The PSYCHOLOGY *and* MANAGEMENT *of* PROJECT TEAMS

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OXFORD

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THE PSYCHOLOGY AND MANAGEMENT OF PROJECT TEAMS

1 THE IMPORTANCE OF PROJECT TEAMS AND THE NEED FOR AN INTERDISCIPLINARY PERSPECTIVE

Brian Hobbs, François Chiocchio,
and E. Kevin Kelloway

Without the integration of findings, no knowledge can accumulate

—WEINGART & CRONIN, *2009, p. 511*

Introduction

This book is written for researchers and their graduate students from the field of project management and the field of organizational psychology who are interested in teams. The objective is to provide useful information to both groups and to build bridges between them. The ultimate goal is the development of an integrated stream of research on project teams.

The project management community has known for a very long time that the effectiveness of project teams has a strong impact on project performance (Baker, Murphy, & Fisher, 1974), and the human factor is thought to be one of the key predictors of project success or failure (Chiocchio & Essiembre, 2009). Unfortunately, project management scholars are largely unaware of the work on teams in organizational psychology.[1] An investigation of the 105 papers published in 2010 in the two most important journals in project management—the *International Journal of Project Management* and the *Journal of Project Management*—revealed that 37 (35.2%) discuss typical organizational psychology topics (Chiocchio, Messikomer, Hobbs, Allen, & Lamerson, 2011). Of the 1,884 references in these articles, only 163 (8.7%) are from organizational psychology journals. Thus the "human factor" is recognized as relevant within project management literature. However, the limited use of the organizational

1. The term "organizational psychology" is meant to include both industrial and organizational psychology and organizational behavior.

psychology literature produces a gap between what is known about human factors in general, and teams in particular, and what is found in the project management literature. Consequentially, the project management literature is often based on outdated models, for example those of motivation and team development (Chiocchio, 2009).

Despite the growing reliance of project work, the literature in organizational psychology virtually ignores project structures. Chiocchio, Messikomer, et al. (2011) found that a very small proportion (approximately 6%) of the articles published in leading organizational psychology journals had a project focus or sampled project workers. The samples of teams in empirical work within the field of organizational psychology often include project teams or a mix of project and non-project teams, but in many cases it is not clear what type or types of teams are included in the samples (Chiocchio & Essiembre, 2009). Somewhat paradoxically, project teams have been identified in the organizational psychology literature for some time (Cohen & Bailey, 1997; Devine, Clayton, Philips, Dunford, & Melner, 1999; Sundstrom, de Meuse, & Futrell, 1990), but authors do not systematically identify when project teams are the object of study.

There are two issues that are prevalent in the organizational psychology literature on teams to which the study of project teams can contribute.

- The contextualization of the study of project teams
- The study of project teams as they develop over time.

Relative to the first issue, Johns stated that the influence of context "is often unrecognized or underappreciated" (2006, p. 389). Constructs are not discussed in relation to the intricacies and particularities of project-relevant contextual factors, which limits scholars' range of potential explanations for their results. The project management literature offers a good understanding of both the characteristics of projects and their organizational contexts, which could be exploited in the study of project teams. Relative to the second issue, organizational psychology scholars investigating teams have been calling for the study of team dynamics as they evolve over time, rather than at single points in time, as has traditionally been the case (Mohammed, Hamilton, & Lim, 2009). The project management literature offers a good understanding of the processes through which projects develop and can provide a framework for the study of the development of project teams. This book is an invitation to scholars in organizational psychology to clearly identify when they are studying project teams and to draw on the organizational psychology and project management literatures in order to take better account of both the context and the dynamic process of team phenomena. The ultimate aim of this book is to promote and to contribute to the

development of an explicitly distinct stream of research and/or intervention that would account for the particularities of project teams.

The Importance of Project Work

Over the last two decades, the projectification of activities has become increasingly common in all sectors of activity (Bredin & Söderlund, 2011). The explanation for the growth of project-based activity can be found in part in the globalization of markets, the increased rates of product and technological innovation, and the corresponding shortening of product replacement cycles (Wheelwright & Clark, 1992). Because projects are a means to innovate and to adapt and change organizations, they are particularly important during periods of more intensive change, such as the period that many parts of the world are experiencing at the present time (Burnes, 2009; McKinsey & Company, 2008).

Several authors have made the observation that the proportion of activity organized by project is growing. The nature of economic organization has been observed to be changing to become more temporary (Bennis & Slater, 1998; Castells, 2009). The French sociologists Boltanski and Chiapello (2005) have identified project-based activities as a recent and increasingly prominent form of economic organization. Organizational psychologists have observed the changing nature of work organization and "team-like behavior over time and across projects" (Wageman, Gardner, & Mortensen, 2012, p. 301). The number of universities offering degree programs in project management and the number of people receiving professional certifications from professional associations such as the Project Management Institute (PMI; www.pmi.org) have grown exponentially over the last two decades.

