sections. The participants answered a survey based on a 2-part inventory that measured the positive shifts which an individual experiences. In Part I, the basic demographic information collected comprised of the participants' gender, age and nationality. In Part II, the information about the participants' efficacy, feelings, and creative competency were

gathered. Affectivity scales were Positive and Negative Affect Scale for Children (PANAS-C, Laurent et al. 1999) as well as Multidimensional Students' Life Satisfaction Scale (MSLSS, Huebner 1994). Efficacy scales (Tan 2007) were creativity-relevant self-efficacy (cognitive style and working style), intercultural efficacy and civic efficacy. A single item scale of creative competency was included in this study.

Positive and Negative Affect scale for children. In 1988, Watson et al. (1988) developed a scale to measure positive affect and negative affect (PANAS). The PANAS scale was validated with groups of university students. In 1999, Laurent and his colleagues (Laurent et al. 1999) further developed a measure of positive and negative affect for children (PANAS-C). PANAS-C has 27 adjectives, comprising of 12 Positive Affect items (e.g., interested, happy) and 15 Negative Affect items (e.g., miserable, nervous). The scale measures positive and negative affects at the present moment. The PANAS-C has been used for the participants from grade 4 to grade 8 with a mean age of 11.64 year. In another study by Laurent et al. (2004), the PANAS-C was also used for US students from grades 6–12 (age range: 11–21 years old).

Laurent et al. (1999) found evidence for good convergent and divergent validity of the NA and PA scale scores with reports of anxiety and depressive symptoms. The alpha coefficients for the NA scale in Laurent et al.'s (1999) study were 0.94 and 0.92 for the scale development and replication samples, respectively; the alpha coefficients for the PA scale were 0.90 for the scale development sample and 0.89 for the replication sample. The participants rated the measure using a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely), indicating to what extent of their emotions they were feeling at that present moment. Five items of negative affect (NA, i.e., frighten, upset, jittery, mad, and gloomy) and two items of positive affect (PA, i.e., calm and proud) were excluded from the analysis due to two reasons. First, the participants posed questions during the instrumentation as they were unsure of the meanings of the words. Second, the inclusion of the items resulted in three factor structures and the factor loadings were either 0.3 and below or between 0.3 and 0.5 of more than one factor structure. After excluding these items (see Appendix for the findings of exploratory factor analysis), there were ten items for positive affect (PA, i.e., interested, excited, strong, happy, energetic, cheerful, active, joyful, delighted, and lively, factor loadings range: 0.70–0.92) and ten items for negative affect (NA, i.e., sad, ashamed, nervous, guilty, scared, miserable, afraid, lonely, disgusted, and blue, factor loadings range: 0.59–0.87). Subsequently, the internal consistencies of the items were computed. Cronbach's values of PA and NA for the present study were 0.96 and 0.93, respectively.

Multidimensional students' life satisfaction scale. The Multidimensional Students' Life Satisfaction Scale (MSLSS; Huebner 1994) consists of 40 items to assess the participants' overall satisfaction with their lives in general. The MSLSS was conducted with children from grade 3 to grade 8. The scale displayed good internal consistencies with the coefficient alpha of 0.92 for the total score, 0.82 for the Family items, 0.85 for the School items, 0.82 for the Self items, 0.85 for the Friends items, and 0.83 for the Living Environment items. The scale was translated

and validated with the participants from 12 to 17 years old in a German cultural setting (Weber et al. 2013). The translated version also showed good internal consistency with a sustainable Cronbach's of 0.88. The participants were to indicate on a 4-point Likert scale, ranging from 1 (never) to 4 (almost always) their level of satisfaction. The items have 5 subscales which include family (e.g., I enjoy being at home with my family.), school (e.g., I like being in school.), self (e.g., I like myself.), friend (e.g., My friends are nice to me.) and neighbourhood (e.g., I like where I live.). The internal consistencies for the present study were with the coefficient alpha of 0.92 for the family subscale, 0.86 for the school subscale, 0.87 for the self sub-scale, 0.90 for the friends subscale, and 0.84 for the living environment subscale.

Multidimensional self-efficacy scale. The multidimensional self-efficacy scale comprised two creativity self-efficacy scales (cognitive style and working style), one intercultural efficacy scale and one civic efficacy scale. Three items of creativity self-efficacy in cognitive style was adopted from Beghetto's (2006) creative self-efficacy scale (e.g., I am good at coming up with new ideas). Five items of creativity self-efficacy in working style were adopted from the Multidimensional Creativity Self-efficacy Scale (MCSE, Tan 2007) (e.g., I continue doing my task and never give up even if I have difficulty). All self-efficacy scales of this study used the indicators of the 5-point Likert scale: 1, very much unlike me, to 5, very much like me. Cronbach's alpha of the creativity self-efficacy in cognitive style was 0.91 and that of creativity self-efficacy in working style was 0.87. The intercultural efficacy scale comprised six items developed by Tan (2007) which were constructed to measure intercultural efficacy with respect to building international friendship (e.g., "I am able to make friends with people of another country"). All intercultural efficacy scales of this study used the indicators of the 5-point Likert scale: 1, very much unlike me, to 5, very much like me. Cronbach's alpha of the intercultural self-efficacy was 0.89. The civic efficacy comprised five items developed by Tan (2007). It was designed to measure the love for one's country (e.g., "I am proud of being a citizen/resident in this country"). All civic efficacy scales of this study used the indicators of the 5-point Likert scale: 1, very much unlike me, to 5, very much like me. Internal consistency from Tan et al. (2007) was established 0.87. Cronbach's alpha of the civic self-efficacy was 0.87.

Self-reported creative competency. A single item scale "I am very creative" was used to measure the participants' self-reported creative competency. A 6-point Likert scale was employed with indicators of 1 (very false) to 6 (very true).

Procedures for Data Collection

Application to the Research Ethics Clearance was submitted on 1 April 2013 and the revisions were submitted on 30 April 2013. The PSAG Ethics Review Committee was satisfied with the revisions and approved this study on 2 May 2013 (Letter no: PS/ER/2013/27). Data were collected from a tuition centre and personal

contacts. The tuition centre is registered with the Ministry of Education, Singapore (Tharman 2004), and which provides academic programs for children aged 2–12 years old. The enrichment classes are based on Language Arts, Cognitive Development, Structured Play and Social Development. The personal contacts were the researcher's friends and their children. Upon receiving the approval letter from the PSAG Ethics Review Committee, the researcher sought permission to carry out the study from the Director of the tuition centre and the aim of the study was explained to the parents and the participants. The Director administered the questionnaires at the tuition centre and the participants were informed that they could discontinue taking part in the survey at any point in time. They were assured of confidentiality of their responses and reminded that they should not write their names on any page of the survey. The participants then signed a letter of consent. Thereafter the participants proceeded to fill up the survey. On average the participants took about 15 min to complete the survey. Similarly, the researcher administered the survey with her friends' children at their homes or place of convenience. At the tuition centre, the participants were selected based on their being in primary five or primary six while the researcher's selection were based on the participants between the ages of 10–20 years.

Procedures for Data Analysis

All survey papers were collected and a code was given to each of the survey paper. A total of 80 questionnaires were distributed at the tuition centre. All were filled and returned. However, three were incomplete. Hence, these were not included in the analysis. A total of 46 questionnaires were distributed in person to the other participants. All were filled and returned. As there were no incomplete questionnaires, all 46 were used. As such, the total number was 123. The responses were quantified. An excel file was created to key in the data. Based on the file, the data file for the SPSS was created for statistical analysis. Mean, standard deviation, alpha values, skewness and kurtosis were computed. Correlational and regression analyses as well as independent 2-sample t-test were performed.

Results

After ensuring that there was no missing value and normality of data (values of skewness and kurtosis within ±3), the data were subjected to further analysis. Values of mean, standard deviation and Cronbach alpha for all measures were computed (see Table 8.1). From Table 8.1, the results showed that the participants of the study rated positive affect moderately low. They rated life satisfaction and efficacy moderately high. The range of alpha values for all measures was high, between 0.84 and 0.96.

Table 8.1 Means, standard deviations, values of skewness, kurtosis, and Cronbach alpha of all scales

	M(*SD*)	Skewness	Kurtosis	Alpha
Positive affect	2.82(1.29)	0.01	−1.32	0.96
Negative affect	1.52(0.79)	1.85	2.74	0.93
Student life satisfaction—family	3.16(0.65)	−0.65	0.02	0.90
Student life satisfaction—school	2.86(0.72)	−0.23	−0.47	0.86
Student life satisfaction—self	2.92(0.63)	−0.24	−0.40	0.87
Student life satisfaction—friend	3.23(0.60)	−0.69	0.17	0.90
Student life satisfaction—neighbourhood	3.09(0.61)	−0.21	−0.95	0.84
Creativity self-efficacy (cognitive style)	3.61(0.95)	−0.34	−0.63	0.91
Creativity self-efficacy (working style)	3.52(0.93)	−0.45	−0.17	0.87
Intercultural efficacy	3.74(0.82)	−0.61	0.44	0.89
Civic efficacy	3.59(0.87)	−0.33	−0.51	0.87

Relationships Between Affectivity and Efficacies

Findings of Pearson correlations among the scales were reported in Table 8.2. Positive affect correlated positively with creativity efficacy (cognitive style, working style), intercultural efficacy and civic efficacy (range of r = 0.45–0.55, $p < 0.01$). Students' life satisfaction with respect to family, school, self, friend, and neighbourhood correlated positively with all efficacy scales (range r = 0.19–0.64, $p < 0.05$ and $p < 0.01$). The above findings supported hypothesis 1a. Negative affect correlated significantly with creativity self-efficacy in cognitive style (r = 0.19, $p < 0.05$), hence findings supported hypothesis 1b partially.

Individual Differences on Affectivity and Efficacy

The mean of the participants' self-reported creative competency was 4.27 (SD = 1.28), and values of skewness −0.68 and kurtosis 0.10. The participants of the study were placed into (a) highly creative group (n = 59) for those who self-reported creative competency, with a rating of 5 or 6; (b) less highly creative group (n = 64) for those who self-reported creative competency, with a rating of 1, 2, 3, or 4. Table 8.3 summarizes the findings of the two sample independent t-test. Cohen d was computed by dividing difference of mean score of all scales for highly creative group and those of less highly creative group by a standard deviation of the two groups. The value of Cohen d is close-to zero (d < 0.10), small ($0.11 < d < 0.35$), moderate ($0.36 < d < 0.65$), large ($d = 0.66$–1.00), or very large (d > 1.00) (Cohen 1988). Moderate effect size was observed for satisfaction with life–school and friend. Large effect size was observed for satisfaction with life–family, neighbourhood and intercultural efficacy. Very large effect size was

Table 8.2 Findings of correlational and reliability analyses

	1	2	3	4	5	6	7	8	9	10	11
1. Positive affect	–	0.17	0.40**	0.48**	0.56**	0.36**	0.40**	0.55**	0.54**	0.45**	0.54**
2. Negative affect		–	−0.03	−0.02	−0.04	−0.09	−0.02	0.19*	0.12	−0.03	0.09
3. Student life satisfaction—family			–	0.32**	0.38**	0.20*	0.44**	0.30**	0.47**	0.26**	0.46**
4. Student life satisfaction—school				–	0.39**	0.23*	0.35**	0.31**	0.41**	0.19*	0.35**
5. Student life satisfaction—self					–	0.39**	0.41**	0.64**	0.57**	0.44**	0.50**
6. Student life satisfaction—friend						–	0.55**	0.37**	0.40**	0.41**	0.33**
7. Student life satisfaction—neighbourhood							–	0.32**	0.39**	0.35**	0.45**
8. Creativity self-efficacy (cognitive style)								–	0.74**	0.57**	0.58**
9. Creativity self-efficacy (working style)									–	0.58**	0.62**
10. Intercultural efficacy										–	0.68**
11. Civic efficacy											–

Notes *$p < 0.05$, **$p < 0.01$

Table 8.3 Mean and standard deviation, t-test, and effect size for highly creative group and less highly creative groups

	Less highly creative		Highly creative				
	M	*SD*	*M*	*SD*	t	p	d
1. Positive affect	2.23	1.13	3.47	1.14	−6.01	0.001	1.09
2. Negative affect	1.48	0.72	1.56	0.86	−0.058	0.56	0.09
3. Student life satisfaction—family	2.95	0.68	3.39	0.53	−3.91	0.001	0.83
4. Student life satisfaction—school	2.67	0.66	3.06	0.72	−3.17	0.001	0.54
5. Student life satisfaction—self	2.63	0.53	3.23	0.58	−6.00	0.001	1.03
6. Student life satisfaction—friend	3.05	0.57	3.42	0.58	−3.50	0.001	0.64
7. Student life satisfaction—neighbourhood	2.89	0.58	3.30	0.57	−3.98	0.001	0.72
8. Creativity self-efficacy (cognitive style)	3.10	0.73	4.17	0.84	−7.55	0.001	1.27
9. Creativity self-efficacy (working style)	3.09	0.86	3.99	0.77	−6.08	0.001	1.17
10. Intercultural efficacy	3.44	0.83	4.07	0.69	−1.54	0.001	0.91
11. Civic efficacy	3.21	0.79	4.01	0.75	−5.72	0.001	1.07

Notes d = [M (highly creative) − M (less highly creative)]/SD (highly creative)

observed for positive affect, satisfaction with life—self, creativity self-efficacy—cognitive style, working style and civic efficacy.

Students with high creative competency rated positive affect, life satisfaction with family, with school, with self, with friends, and with neighborhood significantly higher than students with low creative competency did. Students with high creative competency rated creativity self-efficacy in cognitive style, working style, intercultural and civic efficacies significantly higher than students with low creative competency did.

Predictors for Creative Competency

Partial correlation analysis for creative competency and affectivity and efficacy scales resulted in significant correlation: Positive affect, $r = 0.47$, $p < 0.01$; student life satisfaction—family ($r = 0.40$, $p < 0.01$), school ($r = 0.33$, $p < 0.01$), self ($r = 0.42$, $p < 0.01$), friend ($r = 0.21$, $p < 0.05$), neighbourhood ($r = 0.28$, $p < 0.01$), creativity self-efficacy—cognitive style ($r = 0.70$, $p < 0.01$), working style ($r = 0.58$, $p < 0.01$), intercultural efficacy ($r = 0.38$, $p < 0.01$) and civic efficacy ($r = 0.48$, $p < 0.01$). A multiple regression analysis was conducted to evaluate how well efficacy and affectivity predict students' self-reported creative competency. The linear combination of creativity self-efficacy (cognitive style) and satisfaction with life–family was significantly related to creative competency, $F(10, 112) = 14.13$, $p < 0.01$. The sample multiple correlation coefficient was 0.91 indicating that approximately 83 % of variance in creative competency can be accounted for by the

Table 8.4 Summary of multiple regression analysis predicting creative competency

	B	SE*B*	β	t	*p*
Positive affect	0.08	0.09	0.08	0.89	0.38
Student life satisfaction—family	0.38	0.16	0.19	2.43	0.02
Student life satisfaction—school	0.13	0.14	0.08	0.98	0.33
Student life satisfaction—self	−0.29	0.18	−0.14	−1.57	0.12
Student life satisfaction—friend	−0.17	0.17	−0.08	−1.01	0.31
Student life satisfaction—neighbourhood	0.05	0.18	0.02	0.25	0.80
Creativity self-efficacy—cognitive style	0.98	0.15	0.72	6.70	<0.01
Creativity self-efficacy—working style	−0.06	0.15	−0.04	−0.38	0.71
Intercultural efficacy	−0.08	0.15	−0.05	−0.55	0.59
Civic efficacy	0.08	0.15	0.05	0.53	0.60

linear combination of creativity self-efficacy—cognitive style and satisfaction with life—family. Table 8.4 depicts the summary of the results.

Standardized regression weights were statistically significant for creativity self-efficacy—cognitive style ($\beta = 0.72$, $p < 0.01$) and satisfaction with family ($\beta = 0.19$, $p < 0.02$). From Table 8.4, the findings supported hypothesis that multidimensional life satisfaction—family was a good predictor for creative competency and creativity self-efficacy (cognitive style) was a good predictor for creative competency.

Conclusion

Relationship Between Affectivity and Efficacy

The first research question of the study was related to the relationship between affectivity and efficacies of students in Singapore. From the mean values, the students of this study showed moderately low ratings of their positive affect and moderately high in satisfaction with different aspects in life and efficacies in creativity, intercultural friendship and civic responsibility (see Table 8.1). Fredrickson (2001) proposed in her broaden-and-build theory of positive emotions a spiral effect of positive emotions, cognitive repertoires of skills, and creative performance. The social cognitive theory of self-efficacy (Bandura 2001) alerts us of the positive relationship between emotion and efficacy. Vygotsky's (2004) cultural-historical theory of creativity highlights emotion as a reality in creative imagination. The findings of the study supported the above theories. There were positive significant correlations between affectivity and efficacy. There was also a significant positive correlation between negative affect and creative efficacy in cognitive style (see Table 8.2). The findings supported the theory on the role of negative effect in creative performance that is addressed in the broaden-and-build theory of positive

emotions (Fredrickson 1998). Negative affect correlated positively with creativity self-efficacy for cognitive style at $r < 0.20$. The finding did not come as a surprise, as there has been some attention on the role of negative affect on creative performance under an emerging theme of research of emotional ambivalence (Fong 2006). In high creative performance, positive affect and negative affect can co-exist. Qualitative studies shall be conducted to examine the role of emotional ambivalence in creativity self-efficacy. Narrative stories of highly creative persons on their personal journeys on creativity likely provide some insights into the role of emotional ambivalence in developing creativity self-efficacy.

The study explored if there were differences in ratings on affectivity and efficacy between students who self-reported high creative competency and students who self-reported low creative competency. Highly creative students rated all positive affectivities and efficacies significantly higher than their counterparts did at moderate, high, and very high effect size (Table 8.3). The findings supported social cognitive theory of self-efficacy (Bandura 2001) that highly competent people are efficacious. The findings lent support to Fredrickson's (2001) broaden-and-build theory of positive emotions that highlights a spiral effect of positive emotions, cognitive repertoire of skills, and creative performance. The findings were in line with those in Tan et al. (2011b) study that investigated the relationship between emotion and creativity self-efficacy of secondary school students in Singapore. The research showed that positive emotions correlated positively with creativity efficacy. However, the study also showed that there was no significant relationship between negative emotions and creativity efficacy. They found a positive relationship between creativity efficacy and positive affect, life satisfaction and subjective happiness. Their study revealed that students who have significantly high creativity efficacy exhibited higher ratings of life satisfaction after returning from the service-learning experience. The findings of the present study supported findings of Hill Tan and Kikuchi (2008) that investigated international high school students' ($n = 416$, age: 12–16 years old) multidimensional creativity self-efficacy and perceived creativity self-efficacy and found positive correlations ($r = 0.10–0.50$, $p < 0.05$) with positive affect, satisfaction with life, and happiness. Tan et al. (2008) embarked on an intervention study with 389 high school students in Singapore. They were aged between 14 and 18 years old. The participants filled out a multidimensional creativity self-efficacy scale and three emotion scales (Positive Affect and Negative Affect Schedule, PANAS, Watson et al. 1988; Satisfaction with Life Scale, SWLS; Diener et al. 1985; and Subjective Happiness Scale, SHS, Lyubomirsky and Lepper 1999) before and after an overseas five-day service learning trip. There were positive correlations ($r = 0.13–0.43$, $p < 0.05$) between efficacies and affectivities for the scores before and after service-learning. Participants whose affectivities and efficacies were lower ($n = 141$) showed significant increases only in affectivities (i.e., SWLS and SHS, with small effect sizes, $d = 0.2–0.28$). Their counterparts ($n = 138$) whose affectivities and efficacies were higher showed significant increases in both creativity self-efficacies (with small effect sizes, $d = 0.02$) and affectivities (i.e., PANAS, and SHS, $d = 0.004–0.18$, and SWLS with a medium effect size, $d = 0.58$).

Predictors for Creative Competency

Some theoretical constructs can be further explored and examined between affectivity and efficacies. In a study by Filipowicz (2006), he identified the element of surprise as an important factor which links positive affectivity to higher creative performance. The research showed that with the injection of surprise; for example, humour to induce a positive mood, resulted in a highly significant increase in the students' positive affect. His study revealed that by inducing the positive affectivity, it resulted in a higher creative performance produced by the students. In another research by Hennessey (2003), it examined the relationship between having a sense of motivation and creative self-efficacy. The results showed a positive correlation with the students' driven sense of motivation and creative performance in completing a set task. Both of these studies support the belief that positive affectivities are significantly important to enhance creative self-efficacies. The research findings by both Filipowicz (2006) and Hennessey (2003) can further establish the role of positivity in developing creative self-efficacies and positive learning outcomes.

Multiple regression analysis provided some insight into the relationships between creative competency, creativity self-efficacy in cognitive style and satisfaction with life–family. Findings of this study showed that creativity self-efficacy in cognitive style and life satisfaction with family were good predictors for creative competency (Table 8.4). The findings supported social cognitive theory of self-efficacy (Bandura 2001) that task-specific self-efficacy (in this case creativity) is related to task specific performance (in this case creativity). In the young age, microsystem forms the essential support (see Bronfenbrenner and Morris 1998). Experiences with the family and emotions related to evaluation of the quality experience likely influence self-reported creative competence of the participants of the study. The findings were in line with Vygotsky's (2004) cultural-historical theory of creativity that claims social cultural experiences and emotion as realities of creative imagination. The findings were in line with a study conducted by Tan et al. (2011b) who examined the correlation between multidimensionality of creativity self-efficacy and its contextual (i.e., classroom environment). The study aimed at assessing the multidimensional concept of creativity self-efficacy of students from different secondary schools in Shanghai, China. The study examined the relationship between the multi-dimensional construct of creativity self-efficacy (i.e., idea generation, concentration and tolerance of ambiguity) and students' perceived classroom behaviour. The hypothesis was that perceived supportive environments would have a positive relationship with creativity self-efficacy. Their findings of the study support multi-dimensional conceptions of creativity self-efficacy or creativity related behaviour going beyond a single dimensional construct of creativity. The results showed a significant positive correlation between classroom behaviour and creativity self-efficacy (i.e., idea generation, concentration, and tolerance of ambiguity).

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Chapter 9
How to Develop Children's Creativity and Intercultural Sensitivity: Around Creativity Compass Program

Dorota M. Jankowska, Aleksandra Gajda and Maciej Karwowski

Introduction

It is the second decade of the twenty-first century, and since the end of World War II, the world has not seen a single day of peace. We are writing this chapter bearing in mind fresh media reports on a tragic massacre that took place in Nairobi, we observe the unrest in Egypt with concern, and every day we are being fed with new images of violence flowing straight from a lack of tolerance. The level of cruelty that people inflict on each other is striking, especially when we think about the extent of creative acts that humans are able to perform. On the one hand, people constantly develop their own culture, civilization and themselves, however on the other hand, they can ruthlessly destroy everything. Numerous contemporary studies in social psychology show that the spheres of creative thinking and social relations are in fact closely related: developing creative thinking can simultaneously reduce stereotypes and prejudices, consequently allowing for the construction of a better world (Goclowska and Crisp 2012; Goclowska et al. 2013). Therefore, the need of today's reality and a challenge for educators is to create programs that will stimulate creativity as well as build positive social relationships, respect for diversity and intercultural sensitivity.

The need to develop a program combining the stimulation of creativity and intercultural competences of children comes also from the obvious fact that those abilities are treated as basic equipment in the modern world. They enable people not only to cope well with cultural diversity, but also to exploit the opportunities arising from the merger of different cultures. Many practices applied in education around the world are based on the assumption that multicultural experience fosters the development of creativity (Maddux et al. 2009). Communing with different cultures helps to go beyond the known, previously used, behavioral patterns (Finke et al. 1992;

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Maddux et al. 2009). It also helps to connect remote ideas, which brings about creative solutions (Mednick 1962). Multicultural experiences can also be a source for the development of openness to new experiences, cognitive curiosity, motivation and independence: the essential components of creativity (Amabile 1996; Sawyer 2006). Despite the existing need to take actions shaping sensitivity towards diversity, we still lack such programs aimed at children (Subramaniam et al. 2009), even though it is known that multicultural experiences acquired in childhood are fundamental for the process of learning to accept diversity (Kim et al. 2006).

Education Supporting the Development of Creative Potential

Creativity as the Aim of Educational Activities

Reality changes so rapidly, that it is difficult to predict the challenges people in the future will have to meet. Competences such as openness to experience, independence, ability of creative problem solving significantly facilitate the use of different sources of information and to find one's way in a new and uncertain situation (Cropley 1999; Feist 1998). In education still, too little attention is paid to these elements, promoting analytical thinking and the acquisition of specific knowledge (Beghetto and Kaufman 2010; Karwowski et al. 2007).

Sometimes it is forgotten that by enhancing children's creativity, teachers not only develop their divergent thinking and openness to experience, but also the ability to explore and understand the world, to create new connections and to find new patterns in the complex reality. Most importantly, creative ability extends the understanding of integrated areas of knowledge (Sharp 2004), which may bring about the creation of numerous innovative solutions in the future. Therefore, it is worthwhile to employ various methods in order to stimulate creativity, to introduce educational programs focused on its development and to enrich solutions that are already in use (Starko 2005). Teaching creativity, and giving an education that shapes people who are creative, innovative and open to changes are perceived by many as a necessity (National Advisory Committee on Creative and Cultural Education (NACCCE) 1999; Tsai 2012), and should be an important addition to the typical school activities, which do not engage students in thinking and acting creatively often enough (Mellou 1996; Prentice 2000).

Creative Development Stimulation

Creativity is mostly defined as the activity leading to the creation of products that are new (original) and useful (Amabile 1996), that form a response to perceived, existing or abstract problems (McKinnon 1962). Such definition refers primarily to

the effects of the actions undertaken. During childhood creativity is clearly of a more personal and subjective nature (Glaveanu 2011). Therefore, the criterion of originality and usefulness of the creative works is defined individually for each child (Runco and Charles 1997), and creativity is treated as a potential that can become a creative expression or product (Sharp 2004). The results of the creative activity of the child can be both internal change, such as the development of imagination or creative thinking, and the work-product of a particular material, such as the original drawing or a symbolic creation, for example, made-up dance. Stimuli that trigger children's creative activities include open activities, creative problems posed to them by the environment (parents, teachers or peers), as well as their own invention, the need to come up with creative ideas (Duffy 2006).

Creativity training is one of the most often met forms of developing creativity. Such trainings are carried out at the pre-school level of education (Cliatt et al. 1980; Dziedziewicz et al. 2013; Meador 1994), as well as in primary schools (Castillo 1998). Most of these interactions are based on the assumption that the key element in the development of creativity is to stimulate divergent thinking, mainly fluency of thinking, defined as the ability to produce many ideas in a short time; flexibility of thought, understood as the creation of qualitatively different solutions; originality of thinking, which is responsible for the production of rare and unusual ideas and elaboration—the ability to improve on ideas (Guilford 1967). The effectiveness of such trainings among youths is high (Karwowski and Soszyński 2008; Scott et al. 2004; Ma 2009), also within groups of young children (Cliatt et al. 1980).

Creative imagination—the ability to convert available and stored data and to create new and original mental imagery based on existing information—is another important characteristic of children's creative abilities (Linqvist 2003). According to Vygotsky (1930/2004, 1931/1991) imagination and thinking form a special unity, which helps children to understand the world around them. It was recently demonstrated that the use of programs like 'doodle-book', the aim of which is to complete unfinished drawings, often based on spontaneous fun, positively influence the development of children's divergent thinking and imagination. Creative stimulation with the use of programs such as 'doodle-book' has a positive impact not only on the development of fluency, flexibility and originality of thinking, but also on the imagination of pre-school children (Dziedziewicz et al. 2013). It was also found that creative imagination tends to correlate positively with several psychological characteristics responsible for creative actions, like: personality traits, values and needs and intelligence (Karwowski 2008a, b).

Towards Intercultural Education

Education in Conditions of Cultural Diversity

With the increasing cultural diversity of societies (Berry 1990) there is a growing need for works devoted to education that facilitate socio-cultural integration (Cohen

and Manion 1983). Interventions undertaken in this area are aimed at raising the awareness of cultural diversity, changing attitudes or behaviors (Fisher 2011), stimulating interest in intercultural contacts (Gannon and Poon 1997), encouraging intercultural sensitivity (Klinge et al. 2009) and building intercultural relationships (Sakurai et al. 2010). Such actions usually bring positive effects (Deshpande and Viwesvaran 1992; Morris and Robie 2001); however, they mostly concern adults and are focused on helping to solve pressing problems related to cultural diversity. From a broader perspective the preparation of current and future generations to live in a culturally diverse reality requires creating dedicated educational programs aimed at developing intercultural sensitivity from an early age (Banks and Banks 2004; Derman-Sparks and Ramsey 2006). Such activities, however, require raising the competences of teachers and educators in the field of intercultural education (Ponciano and Shabazian 2012), adjustment of planned interactions to children's and youth's functioning (Kim et al. 2006) and also giving them status in programs and educational practice (Boutte 1999).