It is very difficult, if not impossible, to measure how much project work is taking place. Producing capital investments in buildings, infrastructure, equipment, software, and so on, is almost exclusively project work, which is measured by statistics on gross fixed-capital formation. The World Bank (2012) reports that this represents approximately 20% of the world economy. However, statistics on gross fixed-capital formation do not capture much of the project-based work. They do not capture most projects taking place within organizations, such as large- and small-scale change projects.

The importance of projects goes beyond their weight in the world economy because projects have important structural effects. Most innovation and change are implemented through projects, which have strong carry-on effects. If an organization wishes to change its operational processes, it is likely to undertake a project to do so. When the project is finished, the new process will operate for an

extended period of time. In addition, projects are a significant means for implementing strategic plans (Morris & Jamieson, 2005). Projects thus represent a significant proportion of human activity that has structural effects that augment the influence of projects on society. However, the exact extent of this activity and its influence are impossible to quantify with any degree of accuracy.

The Field of Project Management

Project management is an interdisciplinary field that is based on the idea that managing projects is different from managing non-project activities, a distinction which is discussed below. Although projects have been carried out by humankind since ancient times, the formalization of project management practice emerged during the twentieth century. P. W. G. Morris (2013) provides a detailed and insightful analysis of the formalization of the field. Some elements that would later be integrated into the field of project management were developed and used in the late nineteenth and early twentieth centuries, for example, graphic scheduling tools such as the Gantt chart, project-based accounting, and "project engineers" and "project officers" acting as coordinators. "Project management as a term seems to first appear in 1952–1953, in the US defense–aerospace sector, in three or four different places. It was followed toward the end of the decade in the engineering construction industries" (Morris, 2013, p. 27). It appeared prominently in the general management literature for the first time with an article titled "The Project Manager" in the *Harvard Business Review* (Gaddis, 1959).

Project management is an applied field in which professional practitioner-based associations have played a very significant role. Several professional associations have been founded to develop and promote project management practice:

- International Project Management Association (IPMA), founded in 1965, is a federation of 55 national associations (http://ipma.ch/).
- Association for Project Management (APM), the IPMA association in Great Britain, founded in 1972, is the largest within IPMA (www.apm.org.uk). Many of the documents produced by APM have been adopted by IPMA.
- Project Management Institute (PMI). headquartered in the United States, was founded in 1969 (www.pmi.org). PMI is the largest association with members and certified professionals worldwide.
- Several independent national associations exist, including the Australian Institute of Project Management, founded in 1976 (www.aipm.com.au), and the Project Management Association of Japan (PMAJ), founded in 2005, bringing together several existing Japanese associations (www.pmaj.or.jp/ENG/).

The professional associations organize conferences, develop documentation, publish journals, publish standards, and manage professional certification programs. In the formative years of the field of project management, the associations were the primary source of documentation on the subject, and they remain very influential today. At the outset, the field of project management and the professional associations were focused on project planning techniques (Snyder, 1987). What research there was at the time was within the field of operations research and dealt with scheduling algorithms.

Since the early 1980s, the project management professional associations have been pursuing a professionalization process with the publication of standards and the promotion of professional certification programs; however, research has shown that project management is not yet a profession in the traditional sense of the term and is unlikely to become one in the foreseeable future (Zwerman, Thomas, & Haydt, 2004). The standards, particularly those produced by PMI, are positioned as statements of the consensus among practitioners of what are recognized as "good practices" (Project Management Institute, 2013, p. 1). References to standards published by professional associations are used within this book as a means of identifying what professional associations consider to be the current state of knowledge and of practice in the field. These standards are not recognized as authoritative statements by several members of the project management research community, in part because their content is not adequately supported by research.

The role of universities and of research has evolved over time. The first university program in the field worldwide was the master's degree in project management offered at the University of Quebec in 1976, which was followed by a similar program at Cranfield University in the United Kingdom in 1981. Like these early programs, most project management programs in universities today are course-based and are designed to train practitioners. Research in academia grew during the 1990s, notably with the founding of the Scandinavian School of Project Studies in Sweden (Sahlin-Andersson & Söderholm, 2002) and the organizing of the first biannual International Research Network on Organizing by Project (IRNOP) Conference in 1994 (www.irnop.org). This group of researchers brought concepts and methods from the field of organization theory to the study of projects conceptualized as temporary organizations. In the late 1990s, PMI created its research department and organized the first biannual PMI Research Conference in 2000. The same year, the European Academy of Management (EURAM) was founded, and the annual conference has had a very active project research track since its inception.

Since 2000, research in project management has increased very significantly and has improved in quality. Historically, the project management

research community has been a very close-knit and somewhat reclusive group. However, research on projects has started to become more prevalent in adjacent fields (Kwak & Anbari, 2008). The Swedish tradition of conceptualizing projects as temporary organizations has led to sub-themes in the European Group on Organization Studies (EGOS) conferences. Research on projects specifically is becoming more prevalent in many research conferences in the field of management, but less so or less explicitly so in the field of organizational psychology.

Although the performance of project teams is recognized as important for project performance (Chiocchio and Essiembre, 2009), a small number of papers on project teams are presented at project management research conferences; of the 59 papers presented at the IRNOP 2011 Conference, two presented the results of research on project teams (www.irnop2011.uqam.ca) (Chiocchio, Forgues, Paradis, & Iordanova, 2011; Lechler & Dominick, 2011). The proportion of papers on the topic does not reflect its importance for the field of project management, but rather the lack of a strong research stream on the topic.

Project and Team

This book is on project teams; the fundamental concepts for the basis of the book are therefore "project" and "team." The defining characteristics of projects are presented here, with only very summary reference to teams, the topic of Chiocchio (Chapter 3 of this volume).

There are many definitions of "project" in the project management literature, but because the field is practitioner dominated, the definitions are not constructed as rigorously as in established scientific fields. Table 1.1 presents a sample of definitions of "projects." Many definitions are based on the conception of the project as defined by the project task and/or by the organizational entity that is created to execute the project task. Many define a project as a "temporary organization," referring to the organizational unit that is created to execute the project task (Cleland & Kerzner, 1985; Jamieson & Morris, 2004; Shenhar, 2001; Shenhar & Dvir, 2007; Turner & Müller, 2003; Turner, 2009). This temporary organization may be a project team. The organizational arrangements that are employed in project management are an important topic, but are not very useful as a defining characteristic of projects.

The primary goal here is to differentiate clearly between projects and things that are not projects. The characteristics of project tasks allow for such a distinction. Within the project management literature, definitions of the projet often refer to the project task, as the concept is used in the field of organizational

Table 1.1 Definitions of Project, Arranged in Chronological Order

A complex effort to achieve a specific objective within a schedule and budget target, which typically cuts across organizational lines, is unique and is usually not repetitive within the organization. (Cleland & King, 1983)
A combination of human and non-human resources pulled together into a temporary organization to achieve a specified purpose. (Cleland & Kerzner, 1985)
A human endeavor which creates change, is limited in time and scope, has mixed goals and objectives, involves a variety of resources and is unique. (Andersen et al., 1987)
A temporary organizations *within* organizations. (Shenhar, 2001, p. 395)
A project is a collection of simultaneous and sequential activities which together produce an identifiable outcome of value. (Pich et al., 2002, p. 1011)
A temporary organization to which resources are assigned to undertake a unique, novel and transient endeavor managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change. (Turner & Müller, 2003, p. 7)
A complex effort, usually less than three years in duration, made up of interrelated tasks, performed by various functional organizations, with a well-defined objective, schedule, and budget (Archibald, 2003, p. 25)
A temporary endeavor undertaken to create a unique product, service or result. (Project Management Institute, 2004)
A temporary organization to which resources are assigned to deliver benefit for the parent organization. (Jamieson & Morris, 2007, p. 27)
A temporary organization and process set up to achieve a specified goal under the constraints of time, budget and other resources. (Shenhar & Dvir, 2007, p. 5)
Any activity that is perceived as significant and necessary from the customer perspective. (Perminova, Gustafsson, & Wikström, 2008, p. 73)
A project venture is a temporary entity that combines several participants to accomplish a single, predetermined, short-term task. When the short-term task has been completed, the project team disbands. (Schwab & Miner, 2008, p. 1117)
A temporary organization to which resources are assigned to do work to deliver beneficial change. (Turner, 2009, p. 2)
A sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification. (Wysocki, 2009, p. 6)
Projects are formed around tasks requested by customers and consist of 2–100 employees with complementary competencies. (Reinholt et al., 2011, p. 1282)
A project is a temporary and unique endeavour undertaken to deliver a change in the organization (e.g., a gap between a start and a final state regarding a processes, performance, a product, or a service. (Vidal et al., 2011, p. 718)

Note: Some definitions are adapted or paraphrased, rather than directly quoted from the cited sources.