Supporting the Development of Intercultural Competences

Intercultural competences may be treated as a set of skills, knowledge and attitudes needed for effective functioning in interactions with people who are different linguistically and culturally (Fantini 2000). Supporting the development of those competences may take place on many levels. On a cognitive level: by raising awareness of their own and other countries or nations, and of different culture circles as a component of national identity. Such knowledge concerns, for example, national symbols and colors, the language, the country's history, tradition and culture. Developing cultural self-awareness allows the recognition of cultural differences and the ability to relate them to own culture (Bennett 2009). Another level is the affective level, which is associated with the ability to cope with the emotions that accompany people in intercultural relations. Therefore, the work undertaken concerns changing attitudes; strengthening intercultural sensitivity, which is associated with perceiving significant cultural differences; respect for diversity (Hammer et al. 2003); and understanding and accepting intercultural differences (Chen and Starosta 1998). The third level is the development of specific abilities, which will help the ability to function in conditions of intercultural diversity, for example, the ability to greet and to communicate. Training of this kind uses simulation games and role playing (Fisher 2011).

During childhood, supporting the development of intercultural competences is based on strengthening the awareness of the diversity of cultures and concentrating on everyday situations that require intercultural interactions (Kim et al. 2006). A commonly used practice in this matter is the employment of literature, history or books on intercultural subjects (Subramaniam et al. 2009) as well as the organization of school classes focusing on intercultural aspects (Orly and Maureen 2008). Talking about topics related to intercultural differences strengthens the ability of children to

notice situations in which they could be more sensitive towards intercultural differences (DoBroka 2012). Longer and better organized activities result in increased interest in other cultures and the development of intercultural sensitivity (Subramaniam et al. 2009) as well as the change of stereotypes (Orly and Maureen 2008).

Creativity Compass—A Program Developing Children's Creativity and Intercultural Competences

Assumptions, the Structure and Content of the Program

Basing on the activities model of Stephan and Stephan (2012), the construction of the Creativity Compass program was divided into six steps. At the start a group of respondents was selected. These activities were preceded by an analysis of the research supporting the need, opportunities, and the validity of developing children's creativity and intercultural competences. Then further specified goals were defined, and the choice of relevant theories, which were to be the theoretical assumptions of the program, was made. On this basis specific techniques and exercises activating the selected processes were developed (those will be the subject of a separate publication; Dziedziewicz et al. 2014).

Teachers and trainers working both in schools and kindergartens, as well as in non-formal educational centers, were consulted over the proposed instructional and organizational solutions. The final stage of the program's formation was the intervention study examining its effectiveness, which is presented in detail elsewhere (Dziedziewicz et al. 2014).

The program is addressed to all adults who work with children, teachers, tutors and trainers, who are interested in developing the potential for creativity and intercultural sensitivity among children. The program offers classes for children aged 6–12 years old. It can be implemented both in school and informal education, such as cultural centers, clubs, interests circles, or at camps.

The objectives of the program were determined by the combination of two types of educational activities: (1) creativity training, which consists of triggering the spontaneous creativity of children and (2) intercultural competences workshops, which enable, for example, the enrichment of the knowledge of cultural diversity of the world, learning about other cultures and developing intercultural sensitivity (Table 9.1).

The program also develops a number of other competences, that are not included in Table 9.1, such as interpersonal skills (the ability to cooperate, making joint decision-making, empathy, accepting criticism, coming to compromises) and self-presentation (the students' ability to present their views, to participate in the debate and defend their case). It also stimulates the development of general cognitive processes such as memory, attention and perception.

Creativity Compass is based on active teaching methods. Classes in the program use fiction and storytelling as examples. The general theme is travelling to different countries, cities and regions. Implementation of the program is carried out in three

Table 9.1 Detailed aims of the program

Intercultural competences training	Creativity training
Knowledge about own and other countries, cultural circles	**Divergent production**
Development of knowledge about: - history - legends and myths - culture - traditions and customs - national symbols - landmarks and tourist attractions - famous personalities - cuisine - the climate and environment - national sports	Development of: - fluency of thinking - flexibility of thinking - originality of thinking - sensitivity towards problems - elaboration
Intercultural sensitivity	**Question thinking**
Development of: - interest in other cultures - the ability to perceive cultural similarities and differences - understanding the cultural differences - ability to understand different phenomena, situations, events from a different point of view than own culture - respect and tolerance for intercultural differences	Development of: - the ability to perceive problems - ability to form questions in respect of undertaken problems - ability to re-define question, its form and content
Cultural self-awareness	**Creative imagination**
Development of: - self-reflection on own prejudices in the matter of cultural diversity - ability of coping with negative stereotypes and cultural prejudices Counteracting: - creation of negative stereotypes, prejudices and discriminatory behaviors	Development of: - imagery - ability to transform imaginations - originality of created imaginations
National and regional identity	**Creative thinking operations**
Enforcement of: - sense of unity and identification with the nation, the regional community and its various collectivities - sense of identity with the territory and places - sense of belonging to nation's culture, region and cultural circle - awareness of national heritage	Developing operations of: - creating associations - creating analogies - creating metaphors - transformation - deduction - abstract thinking
	Creative attitude
	Development of: - openness - independence - perseverance

stages. The first stage: 'interest' aims at the introduction of the subject and encouraging children to participate in the creative activity. Typically, this phase takes the form of open questions, which builds a climate of curiosity and stimulates the forming of their own opinions and judgments. This step also serves as a warm-up, which

stimulates the development of divergent thinking and imagination. The box below provides an example of such an exercise and the effects in the form of children's work.

Road traffic in India:
Participants sit at a large table, along which paper tape is glued—the street. Each of them draws an imaginary dream vehicle. The teacher encourages the creation of vehicles that do not exist, but according to kids should exist. Participants put the drawings on the paper tape, forming a long line of traffic. Each child talks about his vehicle, and describes how the vehicle works and why it is unique and can overcome the problem of road traffic in India.

The warm-up is followed by the 'research' stage. This is a series of exercises developing basic operations of creative thinking: association, abstraction, deduction, analogy, transformation, use of metaphors (Nęcka 1992), imagination and creative attitude. These exercises are selected from the so-called 'exercises pool' designed for the nine main themes: the history of the country and its myths and legends, culture, traditions and customs, national symbols, monuments and tourist attractions, famous personalities, regional cuisine, climate and the environment, national sports. These areas were chosen as they relate to different aspects of multiculturalism. The box below provides an example of such an exercise and the effects in the form of children's work.

The face of victory:
The teacher tells the children about the Louvre in Paris and the sculpture of the goddess Nike, which can be found there. He shows pictures of the Nike of Samothrace and gives out worksheets 'The winning Nike'. Children have to draw a face of the winning Nike. They can also draw other elements of the contour sculpture. After completion of the task, each child says in what field the drawn character was victorious.

At the end of each meeting there is the 'discovery' stage, which is a reflective summary of knowledge about other cultures acquired during the course of the class (Fig. 9.1).

All games and exercises in the program are prepared in various forms, varying by age of the children, the duration and type of activity undertaken. This allows the customization of the program to the given conditions and the needs of the children. Each scenario is supported with materials for the class. That includes theoretical and methodological guidelines for a detailed discussion of the main themes together with trivia that can be passed to children during the class. Scenarios are complemented by photographs and supporting plastic cards that can be used in the classroom.

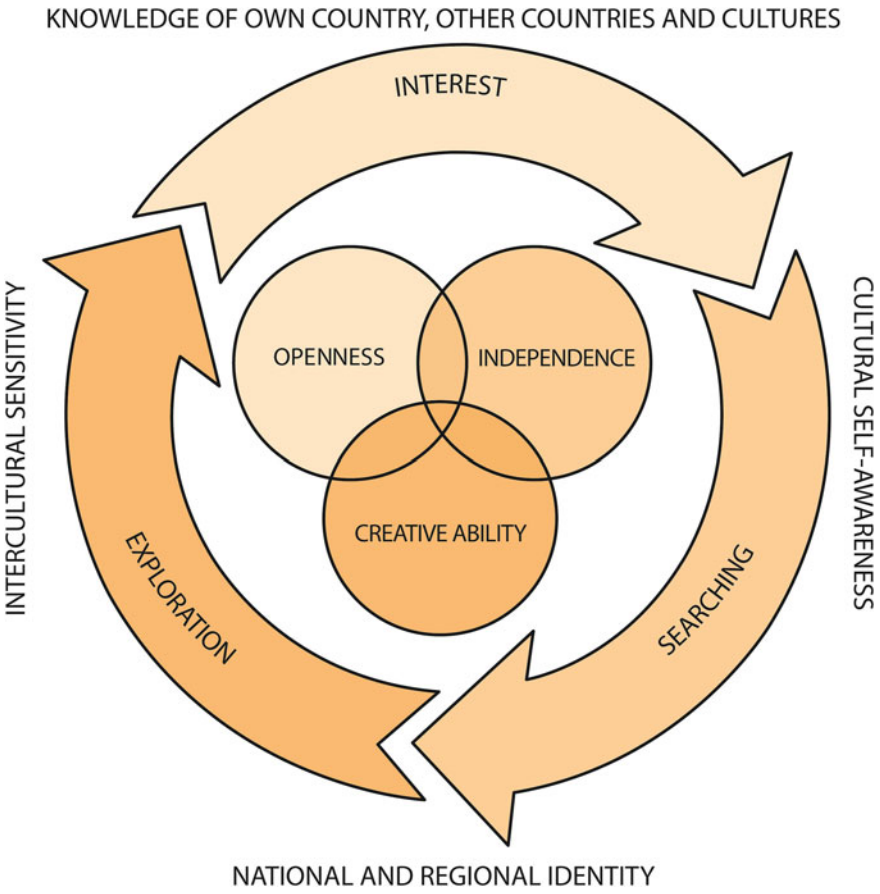

Fig. 9.1 The structure and content of the program

Effectiveness of the Program

The effectiveness of the program has been tested in an intervention study with 122 children aged 6–12 (see detailed description in Dziedziewicz et al. 2014). Prior to testing, for over a year four different types of teachers conducted classes on the basis of this program, including activities at schools and activities for groups of all ages in community centers. These experiences allowed us to refine the experimental program, which ran for 9 months, once a week as part of extra-curricular activities. Thirty training sessions were completed during the intervention. Each of four experimental groups was led by a different teacher, trained for the purpose of the program. Additionally, during the course of the experiment, the leaders took part in specially designed e-learning training that focused on the areas of the development of creativity stimulation and intercultural competences.

The evaluation studies, before the start of the proper experiment, as well as after its completion, used Circles Test from the set of Torrance Tests of Creative Thinking (Torrance 1974) in order to measure the divergence thinking. The creative imagination of the children was tested using the Franck Drawing Completion Test (Dziedziewicz et al. 2013). A new instrument, created on the basis of analysis of existing tools designed for adult respondents (np. Fuller 2007; Holm et al. 2009; Peng 2006) as well as relating to the concept of intercultural sensitivity defined by Hammer et al. (2003), was created in order to measure intercultural competences. This instrument was also used to evaluate participants' knowledge about their own country, which is key in the development of national and regional identity, especially during childhood (Smith 1993). The designed test sheet presented two children of an Asian background who have just moved to Poland. The children's task was to answer two questions: (1) 'What do you think would be difficult for them?' and (2) 'What could you tell them about your country?' The children's answers were assessed by two independent competent judges on a 5-point scale, 1 being a low result and 5 a high one.

In the case of **intercultural sensitivity** its initial level in the control group and the experimental one was similar, but at the end of training, within the group of children participating in it, the level of intercultural sensitivity improved significantly. Despite the differences between the age groups, the effectiveness of the program for each of the age groups was identical (Fig. 9.2).

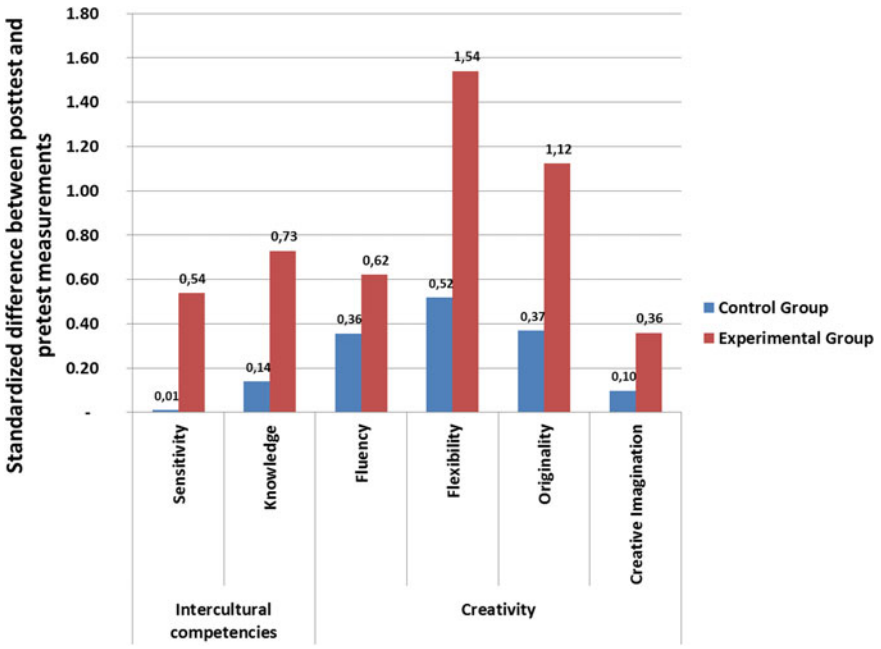

Fig. 9.2 The average changes between posttest and pretest in control and intervention group

A similar situation occurred in the field of **knowledge and cultural awareness**. A study conducted before training showed the same level of knowledge among children who were not enrolled in the program and the children who participated in it. The results of the study repeated after the training showed a significant increase in knowledge and cultural awareness among children taking part in the training activities.

The level of **creative imagination** in children participating in the program did not differ significantly from the results of children who did not participate in training. In the experimental group, the level of creative imagination noticeably increased. Although the increase in the level of imagination was not spectacularly high, it fulfills the expectations related to the effectiveness of the training program.

In the case of **fluency of thinking** the results of the study conducted before the training showed that the level of fluency in children taking part in the training was noticeably lower than in the group of children not covered by the program. After the training, the situation had changed; as far as the control group was concerned, the fluency of thinking had not increased significantly, but among the children who took part in the experiment we observed a significant increase in its level.

A similar situation occurred in the case of the level of **flexibility of thinking**. The first study also showed that the group of children not participating in training was characterized by a higher level of flexibility of thinking, than children in the experimental group. The second measurement, after the training, showed an increase in flexibility of thinking in both groups, except that in the group of children covered by the program, the growth was much higher.

Also, in the case of **the originality of thinking** the first study showed that for the children in the control group, the level was higher than for children taking part in the training. Interestingly, in both groups, the results of a survey conducted after the training ended showed an increase in the level of fluidity. However, in the group of children participating in the program, the observed increase was significantly higher (see Dziedziewicz et al. 2014 for a more detailed description).

Summary

The evaluation demonstrated, as we hypothesized, the high efficiency of the program: The level of participants' creativity had noticeably and significantly increased, as evidenced by higher scores than average in creative imagination, fluency, flexibility and originality of children's thinking. Therefore, we managed to achieve the main objective of the project—the development of children's spontaneous creative activity. The study results correspond with the outcomes of researches of other scholars who conducted training sessions with children in preschool and at primary school level (Castillo 1998; Cliatt et al. 1980; Meador 1994), focused only on the development of divergent thinking. At the same time the increase in the level of creative imagination was similar to the results of studies by Dziedziewicz et al. (2013). Thus it may be concluded that Creativity Compass is an

effective tool developing two aspects of creativity—creative thinking and creative imagination.

Regardless of the age of the children who participated in the project, intercultural sensitivity, knowledge and cultural awareness increased significantly. In other words, we also managed to achieve the second objective of the program—the development of intercultural competence. The positive results obtained in the evaluative study correspond with the results of Klinge et al. (2009), whose aim was to develop intercultural sensitivity and of Subramaniam et al. (2009) who noted also an increase of interest in other cultures. The very manner of the course in some areas is similar to lessons on an intercultural subject described by Orly and Maureen (2008).

The results indicate that both the structure and assumptions of the program were pertinent. Activities based, on the one hand, on the development of knowledge about their own country and other countries and cultures, cultural self-awareness, cultural sensitivity and national identity, on the other hand on stimulation of openness, independence and creative abilities, had the desired effect. Moreover, the three-stage structure of the program (the stages of interest, research and discovery) proved to be helpful in achieving the objectives of the program.

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Chapter 10
Assessing Schools on Creativity: A Toolbox for U.S. Teachers and Policymakers and a To-Do List for Researchers Worldwide

Beth A. Hennessey

Introduction

In much the same way that fashion trends and musical styles come and go, instructional approaches also fall in and out of favor. In the 35 years that I have been involved with education in the U.S., I have seen the pendulum swing from the so-called "open education" model, to a "drill and kill"/"back to basics" mentality, to an age of high-stakes testing[1] and accountability (for a helpful historical overview see Urban and Wagoner 2009). Interestingly, each successive "new and improved" instructional ideology has emerged as almost the antithesis of what has come before. The "open classroom," so popular in the 1970s, provided opportunities for child-centered, "hands-on", individualized instruction (Mai 1978). Teachers rarely delivered lessons to the class as a whole, and curricular content was driven in large part by students' own interests. The publication of *A Nation at Risk*, a report made by the National Commission on Excellence in Education in1983 (NCEE 1983), then raised concerns that American schools were in decline and prompted a revival of a far more academically-driven curriculum and a renewed emphasis on standardized testing. In 2001, the enactment of the No Child Left Behind (NCLB, West 2003) legislation highlighted the glaring educational inequities in public education across the United States and put into law the requirement that each state implement a system of accountability that would first identify low-performing schools and then

[1]High-stakes tests get their name from the fact that scores on these assessments really do have significant consequences for students, teachers, individual schools and entire school districts. In most U.S. states, high school students now have three opportunities to pass the last of a series of assessments that begin at grade three (age 8). If they do not pass, they do not receive a high school diploma. In addition, teachers often find that pay raises, promotions, and even their job security are tied to their students' scores (e.g., Fitzgerald 2008).

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bring those schools up to standard in a prescribed amount of time. And now, most recently, NCLB requirements have been supplemented with standards from the Common Core. U.S. teachers who began their careers in the 1970s and who are now newly retired or getting ready to retire have experienced a profound transformation of their profession, and in the next few years even more fundamental changes are set to take place.

In many respects, these fluctuations in educational approaches and priorities are a reflection of changes in the way that American politicians and their educational advisors have come to see the purpose of schooling over the past half century. We have moved from a model of educating the "whole child", to a concern that young Americans perform as well as (if not better than) students in other countries, to the decision that it is the schools that can best be used as the vehicle to equalize opportunities for all of our citizens. Clearly, some of the major forces driving these changing views are economically based. In an era when the United States was relatively secure in its position as the world's leader in education, technology and innovation, policymakers felt comfortable with the idea of an open, student-centered approach to teaching. But as time went on and more and more international comparisons of student achievement were made, the U.S. worried that it might be losing its edge. Tales of woe and impending doom filled the media as reports revealed that students in some other parts of the world were outperforming their U.S. counterparts. And the educational pendulum swung towards the institution of longer school days and a return to a more structured teaching approach, standardized curricula, memorization, drills and testing (see Urban and Wagoner 2009).

Importantly, this swinging pendulum has in no way been confined to the U.S. With globalization has come a heightened awareness that teaching can and is being "done" in a variety of different ways. Especially in recent years, educational theorists and policymakers worldwide appear to have taken the position that the grass is always greener in some other nation's schoolyard. While the U.S. has been moving back to basics, educational decision makers in many other parts of the world have been striving to infuse more open-endedness and flexibility into their teaching approaches. In 2003, as NCLB regulations were taking hold in the U.S. and the few remaining open classrooms were being wiped from the American landscape, I was invited to make two trips to Asia. In both Shanghai and Hong Kong, I talked with educators about my research focused on the question of how best to set up school environments conducive to student creativity. I made trips to primary-level classrooms that looked and functioned like the open classroom I had constructed as a fledgling teacher in the late 1970s in Colorado. For me, it was like stepping back in time. The physical classroom spaces, the instructional tools and educational approaches, the excitement and energy that filled those rooms—everything felt so familiar, so comfortable. These Asian schools I visited were embracing the very teaching approach in which I had been trained and believe in so strongly, the very same practices that educational theorists and policymakers in the U.S. had decided to abandon.

Some 10 years after my initial trips to Asia, I found myself making frequent flights to Singapore, this time due to my involvement in a collaboration between the government of Singapore and the Massachusetts Institute of Technology (MIT).

Together, we were working to establish the Singapore University of Technology and Design (SUTD), a world-class research institution dedicated to the promotion of innovation and creativity in the areas of engineering and architecture. But students study much more than traditional math, science and engineering at SUTD. Integrated into the curriculum are humanities, arts and social science courses constructed so as to enable students to become multi-dimensional and critical thinkers. This is not the first time that a prestigious American university has engaged in such an international collaboration. A number of elite schools, including New York University, Georgetown and Duke have established sizeable branches in countries such as Dubai, China and India. And in Singapore there are several such collaborations under way, including the *Cornell-Nanyang* Institute of Hospitality Management and the Yale University partnership with the National University of Singapore to build Singapore's first liberal arts college. Again, the pendulum swings. At a time when many economists, educators, employers, parents and students in the U.S. are seriously questioning the practical value (and high cost) of a liberal arts education, countries like Singapore, Spain, Germany, Ghana and the Netherlands are considering the adoption of this higher education model for the first time in their nations' history. The U.S. goes back to basics while much of the rest of the world embraces the liberal arts.

Well, not exactly. In the last few years in the U.S., a new national educational "crisis" has been identified. Educational analysts and policymakers now worry that the high-stakes standardized tests that have recently taken on such importance are based on far too narrow a measure of student success. These assessments, they believe, fail to reveal whether the U.S. public education system is adequately preparing students for the future. Also needed, say the experts, are indicators of the opportunities provided by schools for students to engage in actual creative work—following an idea or project from initial conception through multiple revisions and eventually implementation. In response to this criticism, high-stakes tests are not being replaced, however. Instead, the proposal is to augment the existing tests with creativity rubrics (see Robelen 2012).

A little more than 30 years ago, I made the difficult decision to give up my position as a primary-level teacher, to leave the school and the children whom I loved, in order to pursue graduate studies. As I had come into my own as a teacher, I found that I worried constantly about my own students' plummeting motivation and creativity and wondered what I could do to help children to hold onto the excitement, interest, and creative spirit they had shown as five-year-olds entering school. I decided that an advanced degree in psychology could best prepare me to answer this question, and I have spent my entire research career investigating how best to set up classroom environments so that they are optimally conducive to student creativity. Given my own scholarly mission, it is easy to understand the excitement that I felt when I first learned that my home state of Massachusetts might be the first state in the U.S. to pass a bill mandating that schools provide frequent, high quality opportunities for students to engage in creative work. Massachusetts, as well as Oklahoma, California, and a handful of other states, is now moving toward the implementation of what is being termed a "creativity

index" (Robelen 2012). This measurement device will be designed to rate U.S. public schools on how well they "teach", "encourage" and "foster" creativity in students. One of the primary measures underlying this index will be a tally of the number of opportunities, including science fairs, debate clubs, theatre productions, and after-school enrichment programs, provided for students to engage in creative activities.

But will this effort being spearheaded by well-meaning politicians, business leaders and educators do more harm than good? I have waited my entire professional life for the people in power to take seriously the development of creativity in our schools. But my own research findings, most especially what I have learned about the link between motivational orientation and creativity of performance, leads me to see a whole host of potentially serious problems with this most recent wave of changes to educational policy.

The idea of a creativity index is not entirely new. For example, an index is successfully being used to describe and map the myriad manifestations of and opportunities for creativity in Hong Kong. This measurement device allows for an in-depth examination of the various socio-economic and cultural factors that contribute to Hong Kong's creative vitality (Bacon-Shone and Hui 2010). And with the goal of making cross-national comparisons, Richard Florida and colleagues have constructed a so-called "Global Creativity Index" designed to evaluate and rank 82 nations on Technology, Talent and Tolerance (Florida et al. 2011). Clearly, both of these creativity indices, and others like them, were created to be used as barometers of economic development. But why would Massachusetts and other states around the U.S. set out to apply an economic indicator to their *schools*? Education is about opening the minds of students. Education isn't about economics. Or is it?

As a young teacher, my decision to leave the children and the classroom I loved to pursue graduate study was made at the micro level. My concerns were almost exclusively focused on individual learners. I was determined, desperate really, to figure out how schools could preserve their students' natural intrinsic motivation, that excitement they had about learning as they entered kindergarten. Intrinsic motivation is the motivation to engage in an activity for the sheer pleasure and enjoyment of the task itself rather than for some outside goal such as the winning of a contest or the receipt of a reward. Intrinsic motivation is almost always preferable to extrinsic motivation.

An intrinsically motivated state, characterized by deeply focused attention, enhanced cognitive functioning, and increased and persistent activity (Alexander and Murphy 1994; Maehr and Meyer 1997), leads to deeper, more long-lasting learning and better problem solving on open-ended tasks (McGraw 1978; McGraw and McCullers 1979). As early as 1913, Dewey (1913) identified the link between student interest or curiosity and effort expended in the classroom; and in 1967 Simon (1967) empirically demonstrated that learners driven by intrinsic motivation and curiosity try harder and exert more consistent effort to reach their learning goals. A large body of investigations have demonstrated that when students approach new concepts with high levels of curiosity and interest, information is better learned and remembered (e.g., Flink et al. 1992; Gottfried 1990; Harter and

Jackson 1992; Hidi 1990; Lepper and Cordova 1992; Tobias 1994). In fact, intrinsic motivation promotes far more than memory and persistence. Students' motivational orientation also helps to determine the kinds of activities they will choose to pursue in the first place. When given a choice of open-ended tasks requiring a creative solution, extrinsically motivated students tend to opt for the easiest possible problems (Condry and Chambers 1978; Pittman et al. 1982). Intrinsically motivated learners, on the other hand, are more likely to take risks and explore solutions to questions or activities that represent for them an appropriate level of difficulty and challenge. Most significantly of all, intrinsic motivation leads to creativity of performance, whereas extrinsic motivation is almost always detrimental (Amabile 1983, 1996).

Yes, intrinsic motivation and the creativity it can engender are important at the individual level. Students are more successful learners, they feel pride in the work that they do; and studies of a phenomenon termed optimal experience or "flow" point to a link between creative behavior and a highly pleasurable, almost joyous, state in which persons of all ages become so immersed in an activity or problem that they lose all sense of time and place (see Csikszentmihalyi 1993, 1997). But creativity is also important at the macro level. Creativity is necessary for the advancement of the larger community in which students reside. Creativity brings solutions to society's problems and leads to new and profitable products and inventions. Creativity is essential for the economic growth and development of all nations. This is why countries like Singapore are collaborating with institutions like MIT to develop new creative design centers and universities. This is why places like Massachusetts are working to institute a creativity index that can be used to monitor schools' efforts to boost the creativity of their students. The creativity of its citizens is one of a nation's most valuable natural resources; and at least in the U.S., lawmakers have now decided that it is up to classroom teachers to nurture this resource.

The creation of a creativity index will have a direct impact on curricular decisions made at my own son's school, the other schools in the town in which I live and schools all across Massachusetts. The question for me as a researcher is how can I best use my knowledge and expertise to assist teachers and administrators who must now contend with this new legislation? This is not the first time I have been faced with this thorny problem of bridging the often tension-filled gap between researcher and teacher/practitioner. All too often, PhD investigators and their equally well-meaning graduate students bring with them to the primary or secondary school setting an air of superiority that is intimidating to even the most seasoned of educators. University scholars need to trust the real-world experience and intuition of classroom teachers. And teachers need to suppress the tendency to feel inferior and proceed with the conviction that they really *do* have a good deal to offer these university scholars. Teachers' years of experience in the schools make them the ideal consultants at every phase of the research process. Who better to ensure that empirical studies have direct applicability to classroom practice than these professionals? Who better to "translate" the findings reported by their university colleagues to their fellow classroom teachers? (see Amabile and Stubbs 1982; Frankham and Howes 2006; Fraser 2010; Johnson et al. 1999).