psychology[2] (Katz & Tushman, 1979), referring to the "endeavor" (Andersen, Grude, Haug, & Turner, 1987; Project Management Institute, 2004; Turner & Müller, 2003; Vidal, Marle, & Bocquet, 2011), "activities" (Perminova, Gustafsson, & Wikström, 2008; Pich, Loch, & Meyer, 2002; Wysocki, 2009), "effort" (Archibald, 2003; Cleland & King, 1983), "task" (Schwab & Miner, 2008), or "tasks" (Archibald, 2003; Reinholt, Pedersen, & Foss, 2011). There is a consensus within the literature on the defining characteristics of the project task that is captured in the definition provided by PMI: "A temporary endeavor undertaken to create a unique product, service, or result" (Project Management Institute, 2013, p. 1).

Three characteristics differentiate well between project and non-project tasks:

1. Projects are temporary, meaning that projects have a beginning and an end. Most, if not all, tasks eventually come to an end, but what is specific about projects is that they are temporary by design. In the project management literature, temporary projects are often contrasted with continuous operational processes.
2. A unique product, service, or result. The opposite of unique is repetitive, which forms a continuum. There is no clear-cut rule as to how unique a project must be to qualify as a project; more on this below.
3. Progressive elaboration: this term is not used in definitions but is implicit in the term "create" in the definition from PMI cited above. It is defined as "[t]he iterative process of increasing the level of detail in a project management plan as greater amounts of information and more accurate estimates become available" (Project Management Institute, 2013, p. 552). This definition refers to the progressive elaboration of the project plan, but the concept is equally applicable to the creation of a unique product, service, or result that is poorly defined at the project start and becomes progressively better defined as the project unfolds.

The contrast between routine tasks and tasks that require progressive elaboration can be used to clarify whether a project is unique enough or too repetitive to be called a project. To execute routine tasks, people follow personal, professional, or organizational routines. The concept of routines is used in both organization

2. The "task" also has a more restricted meaning in the project management literature. In the context of detailed planning and particularly scheduling, once the overall "project task" has been broken down into very small "tasks," the smallest elements are referred to as "tasks" as defined in the Practice Standard for Scheduling, Second Edition: "A term for work… within the structured plan for project work. …" (Project Management Institute, 2011, p. 134).

theory and in organizational psychology. "Routines are prevalent in situations where there are few exceptions and the search for responses to exceptions can proceed analytically and logically" (Perrow, 1986). Routines vary along a continuum from "routines-as-mindless-repetition," such as assembling a standardized product, to "routines-as-effortful-accomplishment," such as much of the work done by highly qualified professionals (Lillrank, 2003, p. 229). Routines exist before a task is undertaken and produce standardized results. They are not progressively elaborated and do not produce unique results. In addition, the accomplishment of the overall task of a project requires progressive elaboration, but will most often also require the execution of sub-tasks within the project, which are routine.

Progressive elaboration implies time and effort, which is not insignificant. The definitions of project in the project management literature do not evoke the idea of some minimal scope for the project. However, Sundstrom et al. (1990), in their analysis of different types of teams including project teams, used the concept of "work cycle." They showed that teams generally have multiple work cycles, and that among the work cycles of project teams one lasts as long as the project team exists and includes "longer cycles of independent preparation" (Sundstrom et al., 1990, p. 126), which implies progressive elaboration.

For a task to be considered a project, it must have all three defining characteristics. Many tasks that are not projects have one or two of these characteristics but not all three. For example, the development of a city is both unique and progressively elaborated over centuries, but there is no plan to end the city's development. For further discussion on the management of progressive elaboration, see the section on the project life cycle in Hobbs (Chapter 2 of this volume).

Other Important Characteristics of Project Tasks

An examination of the definitions of "project" from the project management literature reveals that many definitions have been written with the goal of highlighting what the author feels are the important features of projects. For this reason, many of the definitions include important characteristics, many of which are not specific to projects. Their inclusion in the definitions creates confusion for those seeking to make the distinction between project and non-project tasks. Examples of characteristics that are not specific to project work but are included in the definition of projects include the following: having a goal (Archibald, 1976; Cleland & Kerzner, 1985; Cleland & King, 1983; Shenhar & Dvir, 2007; Turner & Müller, 2003; Wysocki, 2009); being under schedule, budget, resource availability, and/or regulatory constraints (Andersen, Grude, & Haug, 2004; Archibald, 1976; Cleland & King, 1983; Shenhar & Dvir, 2007; Wysocki,

2009); complexity (Archibald, 1976; Cleland & King, 1983; Wysocki, 2009); and interdependency, that is, a need for integration and uncertainty (Turner & Müller, 2003).

Williams (1999) in cludes both interdependency and uncertainty within the concept of complexity. All projects are complex purposeful groups of interdependent activities that are realized under constraints in contexts with considerable uncertainty, but many non-project activities are as well. Project contexts are uncertain, particularly when there are multiple stakeholders in the environment. In addition, projects are often used as mechanisms for developing or introducing innovation and change, which are associated with high levels of uncertainty. Projects can have many sources of uncertainty. However, project tasks vary considerably one from another on each of these characteristics; see the discussion on the variability of project tasks and how this variability affects how they are managed in Hobbs (Chapter 2 of this volume).

The multidisciplinary nature of the task and the multifunctional resources needed to accomplish the task are often included in definitions of projects (Sydow, Lindkvist, & DeFillippi, 2004). Although many, if not most, projects are multidisciplinary or cross-functional, and cross-functional integration is often cited as a primary reason for using project management, projects requiring only one type of specialist do exist, for example, in specialized fields of research (Djellal, Francoz, Gallouj, Gallouj, & Jacquin, 2003). Therefore, including "multidisciplinary" among the defining characteristics may be misleading, particularly if the goal is to distinguish project from non-project tasks.

Conclusion

The objective of this introductory chapter is to set the stage for the rest of the book. The book is on project teams; the fundamental concepts for the basis of the book are therefore "project" and "team." This chapter has attempted to clearly differentiate between project and non-project tasks. However, people working on a project task do not necessarily constitute a project team. One important reason is that large projects require too many people for them to constitute a team. Chapter 2 presents how the project task is broken down into sub-tasks, which may be assigned to different teams. Chapter 3 is devoted to the topic of project teams.

The rationale behind the book is that bridging the significant gap that separates scholars in project management from those in organizational psychology can be to their mutual benefit. Most of the significant research that is relevant to project teams has been produced in the field of organizational psychology.

For this reason, the majority of the chapters have been written by scholars from this field. The field of project management can contribute to resolving two difficulties that have been identified in the research on teams in the field of organizational psychology: the contextualization of studies of teams and the study of their development process.

The ultimate aim of this book is to promote and to contribute to the development of an explicitly distinct stream of research and/or intervention that would account for the particularities of project teams. The book has been designed to this end. Chapters 1 through 4 are written by scholars who are familiar with the project management literature. The objective of these chapters is to make knowledge found in this literature that is relevant to the study of project teams available to people in other fields and to organizational psychologists in particular. This chapter, the introduction, presents the field of project management and a distinction between project and non-project tasks. Chapter 2 draws on the project management literature to present the context of projects and the project management practices that provide the context for project teams. Chapter 3 discusses the nature of project teams, and Chapter 4 provides a discussion of organizational contexts of project-based organizations, highlighting contexts in which project-based work is the fundamental organizing principle. Chapters 5 through 17 that examine specific aspects of project teams were written by scholars from the field of organizational psychology. Drafts of the first three chapters describing the project context were provided to the authors of Chapters 5 through 17 before they wrote the drafts of their chapters. The introduction and concluding chapter were written by the book's editorial team.

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2 THE SPECIFICS OF PROJECT CONTEXTS

Brian Hobbs

Introduction

Managing projects poses particular problems and requirements. The project management community has developed specific methods for managing projects that are well adapted to these particularities. Project management methods are well documented and widely used (Office of Government Commerce, 2002; Project Management Institute, 2013a), and their use has a strong impact on the project context, making it very structured. Knowledge of project management methods can provide the means to analyze, understand, and report on the project context. The purpose of this chapter is to summarize the project management methods that have a strong structuring effect and that are widely used.

The Project Life Cycle

Chapter 1 of this volume made a distinction between project and non-project tasks based on the temporary nature of projects, the unique nature of the project deliverables or results, and the progressive elaboration of the deliverables. The project life cycle is derived logically from these defining characteristics. It is a central organizing concept in project management (Project Management Institute, 2013a). When undertaking a project, one naturally goes through the activities in the following list in approximately this order. This list of task activities is simply an illustration, as the nature of the project task varies considerably among projects.

1. Identification of the need, problem, or opportunity;
2. Analysis of the context, including
    a. The origins of the project

   b. The physical, technical, organizational, and political context
   c. The constraints that the project must respect;
3. Identification of the set of possible solutions given the first two points;
4. Selection of the solution to be developed and implemented;
5. Elaboration of the solution, often referred to as "design work";
6. Production of the product or service;
7. Quality control of the product or service;
8. Delivery of the product or service, which may include documentation, guarantees, training, debugging, and handover to operations;
9. Project close-out and evaluation, possibly with lessons learned.