Yet the facilitation of an open flow of communication and the maintenance of an atmosphere of mutual respect is easier said than done. And now, as if problems of distrust between classroom teachers and university scholars weren't difficult enough, with the introduction of creativity indices, come politicians and economists entering the mix. How can researchers like myself best use our knowledge and expertise to assist teachers and administrators who must now contend with this new legislation? First, it is imperative that we "get the word out" that there really is an impressive body of empirical literature that can inform policymakers and politicians as they work to construct measures of opportunities for creativity in the schools. I was especially saddened, but not particularly surprised, to see this quote in an article highlighting the new creativity index legislation:

> Researchers have recently examined the subject of teaching creativity, but experts are just beginning to determine what makes some students more creative than their peers and how the classroom environment can nurture, or smother, that capacity. (Robelen 2012, p. 12)

How is it possible that such an erroneous statement could appear in a publication as prestigious as *Education Week*? Even a cursory review of the literature reveals that the empirical study of personality, cognitive and other factors associated with creativity has an especially prolific and distinguished history. In fact, the issue of whether individual difference variables might contribute to creative performance was one of the first questions investigated by creativity researchers. As early as 1870, Galton published a study of the biographies and autobiographies of well-known creative figures and set out to identify the unique qualities of intellect and personality that differentiated this group from their less creative peers. This emphasis on individual difference variables continues into the present; and beginning in the 1960s, came to be supplemented by a second group of investigators and theorists who turned their attention to the creative process. Investigations of this type built on earlier work (e.g., Wallas 1926) and set out to specify a universal sequence of steps involved in creative production or the cognitive skills necessary for creative performance (Newell et al. 1962).

In the mid 1970s, a small group of social psychologists added yet another important dimension to the study of creativity when they called for a focus on the effect of situational factors on creative performance. Since that time, over 1000 studies of the impact of environmental variables, most especially classroom variables, have been carried out (for reviews, see Hennessey 2003, 2010). These are the empirical investigations that brought us to the realization that there is a direct link between the motivational orientation brought by individuals to a task and their likelihood of being creative at that task. We also now understand that it is the environment, or at least certain aspects of the environment, that in large part determines this motivational orientation. If Massachusetts and its 49 U.S. sister states are to have any success in promoting creativity in the schools, it is imperative that educators and policymakers alike become familiar with this rich literature and the lessons it teaches about the intersection between the classroom situation, student motivation and creativity of performance. Student motivation has for far too long been overlooked in the process of school reform. In an effort to turn this situation

around, I have decided to outfit two toolboxes. Toolbox # 1 is designed for classroom teachers, school administrators, persons charged by the states to evaluate efforts to promote student creativity, and legislators. It is filled with essential findings and prescriptions based on over 35 years of careful empirical research and theorizing. Toolbox # 2 is an essential "to do" list for investigators hoping to further our understanding of the social psychology of creativity in the schools and it is also intended to assist policymakers in their efforts to construct effective creativity indices and other creativity measurement and assessment tools. Also included in this list are suggestions for infusing a consideration of culture into any future research efforts.

A Toolbox for Policymakers and Educators

Lessons to Be Learned

Motivation is key The motivational orientation brought by a student to an open-ended activity or problem forms the boundary between what she is capable of doing and what she actually will do in any particular situation. Without the right kind of motivation, she is unlikely to take risks, play with ideas, or be comfortable with the possibility that she might fail. Without the right kind of motivation, creativity will be nearly impossible. Generally speaking, educators are fairly successful in giving background knowledge and requisite skill sets to their students. Even creativity skills such as brainstorming, suspending judgment or "piggy-backing" off someone else's ideas are often formally taught or informally modeled. Motivation, however, is too often forgotten.

Intrinsic motivation is conducive to creativity and extrinsic motivation is almost always detrimental. Expected reward, expected evaluation, competition, time limits, and surveillance have been shown to be five especially powerful killers of intrinsic motivation (and creativity). This list may sound very much like the recipe for how to set up the typical classroom. Unfortunately, however, each of these ingredients has consistently been demonstrated to be a powerful killer of intrinsic motivation and creativity for students at all grade levels (see Hennessey 2003).

Intrinsic motivation is an especially delicate and fleeting state. This ingredient so essential to creative performance is easily destroyed, and educators wishing to preserve and promote their students' intrinsic motivation must work diligently to do so. Student intrinsic task motivation cannot be taken for granted.

In the classroom, intrinsic motivation is almost always preferable to an extrinsic motivational orientation. As outlined earlier, intrinsic motivation leads to deeper, more long-lasting learning and better problem solving on challenging tasks. Intrinsic motivation also makes it far more likely that students will be willing to take risks and tackle difficult activities and problems.

Open-ended 'creativity-type' tasks are very much like mazes (Amabile 1996). There is one starting point but a variety of exit points and many different paths to those exits. Most importantly, some of those exits, those solutions, are much more "elegant" or creative than others. In situations where a reward has been promised or an impending evaluation looms large, the goal is to "play it safe" and get in and out of the maze as quickly as possible. If a creative idea or problem solution is to be generated, it is essential that the student become immersed in the maze, that is in the activity itself.

While motivational orientation is determined by a primarily internal and individualized process, creativity is very much a social phenomenon. Even the most gifted and talented of learners cannot go it alone. All students need classroom and overall school environments that promote an intrinsic motivational orientation and that are reasonably free of extrinsic constraints. Also essential is a "license" to experiment with ideas and to make mistakes as well as the time and materials to do so.

Nobody is optimally creative 100 % of the time. Creative performance, with its dependence on motivational orientation, is highly variable and very much situation-dependent.

Teachers Promote Intrinsic Motivation and Creativity

What can teachers do to promote intrinsic motivation and creativity? Research like that conducted by Cordova and Lepper (1996) calls for the construction of classroom situations that allow for the contextualization and personalization of lessons coupled with opportunities for students to make decisions about how they will meet their learning goals. Individualized or small-group instruction incorporating elements of choice in terms of what to learn and how to learn is one of the key tools teachers can use to maintain and grow student intrinsic motivation. Importantly, however, there is nothing magic about "learning by doing" activities like those advocated by Dewey and popularized during the "open classroom" movement of the 1970s. Hands-on activities will not guarantee intrinsic interest or creative behavior. Teachers striving to preserve and promote students' intrinsic motivation must work to capitalize on students' own, existing interests.

Conversations with teachers and other school staff can help children to more concretely identify their passions. Students can be encouraged to think about and articulate the exhilaration they feel when learning about particular topics or engaging in the activities they love, and they can also be helped to explore the ways these passions might best be pursued both in and out of school. Teachers, too, can share their own interests and model for their students the ways in which they find intrinsic motivation and exercise creativity in their own lives.

While it may not be practical, realistic or even possible to remove all vestiges of the five killers of intrinsic motivation and creativity from the classroom environment, students can be helped to focus on the intrinsically interesting, fun, and playful aspects of their schoolwork. They can be coached in ways to make even the

most routine assignment more exciting, and they can be taught strategies that will help them to distance themselves from socially imposed extrinsic constraints, such as rewards. This potential for teachers to "immunize" students against some of the negative effects of expected reward or other extrinsic constraints has, in fact, been demonstrated empirically (Hennessey et al. 1989; Hennessey and Zbikowski 1993).

Engagement of Policymakers

What should policymakers do? The research just reviewed tells us that, if the promotion of student (and teacher) creativity is the goal, the *last* thing policymakers should do is impose a creativity index. Most unfortunately, however, powerful killers of creativity and intrinsic motivation like surveillance and competition creep all too frequently into educational legislation. In the U.S., teachers, children and their schools already face all sorts of scrutiny. The institution of NCLB (2003) high-stakes examinations and the more recent Common Core has resulted in far too many educators abandoning open-ended lesson plans in favor of "teaching to the test." Children attend pep rallies reminding them to do their best to help bring up their school's standing. Competition, expected evaluation, rewards, time limits, and surveillance have already been legislated to the max. The intrinsic motivation of students and teachers is very much in peril and the addition of a creativity index could prove disastrous.

Above all else, politicians and their educational advisors working to construct measures of a school's success in promoting student creative behavior must first understand that student *and teacher* creativity do not come easily. Creativity must not be trivialized. Given the pressures of NCLB (2003) and the more recently instituted Common Core regulations and testing, it is already the rare teacher who can find the time, much less the motivation, to build opportunities for student creativity into the school day. The last thing teachers need is a "creativity" index that amounts to nothing more than another punitive checklist against which their own performance and the performance of their students will be judged. And even if teachers are given the resources, the license and the time to organize science fairs, theatre productions and other open-ended activities, there is no guarantee that students' creativity will be increased.

Motivation is everything Policymakers must turn their attention to classroom climate and the motivational orientation of both students and their teachers. Rather than enforcing a simplistic tally of "creative opportunities", state standards must focus on the far more difficult question of whether schools are doing everything they can to slowly but surely create a community of curious, enthusiastic and empowered young learners and innovators. Legislators will find that there are no easy assessment tools to be had here. Unlike academic achievement that can, at least to some extent, be reliably and validly assessed with the use of standardized tests, motivational orientation is situation-specific and ever changing. Any measurement tools that are developed will need to depend upon qualitative as well as quantitative data, and even the best measures will yield only "snapshots" in time

rather than robust classroom or school-wide "scores". Children's self-reports of motivational orientation will need to be combined with teachers' ratings of their students' motivation as well as inventories of classroom (and overall school) climate (e.g., Fraser 1990; Moos and Trickett 1987).

The goal must be to assess the frequency with which students are experiencing the thrill of becoming deeply immersed in an activity or problem, rather than the number of science fairs, poetry contests or theatre productions they are being offered. A tally of these so-called creative events says nothing about children's attitude, the frequency with which they get really excited about their own or another student's creative breakthroughs, or the depth of their conviction that their creative efforts really will be valued and supported at school and beyond.

There are no quick fixes Creativity is never easy. In this age of accountability and high-stakes testing, teachers must be given the moral and financial support they need to maintain the intrinsic motivation, the sheer energy and enthusiasm required to provide opportunities for their students to engage in open-ended thinking and exercise their creativity skills. Students must experience classrooms as supportive environments where intrinsic motivation can surface and flourish. If they are truly committed to optimizing the conditions for creativity in schools, policymakers and educational experts must themselves be motivated to move beyond a simplistic "quick fix" mentality of checklists and rating scales towards a far more complex and difficult reworking of the very philosophy that drives our nation's educational system. Administrators, teachers and students need the gift of time.

A "To Do" List for Researchers

As outlined earlier, U.S. policymakers and their advisors are fortunate to have an extensive literature from which to draw as they make decisions as to how best to foster creativity in the schools. Importantly, however, this body of data-based studies, philosophizing, and theoretical modeling is almost entirely Western-based. Investigators are only just beginning to explore the effect of environmental constraints on motivational orientation and creative performance in non-Western environments, and little is known about the relation between motivational orientation and creative performance outside of the U.S., Canada, and a handful of industrialized European nations. In fact, the empirical research that has been carried out points to the strong possibility that existing social psychological theories and models designed to illuminate the creative process may not adequately capture the intersection between intrinsic motivation and creative behavior across cultures.

Investigators must make a concerted effort to expand this research beyond the boundaries of affluent, industrialized Western nations. Studies must include students and teachers representing a variety of school settings and cultural backgrounds. At its core, the assertion that intrinsic motivation is conducive to creativity

whereas extrinsic motivation is detrimental rests on Western operationalizations of intrinsic and extrinsic motivation and Western assumptions about the universality of self-perception processes. Social psychologists account for the detrimental effect of expected reward, expected evaluation, competition and surveillance with the explanation that each of us is driven by an innate psychological need to feel independent, autonomous and in control of our own actions (e.g., Deci and Ryan 1985, 2000). Yet there is some evidence that persons from so-called collectivistic cultural backgrounds may not share this same need for autonomy.

Researchers and psychometricians everywhere must work to develop reliable and easily administered measures of classroom climate and student motivational orientation. To their credit, U.S. policymakers working to craft new legislation mandating that schools be assessed on their efforts to promote creativity have not fallen prey to the temptation to simply administer to students existing measures of creativity. Of the paper-and-pencil measures available, the Torrance Tests of Creativity (Torrance 1974) are the most widely known. In much the same way that an IQ test is used to measure a child's innate intellectual ability, the Torrance Tests and related measures have been designed to tap one or more enduring creative abilities or predispositions. These measures serve a valid purpose, but they do not address the key issues being targeted by the states. Rather than tally the number of gifted students or even potential creative geniuses currently in the school system, the question being addressed is whether schools are adequately providing opportunities for the development of creativity of all students, "gifted", "typically developing" and "special needs". Every child being served by the public schools has some degree of creative potential, and it is the goal of policymakers to assess whether schools are working to help them to reach that potential.

Wherever they are across the globe, if government officials and policymakers are ever going to hope to assess a school's efforts to promote student motivation and creativity, a wide variety of valid and age-appropriate indicators will be needed. Finally, a concerted effort must be made to integrate what we have learned about the promotion of motivation and creativity in the workplace into the educational psychology literature. For many years now, high quality empirical studies appearing in the organizational behavior and management literatures have shed important light on the promotion and maintenance of creative performance in the business world. These investigations reveal a wealth of important findings as to how managers can work to provide the optimal environment for the promotion of their employees' intrinsic motivation and creativity (e.g., Amabile and Kramer 2011). Educational administrators and classroom teachers could learn much from a distillation of these findings and their empirical replication in school settings. One especially valuable line of research focuses on the creative process of teams (e.g., Wuchty et al. 2007; Falk-Krzesinski et al. 2010). Although it is simplistic to assume that teams will always be more creative than individuals, the reality is that children being educated today will be expected to collaborate with others when they enter the workforce. Learning for the 21st century must include opportunities to develop and practice teamwork skills including collaboration, cooperation, compromise, negotiation, and perspective-taking.

Conclusion

At this important junction in the history of American public education, policymakers, educators and lawmakers would do well to step back and ask themselves a few basic questions. What is the purpose of this new movement to institute creativity indices? What is the purpose of NCLB and Common Core legislation? Is the primary intent (whether implicit or explicit) to revert back to the mentality of the Sputnik era and the Cold War? Is it our nation's fundamental goal to move U.S. students' academic achievement test scores forward toward the front of the international pack? And, if so, at what cost? If, as many educators and policy advisors worry, NCLB and Common Core guidelines and pressures have forced schools to abandon their efforts to promote students' creativity, does it really make sense to try to reverse this trend with the imposition of yet another set of assessments and rubrics? Knowing what we know about the social psychology of creativity, is it even possible to legislate creativity in the schools?

And what of students and classrooms worldwide? The U.S. is definitely not alone in its commitment to increase the innovative productivity of its people. In fact, nowhere in the world is this goal more strongly stated than in Asia. Will the institution of creativity indices in the U.S. prompt other nations to follow suit? Will there be another inevitable international swing of the educational pendulum? And if so, can the intrinsic motivation and creativity of the world's children withstand such interventions? Once again, the stakes are both very high and very real and the chances for the success of creativity indices appear slim at best.

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Chapter 11
Is Relational Theory a Better Answer to the Psychology of Creativity?

Anna Na-Na Hui

Introduction

The psychology of creativity has become a hot topic in Chinese societies since government policies on creative economy were implemented in the new millennium. Political call for creativity in education is usually justified by the need for creativity to survive and excel in the new economy. The creative industries accounted for about 10.6 % of GDP in Beijing in 2007, 4.1 % in Hong Kong in 2011, 3.6 % in Singapore, in 2009, and 2.54 % in Taiwan in 2009. Nurturing talents in creativity in education and industries are necessary and effective strategies in building up the creative capital. The need for creative talents and opportunities in creative industries provide strong impetus for the research and study of creativity in Chinese people. The positive sentiment on creativity and value on innovation are somehow contrasting with the cultural value on conformity, obedience and tradition as discussed by Ng (2001), Rudowicz (2004), and Lubart (2010). How individual and professional creativity are developed in a conforming and collective Chinese "cultural script" (Brandstadter 1999) is an intriguing question. Is relational theory a better answer to the study of Chinese psychology of creativity?

A recent policy analysis conducted by Hui and Lau (2010) reviewed the educational policies in China, Hong Kong, Singapore and Taiwan on creativity development. Successful implementation depends largely on timely legislation with clear definitions of creativity, allocation of necessary and adequate resources, explicit identification of highly creative population and extensive public education in creativity in the general and business communities. All four Chinese societies formally recommended a formal educational policy on creativity in education as an essential feature in their curriculum reform within a similar timeframe between 1997 and 2002. The scope and implementation of the policy is most distinctive in Taiwan as

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creative education is stipulated in an individual policy not subsumed under a major curriculum policy. Clear definitions of creativity in both the general domain and specific domains are specified in all the four societies. Strategies for implementation in the curriculum and teacher education and assessment for creative products and productivity are emphasized although none of them recommends objective assessment for creativity, such as divergent thinking tests. The identification of highly creative students relies mainly on numerous competitions in various domains in these societies. Only Taiwan clearly specifies that creativity in education should be extended to the larger community—the parents and citizens, the professionals in various industries not limiting to the creative and cultural industries. In this contemporary point of time, the sociocultural environment seems to be in favor of creativity enhancement. Can we record the normative belief and expectation in creativity and its beneficial rewards in individuals from all walks of lives?

The relational theory of creativity proposed by Glaveanu (2012) provides a critical basis for analyzing the five dichotomies of creativity including individuals versus society, Big C versus little c, evolutionary versus revolutionary, domain generality versus domain specificity, and product versus process in the Chinese context. The new approach to the study of psychology of creativity is rooted in Vygotsky's (1925/1971) *Psychology of art* and Dewey's (1934) *Art as experience*. These two seminal works confer on creativity in the domain of art. Both discuss how the developmental trajectory of creativity begins in childhood till adulthood. The generalization from the aesthetic theory to the study of creativity in all domains or as a general domain may require further theorizing and empirical support. This paper intends to fill this research gap.

Research on implicit theories of creativity in Chinese people has documented that individual creativity is yet to be celebrated and recognized in the Chinese culture unless and until it brings in a collective orientation "contributes to society's progress, improvement, and betterment" (Rudowicz and Hui 1997). The value and weight of creativity is highly prescribed by the creator's individual "social influence, status, fame, charisma and contribution to society" (Rudowicz 2004). Hong Kong Chinese nominated business tycoons, politicians and fashion designers as prominent figures of Big-C creativity but writers, artists and scientists were often mindlessly neglected (Rudowicz and Hui 1998). Given the Hong Kong context as an internationally renowned business and financial centre, the relational approach to creativity can be applied to account for the overemphasis on professional c and Big C creativity in certain domains and overlook little c, or mini-c. This oversight has roots both in the contemporary context of a financial metropolitan and the traditional Chinese context as well.

The concept of creativity was originated and first mentioned in the classic work on science and technology—*The Records of Examination of Craftsman/Book of Diverse Crafts* (*Kaogong ji*), written in Zhou Dynasty (1122 BC–256 BC), it says:

> The Knowledgeable creates and the Eloquent/Skilled illustrates and follows. This is what we call "crafts". These crafts are all great pieces achieved by the sage. (Translated by the authors)
> "知者创物,巧者述之守之,世谓之工。百工之事,皆圣人之作。"

Inventors are recognized and the followers who imitate and use the crafts are also regarded as masters. Creativity is construed as an ability of trained and skillful professionals engaging in scientific and technological endeavors. Little c creativity displayed by layperson and insignificant members in everyday life (Richards 2007) in the community does not fit into this definition. Insightful and transformative self-perception of "novel and personally meaningful interpretation of experiences, actions, and events" may be excluded either (Beghetto and Kaufman 2007). Individuals as human agents somehow are not entirely free to elicit intentional creative actions because the cultural script provides both prescriptive and descriptive normative expectations and values for the individuals in society.

The relational approach also challenges the dichotomous nature of Big C and little c creativity. A dichotomy by definition usually means a mutually exclusive either-or relation or a division into two with contradictory qualities. To have a closer examination, Big C and little c should have no contradictory qualities. A creative prominent creator can also display little c characteristics, such as sharing a new recipe in culinary creativity, although it is less likely for layman with little c characteristics to demonstrate seemingly expertise and skills as a prominent figure in a specific domain. However, child prodigies with special talents, exceptional aptitude and strong intrinsic motivation in a specific field provide another interesting counter example. Discovering the talents is usually made possible by careful observations of apparently abundant little c characteristics displayed day by day. Continuous striving for mastery of knowledge and skills enhance their potentials to achieve Big C productivity in future.

Revolutionary creativity originates from an evolutionary base. Take Terrence Chi-Shen Tao's case as an integrated example of how little c is developed into Big C, and how revolutionary creativity evolves (Tao 2011). Tao is an ethnic Chinese, born in Australia and now lives and works in the United States. Tao now aged 40 is currently James and Carol Collins Chair Professor in Mathematics in UCLA and is known for Green-Tao Theorem and Tao's Inequality. He has won a lot of notable awards, such as the Nemmers Prize in Mathematics in 2010. His talent in Mathematics was discovered at 2 years old when he tried to teach a 5-year old Arithmetic and the English language. His sensitivity and love of numbers had been constantly displayed in everyday life. After completing his bachelor and master degrees at the age of 16 and finishing the Ph.D. at 20, he started his academic career at 21 and was promoted to full professor at 24. He won his first international prize Salem Prize at 25. The revolutionary creativity does not grow in vacuum but first assumes many guises of evolutionary creativity. Creative product and process are also complementary to each other. A creative product cannot be achieved without undergoing a creative process, although a creative process may not always guarantee a creative product.

Whether these five dichotomies are mutually exclusive or complementary lies in the eyes of the beholder. In the case of Big C, only a prominent few individuals can achieve the highest level of creativity in their specific field. Each trajectory of successful Big C may have both intrapersonal and interpersonal factors. The intrapsychic and interpersonal factors can be unique to the individual but some

commonalities may also exist among these outstanding creative individuals. The dichotomous approach has limitations in viewing individual and society, Big C and little c, revolutionary and evolutionary, domain generality and domain specificity, process and product from a "fundamentally non-overlapping" perspective. The relational theory challenges this basic nature of mutually exclusiveness.

Kaufman and Beghetto's (2009) have advanced the existing little c and Big C characteristics by proposing a Four C Model of Creativity. Big-C creativity refers to eminent creative productivity as examined by Lehman (1953) and Simonton (1991). Pro-c creativity represents the developmental and effortful progression to attain professional-level expertise in any creative area (Kaufman and Kaufman 2007). Mini-c creativity is defined as self-perception, for example creative self-efficacy, and interpretive process of creativity and measured by self-assessment. Little-c creativity refers to creative activities in which layperson participate each day as demonstrated by the work of Richards (2007) and best assessed by psychometric tests, consensual assessment technique and other nomination methods.

The relational theory considers individuals/creators are "socialized individuals and the creative process is at once psychological and social in its origins and expression" (Glaveanu 2012, p. 8). In parallel, taking a social psychological perspective to examine the study of creativity is not new in psychology (see a review in Hennessey and Amabile 2010) as well as in the lifespan developmental psychology (Baltes 1987). The experimental studies by Amabile (1996) of how rewards in the social environment could influence creativity have clearly shown how external factors made a positive or negative impact on the creative production of children, little c creativity. The confluence theory of Sternberg and Lubart (1999) proposed six independent and interdependent factors include intellectual abilities, knowledge, styles of thinking, personality, motivation and environment although no single study is published to examine how the factors work simultaneously and successfully to achieve creative outcomes as little c or Pro c creativity. Csikszentmihalyi's (1999) system theory investigated how creative productivity as Big C creativity is achieved by creators, recognized by the field of experts or gatekeepers in specific knowledge domains and also within a wider established cultural context.

Action theory postulates that human activity and intention, and culture guide self-development (Brandstadter 1999) from a lifespan developmental perspective. Action is defined as intentional activity that is linked to beliefs and preferences in a given sociocultural context. The "cultural scripts of the life course" reflects "the direct influence of social norms, values and customs" (Brandstadter 1999, p. 42). People of similar age have similar views regarding normative expectancies and the older the age, the stronger the norm-conforming expectancies. These normative expectancies become "self-guides" (Higgins 1998) and "personal standards that serve as reference points in the control and evaluation of personal development" (Brandstadter 1999, p. 43). These normative expectations can be regarded as mini c creativity in the 4-C model.

Previous studies on antecedents of creative or innovative behaviors, as little c creativity in layman or Pro c creativity in professionals, have found that both

psychological variables, such as personality traits [e.g. creative personality traits in Gough (1979)] and intrinsic motivation (e.g. Amabile 1996), and sociocultural variables for instance attitudes toward creativity, and normative expectations of creativity, have impact on individuals engage in creative and innovative behaviors. For instance: consumers purchase newly available and genetically modified foods (Chen 2008), use online banking (Yaghoubi 2010), manage investments (Mayfield et al. 2008), engage in creative and leisure activities (Ajzen and Driver 1992), adopt innovative information technology (Yi 2006), influence others in creative work (Carmeli and Schaubroeck 2007), influence on self creative performance (Choi 2004) and design technology-mediated learning environments (Chou 2005).

To predict the intentional behavior of exercising during leisure time among college students in the U.S., the normative belief of individuals that the behavior is approved and expected by others was a strong predictor, as was perceived control of the behavior (Ajzen and Driver 1992). The purchase of technological products among U.S. undergraduates and professionals working in IT and medical industries is influenced by their attitudes toward personal innovativeness (Yi 2006). The intention to use online banking is positively predicted by perceived behavioral control and perceived usefulness among banking consumers in Iran (Yaghoubi 2010).

A positive attitude towards one's own creativity or creative self-efficacy is the best predictor of entrepreneurial intentions among Greek college students, with attitudes toward the family environment and the university environment promoting creativity (Zampetakis and Moustakis 2006). Similar results were found in van Auken et al. (2006) study of American and Mexican college students. Role models in the family had a strong effect on students' entrepreneurial intentions because students were included in business discussions about the advantages and disadvantages of entering the business in which their parents worked. Choi (2004) also found consistent results showing that supportive leadership and an open group climate facilitate creative intentions and creative performance among college students in the U.S. Taiwanese consumers' purchases of genetically modified foods are positively affected by their attitude toward these foods (Chen 2008).

Self-expectations of creativity and perceived leadership expectations both significantly predict how actively individuals become involved in creative tasks among financial service professionals in Israel (Carmeli and Schaubroeck 2007). Behavioral intentions for short-term investments among business school undergraduates are positively correlated with the financial courses they had taken (Mayfield et al. 2008). Whether elementary school teachers in Taiwan design electronic learning materials largely depends on their attitude toward the benefits of educational technology (Chou 2005).

In addition to normative belief in creativity among individuals, Leung and Bond's (2009) concept of the social axiom is also useful in understanding normative beliefs in culture. This dimension provides a cognitive map of how individuals expect creativity to be rewarded or presented in their social world and what constitutes a positive attitude toward creativity. Morris and Leung (2010) suggested

that culture should play a complex role in "shaping people's private cognitive processes or by shaping their public social norms and institutions" (p. 316) in research and comparisons of creative behavior in different cultures.

Tierney and Farmer (2002) defined creative self-efficacy (a mini c variable) as the belief in one's ability to creative productivity in Pro c or Big C creativity. Creative performance largely depends on self confidence in creative ability. Creative self-efficacy of professionals leads to creative performance (Choi 2004; Redmond et al. 1993; Tierney and Farmer 2002). Creative self-efficacy also serves as a mediating variable in predicting success in creative professionals (Beeftink et al. 2012), professionals in non-creative industries (Chong and Ma 2010; Tierney and Farmer 2002), and undergraduate college students (Hung et al. 2008). Beeftink et al. (2012) examined 276 successful architects in the Netherland and reported that self-efficacy played a key role in mediating the relation between innovative cognitive style and success in the creative profession regardless the size of the architectural business organizations. Creative self-efficacy plays a pivotal role in predicting Pro-c creativity in architects.

In a study of 350 individuals from companies in non-creative industries including the financial, business service, telecommunication and food industries in Wellington, New Zealand, creative self-efficacy of managers was significantly higher than non-managers (Chong and Ma 2010). However, their results did not support a direct relationship between creative self-efficacy and either a trusting and caring atmosphere or organization structure. Creative self-efficacy exerted a stronger direct effect on white-collar (managerial) employees than on blue-collar (manufacturing) employees (Tierney and Farmer 2002). Hung et al. (2008) investigated 636 undergraduate students across 5 disciplines (Engineering, Arts, Sciences, Business, and Social Sciences) from 6 universities in Northern Taiwan. Creative self-efficacy mediated the relation between positive feedback and extrinsic motivation. Moreover, in a recent longitudinal study, Tierney and Farmer (2011) found that increase in creative self-efficacy corresponded with increase in Pro-c creativity rated by supervisors.

The present study will adopt the action theory as an exemplar of the relational theory to examine how psychological factors (e.g., creative personality traits, perceived gains and losses in these traits) and sociocultural factors (e.g., norms for creativity, creative intention and belief in rewards in the society) are related to creative self-efficacy as a mini c variable in individuals from emerging adulthood to late adulthood. To my knowledge, it is the first study using a lifespan sample to examine how personality psychological variables and sociocultural variables are related to creative self-efficacy. I put forward to following hypotheses:

Hypothesis 1 Creative personality and perceived gains in the traits would be positively correlated with creative self-efficacy.

Hypothesis 2 Perceived losses in creative personality traits would be negatively correlated with creative self-efficacy.

Hypothesis 3 The sociocultural factors would mediate the effect of psychological factors on creative self-efficacy.

Hypothesis 4 The mediation effect of sociocultural factors on creative self-efficacy would be stronger in the older adults than in the younger adults.

Method

Participants

The sample consisted of 1733 participants, including 761 emerging young adults (aged 18–25, 47.8 % female), 206 young adults (aged 26–40, 67.5 % female), 502 middle-aged adults (aged 41–60, 53.4 % female), and 264 older adults (aged 60 or above, 78 % female), who all lived in the community (see Table 11.1). The emerging young adult group was recruited from universities. The young adult and middle-aged groups were recruited through advertising and performing arts industries, and the older group was recruited from elderly day centers in Hong Kong. The participants were native speakers of Cantonese and were Chinese by ethnicity. They received HK$50 (∼US$6) as compensation.

The levels of educational attainment of the emerging young adults (M = 4.94, SD = 0.32), young adults (M = 4.54, SD = 1.11) and middle-aged adults (M = 3.02, SD = 1.00), F (3, 1724) = 982.01, $p < 0.001$, $\eta^2 = 0.63$) were significantly higher

Table 11.1 Demographic characteristics of participants (N = 1733)

Characteristics	n	%
Age group		
1. Emerging adults (18–25)	761	43.9
2. Young adults (26–40)	206	11.9
3. Middle-aged adults (41–60)	502	29.0
4. Older adults (61 and above)	264	15.2
Gender		
Female	977	56.4
Male	756	43.6
Final educational attainment		
1. Some primary	58	3.3
2. Primary	211	11.2
3. Secondary	470	27.1
4. Associate's degree	59	3.4
5. Undergraduate	876	50.5
6. Postgraduate	52	3.0
7. PhD	2	0.1
8. Missing	5	0.3

than that of the older adults ($M = 2.43$, $SD = 1.00$). Education levels were defined as follows: 1 = some primary, 2 = completed primary education, 3 = completed secondary education, 4 = completed sub-degree education, 5 = completed a bachelor's degree, 6 = completed a master's degree, and 7 = completed a doctoral degree. When comparing the educational attainment of the four groups with the general population, all four groups were a clearly positive selection (e.g., educational level of the majority in the total group: 90.9 % of emerging young adults (aged 18–25) and 56.8 % of young adults attained an undergraduate level education, 62.7 % of middle-aged adults attained a secondary level of education, and 42 % of the elder group over 60 attained a primary level of education). In this study, the selection of participants was biased toward the upper range of education because this selection is more likely to minimize the confounding role of cohort differences due to educational level differences.

Materials and Measures

Creative personality. A Chinese translation of Gough's Creative Personality Scale (Gough 1979) was used. The total list included 30 adjectives describing a wide range of personality traits. The adjectives were translated from English into Chinese and then back translated into English in a study conducted by Cheng (2002). In the study by Gough (1979), 18 personality traits were found to be positively correlated to creativity and 12 traits negatively correlated to creativity. The positive items included capable, clever, confident, egotistical, humorous, individualistic, informal, insightful, intelligent, wide interests, inventive, original, reflective, resourceful, self-confident, sexy, snobbish, and unconventional. The negative items consisted of affected (lacking in natural or spontaneous quality), cautious, commonplace, conservative, conventional, dissatisfied, honest, well-mannered, narrow interests, sincere, submissive, and suspicious. The order of the traits was randomized. Participants were asked to rate each adjective on a 9-point scale for self assessment from 1 (not like me at all) to 9 (very much like me). A composite score of creative personality was calculated by summing all the positively-correlated terms and subtracting the sum of the negatively-correlated terms in accordance with Gough's (1979) suggestion. The reliability coefficients were satisfactory for both positive items ($\alpha = 0.88$), and negative items ($\alpha = 0.66$). A higher value indicates a higher self-assessed creative personality.

Perceived gains and losses in creative personality. Participants were asked to rate each adjective on a 9-point scale for desirability from 1 (not at all desirable) to 9 (very much desirable), increase with age from 1 (never increase) to 9 (very definitely increase). The means and standard deviations for each trait are presented in Table 11.2. Based on the studies of Heckhausen et al. (1989) and Gruhn et al. (2010), traits were classified as desirable ($M \geq 5$) and undesirable ($M < 4.99$). The desirable traits included 24 items: capable, cautious, clever, commonplace, confident, conservative, conventional, honest, humorous, individualistic, informal,

Table 11.2 Means and standard deviations of ratings for each adjective: desirability, self-assessment, and developmental increase (N = 1733)

	Desirability		Self-assessment		Increase with age	
Adjectives	M	SD	M	SD	M	SD
Mannerly	7.84	1.53	6.92	1.53	6.21	2.04
Honest	7.62	1.438	6.73	1.42	5.54	2.17
Sincere	7.59	1.64	6.69	1.66	5.53	2.24
Intelligent	7.57	1.67	5.89	1.65	6.18	1.95
Resourceful	7.54	1.62	5.98	1.71	6.17	1.88
Self-confident	7.47	1.62	5.96	1.75	5.99	1.88
Capable	7.43	1.67	5.85	1.68	6.02	1.88
Confident	7.43	1.64	6.03	1.67	5.95	1.88
Cautious	7.43	1.63	6.20	1.74	6.64	1.72
Clever	7.39	1.73	5.68	1.71	5.46	2.09
Reflective	7.25	1.67	6.17	1.68	6.19	1.82
Insightful	7.14	1.76	5.84	1.66	6.34	1.84
Original	7.07	1.42	5.61	1.70	5.88	1.88
Humorous	7.00	1.82	5.69	1.99	5.30	2.05
Interest wide	6.99	1.83	5.60	1.99	5.17	2.11
Sexy	6.90	1.85	5.29	1.79	5.55	2.00
Informal	6.69	1.72	5.96	1.82	5.41	2.18
Unconventional	6.57	2.04	5.75	1.96	5.17	2.22
Inventive	6.27	2.09	4.90	2.10	4.45	2.16
Conventional	6.01	1.87	5.52	1.93	5.63	2.17
Submissive	5.67	1.86	5.49	1.85	4.98	2.01
Common place	5.51	1.99	5.77	1.92	5.54	2.06
Individualistic	5.47	2.06	5.46	1.91	5.47	2.06
Conservative	5.03	1.96	5.04	1.90	5.62	2.02
Dissatisfied	4.76	2.00	4.91	1.85	5.62	2.05
Snobbish	4.53	2.09	4.15	2.04	4.29	2.14
Egotistical	4.24	2.14	4.38	2.00	4.60	2.13
Suspicious	3.95	2.07	4.55	2.04	5.37	2.05
Interest narrow	3.43	2.09	4.36	2.20	4.62	2.28
Affected	3.20	2.06	3.26	1.96	4.00	2.20

insightful, intelligent, inventive, original, reflective, resourceful, self-confident, sexy, sincere, submissive, unconventional, well-mannered and wide interests. The undesirable personality traits consisted of affected, dissatisfied, egotistical, narrow interests, snobbish, and suspicious.

A composite score of gains was calculated by averaging the mean of the 23 desirable traits that increased with age, ("inventive" was excluded because of its low ranking ($M < 5$) as age increased), but including 1 undesirable trait decreased

with age ("affected"). Another composite score of losses was defined by the remaining 5 undesirable traits that increased with age and "inventive", which decreased with age.

Normative belief in creativity. Based on the studies of Ajzen and Driver (1992) and Francis et al. (2004), the following 4 items regarding normative belief in creativity were adapted. Sample items included the following: "Most people who are important to me think that I should produce something creative" and "I am under social pressure to produce something creative." Items were rated using a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). The reliability level was reasonable ($\alpha = 0.70$).

Rewards for creativity in society. Based on the studies of Leung and Bond (2009), 8 items were adapted from the "Reward for Application" axiom with high liability ($\alpha = 0.83$). Sample items included the following: "Creativity and imagination are keys to achieving goals" and "Creative people are well rewarded." Items were rated using a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*).

Creative self-efficacy. Thirteen items were adapted from Yang and Cheng's (2009) Scale of Creative Self-Efficacy, with high reliability ($\alpha = 0.91$). Items were rated using a 5-point Likert scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Sample items included the following: "I believe that I could suggest new ways to achieve goals or objectives" and "I believe that I could exhibit creativity on the job when given the opportunity."

Results

The means and standard deviations of every adjective and all variables were presented respectively in Tables 11.2 and 11.3. To examine Hypothesis 1 and 2, partial correlation coefficients were calculated after controlling for final educational attainment. Perceived gains in creative personality had a moderately strong and positively correlation with creative personality, $r\,(1723) = 0.26$, $p < 0.001$. Creative personality was correlated positively and strongly with creative self-efficacy,

Table 11.3 Means and standard deviations of ratings for psychological and sociocultural variables (N = 1733)

Variables	M	SD	Range	Skewness
Perceived gains in creative personality	5.69	0.73	1.92–8.73	−0.14
Perceived losses in creative personality	4.39	1.25	1–9	0.15
Creative personality	0.12	1.08	−4.67–4.39	0.04
Normative belief in creativity	3.14	0.73	1–5	−0.26
Rewards for creativity in society	3.69	0.62	1.25–5	−0.18
Creative self-efficacy	3.36	0.63	1–5	−0.40

r (1723) = 0.43, $p < 0.001$. Hypothesis 1 stating that creative personality and perceived gains in creative personality would be positively correlated with creative self-efficacy was supported. However, contrary to the prediction, perceived losses in creative personality was also positively correlated with creative personality, r (1723) = 0.16, $p < 0.001$. Hypothesis 2 was rejected. The most significant and positive correlations were found between creative self-efficacy and normative belief in creativity, r (1723) = 0.51, $p < 0.001$, and also between rewards for creativity in society, r (1723) = 0.44, $p < 0.001$ after controlling for final education attainment.

Hierarchical regression analyses on the whole sample as presented and various age groups were conducted to test the main effect of psychological variables (creative personality, perceived gains in creative personality and perceived losses in creative personality) and the mediation effect of the sociocultural factors (subjective norm for creativity, and reward for creativity in society) on creative self-efficacy. In the regression model, creative self-efficacy served as the dependent variable. Age, gender, and final education attainment were entered in the first step as controlling variables, while perceived gains, perceived losses and creative personality were included in the second step. Subjective norm for creativity, and reward for creativity in society were entered in the third step. The results of hierarchical multiple regression analysis on the whole sample was presented in Table 11.4 and those on each age group in Table 11.5.

Using Creative self-efficacy for the dependent variable, the combination of control variables in the first step had a significant effect, $R^2 = 0.035$, F(3, 1720) = 22.12, $p < 0.001$. The entry of the psychological variables in the second step significantly explained the variance, $\Delta R^2 = 0.206$, F(3, 1717) = 155.63, $p < 0.001$. The

Table 11.4 Hierarchical multiple regression analysis summary predicting creative self-efficacy (N = 1723)

	1	2	3
Final education attainment	0.25***	0.14***	0.10***
Gender	0.09***	0.08**	0.07***
Age	0.14***	0.01	−0.07*
Perceived gains in creative personality		0.15***	0.10***
Perceived losses in creative personality		0.08***	0.02
Creative personality		0.38***	0.26***
Normative belief in creativity			0.34***
Reward for creativity in society			0.25***
ΔR^2		0.206***	0.201***
R^2	0.035***	0.240***	0.441***

Dependent variable: Creative self-efficacy
Block 1: Age, Gender, and Final Education Attainment
Block 2: Perceived Gains in Creative Personality, Perceived Losses in Creative Personality, and Creative Personality
Block 3: Normative Belief in Creativity, and Reward for Creativity in Society
Note *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (female = 0; male = 1)

Table 11.5 Hierarchical multiple regression analysis summary predicting creative self-efficacy across 4 age groups

	1	2	3
Age 18–25			
Final education attainment	−0.01	0.01	0.00
Gender	0.08*	0.06*	0.03
Perceived gains in creative personality		0.12***	0.08*
Perceived losses in creative personality		0.04	−0.02
Creative personality		0.45***	0.32***
Normative belief in creativity			0.28***
Reward for creativity in society			0.30***
ΔR^2		0.245***	0.192***
R^2	0.004	0.247***	0.439***
	1	2	3
Age 26–40			
Final education attainment	0.17*	0.13*	0.10
Gender	0.06	0.07	0.07
Perceived gains in creative personality		0.27***	0.20***
Perceived losses in creative personality		0.03	0.01
Creative personality		0.41***	0.33***
Normative belief in creativity			0.36***
Reward for creativity in society			0.14*
ΔR^2		0.296***	0.170***
R^2	0.026*	0.315***	0.483***
	1	2	3
Age 41–60			
Final education attainment	0.27***	0.17***	0.10**
Gender	0.10*	0.03	0.05
Perceived gains in creative personality		0.08	0.05
Perceived losses in creative personality		0.14***	0.07
Creative personality		0.37***	0.23***
Normative belief in creativity			0.38***
Reward for creativity in society			0.26***
ΔR^2		0.173***	0.205***
R^2	0.082***	0.252***	0.506***
	1	2	3
Age 61 above			
Final education attainment	0.07	0.03	0.08
Gender	0.17**	0.18**	0.14**
Perceived gains in creative personality		0.23***	0.16**
Perceived losses in creative personality		0.09	0.02

(continued)

Table 11.5 (continued)

	1	2	3
Creative personality		0.25***	0.20***
Normative belief in creativity			0.34***
Reward for creativity in society			0.25***
ΔR^2		0.173***	0.205***
R^2	0.032**	0.197***	0.401***

Dependent variable: Creative self-efficacy
Block 1: Age, gender, and final education attainment
Block 2: Perceived gains in creative personality, perceived losses in creative personality, and creative personality
Block 3: Normative belief in creativity, and reward for creativity in society
Note *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (female = 0; male = 1)

sociocultural variables in the third step further explained the variance significantly, $\Delta R^2 = 0.201$, F(2, 1715) = 310.10, $p < 0.001$. The combination of the control variables, psychological and sociocultural variables had significantly explained the variance on the dependent variable, $R^2 = 0.441$, F(8, 1715) = 171.23, $p < 0.001$. The sociocultural variables fully mediated the effects of perceived losses in creative personality and partially mediated the effects of perceived gains in creative personality and creative personality as well.

In predicting creative self-efficacy of emerging young adults, the combination of control variables (age, gender and final education attainment) in the first step had a significant effect, $R^2 = 0.004$, F(2, 756) = 2.61, p = n.s. The entry of the psychological variables in the second step significantly explained the variance, $\Delta R^2 = 0.252$, F(3, 753) = 82.42, $p < 0.001$. The sociocultural variables in the third step further explained the variance significantly, $\Delta R^2 = 0.192$, F(2, 751) = 129.45, $p < 0.001$. The combination of the control variables, psychological and sociocultural variables had significantly explained the variance on the dependent variable, $R^2 = 0.439$, F(7, 751) = 85.69, $p < 0.001$. The sociocultural variables partially mediated the effects of perceived gains in creative personality and creative personality.

In predicting creative self-efficacy of young adults, the combination of control variables (age, gender and final education attainment) in the first step had a significant effect, $R^2 = 0.026$, F(2, 202) = 3.69, $p < 0.05$. The entry of the psychological variables in the second step significantly explained the variance, $\Delta R^2 = 0.296$, F(3, 199) = 29.38, $p < 0.001$. The sociocultural variables in the third step further explained the variance significantly, $\Delta R^2 = 0.170$, F(2, 197) = 33.50, $p < 0.001$. The combination of the control variables, psychological and sociocultural variables had significantly explained the variance on the dependent variable, $R^2 = 0.483$, F(7, 197) = 28.26, $p < 0.001$. The sociocultural variables partially mediated the effects of perceived gains in creative personality and creative personality.

In predicting creative self-efficacy of middle-aged adults, the combination of control variables (age, gender and final education attainment) in the first step had a significant effect, $R^2 = 0.086$, F(2, 498) = 23.41, $p < 0.001$. The entry of the psychological variables in the second step significantly explained the variance, $\Delta R^2 = 0.174$, F(3, 495) = 38.75, $p < 0.001$. The sociocultural variables in the third step further explained the variance significantly, $\Delta R^2 = 0.253$, F(2, 493) = 127.99, $p < 0.001$. The combination of the control variables, psychological and sociocultural variables had significantly explained the variance on the dependent variable, $R^2 = 0.506$, F(7, 493) = 74.11, $p < 0.001$. The sociocultural variables fully mediated the effect of perceived gains in creative personality and partially mediated the effects of perceived losses in creative personality and creative personality.

In predicting creative self-efficacy of older adults, the combination of control variables (age, gender and final education attainment) in the first step had a significant effect, $R^2 = 0.039$, F(2, 256) = 5.22, $p < 0.001$. The entry of the psychological variables in the second step significantly explained the variance, $\Delta R^2 = 0.173$, F(3, 253) = 18.54, $p < 0.001$. The sociocultural variables in the third step further explained the variance significantly, $\Delta R^2 = 0.205$, F(2, 251) = 44.17, $p < 0.001$. The combination of the control variables, psychological and sociocultural variables had significantly explained the variance on the dependent variable, $R^2 = 0.401$, F(7, 251) = 25.69, $p < 0.001$. The sociocultural variables partially mediated the effects of perceived gains in creative personality and creative personality.

Hypothesis 4 stating that the mediation effect of sociocultural factors on creative self-efficacy would be stronger in the older adults than in the younger adults was supported.

Discussion

The present study argued that the relational theory was valid in examining how psychological factors (e.g., creative personality traits, perceived gains and losses in these traits) and sociocultural factors (e.g., norms for creativity, creative intention and belief in rewards in the society) were related to predicting creative self-efficacy in individuals across the lifespan. The mini-c variable creative self-efficacy is strengthened by little c activities, leads to Pro-c creativity in professionals, and Big-C achievements. Creative self-efficacy can offer explanation to both little c and Big C creativity and requires additional accommodation in the dichotomy of little c and Big C. It can be characterized in a specific domain or profession but also as a generalized ability in an employee (Tierney and Farmer 2011).

Based on the findings, we have four observations. Regarding Hypothesis 1, creative personality and perceived gains in creative personality to be increased with age are positively related to creative self-efficacy. The correlations between the sociocultural variables and creative self-efficacy are higher than that between the psychological variables. The subjective assessment of creative personality and

expectation of creativity development that guides people's behavior are related to creative self-efficacy and are often the result of societal and cultural influence (Baltes 1987; Brandstadter 1999; Heckhausen et al. 1989). These normative beliefs may give people reference frames to assess their own developmental trajectory—how typical their developmental course is and what to expect in society (Heckhausen and Krueger 1993).

The subjective perception of desirability gains in creative personality, self assessment of creative personality and creative self-efficacy may result in self-fulfilling prophecies—people may develop their creative abilities and invest in activities and careers related to creativity over time because they will develop and employ creativity in both personal and professional lives. The process is similar to the Pygmalion process evident in Tierney and Farmer's (2004) study as well as in Chong and Ma's (2010) study.

Regarding Hypothesis 2, perceived losses in creative personality does not have a negative correlation with creative self-efficacy. On the contrary, the perceived losses in creative personality is positively associated with creative self-efficacy. The perceived losses may be compensated by normative belief in creativity which will serve as a socially motivated factor to sustain or increase in creative self-efficacy by active participation in creative activities and career. Creativity can be a reserve capacity in human individuals in adulthood and late adulthood. Older winners of Nebraska Annual Art Show perceived creativity as a form of learning, an activity to keep one busy, and a way to overcome setbacks (Lorenza-Huber 1991). Cohen's (2000) work on creativity and aging supports this perception among older adults establishing an alternative career, developing new potentials and achieving successful aging. Creativity can be capitalized as a cognitive reserve for older adults in the compensation process.

Regarding Hypothesis 3, sociocultural variables serve as mediators in predicting creative self-efficacy from psychological variables. They also serve as stronger predictors of creative self-efficacy when compared with psychological variables. Normative belief in creativity, and reward for creativity in society both partially mediated the relationship between perceived gains in creative personality and creative personality. Whether an individual has high creative self-efficacy seems to depend more on how he/she perceives the normative belief in creativity and rewards for creativity. One of the implications of the finding is that cultural scripts are more powerful than personal scripts in influencing perception of creative self-efficacy in individuals across the lifespan (Bandura and Locke 2003; Tierney and Farmer 2011).

The present study focuses on how better is relational theory team in studying Chinese creativity. The findings have supported that sociocultural factors are related more strongly with creative self-efficacy than psychological factors in Hong Kong.

Regarding Hypothesis 4, the mediating role is found to be strongest in the middle-aged and older participants in the present study. The findings are consistent with Baltes (1987), Heckhausen and Krueger (1993). Culture effects have stronger impact on members who have more extensive experience in the culture, such as members with higher seniority in terms of chronological age, or expert members in

a particular knowledge domain or industry in terms expertise and experience in the field. These experts usually serve as gatekeepers in the field to judge creative productivity of Big C (Csikszentmihalyi 1999).

Several limitations of this study warrant attention. First, the participants were not randomly selected, and a common criticism of studies using convenient samples is that the results may fail to generalize to the whole population. Second, a common limitation with cross-sectional and correlational research, the findings reveal only an associative relationship among the variables but cannot establish longitudinal and causal effects on psychological and cultural variables, and creative self-efficacy. A longitudinal data collection has overcome this potential disadvantage. The third limitation is the use of self-reports. The threat of common method variance as systematic error variance usually observed in correlations may exist (Doty and Glick 1998). Despite the above limitations, this study is the first study to examine how psychological and sociocultural variables are related to creative self-efficacy among individuals across different age groups in Hong Kong.

Conclusion and Future Directions

In conclusion, we have reviewed that the contemporary trend of promoting creativity education in four Chinese societies is initiated by an external demand for profiting in creative economies. A critical analysis of applying the five dichotomies in explaining Chinese psychology of creativity is proposed. These delineations have contributed to the complexity and the richness of the concept of creativity in the Chinese culture. The relational theory is used as a theoretical framework to provide empirical evidence that sociocultural factors are powerful mediators to predict creative self-efficacy by using psychological factors. Further studies should be conducted in other Chinese societies, such as China, and Taiwan. Cross-cultural studies can also be conducted to examine if similar findings can be replicated. In a practical sense, the mediating role of norms and cultures should be emphasized more in education, training and development.

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Part III
Valuing Creativity

Chapter 12
Developing Society: Reflections on the Notion of Societal Creativity

Vlad Petre Glăveanu

Introduction

Development is a multifaceted phenomenon. It is also the fundamental characteristic of open systems, including human beings, society, and the natural environment. Culture itself is a developmental matter, and so is creativity. But while in psychology we often consider development in individual terms, particularly in relation to infancy and childhood, and rarely within the whole life course, we normally forget to consider this (ontogenetic) developmental scale in the context of sociogenetic, macro development. The latter refers to the emergence and transformation of societal and cultural structures that frame human existence and behaviour. However, as the study of creativity comes to show, individuals respond to such influences and, in turn, shape their context for both self and others. In doing so, they rely on and coordinate their activity with that of others. It is this 'togetherness' of creative action aimed at developing new types of society that concerns me in this chapter.

What prevents us from studying the social, creative roots of societal development? We are used to thinking in psychology about creativity as an individual type of phenomenon and, as such, we tend to formulate questions and create methodologies that focus primarily on the person (even within studies of group creativity). Some of the most popular criteria used for recognising and validating creativity have to do with novelty, originality and social value (Plucker et al. 2004). The 'social value' of creative acts is typically measured against the performance of individuals in privileged domains such as the arts and sciences. At the same time, the world today faces us, collectively, with increasing demands and challenges: From global warming and the effects of economic meltdowns, to creating more inclusive and democratic societies. The way in which we (as individuals, groups

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and communities) respond to such difficulties is proposed as a general domain of reflection for creativity researchers—the sphere of *societal creativity*. Societal creativity collapses the sharp differences set between individual and collective creativity, between revolutionary and everyday creations. It connects creative action to our existence as members of societies that need to learn how to be responsible towards others and ultimately towards themselves, a world plagued by global problems but also one in which 'ought' implies 'can' and 'create' (Gruber 1993). This chapter will review existing literature on social and collective creativity, elaborate a cultural psychological account of this new creative domain, and illustrate its relevance for both creativity theory and societal development in today's context and for the world of tomorrow.

Society as a Creativity Domain

Most mainstream theories of creativity tend to propose universal models of this phenomenon that link it to properties or processes presumably taking place at all times and for all creative people (see for instance the relation between creativity and divergent thinking; Guilford 1950). However, it is undeniable that creativity is, like any other form of human expression, highly dependent on *context*. The creativity of an artist is manifested differently than that of a chemist or engineer. It is difficult to imagine someone capable of (high level) creative achievements in more than a few, usually related, domains. This is so for multiple reasons, starting from a person's inclination towards, capacity for and experience with some areas of work and not others. Specificity also builds on society's drive to organise human activity in distinct domains, draw relatively clear boundaries around them (think, for instance, about academic specialisation), and encourage individuals to adopt a limited number of work-related identities. It becomes difficult, at a practical level, to discuss creativity in general. Indeed, many books dedicated to this topic take a clear domain perspective and structure their content accordingly (see, for example, Gardner's 'Creating minds' 1993, or Saywer's 'Explaining creativity' 2012).

And yet, as soon as we adopt domain-specificity, the question arises as to what exactly is a domain and, second, how many domains are there? We can agree with Baer (1998) that the concept of domain is notoriously fuzzy in the creativity literature. Perhaps one of the most famous theories to engage with this notion was proposed by Csikszentmihalyi (1988) as the systemic model of creativity. For him, creative acts involve at least three instances: The individual creator, the social field, and the cultural domain. To take a simple example, a painter could not be considered creative outside of his or her field (represented by colleagues, critics, and most of all, experts and gatekeepers) and the domain he or she is contributing to (in this case the arts, more specifically contemporary art). This social perspective has the benefit of clearly contextualising creative work and emphasising its socio-cultural dynamic and origin. It also unfortunately supports a relatively narrow understanding of what a domain is, making it equivalent to what society accepts,

institutionally, as a creative domain (in our example, the arts clearly constitute a cultural domain open to creativity). This view ends up excluding a lot of creative acts taking place in everyday life, such as the creativity of children (Glăveanu 2011a). Similar perspectives have been widely adopted by other systemic thinkers (see Gardner 1993).

A second complication arises from the continuous, and largely sterile, debate as to whether creativity is domain general or domain specific (see the point-counterpoint on this topic published by the Creativity Research Journal in 1998). Supporters of the specificity camp, like Baer, offered different ways of understanding domains, from domains cognitively defined (like the linguistic, mathematical, or musical), to domains characterised by particular tasks (poetry writing, story writing, collage making, etc.) (see Baer 1998, p. 174). Such classifications go into a different direction than systemic theories since they specify domains in terms of psychological functions or concrete activities, but stay silent about the societal organisation of these creative domains. Lacking a more comprehensive framework made other researchers easily dismiss what they called the 'false dichotomy' between generality and specificity (Sternberg 1989). For Sternberg, as well as other colleagues, it was clear that creative expression involves *both* domain general and domain specific qualities and the real question to ask was which are these qualities and how they interact. More recently, Baer and Kaufman (2005) offered an analytical solution through their Amusement Park Theoretical Model of Creativity. According to this model, there are initial general requirements to creativity but, in essence, creative expression unfolds in a nested field of macro, meso and micro domains. To continue with the art example, the arts are a general thematic area, within them, painting is a domain and there are various kinds of paintings and different techniques that are situated at the micro level.

Despite its clear and logical organisation, this framework as well suffers, in my view, from a structuralist ethos that tends to see domains as relatively stable areas of psychological expression or human activity, often institutionalised by society. This perspective runs into trouble whenever we want to understand how and why domains evolve or how people can be creative without being recognised for their creativity within a particular domain. What I will propose here is to consider this debate in *pragmatist terms* and refer to what any specific creative work is intended to accomplish and the contribution it makes, rather than the 'content' of the domain itself. For instance, instead of discussing 'creativity in the arts' or even 'artistic creativity', it would be more useful to refer to creativity resulting in artistic or aesthetic outcomes. In this way, we would be able to appreciate not only artists (or, as it often happens, validate artists as creative people simply because of their occupation) but also find aesthetic quality in the work of scientists or in everyday activities like cooking or gardening.