The activities identified in this list are related to the task activity of producing and delivering a product, whether it be a tangible product, such as a piece of equipment, or an intangible product, service, or result. The list includes many project management activities, including planning and organizing.

Typically the project life cycle is managed by breaking the execution of the project into a small number of phases or steps. An example of a typical breakdown into phases is shown at the bottom of Figure 2.1 with the following labels: Project Identification, Project Definition, Project Execution, and Project Termination. Operations and Support are post-project activities outside the scope of the project. This four-phase life cycle is but one example. Project life cycles are adapted to the characteristics of the project and its context and, therefore, vary considerably. The most prominent models of project life cycles are discussed below. Within each model there is considerable variation; for example,

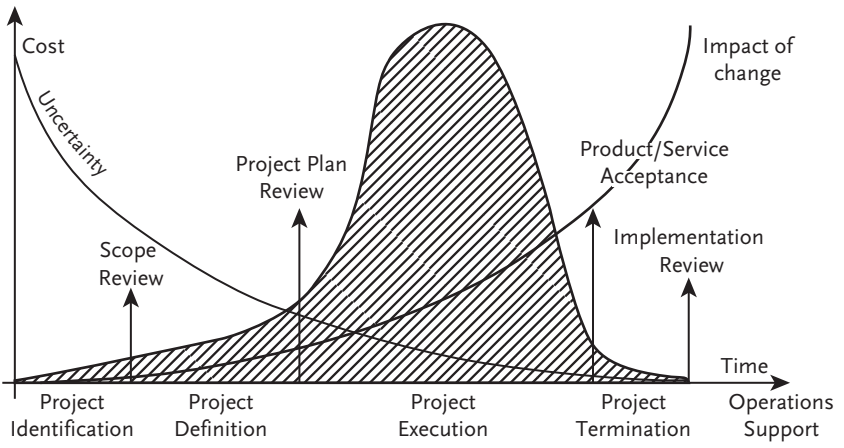

FIGURE 2.1 A typical project life cycle

the number of phases in a project life cycle is usually small, typically between three and five, but some life cycles have a dozen or more phases.

A typical project life cycle is represented graphically in Figure 2.1. All projects have a life cycle. It is one of the features that distinguishes projects from non-project activities in general, and from stabilized ongoing operational processes in particular. The life cycles vary from one type of project to the next and from one specific project to the next. However, most project life cycles share the characteristics of this generic project life cycle.

> The curve with the shaded area under it represents the rate of consumption of human, material, and financial resources. The project starts out with only a few people working on the project, carrying out the activities that lead to the identification of what the project is to be. This is followed by more intensive activity to elaborate on the deliverables and planning for execution. The production of the project deliverables consumes the majority of the resources of the project. As the deliverables near completion, the rate of resource consumption is reduced, until finally after delivery of the final product the project comes to an end.

This pattern of resource use creates a situation in which resource mobilization and demobilization are significant, which is made even more prevalent by the fact that the competencies that the project requires vary throughout the project life cycle as the nature of the activities changes. The mobilization and demobilization of human resources are very much affected by this pattern, creating "planned turnover or churn" (Eskerod & Blichfeldt, 2005). There may also be "unplanned turnover."

In the literature on organizational psychology and on personnel management, turnover is considered an unplanned and undesirable effect of the employment situation (Hom, Mitchell, Lee, & Griffeth, 2012; Marescaux, De Winne, & Sels, 2013; Seibert, Wang, & Courtright, 2011). The literature on unplanned churn is certainly relevant to project contexts as well, because unplanned turnover is prevalent in temporary systems (Keith, 1978). In organizations that execute projects simultaneously while drawing from a common pool of human resources, it is common for people to be transferred from one project to another in an unplanned manner, particularly when a higher priority project falls behind schedule (Bredin & Söderlund, 2011; Engwall & Jerbrant, 2003; Eskerod, 1998; R. Turner, Huemann, & Keegan, 2007). In project-based industries such as construction, where work is done on a contract basis for external customers, the human resource needs of firms vary frequently, and the labor market is

characterized by the rotation of employees between firms (Blair, Grey, & Randle, 2001; Bredin & Söderlund, 2011; Clark & Colling, 2005; Raiden, Dainty, & Neale, 2008; R. Turner et al., 2007). Human resource management practices and issues are quite different in a project context; the issue of turnover is but one example. Human resource management has received more attention in the project management literature in recent years (Bredin & Söderlund, 2011; R. Turner et al., 2007; see also Söderlund, Chapter 4 of this volume).