Defining creative domains in terms of the set of problems addressed by them should also make us sensitive to the multiplicity of (potential) areas of creative expression, above and beyond the 'traditional' fields of science and art. One notable absence in existing typologies relates precisely to living and developing together as societies that jointly inhabit and develop within a world of finite resources. Unlike

creativity in established fields, the creativity invested by individuals and communities in dealing with societal challenges engages with what Csikszentmihályi (1996) called the 'domain of the future'. It is precisely this type of creative activity that concerns me here and, in order to understand better its area and the necessity of theorising it, I will first consider the wide range of global problems that pressure today's societies for more and more creative solutions.

Societal Challenges

In 2011, the Copenhagen Research Forum (CRF) invited over 600 researchers from Europe to contribute to the discussion of various societal challenges not only the European Union but the whole world is confronted with. The six key thematic areas under discussion where: health, food and agriculture, energy, transport, climate and resources, and inclusive societies. Recommendations from specialists were published in two reports (see Copenhagen Research Forum 2012a, b) and presented to EU officials in support of the general strategy for Horizon 2020, the new European Union (EU) framework for research and innovation. This initiative is interesting for many reasons. On the one hand, it represents an attempt from the scientific community to inform policy and shape the European research agenda. The aim was to present 'unbiased' advice to stakeholders coming out of decades of research into societal problems and their potential resolution. Second, the CRF reports make a useful summery of some of the most important difficulties our society is facing at a global level. From this perspective, discussions taking place in Europe contribute to international efforts and, indeed, there is a strong feeling not only that what we are confronted with are common problems, but also that we can only address them collectively. In this sense, one of the main messages of the CRF is that societal challenges inhibit individual and community development and can be solved only in a multi- and cross-disciplinary manner, a process based on sharing and collaboration.

An excellent example of a societal problem relates to the production of *secure, clean and efficient energy*, as detailed also in the report. This challenge, considered in the broader context of global warming, doesn't only concern technological innovation but also the practices of individuals and communities in terms of saving or economising existing resources (like electricity) and creating new ones (by transforming, for instance, waste into reusable material). The urgency of dealing more effectively with this challenge cannot be emphasised enough by science. The increase in greenhouse gas emissions, deriving from the use of fossil energy, already has a notable impact on the planet. The possibility of limiting the rise of global temperature beyond critical levels is rapidly being compromised by a 'business as usual' model adopted by the international community despite repeated calls and some minor changes made by some states but not others. One of the big

dilemmas in this regard is how to decrease the use of fossil energy without jeopardising economic growth, the real concern of governments around the world. The scientific community has at least a few suggestions. "Technologies such as energy storage, innovative thermal (heating and cooling) energy technologies, polygeneration, geothermal energy (including heat pumps), and materials for energy applications should be developed and supported" (CRF 2012a, p. 43). In addition, the recommendation of the Forum is that "Horizon 2020 should underpin the competitiveness of new technologies now close to breakeven, making them competitive energy options, e.g., wind power, PV, second-generation bio-fuels, and at the same time prepare for next-generation technologies" (CRF 2012a, p. 44). In other words, continuous creativity is required to generate alternative solutions but, I would add, also to implement them. In both these processes, scientists, governments and the civil society need to work together, creatively.

But this type of creativity is hard to theorise, hard to measure and, as such, hard to notice. In psychology at least we have extensive expertise in understanding how individuals create and studying their (most often thinking) processes. There are also efforts made, particularly in the past three decades, to conceptualise group creativity (Paulus and Nijstad 2003), but most of this experimental research is not informative when it comes to macro-social processes that involve individuals and institutions. Gilla Family talks, in this context, about 'collective creativity' (a notion I will return to later), when noting that:

> It seems like we have indeed found the problems and even partial solutions. What is lacking seems to be an integration of our findings and a working definition of the greater problem. The problem is simply too big for a single creative genius to solve. Therefore, we need a collective creative effort, at the global level, to solve our problems. (Family 2003, p. 90)

This necessity is also largely recognised by the Copenhagen Research Forum reports which very often make reference to both creativity and innovation. In their words, "innovation and creativity are essential to future societal growth, both economic and social. Creativity and innovation are meta-issues, as these capacities can be used to foster social innovation and promote inclusiveness" (CRF 2012a, p. 75). However, despite this widespread belief among academics and lay audiences alike, there is today a scarcity of research about the creativity involved in solving societal issues, at least from a psychological perspective. Preoccupied mostly with the creativity of individuals (initially the genius, nowadays ordinary people as well; see Glăveanu 2010) and invested in the study of creation within 'traditional' domains (e.g., art, science, design), creativity researchers are, on the whole, missing a great theoretical, methodological and practical opportunity. By turning their attention towards the creativity involved in dealing with societal challenges, what I call here societal creativity, they would not only become sensitive to new, collective creative processes, but also make a real contribution, through their work, to pressing global debates. Has this opportunity been completely missed though? To answer this, I will review as follows existing literature that deals with social creativity and creativity for society.

Conceptualising Societal Creativity

Social Creativity

The idea of 'social creativity' has been recurrently mentioned in the previous decades without, unfortunately, gaining a lot of currency. This can be explained, on the one hand, by the complexity of the phenomena it denotes and, on the other, by the fact that the term is increasingly polysemic (Watson 2007). At the broadest level, this concept is used to designate the creativity that takes place in social contexts or has a social form of expression (see, for instance, the volumes on the topic of social creativity edited by Montuori and Purser 1996). The authors who support this understanding tend to emphasise not only those instances in which creative action is social in its expression (e.g., people working together in groups to solve a problem), but refer to the fact that all types of creativity are indeed *social*, at least to some extent (see Glăveanu 2011b). But there is also a more restrictive sense that focuses on how creativity is expressed in interpersonal and inter-group relations, basically studying how creativity is enacted *in* the social domain. This line of research is best represented by the investigations of Mouchiroud, Lubart and Bernoussi, discussed next.

In an effort to circumscribe their own interest and acknowledge the diverse forms of social creativity, Mouchiroud and Bernoussi (2008) proposed a simple typology of creative contributions to the social field. They structured this classification along the traditional distinction between outcomes that are creative for the person (psychological novelty) and outcomes that are creative for an entire society (historical novelty). To this, they added the criterion of level of expression: dyads (interpersonal interactions) and society (interactions between large groups and communities). Notwithstanding the fact that such divisions do not account for a wide range of phenomena that take place in-between extremes, or have more than one dimension, the proposal of the two authors is indeed useful to locate different types of research. They offered examples for each of the four emerging categories (p. 373). For instance, novelty produced at the level of dyads can be represented by a new strategy in solving interpersonal conflicts, while a historical creation in the interpersonal sphere is exemplified by Freud's psychoanalysis. With regard to psychological novelty for society, we can think about an individual's own involvement in societal change, whereas historical creations dealing with society are best illustrated by Gandhi's method of social protest (see also the next section).

For Mouchiroud and his collaborators it is primarily the psychological and dyadic level that is of interest, particularly in relation to the developmental study of individual differences. In 2002, Mouchiroud and Lubart noticed that most studies of creativity, especially with children, are restricted to object-oriented tasks (of the type 'how many uses can you think of for this particular object', etc.). And yet, a lot of everyday creativity is involved in building and maintaining relations with others. This type of creativity they called 'social creativity' and saw it as a function that finds its expression both in daily life and the activity of eminent leaders such as

Martin Luther or Gandhi. Their specific concern was for how this creativity in the social domain develops during childhood. To study this, they used a few imaginative scenarios built around situations of tension or conflict between people and asked children of different ages to generate unique ideas in relation to them. For instance:

> Imagine that during recess you see two children playing an interesting game and you want to play with them. So you go over and ask them: 'can I play with you?' Imagine that they say no. What could you do or say to convince them to let you play with them? Give as many ideas as possible. Try to find ideas that are different from those that everyone can have (Mouchiroud and Lubart 2002, p. 62).

Generating ideas regarding a situation like the one above is certainly a new type of task compared to the classic items of creativity tests but it does little to depart from an understanding of creativity as divergent thinking. In this way, it is hard to study *acts* of social creativity and what is being researched is in fact the *potential* of the child to be socially creative. But the focus of the authors was also different. They wanted to find supporting evidence for social creativity as a 'unitary construct' and managed to do this by studying the correlation between answers to social tasks and the children's performance on other tests, including object-oriented (i.e., classic) creativity measures. An interesting result in this regard is that social creativity tends to be a distinct ability in younger children but starts correlating more highly with general creativity at older ages. A possible explanation for this "is that abilities to generate creative ideas in the social domain may gradually become part of a larger set of abilities that could include creative problem-solving abilities in object-oriented tasks" (Mouchiroud and Lubart 2002, p. 66). For a second study aiming to demonstrate the construct validity of social creativity as a psychological variable see Mouchiroud and Bernoussi (2008).

In sum, current discussions about social creativity relate to what I call societal creativity but do not fully capture its meaning as they tend, at least at a research level, to focus on how individuals or pairs invent new strategies allowing them to solve social problems mostly of an interpersonal nature. While it is acknowledged that "the emergence of socially creative behaviours can initiate positive social change" (Mouchiroud and Bernoussi 2008, p. 373), it is not clear how this research can contribute to our understanding of societal challenges. Yet, the two authors were sensitive to this issue and tried to offer educational advice for the enhancement of both social and societal creativity. For a broader discussion of the latter as 'creativity for society', we need to turn our attention however to another type of literature.

Creativity for Society

Beside concerns for how individuals develop their creativity in the social domain, itself a recent area of study, classic investigations of creativity and society consider primarily the creative expression of celebrated individuals. This type of research is

usually informed by a systemic view of creativity and tends to consider the creative individual in his or her context. A good example in this regard is Gruber's evolving systems approach (see Gruber 1989), which locates creators within a network of people and activities that transform over time. As such, these studies are close to psycho-biographies and adopt a longitudinal design that is usually missing from more cross-sectional studies of social creativity. A notable landmark in this area of research is Howard Gardner's well-known discussion of 'exemplary creators' of the modern era (see Gardner 1993). For this work, Gardner chose seven prominent creators who each depict a certain type of intelligence and creativity: Sigmund Freud (interapersonal), Albert Einstein (logical-mathematical), Pablo Picasso (spatial), Igor Stravinsky (musical), T.S. Elliot (linguistic), Martha Graham (bodily-kinesthetic), and Mahatma Gandhi (interpersonal). While most of them belong to the traditional domains of the arts and sciences, it is the last case in particular that is of most interest for the purposes of this chapter since it deals with interpersonal and moral creativity within the sphere of society.

Mahatma Gandhi (1869–1948) is often referred to by researchers focused on societal creativity and development as his leadership and the new forms of collective action he proposed and practiced continue to inspire social movements around the world. An Indian political and spiritual leader, Gandhi's life history, both personal and public, has been scrutinised by many creativity scholars in the hope of understanding what is specific for creative acts that transform society. Associated by Gardner with the great interpersonal innovators of human history like Christ, Buddha, Mohammed or Confucius, Gandhi's commitment to creative methods of peaceful resistance has its origins in his South African experience where he took it upon himself to be the voice of a largely marginalised Indian community. At the core of his creativity stand not only a genuine understanding of social issues but also the capacity to mobilise others through personal example. For Gardner,

> Gandhi is a prototypically creative master. He is prototypical in his precocity in his chosen domain (the moral domain); his obsessive search for opportunities and his capacity to exploit them; his studied marginality; his oscillation between attachments to the many and the need for isolation; his essential selfishness; his asceticism; his Faustian sacrifice of personal intimacy in favor of political effectiveness; and the persistence of childlike features in his philosophy and in his person (Gardner 1993, p. 352).

His main creation is represented by the practice of *satyagraha*, a form of protest that asks community members to resist laws that are unjust to them. This method involves picketing and disobeying orders but also imposes restraint, refraining from the use of violence and not opposing arrest. This of course implies a great personal risk for both initiator and followers and this is why Gandhi's creative effort was focused on giving his method a solid moral ground, an ethical dimension that would be recognised and respected both by fellow protesters and their opponents. The practice of *satyagraha* combines thus not only political but also philosophical and religious ideas which does not mean that its utility is restricted to the Indian context (on the contrary, while India experienced decades of violence post-independence, Gandhi's ideas became incorporated in the civil rights movement in the US and

other parts of the world). The ultimate goal of this method is to achieve reconciliation and fairness in human relations, something that relies heavily on using the personal example in order to increase reflexivity and openness to dialogue in others. This, of course, is not an easy process and Gandhi himself acknowledged it when saying that "The rope dancer, balancing himself upon a rope suspended at a height of twenty feet, must concentrate his attention upon the rope and least little error… means death for him… [A] *satyagrahi* has to be, if possible, even more single-minded" (in Gardner 1993, p. 335).

Gandhi's activity and his legacy uncontestably place him among the great creators of our era. However, research focused almost entirely on the actions of a single individual, even when his or her circle of social relations is equally studied, risks over-emphasising the role of the person at the expense of the collective. Like a double image, person and community represent the two sides of an integrated unit. While Gandhi devised and practiced an innovative social method for the peaceful resolution of conflict, this 'creation' should be placed within the broader context of those who use, adapt and transform his ideas, taking them forward and initiating new types of social change. The notion of societal creativity needs to account for the creativity of leaders but, at the same time, understand how entire communities participate in the process of addressing challenges faced by all. In this regard, we need further theoretical work to conceptualise such creative processes in a broader, more comprehensive manner.

Societal Creativity, A Cultural Psychological Framework

Despite this great opportunity for cross-fertilisation, the individual/psychological and the societal have seldom crossed paths in the study of creativity. The interest for either psychological development or the career of great creators leaves virtually untouched the great area of creative acts taking place at a community level and aimed at addressing community problems. Certainly it is important to understand how social creative thinking emerges in children and what characterises innovative community leaders but how do we move the focus from the individual to the collective, especially without losing the individual component from sight? In an effort to redress the balance, several voices in the creativity literature started to make the case for 'collective creativity'. The work of Family (2003), also mentioned before, illustrates this trend. In her view there is not only a need to study collective creativity but to enact it in society since "it will take collective creativity to achieve the transition from individualistic hedonism to community-oriented service" (p. 89) and real social change. However, the notion of collective here tends to simply stand for *group or team* (see also Hargadon and Bechky 2006). The emphasis thus falls on bringing together experts from various fields to brainstorm and exchange ideas, define and refine solutions in the process of working together. In order to distinguish collective creativity from a more established line of research into groups and co-creation, other scholars discuss the former as the creativity of the

crowd, a set of strangers assembled to perform a task (Yu et al. 2012) or, in other works, a heterogeneous community of interest (Chaharbaghi and Cripps 2007). Is this though the main characteristic of societal creativity?

The main problem with these definitions, I would argue, is that they operate with rather strict distinctions between individual and society, value for the person and historical value, and take social interaction as the goal of creative action rather than as a mean towards creating social change. As I mentioned before in the chapter, the creativity I am concerned with encompasses both individual and collective action, moreover, it considers them necessarily inter-related. In a broad way, I define *societal creativity as simultaneously individual and collective acts of creativity that respond to pressing social problems of general interest in ways that have important developmental consequences for larger communities*. Formulated as such, this notion bridges the psychological/individual differences focus of 'social creativity' studies and the macro-level, public displays of 'collective creativity'. It also guides our attention towards related processes such as gaining awareness, at an individual and community level, of existing (macro) challenges, defining or redefining them, and developing a collective sense of agency and empowerment. Societal creativity is therefore not associated with the thinking processes of isolated individuals but draws on social, cultural, and material resources within the community to address issues that concern all its members.

In order to develop a more comprehensive framework for this phenomenon it is useful to consider it through the lenses of *socio-cultural theory*. Cultural psychology discusses creativity in a situated manner, in real-life contexts, as a process distributed between creators and their multiple audiences and always in relation to the material and cultural constraints specific for human action in the world (Glăveanu 2010; Tanggaard 2013). Fundamentally, this theoretical approach considers creativity to exist not in the isolated mind of an individual creator, but locates it, developmentally, at the level of social interaction and the use of cultural resources. This vision is extremely fertile for conceptualising societal creativity. The Copenhagen Research Forum report (2012a) points to the fact that innovation and creativity need to be embedded "within societal actors, citizens and communities—not limited to the top-down agenda of policymakers and business elites" (p. 78). Indeed, existing models of collective or social creativity emphasise as well the necessity of 'extending' the actors of creative acts into the social sphere (Hargadon and Bechky 2006; Watson 2007; Wilson 2010). They also acknowledge the lack of inclusive frameworks that explain the societal aspects of creativity (Bissola and Imperatori 2011).

Elsewhere (Glăveanu 2012) I have developed a potentially useful framework in this regard in the form of the five A's of creativity: actor, audience, action, artefact, and affordances. This model reshapes, from a socio-cultural perspective, the well-known and widely used four P's of creativity—person, process, product, and press or environment (Rhodes 1961). It stresses the fact that creators are actors within a social and institutional arena—they are not only individuals but can also be groups of various sizes—always in relation to different audiences (communities of peers, critics, the public, etc.). At the same time, any creative action leads to the

generation of a cultural product, an artefact (which can range from an idea and/or specific material outcome, to new norms and institutions), by using what the social and material environment 'affords' creative actors (the types of actions facilitated by existing environmental settings). The five A's framework adopts a dynamic, developmental perspective on creativity that stresses not only the inter-relation, in creative acts, between the five elements, but also emphasises their temporality. Relations between actors and audiences, creative artefacts and their affordances accumulate over time, are in a constant process of change and transformation and it is precisely this process that creativity researchers need to understand and unpack at all levels: individual, community-based, organisational, and societal.

Of course, applying this model to issues related to societal creativity requires adapting its elements to this specific context along the following lines:

- *Actors*—individual and group actors, teams and local communities as creative 'units';
- *Audiences*—individuals and groups who respond to or resist dialogue with creative actors;
- *Actions*—cycles of idea generation and implementation embedded in processes of social change;
- *Artefacts*—material as well as normative or institutional resources and outcomes;
- *Affordances*—the evolving sets of constraints and facilitators of collective creative action.

Developing a theory of societal creativity is a particularly important commitment for at least three reasons. To begin with, it recognising the creativity involved in dealing with societal problems and proposing it as a field of study is not only timely but also has a great potential to help us, collectively, address these problems by drawing on current psychological theory and research on creativity. Second, a societal focus can enrich creativity theory by 'enlarging' its area of interest outside of the isolated individual. Third, a cultural framework of creativity can contribute, in turn, to our understanding of societal development and, in particular, of collective action, something I move on to discuss next.

The (Societal) Creativity of Collective Action

There are many strands of literature to consider when studying collective action. Among them, we can distinguish between research on organisational change, in the area of technology innovation management, as well as the broader literature on social movements. Each of these has a slightly different focus ranging from individuals to groups or institutions. What I am interested in for the purpose of this discussion of societal creativity is the nexus between collective action and social change. In this regard, Hargrave and Van de Ven (2006) offer us an interesting

summary based on diverse sources, from the civil rights movement to the story of how the Java technology came into existence.

> In each case a few individuals or groups envisioned the need for some form of institutional change to address a problem or opportunity and then initiated actions consistent with their intentions. However, these entrepreneurs did not have the resources, power, or legitimacy to produce institutional change by themselves. They therefore engaged in a 'grassroots' form of organizing networks to build their coalition, and they allied themselves with other activists and groups with complementary interests and resources. Groups with opposing views did the same. As a result, many diverse and partisan actors became engaged and embedded in path-dependent processes involving numerous events over an extended period of time. In each case, institutional innovations developed through a political process in which actors contributed to a larger solution by recombining inherited practices, technologies, and institutions to address their own unique and partisan interests (Hargrave and Van de Ven 2006, p. 865).

The two authors stress the fact that in both cases they studied, the leaders of the social movement showed a great capacity to understand the different interests of all the players and to shape their action in ways that appeal to these diverse interests and identities. In a certain sense, we are reminded of Mahatma Gandhi and his extraordinary ability to persuade equally his supporters and his opponents. More than this, what Hargrave and Van de Ven propose in their account is a *dialectical model* of social change, cyclical and recurrent, in which a new synthesis is achieved in relation to institutional policies and structures out of the tension and oftentimes open conflict between groups supporting an opposing thesis and antithesis. This process is interesting from the perspective of societal creativity because it captures both the social dynamic of the phenomenon and the uniqueness of its outcome for all those involved, since "the syntheses produced by dialectical processes seldom turn out to be what institutional entrepreneurs initially anticipate or desire, and they are rarely if ever the end of the process of change" (Hargrave and Van de Ven 2006, p. 865). In addition, the two authors also call our attention to three important concepts for understanding collective action that are rarely discussed in the theory of creativity: conflict, power, and politics (see Glăveanu and Sierra, forthcoming).

At the same time, it is interesting that theorists of collective action and social change rarely mention creativity. Perhaps due to a long legacy of considering it an individual function, located in the isolated mind, creativity has yet to find a place within studies of this kind. On the other hand, numerous authors are struggling in this field to move beyond structuralism and theorise dynamic and emergent processes that stand precisely at the core of creative action. This is how, more and more voices advance nowadays the question of agency and try to bring back the individual into studies of collective movements. According to Jasper (2004), we need to recognise the *choices* individuals and groups make in this process since "participants in social movements make many choices, but you would never know this from the scholarly literature" (Jasper 2004, p. 2). In order to capture both the intentional and constrained nature of alternatives action paths, he refers to strategic choices as "one component of the microfoundations of political action" (p. 4), the study of which would allow us to consider the micro-level of individuals and their

interactions in the context of macro-level structures and institutional arrangements. Other authors too emphasise the need to consider the relation between agency and culture in social movements (Williams 2004). For Williams Emirbayer and Goodwin:

> Human agency itself we define as the *engagement* by social actors of their different contexts of action, an engagement that both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations. Agency is precisely that analytical element that revivifies, modifies, and sometimes challenges transpersonal (cultural, social-structural, and/or social-psychological) networks in the course of empirical social action (Emirbayer and Goodwin 1996, p. 371).

This 'element' is what I call here societal creativity as enacted by individual and group actors, to use the terminology of the five A's model introduced before. This reformulation allows us to move beyond what Cleaver (2007) called unhelpfully narrow conceptions of agency as deliberate participation in decision-making and collective action, and towards a *relational, developmental account* of actors and audiences in dialogue. The creative process in any field, and particularly in the societal domain, is based on the interplay between structural constraints and agentic moves to shape these constraints in ways that allow new, beneficial outcomes to emerge. "This is how structures change, after all" (Jasper 2004, p. 7). To capture some key insights afforded by adopting this cultural model of societal creativity in the study of collective action, I will finally present a case coming from a recent experience in Colombia.

Societal Creativity in the Colombian Context

Colombia offers both creativity researchers and scholars interested in collective action a fascinating area of study. One of the most diverse places on Earth, both in terms of biodiversity and ethnic composition, the country is extremely rich in natural resources and cultural heritage while, at the same time, suffering from a long and troubled history marked by social inequality, exploitation, and guerrilla wars (Ospina 2013). In this context, Colombia and its population are facing a series of major societal challenges related to the sustainable use of natural resources and the resolution of conflicts in ways that create an inclusive, just and equitable society. These challenges are, of course, not specific for Colombia alone and they at least resonate with the situation of many developing countries struggling, after centuries of colonialism, to create the social fabric of a new society and protect their unique environment. In this sense, the Colombian case has a lot to offer in terms of both theoretical reflection and practical action and I had the opportunity, in March and April 2014, to discover first-hand several initiatives that illustrate very well the concept of societal creativity.

The concrete example I would like to focus on briefly and analyse through the prism of the five A's framework is the collective struggle of the community of San

Luis, a small town situated in the region of Antioquia, to prevent the construction of a hydroelectric power plant on the river Dormilón, the main water source of the municipality. The key *actors or agents* in this particular context are, on the one hand, social activists from the local community, led by Luis Evelio Giraldo García, who is also a member of a Non-Governmental Organisation focused on environmental educational and research services called CEAM ("Corporación de Estudios, Educación e Investigación Ambiental"[1]). On the other hand, there are the representatives of the company who initially obtained the legal rights to build the power plant. Just as in the dialectical model proposed by Hargrave and Van de Ven (2006), these actors hold incompatible views and interests and their actions, as well as reactions to the actions of others, generate new conditions for creating an arrangement that might or not be considered fair by both parties (the creative *artefact*). This, of course, is a long process that has been spanning several years. The moment in time I was introduced to this situation was soon after a Community Assembly had been organised in San Luis (on the 18th of March 2014). This meeting aimed to inform locals about the steps taken to prevent the construction of the power plant, the potential economic and environmental consequences of building it for the river and for the community, and to listen to their wishes and concerns in relation to this project. The course of *action* taken in this case by the group of activists was twofold. First, it involved the study of legal documents and the creation of petitions in defence of citizens' rights over communal resources, in this case the waters of the river Dormilón. Second, it led to mobilising the local community, increasing awareness and participation. In other words, turning what initially might seem to be simply an *audience* of the conflict into a collective actor. In doing this, Luis Evelio and his collaborators exploited existing *affordances*, from the legal bases to organise a movement entitled the Watchers of the river Dormilón, up to the concrete material conditions (e.g., space, finances) to hold several assemblies that reunited over 200 people from San Luis and other neighbouring communities.

One of the concrete outcomes of the community gathering was the creation of a popular manifesto published in the local newspaper, El Arriero (2014). This manifesto was accompanied by an article signed by Luis Evelio in which the processes leading to the Assembly were explained along with the main conclusions of the reunion. The text of the manifesto is reproduced below (in my own translation from Spanish):

> We are the sons and daughters of the river Dormilón who, by making use of our legitimacy and the rights inscribed into the Constitution, today present ourselves in front of the competent environmental authority, to ask a reconsideration of decisions that affect our community interests in the PCH project (Pequeña Central Hidroeléctrica/Small Hydroelectric Plant) on the river Dormilón.
>
> The river is a fundamental part of our cultural identity and, as such, without it we would lose our connection to the water, the forest and the earth. At the same time, many of our roots and ancestral values like solidarity, peaceful coexistence and dignity, would risk being harmed through ruptures and processes not well understood.

[1]For more information about CEAM see http://www.corpoceam.org/.

> We, the inhabitants of San Luis and of this region, who love our river, are bound today by spiritual and cosmic unity, a superior value that has no comparison with what is intended for our river.
>
> In addition, today the river Dormilón is a structural axis around which the 'social economy' of San Luis is organized. How many people come month after month to San Luis looking for the tranquillity and recreation possibilities offered by the river? Was this benefit taken into account before replacing it with other alternatives and economic interests? We see that the river Dormilón moves a great part of our local economy and will do so even more in the future if we keep our dreams clear and act to offer locals and visitors services of rural tourism in accordance to our values.
>
> We emphasize this because we are sure that, in this way, we will keep alive our possibilities of development and public and communitarian alliances for the harmonious coexistence of all.
>
> We only ask for just and responsible decisions regarding our community and offer, in advance, our gratitude.

From the content of this popular manifesto and my discussion with Luis Evelio and his collaborators there are at least a few interesting aspects to highlight for our study of societal creativity. First of all, it is useful to notice the stance adopted by the group of activists, encouraging dialogue and making constant references to rights, values, and the text of the law in order to avoid violent confrontations. Second, the presentation of this dialogue is framed in terms of a '*conflict of interests*' in which both parties, the local community and the hydroelectric company, hold '*legitimate interests*' and have specific rights and responsibilities. Third, the process of gaining support from the community of San Luis is gradual and presents its own challenges, including diverse interests within the community, the difficulty of having everyone participate, etc. By asking people whether it is worth losing 75 % of the water that goes through a local waterfall, well-known in the area as a recreation space and landscape inheritance, the group of activists invite their audience to imaginatively consider the future in case the hydroelectric plant is built and, empathically, to take the perspective of the local community. Finally, building on best practices from the region and connecting to similar, successful movements in neighbouring towns builds a network of support (including the local authorities) essential for enacting societal creativity. The outcomes of the Assembly materialised in a collective decision to terminate the plan of building a plant and enhance the social economy of the region by using the river Dormilón for fishing, reforestation and conservation, and recreation purposes exclusively. Thinking about the future, the Assembly also decided to strengthen the dialogue between community, government and private enterprises in a move that empowers the citizens to react to and challenge existing relations of domination (Drury and Reicher 2005). One year later, in 2015, the local community managed to legally revoke the permission for building the power plant following also a peaceful collective march that mobilised more than 300 participants from San Luis.

Conclusion

This chapter aimed: (a) to introduce societal creativity as an important domain of creative expression, (b) define it in relation to other existing notions such as social or collective creativity, (c) to propose a cultural framework for its study, compare it

to existing literature on collective action, and (d) to briefly illustrate it with a recent case from Colombia. While the idea of creativity for society is quite old and has led to the in-depth study of celebrated creators, such as Gandhi, the use of creativity for dealing with societal challenges, often global in nature, is still in its infancy. Between the emphasis on generating clean, secure and sustainable energy discussed in the Copenhagen Research Forum report (2012a) and the struggle against altering and contaminating the environment by building an energy plant on the river Dormilón in San Luis, there is a great space to be bridged. It is a space that ranges from global to local, from theory to practice, from the creativity of scientists working in research labs to that of social activists who are in touch with the everyday life of oppressed or marginalised communities. The concept of societal creativity is meant to bridge this 'gap' by reuniting individuals and collectives, micro and macro forms of change, the creativity of understanding problems, imagining solutions and acting to turn them into reality.

We cannot ignore however some difficult definitional and methodological questions. First of all, it is important not to 'over-romanticise' the notion of societal creativity and acknowledge the fact that creativity in this case can be as disruptive as it is constructive (indeed, it is often both at the same time). There are also important actor—observer differences in judging the consequences of seemingly 'creative' acts. Is the decision to boycott the construction of a hydroelectric plant on the river Dormilón creative for the owners of the electric company? Is it equally 'useful' or 'valuable' from their perspective as it is from that of the local community? And even within the local community, for certain parts of it, because we can expect that some could have benefited in different ways (e.g., by being employed by the company) from the project of building the power plant. These kinds of questions are meant to make us aware of the fact that societal creativity as a phenomenon cannot be studied without engaging in a discussion of *ethics*. Indeed, creativity in and for the social domain possesses a moral quality that is often questioned, contested, and negotiated. And researchers who study this type of phenomena become an active participant in these debates. Why did I choose to present the Colombian context and why this particular case? I certainly have my own assumptions and value judgements in relation to the local community and its course of action. A continuous exercise of reflexivity is required from researchers engaging in the study of societal creativity.

In the end, this discussion is preliminary in nature and should be considered an open invitation to think together about the role of societal creativity for the development of both individuals and society and, most of all, how it can be fostered in applied contexts. In a 2009 article, Louis (2009) raised the important question "Collective action—and then what?" and pointed to the fact that we tend to theorise collective action excessively and fail to understand how exactly collective action *creates* social change. The notion of societal creativity is meant precisely to address this issue by reuniting a socio-cultural theory of creativity with knowledge from economy, sociology, politics and environmental studies. There is much too learn, on all sides, and considerable efforts are required to integrate different literatures in ways that make sense not only for scholars but also (and primarily) for practitioners.

Ultimately, the study of societal creativity has the potential to change our position towards the object under investigation since it is unlikely that we will learn much about this type of creativity simply by administering tests and designing controlled experiments. The realm of societal creativity is the *world* and it is high time for creativity scholars to open themselves to it and do the kind of work that turns them from detached, 'neutral' observers into responsible and creative agents.

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Chapter 13
Organizational Creativity as an Approach Towards Leveraging on the Networking and Caring Capacity of (Vision Rehabilitation) Services

Meng Ee Wong

Introduction

The recent increase in the interest of creativity in organizations is largely born from two major trends. These are the need for organizations to adapt and respond to change while the other is a concern for innovation (Puccio and Cabra 2010). While this particularly impacts organizations in the private sector, there are increasing implications for organizations found in the public and non-profit (NPO) sector. This is in part due to greater competition observed across sectors and open markets (Weinberg and Ritchie 1999) as well as increased measures and expectation of NPOs. This chapter will consider how creativity, culture and development exist in organizations and how they converge and can be harnessed to meet and enhance management challenges for NPOs.

Creativity in Organizations

Hitt (1975) explains that organizations exist to provide solutions to society's needs and problems. As a result, organizations are compelled to be responsive to societal changes; those unable to adapt to the changes will be replaced by organizations able to do so. 'In order to avoid extinction, organizations must change and adapt to changes in order to remain viable. To do so requires utilization of all available resources, especially the most creative—the human resource' (Hitt 1975, p. 284).

One way to understand organizational creativity is through Puccio et al. (2007) creative change model, which utilizes a systems approach. Innovation results from the interaction among people, the processes they engage in, and the environment in

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A.-G. Tan and C. Perleth (eds.), *Creativity, Culture, and Development*,
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which they work. The people, process and environment tripartite also has parallels with the convergence of creativity, culture and development where creativity is found in people, culture in environment and development in processes to bring together creative outcomes. Person refers to their background, experience, knowledge, personality, motivation and individual skills. *Process* relates to the stages of thought individuals go through either alone or in a group to address problems or opportunities at work. *Environment* relates both to the psychological and physical setting in which a person works (Puccio et al. 2007).

From the interplay of these three variables emerges the formation of an intangible or tangible product; that may emerge as a solution to a problem, a new idea, service, invention etc. 'Not until the product of creative thinking has been adopted is creative effort fully realized—change has been adopted, at least temporarily. When adopted internally, these creative changes can lead to cost reduction, improved policies or procedures, new business models, and so forth. Products with an external focus result in a change in the marketplace, such as the successful introduction of an innovative product or service. This is an iterative model, as the adoption of an internal or external change has a subsequent impact on the organization and thus potentially influences people, processes, and the environment in that organization' (Puccio and Cabra 2010, p. 149).

Person

In setting forth to understand creativity, it is not surprising that a large body of literature has focused on identifying the personal characteristics, cognitive styles, and attributes associated with creative achievement (Kirton 1976; Scott and Bruce 1994; Woodman et al. 1993). Considering factors that predisposes successful individuals in the organizational context, Amabile's (1983a, b, 1988) research is prominent. In examining the role individual creativity plays with respect to organizational creativity, Amabile (1988) emphasizes the significance of employees' creativity to innovation. 'The entire process of individual creativity must be considered as a crucial element in the process of organizational innovation. It is individual creativity that provides the raw material for organizational innovation and, therefore, individual creativity must be central to the organizational model' (Amabile 1988, p. 150).

Individual factors contributing to creativity in the workplace include various personality traits (e.g., persistence, curiosity, and energy); self-motivation; special cognitive abilities; risk-orientation; expertise in the area; qualities of the group; diverse experience; social skill; brilliance; positive mood; and naiveté (Amabile 1988; Amabile and Gryskiewicz 1988; Amabile et al. 2005).

Further, Amabile (1987) introduced the componential model of individual creativity. The model comprises three individual factors important for creativity: domain-relevant knowledge, creativity-relevant skills, and motivation. Domain-relevant skills refer to knowledge, technical skills, and special talents associated

with one's area of work. These skills alone while necessary are not sufficient to produce creativity. This is where creativity-relevant skills such as suspending judgment, self-discipline, perseverance, and nonconformity are needed. Motivation then is the final component to produce creative outcome. Here, motivation can be understood in three categories: no motivation, intrinsic motivation (enjoyment, interest, challenge of the task) and extrinsic motivation (completion of task driven by rewards, expectation, pressure). Generally, individuals who are intrinsically motivated are likely to harness creative outcomes while those extrinsically motivated tend to undermine creativity. Cognitive styles is another way to understand creativity. 'Cognitive style is a person's preferred way of gathering, processing, and evaluating information. It influences how people scan their environment for information, how they organize and interpret this information, and how they integrate their interpretations into the mental model and subjective theories that guide their actions' (Hayes and Allinson 1998, p. 850). Taking the cognitive styles, Kirton (1976) developed the Kirton Adaptor—Innovator Inventory (KM theory), which proposes that individuals can be located on a continuum ranging from Adaptation style to Innovation style with varying characteristics. These are assessed against: originality and idea creation; conformity to rules and group norms; and efficiency, which is about paying attention to detail, and thoroughness (Kirton 1976).

If motivation is a contributing factor to individual creativity, then it will ultimately have influence on the organization. Chuang (2007) corroborates that individual factors, such as employee creativity, were directly related to organizational innovation. In fact, Chuang also found that organizational resources, culture and structure; and environmental factors such as customers, technology, competitors also influenced individuals and were a complement to the larger creative process. Ford (1995) also asserts that positive environment goes as far as to draw out creativity from those who would otherwise not consider themselves creatively oriented. This will be considered next.

Creative Work Environment

In studying the impact of the environment on creative behavior, MacKinnon (1978) called this the "creative situation" and described this research as the identification of "those characteristics of the life circumstances and of the social, cultural, and work milieux that facilitate or inhibit the appearance of creative thought and action" (p. 52).

Researchers have followed on to understand how factors associated with the work environment affect employee creativity (Abbey and Dickson 1983; Amabile and Gryskiewicz 1988; Ekvall 1983). From this body of research, lists of workplace environment attributes influencing employee creativity have emerged questionnaires from researchers including Amabile's KEYS (Amabile et al. 1999). Attributes

included: organization and supervisor encouragement; autonomy and freedom; reward or recognition of creativity; pressure; and collaboration and information flow.

Relatedly, Ekvall (1983) was interested to understand how organizational climate influenced individuals to communicate, problem-solve, make decisions, resolve conflicts, learn and motivate. To understand these attributes, Ekvall's (1996) Creative Climate Questionnaire was developed. The following dimensions were reported to contribute to a creative climate—dynamism, Challenge, Freedom, Trust and Openness, Idea Support, Conflict, Debate, Idea Time, Playfulness/Humor, and Risk-Taking. Sellgren et al. (2008) reported that work climate was a strong contributor to work satisfaction.

Similarly, Anderson and West (1998) introduced the Team Climate Inventory (TCI) to measure innovation through understanding work team development of initiatives to promote creativity. The measure assesses four factors: Vision (how clear and if team goals corresponds to vision); Participative Safety (whether there is group decision-making in teams and if the environment is perceived to be non-threatening); Task Orientation (do team members have a shared standard of excellence in quality of task performance); and Support for Innovation (how much practical support is provided to doing things in novel ways).

Where the organization's culture or climate contributes to fostering creativity, there is also research that considers the physical structure and workspaces. For example, Kelly (2001) relates how a Californian company, IDEO encourages its staff to design their workspace while Ewing (2007) reports that a Danish company, Oticon allows for staff to move furniture according to the leaders and projects they want to work on. For companies sensitive to physical structures, Lewis and Moultrie (2005) assert that the use of space can be a competitive advantage to organizations to leverage upon to improve their innovation efforts. Physical space is also said to improve employee well-being and foster creativity (Kristensen 2004). Hybrid spaces, where private and group work can be accommodated to support divergent and convergent processes to promote innovation (Haner 2005).

Process

The literature offers evidence of the feature of creativity in individuals and environments. However, without a process, creative outcomes are not guaranteed. Recognizing this, organizations employ management practices and training programmes to better promote creativity so that it is a more deliberate approach and not left to chance. Ekvall (2000) assert that organizations can adopt creative thinking practices including project groups, continuous improvement methods and creative problem-solving methods to promote creativity. Mahmoud-Jouini and Charue-Duboc (2008) studied discontinuous innovation, how radically new ideas emerge from existing products and services in a car company. They documented the creative process of a team from inception to funding of a project. The organizational practices promoting success include: (1) a broad scope for the innovation unit; (2) the

flexibility for members to have dual roles, in their existing work commitments as well as in the project, encouraging boundary spanning; (3) the open, fluid exchange between knowledge and concept development during the creativity process; and (4) the role and cross-divisional nature of the exploratory projects that emerged from the innovation unit (Mahmoud-Jouini and Charue-Duboc 2008). Beyond the holistic organization processes are models and structures that helps demystifies the creative process for individual application. Some training programmes designed to help stimulate individual's creativity include Osborn's brainstorming technique to generate diverse thoughts and solutions and the Osborn-Parnes creative problem solving process (CPS) (Fryer 1996).

The chapter has thus far considered briefly the person, process and environmental influences within organizations. Each of these components bring with it creative leverages which can be adopted to introduce greater expressions of creative practices. However, having considered creativity, it is also undeniable that there is a danger that these aspects are construed as Big-C creativity, i.e. eminent creativity that only rare and talented individuals possess. By contrast, there is little-c creativity that is perceived and practiced in everyday situations (Kaufman and Beghetto 2009). To more fully express the creativity construct, *professional* and *mini-c* creativity are introduced. Where mini-c describes the creative insights experienced by the students and to "encompass the creativity inherent in the learning process" (Kaufman and Beghetto 2009, p. 3). Professional, or Pro-c represents the developmental and effortful progression beyond little-c but who have not yet reached Big-C status (Kaufman and Beghetto 2009).

Having considered where creativity, culture and development exists through an organization's people, work environment and processes, the following section will present social services for persons with visual impairments in a modernized, fast-face, newly emerging multicultural society, e.g., Singapore. Embedded in the existing services are a number of possible avenues where organizations can take an active role in promoting action to foster networking activity towards building community carrying capacity through the synergistic potential of networking as well as innovation and creativity.

Networking and Caring Capacity of Social Service

The availability of human, financial, and social resources alone does not inherently define a community's nonprofit carrying capacity. Rather et al. (2009, p. 598) argues that "the nonprofit carrying capacity of any geographic community is a function of the relationships among diverse agents and that exchanges between nonprofits and other organizations in such communities and the broader interorganizational fields in which they are embedded may produce positive synergistic effects." This bringing together of diverse agents and resources to produce positive synergistic effects put in different words is innovation in action. According to Pai et al. (2012, p. 467) "Innovation can be seen as the ability to create value for the

organization from its capabilities. Value creation is not decided just by the internal capability but also by the external linkages with other organizations. As such, the importance of inter-organizational collaborative relationship for innovation is evident."

Opportunities Through Networking

The benefits of delivering public services through networks are well research and supported in the literature. Networking has proved to promote positive outcomes for individuals, organizations and communities (Porter and Powell 2006). Where issues are too complex for a single agency's capabilities and resources, service delivery networks offer tangible solutions (Musso et al. 2006). Networking allows for cross pollination of ideas, better decision-making through shared advice, enhanced expertise and capacity of all organizations, transfer of good practices, and promotion of more effective problem solving (Hansen and Nohria 2004). Above all, clients enjoy higher quality outcomes (Selden et al. 2006).

Collaborative networking, however, requires changes from the individual, within agencies and at the inter-agency organizational level. This challenges existing professional practice and cultures. Many people dislike change, it challenges people's current work, they may become defensive and find reasons why it will not work before it has been tried (Sloper 2004). To address some of these reactions, we turn to creativity in the organization as a means to assuage the concerns and put forward beginning steps to initiate a process for collaborative change through creative-oriented practices.

The primary service provider for vision rehabilitation is the Singapore Association of the Visually Handicapped (SAVH). Founded in 1951, SAVH is a voluntary welfare organization (VWO) with a mission 'to help the visually handicapped help themselves' by acquiring new skills and gaining self-reliance to cope with the integration into society (SAVH 2001). The association's objectives are:

- to serve as an Association for the visually handicapped and to promote the welfare of the visually handicapped in Singapore;
- to facilitate and encourage greater participation of the visually handicapped in the administration of their affairs, activities and in the Association's management;
- to work towards the abolition of architectural, attitudinal, social, cultural, educational, employment and any other barriers that prevents the total integration and equal treatment of the visually handicapped in the community;
- to encourage eye-care, safety and research in the prevention and cure of blindness and related diseases;
- to do any or all such other things as are incidental or conductive to the attainment of the above objects and shall include the appeals for funds to help the visually handicapped.

SAVH is affiliated to the National Council of Social Service (NCSS) and receives partial funding to run its programs. According to the SAVH 2010–2011 Annual Report, the association recorded 3235 clients in their 2010 register. From this base of clients served, the services offered include:

- Rehabilitation and Social Service—The Social Work Department is a conduit between the association and clients. On top of referral and case management matters, services include:
  - networking with other VWOs, schools and Governmental Ministries to ensure that clients have access to community based services;
  - provides up-to-date information to clients to help them make conscious and informed choices; and
  - supporting newly registered clients to help and counsel them in adjustment and overcoming the challenges of living with a visual impairment.
- Vision Rehabilitation Program—Programs includes training in orientation and mobility, activities of daily living and public education.
- Low Vision Clinic—The program supports individuals with visual impairments. Understanding of their visual condition and techniques to maximize their residual vision through adaptive aids. Consultant optometrists evaluate the visual capabilities and prescribe appropriate aids. Advice about using various magnifications, enhanced lighting and contrast is offered to assist clients with their daily activities. The clinic is also involved with public awareness activities and collaborates with hospitals and VWOs on eye education and low vision screening. By extension, SAVH established the Satellite Low Vision Clinic situated at the Singapore National Eye Centre in 2001 to better meet the needs of newly diagnosed patients with visual impairments.
- Vocational Skills Programme—As employment remains a critical need for securing a livelihood, increases quality of life and enhances self-esteem, activities at the Vocational Skills Programme include skills training, finding jobs and job matching to secure employment.
- Communications Department—Primary services offered at the department are concern with providing and enhancing communications for the person with visual impairments. The three essential services offered include the Assistive Devices Centre for sales of access technology; braille Production Unit for transcription services and the Library for loan of materials in accessible formats.
- Mobile Massage Team—Massage remains a major employment opportunity for the visually impaired in Singapore. With the introduction of recognized national certification in massage, the team offers training in various massage techniques and service opportunities both in-house as well as where demand takes the mobile team.
- Sheltered Workshop—An external agency Bizlink has partnered SAVH (2007) to offer sheltered workshop facilities to both persons with visual impairments as well as other disabilities to benefit from workshop related jobs like packing.

- Advocacy—Public awareness and lobby work to various government agencies on emerging and perennial issues including built, pedestrian and transport needs to improve the lives of the visually impaired in Singapore.
- Fundraising—For the association to deliver its services, fund raising is a critical part of the work to ensure programs are financed.
- Public Relations and Volunteers—Public education and outreach is a critical channel to foster goodwill and rapport between the association and society. Successful outcomes lead to donors and volunteers participating and supporting the association through various efforts.
- White Cane Club—The White Cane Club is the social and recreational arm of the association and members organize related activities to meet the needs of the clients (SAVH 2011).

The described services are seemingly extensive and suggest much of the needs in the community are met. However, in recent years, there has been a proliferation of groups emerging to offer related and competing services in addition to those offered at SAVH.

Burgeoning Vision Rehabilitation Services

SAVH aside, there are additional organizations representing the visually impaired. These include:

- Ahmad Ibrahim Secondary School—established in 1963, the mainstream school introduced support for students with visual impairments in 1967 offering resource teachers and facilities to support students in secondary education (Wong and Chia 2010).
- Asian Women's Welfare Association—A charity set up in 1970, AWWA introduced low-vision support services for students with visual impairments in mainstream schools in 2010 as part of their TEACH ME Integration Services (AWWA 2011).
- Glaucoma Patients Association of Singapore (GPAS)—formed in 2007, GPAS serves to offer support and information to members, caregivers and the community about glaucoma (GPAS n.d.).
- Glaucoma Society Singapore—Set up in 2003, a forum for members and family to be kept updated on information, research and patient support (Tan 2008a).
- Guide Dogs Association of the Blind (GDAB)—Established in 2005, GDAS provides instruction in orientation and mobility, assessing guide dog compatibility, training and acquisition services. Public awareness is also a key GDAS activity (Seow-Choen et al. 2008).
- iC2:PrepHouse—established in 2012, this recent organization seeks to prepare children and youth with visual impairments with the core curriculum skills to be better equipped for inclusion in the mainstream (iC2PrepHouse n.d.).

- Lighthouse School—established in 1956, the former Singapore School of the Visually Handicapped offers primary education and rehabilitation for children with visual impairments as well as other disabilities (Wong and Chia 2010).
- Macular Degeneration Society Singapore (MDS)—Formed in 2007 this group serves to support patients with macular degeneration and to raise public awareness (MDS 2012).
- Moral Charity—A charity established in 1978, services to support the visually impaired were introduced in 2005 including sheltered workshop, massage and orientation and mobility (Lee 2008).
- Retinitis Pigmentosa Society Singapore (RPSS)—Formed in 2002, RPSS serves to provide updates on retinal research and development as well as to offer talks and sharing in living with retinitis pigmentosa (Wong 2008).

While the Rotary Club's Avoidable Blindness initiative and the Lions Club of Singapore's Sight Conservation efforts are also noteworthy (Tan 2008b), the focus is fund-raising and screening. Each of the above organizations were formed to meet specific interests and vision rehabilitation needs as well as to meet new and emerging aspirations of the visually impaired community.

Discussion

Vision rehabilitation in Singapore is anchored by the services offered at the SAVH. From the programs offered, the core programs serve persons both newly diagnosed with visual impairments as well as those needing to acquire ongoing skills to live with visual impairment. With more than 60 years of history serving the visually impaired in Singapore, the services at SAVH places the association in a leadership position. With the recent proliferation of groups representing patients with specific visual diseases and rehabilitative needs, however, there is potential to build upon the carrying capacities of this diverse group to consider how services may converge to better support the community. Arguably, it can be put forward that given the existing visually impaired population is relatively small, there are numerous advantages to consider collaborative opportunities to maximise expertise, resources, etc. Yet there also is a further issue of overdependence on a single provider which a 2005 incident raises caution on monopoly of services.

Implications of a Single Service Provider

In 2011, SAVH commemorated its 60th year of serving the visually impaired. During the proceeding years of service, SAVH has remained the prominent service provider for the visually impaired. Yet in 2005, weaknesses in executive and governance administration at SAVH led to NCSS, the major funding and watchdog

body for social services in Singapore to suspend general funding to the association (Tan and Sua 2005). NCSS also withdrew the association's institute of public character (IPC) status—for charities to offer tax deductible receipts to donors, non-profits are mandated to be authorized with IPC status which enforces standards of governance, sound fund-raising practice and financial accountability (Quah 2005).

While the Commissioner of Charities (COC) did reinstate SAVH's IPC status in 2006 after a period of investigation (IRAS 2006), the impact of the suspension and investigation left the association with new challenges to surmount. Where programs previously received government funding, the association had to begin partial fund-raising to finance programs no longer supported through government funding. No easy task convincing donors for support especially when the association had just emerged from investigations and its reputation still under question. With reduced funding, staff strength fell from 55 to 32 (SAVH 2007) and fell further to 28 staff (SAVH 2011). This placed pressure on almost a staff strength of half to deliver services with reduced manpower and resources.

In spite of the administrative challenges in recent years, SAVH remains the primary service provider on general issues of visual impairment. This lends SAVH in a leadership position based largely on its historical position and services. However, the presence of the many emerging groups serving related, but specific needs such as guide dogs, and the various eye conditions resulting in visual impairment signals the issues represented were unsatisfactorily provided for or neglected.

Without a single credible alternative service provider, the availability of similar programs becomes critical in guarding against diminution of services under unforeseen circumstances. Yet the economic question of utilizing scarce resources also cannot be ignored in the face of limited government funding coupled with increased charities competing for limited donor support.

Potential for Networking and Collaboration

The various creative practices found in the organizational creativity literature has much to offer in considering the needs of better serving the visually impaired community in Singapore. Non-profits are in a space where they are operating from serving people and the community. The purpose and satisfaction gained from the service must not be diminished. These positive feelings need to be nurtured to foster creative outputs (Bianchi 2006). The three broad areas of people, process and environment suggests each of these areas leads to a beginning framework for existing services to consider internally how to organize the creative process. The tie the three areas together, the following section introduces the 3-D creativity framework.

3-D Creativity

Napier and Usui (2008) propose three types of disciplines important in building and sustaining creative organizations. The disciplines move from basic activities to more advanced ones and draws upon the three people, process and environment pillars.

1. Organizations need high-level expertise, or within-discipline mastery;
2. They need out-of-discipline thinking or reaching beyond the field for ideas to improve the organization;
3. Organizations need a disciplined process to enhance creativity.

Within-Discipline Expertise

With people being the most important part of the creative process, it is no surprise that depth of discipline or expertise is a fundamental discipline for enhancing creativity (Mauzy and Harriman 2003). Napier and Usui (2008) asserts '"within-discipline' expertise include three components:

1. Being (with) the best;
2. Speeding learning; and
3. Moving "beyond the fundamentals."

Being (with) the Best

People in the various organizations must want to be part of high-performing, highly creative organizations. This means organization members keep an open mind to continually learn and improve. Where team members may lack expertise in areas, trading skills within or across teams is one solution. Similarly, where knowledge is unavailable within the internal organization, discussion and exchanges with counterparts from other organizations and sectors are critical.

Given the recent emergence of charities serving the visually impaired, there are overlaps where SAVH, or the other groups can come together to leverage on expertise. Where there are specific needs unique to different eye conditions, there will also be general needs common across the spectrum of diseases. Platform to learn and exchange ideas is one beginning step. Opportunities for mutual short-term staff internships can facilitate knowledge-building.

Speeding Learning

Within-discipline thinking and skills needs to be complimented with speed learning especially when teams unknown to one another collaborate (Davila et al. 2006). While Napier and Usui (2008) use the term 'speeding learning', this suggests haste, or a sense of hurridness to achieve the goal with a risk of wrecklessness unwittingly implied. A more appropriate connotation of the concept is immersion learning. This emphasizes effort to adopt a sense of steeping oneself in jargon or vernacular, and availability to substitute "backups" or understudies. Speaking the trade parlance helps new comers become team members and understand tasks. In supporting students with visual impairments, terms such as expanded core curriculum and O&M are commonly used terms. Immersion also means individuals are able to fill-in when there is manpower shortage. In essence, staff serving the visually impaired need to be immersed in fundamental training if they are to work intimately with the people they serve.

Moving Beyond the Fundamentals

Grounded knowledge and competence in the discipline is important before moving beyond the boundaries (John-Steiner 1997). Having acquired experience and knowledge within the field, it is necessary to go beyond the fundamentals by moving beyond expected performance boundaries.

While this is an important practice, it is also at risk of staff claiming that they are not yet fully competent in their disciplines and that moving beyond their existing knowledge and skill sets is premature. In the current situation, Each of the diverse organizations offer specific areas of expertise which can be presented as both an opportunity to enhance within discipline knowledge or to extend beyond the fundamentals in deepening knowledge in related but different areas. All organizations are set up to serve the needs of persons with visual impairments yet it is the age group, eye condition and needs that is immediately distinctive.

Out-of-Discipline Thinking

Unsurprisingly, outside-of-discipline thinking is more difficult to achieve compared to within-discipline expertise (Parker 2003). Out-of-discipline thinkers have at least three characteristics:

1. Openness to new ideas;
2. Active search for new ideas;
3. Encouragement and expectation of out-of-discipline thinking.

Openness to New Ideas

To facilitate new ideas, reading widely, networking actively and learning constantly are some fundamental strategies. Drawing strategies and ideas from cross-disciplines such as from a related field to understand how social services in the elderly sector for instance is marketing a programme offers ideas. Equally, understanding a problem from an unrelated discipline such as dance may shed light on how to introduce new practices. The exercise in itself may not yield a direct result but a willingness to consider perspectives from a different lense promotes out-of-discipline thinking.

Active Search for New Ideas

A sure way to minimize creativity is passivity in searching for answers. Instead, proactive search for ideas helps to trigger creativity and novel ideas in the process. Organizations can introduce a monthly book discussion where teams come together to share suggestions and learning points on a collectively decided book or theme. Good ideas can be trialed and evaluated for a period before deciding whether to implement organizational-wide. Additionally, guest speakers from diverse disciplines should be invited periodically to share with the aim of encouraging lessons learnt from other sectors or practices for possible in-house adoption. Bringing together seemingly different entities with similar constraints may help to uncover nuggets of solutions. In the case of reaching out to people with visual impairment in the community, how can the existing services reach more people in need. Relying on existing practices will unlikely yield any difference. Engaging a marketing company, however, is likely to throw some light to incorporate more strategies for implementation. Further, if the carrying capacity of charities can be harnessed, this brings yet a wider range of options to be considered. It is the bringing together of diverse people where ideas collide and can be built upon to reach new heights.

Encouragement and Expectation of Out-of-Discipline Thinking

Thus far, the importance of within-discipline and out-of-discipline has been highlighted. However, this can only be realized if there is an expectation for such practice to be welcomed. Leaders play a big part in encouraging their teams to be open to out-of-discipline thinking and ideas. Demystifying that creativity is a gift belonging to a few is necessary to dispel misconceptions. Once there is a collective realization that mini-c creativity resides within everyone, possibilities begin to unfold. Leaders also should build upon outside networks (Johansson 2004). One way to foster networks is

to offer visits or short-term internships to leaders across the various organizations. Understanding first hand how programmes are delivered and to observe how programmes can be improved offers mutual benefits. Observers come in with fresh perspectives and can spot practices that may have been overlooked and offer suggestions how these may be improved. Likewise, having seen how programmes are delivered elsewhere, lessons can be brought back to one's home organization to consider adjustments in implementation. Yet at a further level, where gaps exists in one organization, potential for inter-organization collaboration becomes possible to offer a joint solution. After all, the end goal is to serve the community.