The downward sloping curve in Figure 2.1 represents the level of uncertainty in the project, which decreases as the project progresses. This curve also represents the progressive elaboration of the final product or service and of the project plan. As different studies are carried out, and as design work progresses and the detailed problems of producing and delivering the final product or service are worked out, more and better quality information becomes available and decisions are made. Also, as the project progresses it tends to acquire a legitimacy that reduces the risk of the project being rejected by different stakeholders. The decrease in the level of uncertainty is rarely as smooth as the figure indicates, as risks, issues, problems, and crises emerge during the life of the project (Miller & Lessard, 2000).

The upward sloping curve represents the increasing impact of a change in the project as the project progresses; these include impacts on cost, schedule, product or service quality, motivation of those involved (particularly the project team), and relationships with stakeholders.

The Life Cycle Phase Strongly Influences the Context

The nature of both the task and project management practices varies by phase. The context, therefore, changes significantly. A brief overview of the ways in which the task varies across the life cycle has been provided here; however, there is considerable variation among projects in the nature of their life cycles, discussed in more detail below.

Several studies have examined the ways in which project management practice varies among phases. One of the earliest, by Pinto and Slevin (1988), examined variations in critical success factors among phases (see also Do Ba and Tun Lin, 2008). Other studies have examined variations in project management practices across life cycle phases (Besner & Hobbs, 2006, 2012, 2013; Jaafari & Manivong, 1999; Li & Becerik-Gerber, 2011; Olsson & Magnussen, 2007; Patanakul, Iewwongcharoen, & Milosevic, 2010). However, the concept of the project life cycle has been used to a lesser extent in studies of project teams (Furst, Reeves, Rosen, & Blackburn, 2004; Greenberg, Greenberg, & Antonucci, 2007;

Kloppenborg & Petrick, 1999; Reid, Culverhouse, Jagodzinski, Parsons, & Burningham, 2000; Uflacker & Zeier, 2011). Within the project management literature, the project phase is recognized as an important contextual factor, and many studies indicate the project phase being investigated, particularly when early phases are the object of investigation (Austin, Steele, Macmillan, Kirby, & Spence, 2001; Nihtilä, 1999; Nobelius & Trygg, 2002; Uher & Toakley, 1999). A study of project teams that aims to take the context into consideration should therefore identify both the life cycle for the entire project and the particularities of the phase or phases under study.

The Management of the Project Life Cycle: The Traditional Waterfall Approach

The life cycle is managed through a series of end-of-phase reviews, indicated by the vertical arrows in Figure 2.1. At the end-of-phase reviews, the project manager reports back to the person or organization from whom he or she has received the mandate to carry out the project. At each end-of-phase review, the project manager reports on the overall status of the project and what is foreseen for the phases yet to come, including the nature of the product or service to be delivered, the project plan, and any issues that need to be addressed. The project manager makes a recommendation to proceed or not with the project, and the person in authority makes a "go-no-go" decision, authorizing the project manager to proceed on this basis.

The "waterfall" model is the longest standing and most frequently used approach. It is often referred to as the traditional project management approach (Davis, Bersoff, & Comer, 1988). The life cycle shown in Figure 2.1 is a "waterfall" life cycle because the project "cascades" through a series of phases, and it is unlikely that the project will go back up the waterfall the project traverses at the end of each phase. A decision to return to a previous phase would only occur if the project became unfeasible or inappropriate for some reason. Most projects are managed using such a waterfall approach, but there are exceptions, some of which are discussed below.

In a true waterfall approach, the design work would normally be finished before execution can begin. The waterfall approach is well adapted to products that cannot be broken down into independent parts, because it requires that the entire product be designed before it is produced; this is typical of projects producing a physical artifact, but can also be the case for the production of a service or a cultural or artistic event. The number and nature of phases vary; in some projects a prototype is developed and tested, in which case phases for managing these activities will be among the earlier phases of the project life cycle. The

waterfall approach provides control over the progressive elaboration of the deliverable. However, this approach takes considerable time because all the activities of a phase must be complete and authorization must be obtained before proceeding to the next phase. This approach also lacks flexibility; once a decision is made, it is difficult to change. Finally, this approach delivers all the products, services, or results at the end of the last phase, in a "big bang" delivery.