Disciplined Process

Having discussed how within-discipline and out-of-discipline features in promoting creativity, we consider process and how structure contributes to creativity generation. Drucker (2002) calls this the 'disciplined process' for creative endeavours. Generally, the fundamental structure for creativity include planning and generating ideas, experimenting, and testing or "practice" (Cannon and Edmondson 2005).

Planning and Idea Generation

In organizations, it is possible to introduce a portion of time dedicated to creative activity. This can begin during staff meetings where each member has the opportunity to be involved with participating in creative discussion. Time set aside for brainstorming and idea generation at the start of a project offers the team opportunity to share and propose ideas at the early stages. This can be an agreed percentage of the total project time with concrete suggestions expected. In considering whether there are opportunities for collaboration across organizations and programmes, teams can role play from positions of clients, administrators, funders or partners to explore possibilities. Questions to ask include why is this the right collaboration or partnership; is this the right time; are we benefiting the community?

At the same time, these opportunities for creative activities are only possible if there are routines and structures put in place. Contrary to popular belief that creativity is often found in spaces where there is less structure, it is in discipline that creativity is better able to be produced and not left to accident (Napier and Usui 2008).

Experimenting

Once ideas have been collectively agreed upon, the team needs to work on ironing out details on how new ideas can work. Creative inputs do not diminish after

brainstorming, but continue into the experimental phase to work at problem solving when hick-ups arises during trial periods.

Final Testing

This final test is a pre-launch phase where staff rehearse the entire plan, step by step to integrate the programme. Where collaborative programmes are proposed, technical and human aspects in terms of scope of responsibility, referrals, funding, contact persons etc. needs to be put in place and individuals know what they need to do when the programme is launched.

Conclusion

The literature on organizational creativity has introduced how companies and research intensive firms foster creativity through diverse ways. For many managers and observers, many of these practices are considered beyond the organizational capacity nor do they have the manpower with the requisite skills to even step into the creative space. Rather than to be paralyzed, organizations can start with the existing box to enhance creativity, whether in a programme, group, organization, or field. Napier and Usui (2008) had presented the creativity approach in the three disciplines. While it may not be immediately obvious that all disciplines resides in a single person, it is likely to be found in group or organization in differing levels. While most organizations recruit based on within-discipline knowledge or expertise, the challenge is to identify people able to uncover and connect ideas from outside their fields. Still others may possess the disciplined process to find, test and launch new ideas. In building on the existing network to expand on the carrying capacity of charities, organizations can seek to push and develop different types of discipline thereby expanding the 'box'.

Possible creative outgrowths for organizations include:

1. As orientation and mobility training is a fundamental need for all persons with visual impairment, explore shared O&M services and instructors who can serve all organizations. This is one way to address the many critical needs in the community without organizational and boundary demarcation. By extension, while guide dogs are a reliable mobility option for many persons with visual impairments in the world, there remain issues with acceptance and awareness in Singapore. Reports of individuals being turned away at restaurants, taxis and buildings because of their guide dogs feature periodically but prominently in the news. Law Minister K. Shanmugaratnan has recognized this issue and has called for greater clarification in government regulations to make access and ownership of guide dogs less onerous for users. To date, there are only three guide dogs in

Singapore (Goy 2013). While this issue is led by the GDAB, there is much synergistic potential if all groups work together to campaign for greater awareness and acceptance.
2. The National Population and Talent Division (NPTD) reports the number of residents aged 65 years or older will multiply threefold from 300,000 to 900,000 in 2030. By then, one out of every five residents will be a senior (NPTD 2012). With the swelling numbers of senior citizens in the time ahead, the various groups supporting the visually impaired can reach out to larger groups by exploring collaborative efforts to meet the needs of the elderly population with visual impairment.
3. Assistive technology has advanced significantly in recent years. However, there is still much training and publicity that can be initiated to engage greater usage in the community. To start, this includes, teachers, parents and students (Wong 2009; Wong and Cohen 2011). Making a start now is a step in the direction in avoiding the digital gap widening further (Wong 2012).

Final Words

In an increasingly complex and competitive social service sector confronted by limited resources, there is evidence for greater networking opportunities for the various groups serving the visually impaired to work collaboratively to build on strengths and resources. SAVH has the historical network serving from a generalist standpoint to serve the community while the newer agencies have specific interests and work fixedly to champion their respective causes. Duplication of services and worst still, working in silos would be unproductive in a small non-profit market. Through networking, there is a chance for new knowledge to be facilitated when knowledge boundaries are crossed. Creative-oriented activities and practices can help encourage such a climate in organizations. The common goal is then to guard against territorial divide but augment the carrying capacity of each group to value add in serving the visually impaired through continuous networking.

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Chapter 14
Creativity in Musical Performance: Musicians' Notion of Tradition, Originality and Value of Performance

Hiromichi Mito

Introduction

Creativity is one of the most important factors in musical performance (Clarke 1995; Persson 2001). In musical activities, although creativity has often been emphasized in the process of composing activity, where musical notes are constructed from nothing, a musical performance may also be a creative activity. If the works of great composers such as Bach, Beethoven, and Chopin are outstanding products of creativity, marvelous performances by renowned artists are also the outcome of creative processes. In musical performances, performers construct the musical sonority with their own richly imagined interpretation of the musical notes. The presence of creativity makes a strong contribution to the value of a performance (Williamon et al. 2006).

Although creativity is one of the most essential parts of musical performance, musical performance is tightly bound by various constraints. Especially from the viewpoint of expressing one's original ideas, musical performance is considerably more ristricted than other artistic activities such as composing, painting, and carving. One of the strongest constraints on musical performance is that the performance is a reproduction of notes that have already been determined. Contrary to composing where composers create music from nothing, musical performance is a creative process in which the notes that have to be played are already written in musical notation or transmitted orally by others.

Of course, the degree to which the notes that must be played are predetermined is not the same among the different genres of music. For example, in the case of jazz and Indian classical music, the majority of a performance is conducted in the form of improvisation, in which a performer invents the notes in the course of live performance. Even in such improvisational situations, however, the format of a

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performance such as the chord progression, the mode, the rhythmic patterns, and the melodic patterns are to a certain degree predetermined. It can be said that the musical performance is the reproduction of musical events that have already existed.

In Western classical music, the musical notes that must be played are written in notation, which describes tempo, pitch, timing, and dynamics. The information shown in the notation, however, is only a part of real performance: the musicians' performances are far more sophisticated than what is shown in the notation. The information written in notation is only a mechanical norm for the performance, and the musicians' performances deviate from the notation in timing, and even in pitch, in order to make the expression musical (Gabrielsson 1999).

In the case of traditional music, musical pieces are transmitted orally, and students learn new pieces by imitating the performance of a master. The model performance of a master also includes delicate information in terms of tempo, timing, pitch, and dynamics, and the learners try to imitate all those aspects with exact precision (Blacking 1957; Lilliestam 1996).

An important aspect of musical performance is that these detailed ways of expressing musical notes have commonality within a musical style. Namely, each style of music has its own way of expressing musical notes based on the rules and conventions of the style, which have perpetuated from the past to the present. Such performance styles have been shared by members of the same cultural group, and performances are strictly watched and evaluated within the scope of rules and conventions by the audiences as well as musicians. There are strict "traditions" that cannot be ignored.

Regardless of such constraints, musical performances still hold the possibility of variation. In musical performance the same piece is often reproduced differently by different performers. For example, there is a marked difference in tempo when listening to the performance of Beethoven's Sonata No. 17 by two great pianists, Claudio Arrau and Wilhelm Backhaus. While Claudio Arrau took 7 min 58 s to perform the third movement (Beethoven 1803a), Wilhelm Backhaus only took 6 min 20 s (Beethoven 1803b). Although these two pianists are unanimously regarded as orthodox successors of German classical music, there is a great difference in the performances of the two pianists, even just focusing on tempo.

To summarize the discussion so far, musical performance is strongly bound by tradition. Nevertheless, even orthodox musicians in the same genre of music do not perform in the same way, and the performance of each musician shows originality. *The question then arises as to how we can interpret the relationship between tradition and originality in terms of creativity.*

As pointed out by many researchers, one of the most difficult aspects of studying creativity in musical performance is how to define creativity in the first place. It seems possible, however, to have a broad consensus on the definition of creativity in musical performance. Sternberg and Lubart (1999) explained creativity as "the ability to produce work that is both novel and appropriate." Sternberg and Lubart's framework can also be applied to creativity in musical performance. Namely, "the

ability to produce novel work" can be regarded as the performer's attempts to establish their original expression, and "the appropriate work" as the rules and conventions established by long-term traditions.

The critical question is thus how can these two ideas be reconciled in musical performance? While tradition requires performers to perform in the same way, originality requires the performers to be different. A study of creativity must consider how these conflicting two ideas construct the essential part of creativity in musical performance. Furthermore, one of the most *important aspects in discussing creativity is how the musicians consider the value of performances in relation to tradition and originality*.

One practical way to discuss the value of performance in relation to tradition and originality is to examine differences between original performances and bizarre performances. A musician can receive a positive evaluation based on original performance, or a negative evaluation for a performance characterized as bizarre. There have been numerous debates about the difference between original performances and bizarre performances, which clearly shows the difficulty in drawing a sharp line between these two types of performances.

One famous story from the Western classical music world occurred at an internationally renowned piano competition, the Chopin competition, in 1980 (Waldorff 1985). One candidate from Yugoslavia, Ivo Pogorelić, stirred up a sensation over his extremely individualistic performance. The fray started at the second round elimination, when the jury from the UK resigned in strong opposition to the result that Pogorelić survived the first round elimination. The jury strongly criticized Pogorelić's performance which deviated from the traditional way of playing Chopin. On the contrary, in the third round, the famous pianist Martha Argerich resigned, opposing the result that Pogorelić was not permitted to advance from that round. She left the message that "he is the true genius!"

The story illustrates that, even among world-class musicians, the evaluation of individualistic performance is inconsistent. At the same time, it shows that the balance between tradition and originality is one of the most essential factors for considering the value of a musical performance, which determines creativity in musical performance. While some musicians might put an emphasis on originality in creating their expression, others might respect tradition to a greater extent in their performances.

These different notions of originality and tradition seem to relate to differences in the way musicians have been trained and educated. In particular, differences between musicians from different musical genres give us an important insight in discussing this issue. As has been discussed, each genre of music has its own rules and conventions which create common expressions particular to it. In addition to the traditions of musical expression, each musical genre has its own way of acquiring musical expressions.

In Japanese traditional music, imitation is the most important way of acquiring musical expression. Students start learning new pieces by imitating the teacher's performance without using the musical notation. The student simply concentrates on playing exactly the same way the master played. Explanations regarding how to

interpret the musical piece are rarely given. Furthermore, the reasons for using certain musical expressions are not explained (Ikuta 1987). In some sense, the performance of the master is the absolute existence backed by the traditional authority.

On the other hand, in Western classical music, music is often transmitted using notation and students are required to establish their expression by interpreting the written notation rather than imitating a model performance. Furthermore, the theoretical background for certain musical expressions is often given to students. Students are required to positively establish their performance style.

Of course these differences are not clear-cut, and there might be differences in how genre-specific teachings are interpreted among musicians in the same genre. However, the approaches taken by different musicians in different genres of music provide important insights into how musicians value originality and tradition in musical performances, and a context for discussing how musicians consider creativity.

On a routine basis, the discussion of tradition and originality is by no means uncommon in evaluating performances. Many musicians use words such as "bizarre" or "original" in evaluating performances. There has been, however, little academic research that has focused on this most important aspect of creativity. Empirical data are rarely given when discussing this issue.

The goal of the present study was to explore the following:

1. How musicians in different genres consider the relationship between tradition and originality in musical performance.
2. How musicians in different genres value musical performances in relation to the balance between tradition and originality.
3. How musicians consider creativity in musical performance.

In order to clarify these research questions, musicians were interviewed from the following genres: Western classical music, Indian classical music, Japanese traditional music, and jazz music. In the interview, six interrelated questions were asked, relating to what constitutes a good performance, notions of tradition and originality, differences between original performances and bizarre performances, designation of performance, the necessity of creativity in musical performances, and the development of creativity. Although the content of these six questions overlap, the intention was to explore the essential meaning of creativity by asking a similar question from different angles.

Method

Participants

A total of seven musicians volunteered for the study. They consisted of a *sitar* player (Indian stringed instrument from Indian classical music), a *koto* player

(Japanese stringed instrument from Japanese traditional music), a *shamisen* player (Japanese stringed instrument from Japanese traditional music), a *shakuhachi* player (Japanese flute from Japanese traditional music), a cellist (Western classical music), a pianist (Western classical music) and a pianist (jazz music). The profiles of the seven musicians are as follows.

***Sitar* player (Indian classical music)** Born in India, he began sitar lessons under his father, and continued his study with Santosh Banerjee and Nikhil Banerjee. He has given many recitals not only in India but also in Japan, Europe, and the United States. He has released many CDs collaborating with acclaimed Indian musicians.

***Koto* player (Japanese traditional music)** Born in Japan, she learned *koto* and *sangen* from her mother. She has performed in many countries, including Italy, Australia, and Germany. Her performances have regularly been broadcast on nationwide TV and radio. She has received numerous awards.

***Shamisen* player (Japanese traditional music)** Born in Japan, she learned *koto* and *sangen* from her mother. She has performed in many countries, including Belgium, Canada, France, Germany, Holland, Italy, the UK, and the USA. She has received numerous awards.

***Shakuhati* player (Japanese traditional music)** Born in Japan, he began studying the *shakuhachi* under his father. In 1980, he entered the Tokyo University of Music and the Fine Arts, studying under Ningen-Kokuho (Living National Treasure) Goro Yamaguchi. He has performed in many countries such as Spain, New Caledonia, Turkey, Tanzania, Ghana, South Africa, Sudan, Russia, and the USA.

Cellist (Western classical music) Born in Japan, he became a student at the Tokyo University of Music and the Fine Arts, studying under Kiyoshi Mouri. After graduating, he went on to study under the principal cellist of the Vienna Philharmonic Orchestra. Presently, he teaches, performs, and records in Japan.

Pianist (Western classical music) Born in Japan, she took up the piano in early childhood. She entered the Musashino Musicae, and in the following years went to study in Germany. There, she studied under Elisabeth Ilinichna Leonskaja. She has given many recitals and lectures.

Pianist (jazz music) Born in Japan, he has been familiar with Western classical music since beginning to play violin at the age of 3. After entering university, he concentrated on studying jazz piano. During the 1980s, he stayed in New York many times, where he refined his piano skills by joining sessions with famous jazz musicians. He has taken part in sessions with top musicians such as Richard Davis, Sonny Fortune, and Tiger Okoshi.

Questions

The following six questions were posed. Although predetermined questions were prepared, the interviews took the form of semi-structured interviews. The interviews allowed new ideas to be brought up on the basis of the interviewee's responses.

1. What kind of performances do you think represent good (excellent) performance?
2. Can you please tell me the relationship between tradition and a musical performance?
3. Can you please explain the difference between an original performance and a bizarre performance?
4. During a live performance, do you try to play exactly the same way as you planned to in advance?
5. Do you think that creativity is needed for a musical performance?
   If so, can you please explain what a creative performance is?
6. Do you think creativity can educate?

Results

The results will be presented regarding each question, respectively.

1. **What kind of performances do you think represent good (excellent) performance?**

The intention of question 1 was to know broadly what aspects of the music the musicians prioritized in their performances. Before the interviews began, and as the purpose of the study was simply explained as to "investigate the musicians' notion of musical performance," participants were not aware that the main purpose of the interview was to explore musician's notions of creativity. Therefore, each musician answered this question without any preconceptions.

Some participants put priority on how the performance affects the audience. The *shakuhachi* player and the *shamisen* player pointed out that a good performance should be affecting and moving to the person who listens to it. The Indian musician also emphasized that good performance should be judged as good based on audience reactions. Contrary to such ideas, the two Western classical musicians' notions were more individualistic. The pianist explained that a good performance is a performance that satisfies her. She did not consider the evaluation of others to be important to her. The cello player also suggested that he wants to be a musician who can strongly express himself. He said that a good performance should show the performer's identity in whatever pieces he or she played.

The *koto* player focused more on concrete aspects, such as the quality of tone, including pitch and timbre, as important factors in good performance. Although

several players pointed out the necessity of technical skills to good performance, all players regarded technical aspects as subsidiary factors for good performance, factors that underpin more important goals.

On top of such notions of good performance, an interesting point is that three of the traditional music performers strongly set their goal of good performance as equating their master's performance. The *shakuhachi* player suggested this in the following way:

> Generally speaking, a good performance is a performance that moves the audiences. However, for me as a traditional music artist, my supreme goal is my master. The master is like an absolute existence, whose skills I cannot ever equal.

2. **Can you please tell me the relationship between tradition and a musical performance?**

Although their ways of explaining tradition were not the same, all participants suggested that tradition forms the most fundamental part of musical performance. They stated that original expression should be built on top of the fundamental parts of musical performance, which have been shared by musicians in the same culture.

The *shamisen* player explained the relationship between tradition and originality in the following way:

> First, we've got to learn fundamental performance style. After we have fully acquired the fundamental performance style, I think we are allowed to look for adventure. I think it is an outrageous mistake to make new attempts without acquiring the traditional rules of performance. Once the musicians have fully acquired the fundamental style of their musical genre, they can estimate the degree to which they can deviate from the fundamental style in order to establish originality.

The *koto* player also placed emphasis on the style of performance:

> There is no way we can change the fundamental part of the performing style. The fundamental performing style of traditional music is deeply ingrained in my body. For example, nowadays, the young performers start *koto* from modern Japanese music, and later on, go into traditional music. I think it is quite difficult for them to acquire the stylistic sensitivity of traditional music in this way. The fundamental part of style sensitivity cannot be easily acquired. However, for me, I was born in a traditional music family, so I started listening to traditional music before I was born. I think this is the right way to start traditional music. Although I also perform modern Japanese music, the fundamental part of my style sensitivity does not collapse.

The Western classical musician cellist also considered that tradition is ingrained in performance, and explained this by drawing an analogy between language and music:

> If a person tried to imitate the intonation of a dialect they didn't speak, the local people would be able to tell the difference from the original dialect, because the intonation of the language is ingrained in our body. The tradition of music is the same. Take, for example, the rhythm of a Viennese waltz, nobody can perform it like the Viennese. Although the Berlin Philharmonic Orchestra often plays a wonderful Viennese waltz, it's not a true Viennese waltz.

3. **Can you please explain the difference between an original performance and a bizarre performance?**

Although the participants explained their thoughts in different ways, all the participants believed that they could clearly differentiate a performance with originality from a bizarre performance. All participants were positive about the benefits of including novelty or new ideas in a performance. All of them, however, strongly warned about stepping out of the bounds of tradition. Interestingly, many participants showed a strong aversion to performances that deliberately seek to get attention. The Western classical pianist explained an attention-seeking performance in the following way:

> Attention seeking performances cannot eventually move the audiences because the performance must be created based on the performer's own motivations. I can instantly recognize performances that address the audience's mood.

The jazz pianist cited the story of famous pianist Bill Evans, who stuck to natural expressions:

> He never aimed to surprise the audience. If he wanted, he had many tools (techniques) to surprise audiences, but he didn't play dirty tricks by surprising the audience or drawing attention.

The jazz pianist explained the difference between original and bizarre performances in relation to the quality of the audience:

> The attention-seeking performance does not apply to the sensitive audiences. Although the number of sensitive audiences might not be high, they can obtain an insight into the true nature of good performance.

The Indian musician also mentioned the quality of the audience, explaining that although some people criticize original performances on the basis of jealousy, there do exist audiences who can make the distinction between performances with originality and those without any value. The Japanese *koto* player also pointed out that Japanese traditional artists are always seeking new ways of performing. The performance, however, does not work without convincing sensitive audiences of the necessity to find new ways of expression.

Many participants admitted that arbitrary and artificial performances often surprise a mass audience and gain enormous popularity. Furthermore, this type of performance often leads to commercial success. The participants emphasized, however, that this kind of performance is ultimately unsustainable and they denied the worth of such performances. It was interesting that all participants emphasized that the performances of artists who are commercially successful are not always good performances. Furthermore, some participants emphasized that we should not be swayed by commercial success or by formal prizes awarded to a musician, when evaluating his or her performances.

4. **Do you try to play exactly the same way as you planned to in advance?**

Some participants said that the performance changes according to the situation, and new expressions and ideas come to them spontaneously. In most cases, these new expressions emerged automatically. On the other hand, the jazz pianist reported that new expressions that occur in the course of a live performance represent a conscious process as well as an intuitive one. The jazz pianist explained that he always tries to generate new ideas during live performances. Furthermore, he said that he could explain why he adopted a certain expression at a given point in the music.

Many participants emphasized that attempting a new expression during live performance is not as easy as it sounds. In live performances, performers have to overcome stage fright, which hinders free expression. Although each participant indicated understanding the importance of improvisational free expression during live performance, participants regarded preliminary ideas regarding how the performance might progress as necessary to performances' success.

5. **Do you think that creativity is needed for a musical performance? If so, can you please explain what a creative performance is?**

Although none of the participants pointed out creativity as a factor needed for good performance in Question 1, all participants answered that creativity is needed in musical performance. The notion of creativity, however, was not the same among the participants.

The traditional musicians considered creativity from a long-term perspective. They considered that creativity is needed in shifting performance styles into congruence with the time in which we live. The *koto* player explained this in the following way:

> Our music started in the Edo period (1603–1868). We actually don't know how the artists in the Edo period played. Although we call our music "classic," we are playing this music in modern society. So we have to "create" the expressions that can live in current society.

The *shamisen* player also regarded creativity as an important factor for establishing performance styles that modern society requires:

> We should not continue to play our music in the same style because it is a "traditional" music. Traditional music can change its performing style. Although some fundamental parts of performance style never change, we should continuously change other aspects of performance style along with the passage of time. And this is exactly the nature of creativity in musical performance.

On the other hand, the Indian musician seemed to find creativity within individual performances. He emphasized the importance of past experience, and closely related creativity and the value of performance:

> For me, the creative performance is an utmost performance that has only happened twice or three times in my life. The utmost performances only occur when the outcome of daily practice and the information that I receive through my listening experiences come together and shape up.

Contrary to the idea of the Indian musician, several musicians regarded creativity as a more essential part of musical performance. The jazz pianist, the Western classical pianist, and the *shamisen* player simply explained that expression through musical performance is itself already a creative activity. The jazz musician put this way:

> Nowadays we can make a PC perform music. However, the music played by the PC does not vary in each performance. Although the performance is perfect, it is always the same. On the other hand when we play music, it cannot be the same. Every musical performance by a human being can be a creative activity, because every day we create the musical performance in a different situation, in which we feel different emotions.

6. **Do you think creativity can educate?**

As was discussed in Question 5, many participants similarly emphasized that an important factor in creative performance is to express something through music. Participants regarded creativity as an essential part of musical performance that many performers should have. Such notions are closely related to participants' answers to this question. The Western classical pianist explained this as follows:

> To express something through musical performance, that is already an expression of creativity. So if we could educate students on how to be creative, it would be to encourage them to "say something through music." Creativity does not exist in the performance in which no assertion is made.

The cellist's opinion was similar:

> It is easy to teach students who have their own intentions of how to express something, because the task of the teacher is simply to make up their expressions so that they become the proper ones.

In order to express creativity, many participants pointed out the importance of obtaining some feelings from the musical patterns. Furthermore, every participant expected that this feeling should emerge spontaneously from the students. Some reported the difficulty of teaching "how to feel" or "how to express." Some participants explained that they can bring out these abilities, but cannot "teach" them.

The jazz pianist considered that a creative performance occurs in the process of conscious control of performance, and emphasized the function of training in the acquisition of creativity:

> Creativity can be acquired by training and experience. The accumulation of musical knowledge enables the performer to consciously establish the proper conditions for creative performance.

Discussion

The present study focused on two conflicting ideas, tradition and originality, in discussing creativity. At the outset of this study, it was suggested that tradition and originality contribute to the construction of the value of musical performances,

and that creativity in musical performance should possess these two components in good balance. Standing on such a theoretical framework, three research questions were drawn:

1. How do musicians in different genres consider the relationship between tradition and originality in musical performance?
2. How do musicians in different genres value musical performances in relation to the balance between tradition and originality?
3. What do musicians consider creativity in musical performance to consist of?

Generally, the results are clear. All participants considered tradition and originality as important components of musical performance. Although these two ideas are conflicting, all participants considered that tradition is an essential part of musical performance, and that originality should be built on top of this fundamental part of performance.

As for the balance between these two ideas, many participants placed importance on the rules and convention based on traditions. The participants did not support the presentation of performances that only possess novelty and lack traditional underpinnings. The participants favored performances that comply with the rules and conventions established by their predecessors. An interesting remark from the Japanese traditional musician was that if the musicians have fully acquired the fundamental style of their musical genre, they are able to estimate the degree to which they can deviate from the fundamental style in order to establish originality.

This notion was common among the participants, and is clearly reflected in the answers to Question 4 in which all participants decisively answered that they could point out a performance that lacks traditional underpinnings, and they showed a strong aversion to bizarre performances. Now, we can go back to the topic of the Chopin piano competition discussed in the Introduction, in which different musicians reacted completely differently to an individualistic performance. While some musicians showed determined opposition to performances that deviated from the traditional, others provided the highest evaluations of such performances. Similar to this story, each of the participants in this study also seemed to have firm ideas about the balance between tradition and originality.

At this stage, it might be difficult to clearly illustrate performances that comply with the rules and conventions, or to show concrete examples of traditional constraints in musical performance. What was made apparent in this study, however, was that each musician possesses his or her own norm of rules and conventions that cannot be undermined. It was also revealed that such norms have been ingrained by long-term experience and training.

The notion that values the traditional aspects of performance reflects one of the most important aspects of artistic music. The participants were uniformly opposed to attention-seeking performances, and they did not find any value in such performances. Furthermore, they were wary of commercially successful performances, and warned that audiences should also be sensitive to these kinds of performances.

Although the results highlighted the relative importance of tradition, this does not mean that participants were dismissive to the value of creativity in musical

performance. It became clear that all participants, including the Western classical, traditional and jazz musicians were strongly aware of the need for creativity in musical performance; however, the perceptions of creativity were diverse among the participants.

Japanese traditional musicians viewed creativity from a long-term perspective. They believed that the style of performance should change along with the times. They considered that such a process of shifting the performance style was exactly the process of creativity. Although it was expected that traditional musicians would stick to the historical style of performance, Japanese traditional musicians considered that shifting their performing style was one of their biggest missions. While they fully respected the rules and conventions accumulated by their predecessors, they also keenly realized the necessity of creating new styles that live with the time period in which they are performed.

In this study, the relationship between the value of the performance and the creativity present in the performance was examined. Differing views on this topic were observed. While the Indian classical musician closely related creativity to the value of performance, the Japanese traditional musicians and Western classical musicians considered creativity part of the essential nature of performance, which every musical performance should possess.

This last idea of creativity leads to the implication that creativity in musical performance is not only of importance to professional musicians. At any musical level, from the performance of conservatoire students to the singing of primary school children, the expression through musical performance could be a creative process. Although music education research often focuses on creativity through composing activities, the importance of creativity in musical performance should not be ignored.

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Chapter 15
Team Processing and Creative Self-efficacy in Professionals from Creative and Non-creative Industries

Anna Na-Na Hui, Dannii Y.L. Yeung, Christina Sue-Chan and Sheung-Tak Cheng

Introduction

The value of creative industries is developing worldwide: the United States (11 % of GDP in 2010; Oxford Economics 2013), Argentina, Mexico, and Peru (7 % of GDP in 2010; Oxford Economics 2013), the European Union (4.5 % of GDP in 2008; TERA Consultants 2014), South Korea (10 % between 2010 and 2012; CISAC 2014), China (6.37 % of GDP between 2010 and 2012; CISAC 2014), Hong Kong (4.1 % of GDP in 2009; Census and Statistics Department, HKSAR 2011), and Taiwan (3.7 % of GDP in 2010, Ministry of Culture, Taiwan 2010). Creative industries are major industries in the 21st century, a time in which knowledge generation through creativity and innovation is emphasized (Florida 2002; Landry 2008).

More attention and emphasis was placed on the conceptual model on "creativity". Many suggested that creativity should not only focus on eminent creative but also some everyday thinking. Kaufman and Beghetto's (2009) proposed a Four C Model of Creativity. Big-C creativity refers to eminent creative productivity as examined by Simonton (1991). Pro-c creativity represents the developmental and effortful progression to attain professional-level expertise in any creative area (Kaufman and Kaufman 2007). Mini-c creativity is defined as self-perception and interpretive process of creativity and measured by self-assessment. Little-c creativity refers to creative activities in which layperson participate each day as demonstrated by the work of Richards (2007) and best assessed by psychometric tests,

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consensual assessment technique and other nomination methods. This study will look into the relationship between mini-c creativity and Pro-c creativity in professionals in creative industries and other industries.

It is important to study team processing in creative industries for several reasons. First, in the modern knowledge era, the creative class is thriving; creative talents are needed regardless of age and background (Beghetto and Kaufman 2007; Florida 2002). Understanding of team processing in entrepreneurship will enhance team creativity in creative industries. In fact, more education on creativity has had grown to meet the increasing pursuit of creativity (Matheson 2006). Second, creativity is regarded as character strength that develops across the lifespan (Peterson and Seligman 2004) and an important piece of psychological capital for knowledge workers (Luthans et al. 2007). Continuously developing creativity for people of all ages encourages healthy human development (Peterson and Seligman 2004). Third, creative industries have been identified as crucial to the economic development of Hong Kong and Greater China regions. Perception of team processing and creativity among professionals in creative and other industries contributes to the epistemology of Pro-c creativity in the era of creative economy. This means Pro-c creativity development will affect more professionals than ever before.

The purpose of the present study was to investigate the mini-c and Pro-c differences among professionals working in two different organization cultures, creative and non-creative industries. We investigated professionals' perception about team processing of Pro-c creativity. We also asked them to assess their creative personality traits, creative self-efficacy, and social axiom of reward for creativity. This study extends previous research by showing how a Hong Kong Chinese sample in both creative and non-creative industries perceives team processing of creativity in their work setting and how they perceive their creative self-efficacy. Findings from this study may enhance our understanding of professional creativity, team processing and individual creativity.

Pro-c Creativity

In a recent meta-analysis on individual and team predictors of innovation at work, Hulsheger et al. (2009) summarized 3 research designs: Type 1 design—examining individual antecedents and their impact on individual creativity; Type 2 design—examining team antecedents and their impact on team creativity; Type 3 design—examining individual perceptions of team variables, in particular team processes and influence on individual creativity. An advantage of Type 3 design is that it assumes a variability of impact of team characteristics on individual and team innovation. The current study adopted the third design examining how the perception of both individual and team variables affect individual creativity.

In Woodman et al. (1993) interactionist model of organizational creativity, a type of Pro-c creativity, it was proposed that the path from individual factors

(cognitive style, abilities, personality, knowledge and intrinsic motivation) to organizational creativity was mediated by group factors (group composition, group characteristics and group processes). Studies on pro-C creativity have shown that climate for creativity (Oldham and Cummings 1996), perceived support for innovation (Siegel and Kaemmerer 1978), task requirement for creativity (Gilson and Shalley 2004), feedback (Zhou 2008), support for creativity from supervisors or coworkers and family and friends (Madjar et al. 2002; Shalley 1995), and creative strategy (Denison et al. 1996) all contributed positively to professional creativity, but perceived barriers to creativity, such as low commitment to organization and system, fear of change and criticism, time and work pressure, rigid rules and company policies, contributed negatively to professional creativity (Mostafa and El-Masry 2008; Wong and Pang 2003).

Pro-c creativity is influenced by some personal characteristics, such as creative personality (Christensen et al. 2014; Collins and Cooke 2013; Zhou 2003), educational level and gender of the professionals (Mostafa 2005; Tagger 2002; West 2002; Yoo et al. 2010) as well as their belief in how creativity is rewarded in the organization (Chen et al. 2015; Leung and Morris 2011). Personality of professionals in creative industries is often characterized with humor, inventive, insightful, original and resourceful (Christensen et al. 2014; Helson et al. 1995). Managers in engineering/product development and marketing/advertising with higher educational level and male managers tend to have a more positive outlook towards Pro-c creativity (Mostafa 2005). The findings are consistent with the differentiation of professionals into super-creative core and creative core industries proposed by Florida (2002). The super creative core industries include computer and mathematics, architecture and engineering, life, physical and social sciences, education, training and library, arts, design, entertainment, sports and media. The creative core industries include management, business and financial operations, legal, healthcare and technical, high-end sales and sales management.

Leung and Bond's (2009) concept of social axiom is also useful in understanding normative beliefs in cultures, including organizational culture. This dimension has provided a cognitive map of how individuals organize and expect creativity to be rewarded or presented in their social world and constituted a positive attitude towards creativity in individuals. Creative professionals in advertising industries have a stronger belief that the organization rewards creative effort (Leung and Hui 2014). It is essential to understand how different cultural factors and social factors contribute to influence creative behaviors when investigating creativity (AAH 2003). Different organizational culture should have their characteristics that shaping workers creative capacity.

Hypothesis 1 Professionals in creative industries will have higher self perception of creative personality than professionals from other industries.

Hypothesis 2 Professionals in creative industries will have higher social axiom in reward for creativity than professionals from other industries.

Creative Self-efficacy

Tierney and Farmer (2002) defined creative self-efficacy as the belief in one's ability to creative productivity. Creative performance largely depends on self confidence in creative ability. In addition to creative ability, creative self-efficacy also depends on individual's team processing in the work environment (Denison et al. 1996), job tenure, and job complexity (Amabile 1988; Tierney and Farmer 2002), as well as self-efficacy enhancing role of leaders (Tierney 2008). Creative self-efficacy of professionals leads to creative performance (Choi 2004; Redmond et al. 1993; Tierney and Farmer 2002). These studies showed that the individual's education, job tenure, organization support and leader facilitation were related to creative self-efficacy.

Creative self-efficacy also serves as a significant variable in predicting success in creative professionals (Beeftink et al. 2012), professionals in non-creative industries (Chong and Ma 2010; Tierney and Farmer 2002), and undergraduate college students (Hung et al. 2008). Beeftink et al. (2012) examined 276 successful architects in the Netherland and reported that self-efficacy played a key role in mediating the relation between innovative cognitive style and success in the creative profession regardless the size of the architectural business organizations. Creative self-efficacy plays a pivotal role in predicting Pro-c creativity in architects.

In a study of 350 individuals from companies in non-creative industries including the financial, business service, telecommunication and food industries in Wellington, New Zealand, creative self-efficacy of managers was significantly higher than non-managers (Chong and Ma 2010). However, their results did not support a direct relationship between creative self-efficacy and either a trusting and caring atmosphere or organization structure. Creative self-efficacy exerted a stronger direct effect on white-collar (managerial) employees than on blue-collar (manufacturing) employees (Tierney and Farmer 2002). Hung et al. (2008) investigated 636 undergraduate students across 5 disciplines (Engineering, Arts, Sciences, Business, and Social Sciences) from 6 universities in Northern Taiwan. Creative self-efficacy mediated the relation between positive feedback and extrinsic motivation. Moreover, in a recent longitudinal study, Tierney and Farmer (2011) found that increase in creative self-efficacy corresponded with increase in Pro-c creativity rated by supervisors.

Hypothesis 3 Creative self-efficacy are positively correlated with creative personality and social axiom of reward for creativity in professionals.

Team Processing of Pro-c Creativity

With a sample of 480 undergraduate students working in teams as professionals, Tagger (2002) found that conscientiousness, extraversion and agreeableness predicted team processing relevant to Pro-c creativity, such as involving others,

providing feedback and etc. There was also a significant interaction between individual creativity and team processing to Pro-c creativity. Groups with high little-c creativity on an individual level and high levels of team processing yielded higher Pro-c creativity as a team. Groups with low team processing neutralized the effect of groups with high little-c creativity. Similarly, groups with low little-c creativity neutralized the effect of groups with high team processing.

Different types of industries call for different talents with specific skills and competencies for success in Pro-c creativity (Yoo et al. 2010). Pro-c creativity is influenced by team characteristics that facilitate open interactions, diverse viewpoints, as well as personal characteristics and organizational culture. In Yoo et al. (2010) study, 228 Korean professionals in 6 industries reported that learning organization culture directly impacted Pro-c creativity as a team. They address the significance of team development of Pro-c creativity by strengthening creativity within teams and creative self efficacy within individuals in a learning organizational culture.

Teams are the core element of today's organizations as they contribute to business success by bringing individual expertise, skills, knowledge, and abilities together (Cohen and Bailey 1997; Hackman 1987; Kozlowski and Bell 2003).

One of the antecedents of organizational creativity is team processing in general functions, such as creative strategy, teamwork and etc. (Andriopoulos 2001; Denison et al. 1996), also in specific knowledge creation practices (Yoo et al. 2010), and motivated information processing (De Dreu et al. 2011). Andriopoulos (2001) reviewed 5 important determinants of organizational creativity, including organizational climate, leadership style, organizational culture, resources and skills, and the structure and systems of the organization.

The existing literature on models of team processing provides a rich base for conceptualizing the functional domains of teams in terms of context, process, and outcomes, for example in Denison et al. (1996) Model of Cross-functional Team Effectiveness. Their analysis has revealed six domains of team processing, including norms; the importance of the team's work; effort; efficiency; creative strategy; and breadth. Hackman (1987) developed an input-process-output framework to explain how teams work out. This framework posits that various input factors (such as features of the group, its task, and its work context) affect team processes which in turn affect the output of the group.

In the globalized economic world with rapidly changing customer requirements, financial crises, new technologies, and outperforming competitors, teams are increasingly forced to improve, learn, reflect, and adapt in order to sustain and enhance their team effectiveness (Burke et al. 2008). The organizational context of creative industries should be by nature more conducive to Pro-c creativity.

Hypothesis 4 Team processing variables mediate between creative personality and social axiom of reward for creativity to predict creative self-efficacy in professionals.

Method

Participants

A total of 737 individuals living in Hong Kong participated (including 303 male, 430 female). Convenience sampling was used. Participants working in the creative industries were recruited by sending an invitation letter to the organizations whereas participants working in the non-creative industries were recruited by sending an invitation letter to working family members of undergraduate students in a local university. Their age ranged from 18 to 65 years, mean age was 40 (see Table 15.1). Participants were native speakers of Cantonese and were Chinese by ethnicity. They received HK $50 as compensation.

Table 15.1 Demographics characteristics of participants (N = 737)

	Frequency	Percent
Age		
18–30	116	15.80
31–40	127	17.30
41–50	270	36.78
51–65	221	30.12
Missing	3	0.4
Gender		
Male	303	41.30
Female	430	58.70
Missing	4	0.5
Education level		
Primary	118	16.10
Secondary	367	49.90
Associate degree	7	1.00
Undergraduate	201	27.30
Postgraduate	42	5.70
Missing	2	0.2
Creative industries		
Non-creative industries	308	43.6
Creative industries	74	10.5
Super creative industries	324	45.9

Note Non-creative industries include agriculture, manufacturing, electricity and gas, water, construction, real estate, public administration, import and export, food, transportation, domestic, disciplinary forces; Creative industries include finance insurance, finance administration, health and social work; Super creative industries include advertising, information communication, education, arts and entertainment, scientific, and information technology

Hong Kong Standard Industrial Classification Version 2.0 was used for collecting participants' occupation and at last it was differentiated into 3 Creative industries groups (Non-creative industries, Creative industries and Super Creative industries) in accordance with the differentiation suggested by Florida (2002). There were about 45.9 % of participants came from Super-creative industries, 10.5 % came from Creative industries and 43.6 % from Non-creative industries. And about 16.1 % of participants graduated from primary school, 49.9 % secondary school, 1 % associate degree, 27.30 % bachelor's degree, 5.7 % master degree. About 31.45 % of the respondents were having HKD 10,000 or below income per month, 24.1 % were having HKD 10,001 to HKD 15,000 income per month, 44.45 % were having HKD 15,001 or above income per month.

Materials and Measures

Team processing 21-items Team Process Measurement was adapted from Denison et al. (1996) with acceptable reliability (α = 0.61–0.85). It is designed to measure the six team processing: Norms (4 items), Importance of the team's work (5 items), Effort (3 items), Efficiency (3 items), Creative strategy (3 items) and Breadth (3 items). Respondents are required to rate the extent to which they agree with different statements about team processing on a Likert-5 point scale (from 1 = strongly disagree to 5 = strongly agree). In our study, the reliability coefficients of the team processing scale were 0.24–0.80 in which four subscales had a reliability coefficient higher than 0.60, including Norms (α = 0.71), Teamwork (α = 0.80), Creative Strategy (α = 0.76), and Breadth (α = 0.62). So we used exploratory factor analysis to explore a new factor structure for team processing.

Table 15.2 presents the results of exploratory factor analysis. It was conducted on the 24 items to examine the factor structure of the team process. The principal component analysis with varimax rotation was used. Five factors loading yielded with an eigenvalues exceeding unity, and the factors accounted for 53.75 % of the total variance. Factor loading are listed in the Table 15.2, factor 1 (*Creative Synthesis*) accounted for 28.51 % and comprised the 3 items of creative strategy, 3 items of breath, 1 item of effort, 1 item of efficacy and 1 item of Importance of team work. The second factor (*Norm for Team*) accounted for 8.17 % of the variance and consisted of 4 items of Norms, 1 item of efficiency and 1 item of effort. The third factor (*Importance of the team's work*) accounted for 6.47 % of variance and comprised 4 items of Importance of team work. The fourth factor (*Reward for Team Creativity*) accounted for 5.64 % of variance and comprised 2 items of Reward. The fifth factor (*lack of effort*) accounted for 4.96 % of variance and comprised 1 item of effort, 1 item of efficacy and 1 item of Reward. The Cronbach's alpha of the five factor are 0.43 $\sim$ 0.83. Creative Synthesis (α = 0.83); Norm for Team (α = 0.75); Importance of the Team's Work (α = 0.78); Reward for Team Creativity (α = 0.70);

Table 15.2 Factor loadings for the rotated factors of team processing in Pro-c creativity

	Factor loading				
	1	2	3	4	5
Our team is highly imaginative in thinking about new or better ways we might perform our tasks. (Creative strategy 17)	**0.787**				
When a non-routine matter comes up in our work, we often invent new ways to handle the situation. (Creative strategy 18)	**0.757**				
Our team frequently experiments with alternative ways we might carry out our work. (Creative strategy 16)	**0.713**				
My perspective is well-integrated into the team's outcome. (Breath 20)	**0.687**				
I feel that this team integrates diverse viewpoints. (Breath 19)	**0.664**				
Everyone on our team cares about the team and works to make it one of the best. (Effort 11)	**0.423**	0.368			
I understand how our team's work fits into the whole product. (Breath 21)	**0.407**				
After an issue is raised, we quickly reach a decision as to what to do about it. (Efficacy 14)	**0.407**	0.371			
It is exciting for me to participate in this team. (Importance of teamwork 5)	**0.387**	0.330		0.351	
Behavior in our team is very orderly—it is clear what members are expected to do and they do it. (Norm 2)		**0.789**			
Our group has clear standards for the behavior of group members. (Norm 3)		**0.734**			
Behavior in our team is very orderly—it is clear what members are expected to do and they do it. (Norm 1)		**0.623**	0.311		
The team has a strong process leader. (Norm 4)		**0.510**		0.311	
Team meetings are well organized and productive. (Efficacy 15)	0.362	**0.451**			
Core team members give the team's work highest priority. (Effort 12)	0.330	**0.441**			
The team's work is highly important to the company. (Importance of teamwork 8)			**0.807**		
The team's work is highly important to my department. (Importance of teamwork 9)			**0.792**		
The team's work is highly important to my own career. (Importance of teamwork 7)			**0.760**		

(continued)

Table 15.2 (continued)

	Factor loading				
	1	2	3	4	5
I am highly challenged by working in this team. (Importance of teamwork 6)	0.428		**0.461**		
This organization publicly recognizes those who are innovative. (Rewards 54)				**0.750**	
The reward system here encourages innovation. (Rewards 53)				**0.749**	
Some individuals do not pull their share of the workload. (Effort 10R)					**0.769**
In our team meetings we often get sidetracked into peripheral issues. (Efficacy 13R)					**0.712**
The reward system here benefits mainly those who don't rock the boat. (Rewards 55R)				−0.348	**0.485**

(*R* Reverse coding). Principal component analysis with varimax rotation is used, the eigenvalues of 5 factors is 1.191, explaining 53 % of total variance

and Lack of Effort ($\alpha = 0.43$). Due to the unsatisfactory reliability, the fifth factor—Lack of Effort was excluded in further analyses.

Social axiom of creativity Eight items of Leung and Bond (2009) were adapted from the "Reward for Application" axiom with a high reliability ($\alpha = 0.83$). Sample items included: "Creative and imagination are keys to achieving goals, Creative people are well rewarded." Items were rated using a Likert-5 scale (from 1 = strongly disagree to 5 = strongly agree).

Creative self-efficacy Thirteen items of Yang and Cheng's (2009). Scale of Creative Self-Efficacy were adapted, which held a high reliability ($\alpha = 0.91$). Items were rated using a 5-point Likert-5 scale (from 1 = strongly disagree to 5 = strongly agree). Sample items included: "the belief that I would suggest new ways to achieve goal or objectives, the belief that I would exhibit creativity on the job when given the opportunity to."

Creative personality Thirty-item creative personality check list was adapted to measure participants' perceived developmental increase of personality traits (Gough 1979) and an additional item *creative* was also measured. Nineteen out of thirty one items were categorized as Positive personality traits based on the high reliability ($\alpha = 0.86$), included: *capable, clever, confident, creative, egotistical, humorous, individualistic, informal, insightful, intelligent, interests wide, inventive, original, reflective, resourceful, sell-confident, sexy, snobbish* and *unconventional*. The rest of twelve personality traits were categorized as negative personality traits, included: *affected, cautious, commonplace, conservative, conventional dissatisfied, honest, interests narrow, mannerly, sincere, submissive, and suspicious*, which also held a

reasonable reliability ($\alpha = 0.68$). Items were also measured in a Likert-9 scale (from 1 = most dislike me 9 = most like me). A composite score of creative personality was computed by subtracting the sum of the negative items from that of the positive items.

Results

Table 15.3 showed the three groups of creative industries had mean differences in the team process, social axiom, creative self-efficacy and creative personality. Significant mean differences were observed on the team process (creative synthesis, $F(2, 695) = 16.00$, $p < 0.001$; norm for team, $F(2, 695) = 4.54$, $p < 0.01$; importance of the team's work, $F(2, 693) = 27.02$, $p < 0.001$; and reward for team creativity, $F(2, 693) = 13.51$, $p < 0.001$), creative personality, $F(2, 695) = 13.77$, $p < 0.001$, social axiom, $F(2, 694) = 3.13$, $p < 0.05$; and creative self-efficacy, $F(2, 695) = 12.71$, $p < 0.001$. And Scheffe post hoc tests were used, Super-creative industries participants' Creative Synthesis, Importance of the team's work, reward for team creativity, desirability gain, creative personality, Social axioms and creative self-efficacy were higher than non-creative industries, and creative industries participants' norm for team was higher than the other two groups.

Intercorrelation analyses were calculated to investigate the relationship among the variables. The results are summarized in Table 15.4. Creative self-efficacy was

Table 15.3 The ANOVA table for the team processing, social axiom, creative self-efficacy and desirability of creative personality

	A: non-creative industries		B: creative industries		C: super-creative industries		
	M	SD	M	SD	M	SD	F
Creative synthesis	3.34	0.58	3.46	0.53	3.58	0.49	16.00*** A < C
Norm for team	3.67	0.61	3.89	0.59	3.67	0.53	4.54** A < B < C
Team's work	3.68	0.70	3.84	0.71	4.078	0.63	27.02*** A < B < C
Reward for team creativity	3.14	0.88	3.25	0.82	3.48	0.77	13.51*** A < C
Creative personality	0.31	1.31	0.58	1.31	0.87	1.33	13.77*** A < C
Social axiom	3.51	0.62	3.55	0.55	3.63	0.56	3.13* A < C
Creative self-efficacy	3.20	0.61	3.28	0.56	3.43	0.54	12.71*** A < C

Note $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

Table 15.4 Correlation between team process, social axiom, creative self-efficacy and personality

	1	2	3	4	5	6	7	*M*	*SD*
Mini-c creativity variables									
1. Creative personality	1							0.58	1.34
2. Social axiom	0.22***	1						3.58	0.58
3. Creative self-efficacy	0.43***	0.44***	1					3.31	0.58
Pro-c creativity variables									
4. Norm for team	0.23***	0.35***	0.29***	1				3.69	0.57
5. Creative synthesis	0.35***	0.45***	0.61***	0.56***	1			3.46	0.55
6. Importance of team's work	0.25***	0.44***	0.40***	0.52***	0.56***	1		3.86	0.69
7. Reward for team creativity	0.19***	0.35***	0.45***	0.28***	0.46***	0.32***	1	3.30	0.84

Note $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

positively and moderately correlated to social axiom and ($r = 0.44$, $p < 0.001$), and creative personality ($r = 0.43$, $p < 0.001$). Hypothesis 3 was supported. The three mini-c variables had moderate relationships with one another.

To test for Hypothesis 4, hierarchical multiple regression analysis was conducted to examine the main effects of the mini-c creativity (Social Axiom, and Creative Personality) and the mediating effect of Pro-c creativity variables (Creative Synthesis, Norm for Team, Importance of the Team's Work, and Reward for Team Creativity) on Creative Self-Efficacy. In the regression model, creative self-efficacy served as the dependent variable. Age, Gender, Education level, income level and Creative Industry group were entered in the first step as controlling variables, while Creative Personality, and Social Axiom were included in the second step, and the four team processing variables were included in the third step to examine if additional variance could be explained by these Pro-c variables. The results of hierarchical multiple regression analysis is presented in Table 15.5.

Using Creative self-efficacy for the dependent variable, the combination of control variables in the first step had a significant effect, $R^2 = 0.12$, $F(5, 667) = 19.22$, $p < 0.001$. The entry of the mini-c creativity (creative personality and social axiom) in the second step significantly improved the model fit, $\Delta R^2 = 0.25$, $F(7665) = 56.44$, $p < 0.001$.. The entry of the team processing variables in the third step significantly explained the variance in creative self-efficacy, $\Delta R^2 = 0.16$, $p < 0.001$. Only partial mediating effects were found in which creative personality and social axiom still serve as significant predictors. The combination of the control variables, mini-c creativity and Pro-c creativity had explained 52 % of variance in creative self-efficacy, $R^2 = 0.52$, $F(11, 661) = 67.30$, $p < 0.001$.

Table 15.5 Hierarchical multiple regression analysis summary predicting creative self-efficacy

	Block 1	Block 2	Block 3
Gender	0.08*	0.07*	0.09***
Age	−0.11**	−0.15***	−0.11***
Education level	0.18***	0.09*	0.04
Income level	0.18***	0.13***	0.08**
Creative industries	0.01	−0.05	−0.08*
Creative personality		0.32***	0.24***
Social axioms		0.35***	0.16***
Creative synthesis			0.40***
Norm for team			−0.12***
Importance of the team's work			0.05
Reward for team creativity			0.18***
ΔR^2	0.12***	0.25***	0.16***

Note *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (female = 0; male = 1)

Discussion

The study was designed to examine team processing of Pro-c creativity and mini-c creativity among professionals in creative and non-creative industries. We found that professionals in creative industries have higher mini-c creativity and Pro-c creativity than those in non-creative industries. Based on the findings, we have three observations.

Regarding Hypothesis 1 and 2, professionals in creative industries (both creative and super-creative industries) scored significantly higher in mini-c creativity as measured by self-perceptions in Creative Personality, Social Axiom on Creativity and Creative Self-Efficacy than professionals working in non-creative industries. The mini-c creativity variables reflect the subjective perception and expectation of reward for creativity that guides people's behavior and are often the result of societal and cultural influence (Baltes 1987; Heckhausen et al. 1989). These normative beliefs may give people reference frames to assess their own developmental trajectory—how typical their developmental course is and what to expect in future (Heckhausen and Krueger 1993).

Among professionals in creative and super-creative industries, self assessment of creative personality and creative self-efficacy may result in self-fulfilling prophecies—people may develop their creative abilities and invest in careers related to creative industries over time because they will develop and employ creativity in both personal and professional lives. The process is similar to the Pygmalion process evident in Tierney and Farmer's (2004) study as well as in Chong and Ma's (2010) study. Self-expectations that creative professionals ought to have more confidence in creative endeavors than professionals in non-creative industries are realized.

Also, professionals in creative and super-creative industries incline to work with sophisticated skills at creating new knowledge and insight in an organizational culture that can encourage innovative practices, and thus creativity of these professionals (Joo et al. 2012).

Regarding Hypothesis 3, moderately strong positive correlations among creative personality, creative self-efficacy and social axiom of reward for creativity have provided convergent validity to the psychological construct of mini-c creativity. The importance of mini-c creativity lies in its connection and mechanism between learning and creativity (Beghetto and Kaufman 2009). Professionals interpret information about creative work demand through the lens of social axiom of reward for creativity and transform and develop their creative personality and creative self-efficacy. Their personal histories, and past experiences of creative efforts all contribute to strengthen creative personality and creative self-efficacy. The mini-c creativity constructs within professionals can serve as catalyst for creative productivity (Kaufman and Beghetto 2013).

Results of the exploratory factor analysis of team processing in Pro-c creativity have revealed that professionals tend to integrate idea generation with team development as an integral part in team processing in all industries (Denison et al. 1996). Facilitating contextual factors, such as reward for team creativity and perceived importance of the team's work, contribute to team effectiveness and organizational creativity (Hackman 1987; Yoo et al. 2010). Training and professional development of creative professionals should enhance effective team performance. Organizations must encourage creativity and innovation within teams, which will then further enhance inter-team collaboration to yield creative outcomes (Morris and Leung 2010). The super-creative professionals have demonstrated higher creative synthesis, put more importance in their team's work and perceived higher in reward for team creativity than professionals in creative industries and non-creative industries. Professionals in creative industries have displayed highest scores in norm for team when compared with the other two groups. The findings are consistent with Mostafa's (2005) study in Egyptian organizations. Managers in super-creative industries, such as advertising and product development had higher scores of attitude towards Pro-c creativity in their organizations. Innovative team climate serves as a mediating variable between creative personality and team innovativeness as shown in Mathisen et al. (2008) study on 29 teams of media professionals. Working collaboratively with team members should be particularly important when the tasks involve generating novel ideas or synthesizing knowledge or products (Paulus 2000). Regarding Hypothesis 4, team processing variables of Pro-c creativity, including creative synthesis and expected reward for team creativity, serve as partial mediators for creative self-efficacy in professionals. Mini-c creativity, for instance creative personality and social axioms of creativity, also significantly predict creative self-efficacy. One of the implications of the finding is that active engagement in creative synthesis within a team will spontaneously influence perception of creative self-efficacy in a dynamic work context (Bandura and Locke 2003; Tierney and Farmer 2011). On the other hand, creative

self-efficacy of professionals can lead to improvement in creative performance (Choi 2004; Redmond et al. 1993; Tierney and Farmer 2002). Professionals in creative industries engage actively and continuously in creative synthesis, and thus enhance perception of creative self-efficacy and also influence creative performance. Then, the present study provides insight about how different organizational culture can contribute to the development of employee creativity.

The present focus on team processes provides a process-based explanation of how some factors contribute to creative self-efficacy. Theories of 4-c creativity and testing of the relationships between individual mini-c and Pro-c creativity variables will provide an enriched understanding of the creative processes experienced by individuals, teams, and organizations. In a practical sense, this understanding of team processing will also promote the effectiveness of training to enhance creativity in industries by revealing the mediating psychological processes that should be targeted as an intermediate outcome of these professional training and development.

Several limitations of this study warrant attention. First, the participants were not randomly selected, and a common criticism of studies using convenient samples is that the results may fail to generalize to the whole working population. Second, a common limitation with cross-sectional and correlational research, the findings reveal only an associative relationship among the variables but cannot establish longitudinal and causal effects on creative personality, team processing and creative self-efficacy. A longitudinal data collection has overcome this potential disadvantage. Experimental studies in laboratories or experience sampling study in the field can also be conducted. The third limitation is the use of self-reports. The threat of common method variance as systematic error variance usually observed in correlations may exist (Doty and Glick 1998). Despite the above limitations, this study is the first study to compare variables related to mini-c and Pro-c creativity among professionals working in various industries in Hong Kong.

In conclusion, previous research has supported the importance of team processing for creative self-efficacy. Results of the current study suggest that such influence extends not only to professionals' confidence to be creative in their work, but also how this relates is unique to the nature of the industries they work in. Future research is needed to identify additional personal and organizational factors that promote a strong belief in creative capacity in individuals and the strong sense of team processing in the workplace. Also, further research is needed in different countries and cultures to see if different organizational cultures promote different belief in creative capacity in individuals and the creativity of individuals. Further explorations can focus on the influence of creative outcomes in both individual and team levels across a variety of industries.

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