Because the different steps in the sequential waterfall approach require different skill sets, the different steps are often executed by different specialized functional departments. In such cases, the sequential waterfall approach often leads to a lack of integration of the different specialized contributions, and often work done by one group does not take sufficiently into account the concerns of the other specialized groups to which the project will pass in successive steps. A very common example of this is the design of a product by a product design department that the manufacturing department later discovers is very difficult or impossible to manufacture. The manufacturing department can send the project back to the design department for rework, can change the design itself, or can make do. The waterfall approach through successive specialized departments can be a very lengthy and inefficient process for the design and manufacturing of new products. In the field of new production development, the practice of putting in place multidepartmental project teams to alleviate these problems has become very widely used. This approach, known as "concurrent engineering," was developed in the automotive industry, based on the creation of a project team that includes representatives of each of the specialized functional groups that will be involved in the design and manufacturing of the new product (Prasad, 1996; Takeuchi & Nonaka, 1986). The use of the approach has been widened to include different types of specialized groups producing different types of projects, including less tangible products and services. Note that the multifunctional project team is at the heart of this approach.

The Management of the Project Life Cycle: Alternatives to the Waterfall Approach

Several alternatives to the waterfall approach have been developed in different industries. The goal of alternative approaches is to reduce project duration and increase flexibility. The approaches are based on breaking the project deliverables down into independent parts that can be designed and produced in parallel. Decomposability allows for a variety of different approaches to the project life cycle (Yakob & Tell, 2007). The concept of "modularity" is often used as the basis for such approaches (Hellström, 2005). If the product or service is not decomposable into completely independent parts, the accelerated schedule comes at

a cost of increased coordination effort, suboptimal design, and increased cost. But for some projects, these are counterbalanced by the benefits of receiving the product or service more quickly and/or of increased flexibility.

One example is a "fast-track" approach in which the different parts of the product are designed and executed in partially overlapping phases (Williams, 1995). This approach was developed for construction and infrastructure projects in particular, but can be used for any type of project deliverable. This is done to accelerate the delivery of the final product.

Software development has occupied a very significant place in the project management domain for more than a decade. Software products have features that make them more amenable to management using life cycles characterized by flexibility, faster delivery, and multiple partial deliveries. First, the physical product can be more easily broken down and produced in modules. Second, software is much easier to modify than many other types of products, particularly physical artifacts such as buildings and infrastructure; a module can be developed, tested, and changed (if desirable) more quickly and more cost-effectively than many other types of products. Third, it is possible to deliver parts of the final software product to users and/or the market through partial releases of bundles of functionalities or releases of successive versions, which creates value and possibly revenue streams, while at the same time providing user/market feedback on the use of the product. Fourth, the software market is very competitive, and being ahead of the competition by releasing products more quickly into the market often provides a distinct competitive advantage. Fifth, experience has shown that producing very large software products for one big final release is very risky because of problems with cost, schedule, quality, and user acceptance. Finally, information technology is evolving very quickly, and the longer a project lasts, the more likely it is that the technology will change before the product is released (Kwak & Stoddard, 2004).

For these reasons, the software development industry often uses project life cycles that are different from the waterfall approach (Benediktsson, Dalcher, & Thorbergsson, 2006). Two such approaches are particularly widespread. Boehm (1988) introduced the spiral life cycle in which successive versions of a software product are developed and released. More recently, agile methods have become very widespread in software development (Fowler & Highsmith, 2001). The agile methodology is a very detailed and specific method for software development, which is based on concepts and practices found in the earlier work on new product development by Takeuchi and Nonaka (1986). One of the central concepts is the "scrum," based on an analogy with rugby players (Schwaber, 2004). A scrum is a small team of software developers that is given the task to develop a

small group of software functionalities in a very short cycle, often 30 days, which at the end will be ready for release to the customer or the market. The internal functioning and dynamics of the scrum are a central component of agile methodologies. More flexible life cycles based on some of the principles of agile methods can also be found in other industries, but their use is much less widespread (Ballard, 2000; Highsmith, 2009).

There are important differences between project life cycles and between different phases in a particular life cycle. Both contribute significantly to structuring the context within which project teams do their work. For these reasons, the study of project teams in context should account for both.

Project Management Methodologies

Organizations that do many projects often have project management methodologies (Kliem, Ludin, & Robertson, 1997). They may do several types of projects and may have different methodologies for different types of projects. The project life cycle is a central organizing concept that constitutes the backbone of project management methodologies, which define for each phase the following:

- What sub-deliverables are to be produced, including feasibility studies, studies of options, specifications, design documents, prototypes, quality controls, and so on;
- What project management documents will be produced, including plans, estimates (particularly for cost and time), risk and stakeholder analyses, status reports, and so on;
- The level of detail and of precision that is required at each phase as the project is progressively elaborated;
- Who makes what decisions; and
- Who is responsible for what.

For those studying project teams in a context where a project management methodology is in use, a documented project management methodology provides a detailed description of important aspects of the context.

Project Management Maturity

In many contexts there is no documented project management methodology. Where documented project management methodologies are present, they vary both in their level of detail and in the extent to which they are followed

systematically in the reality of organizational life. Within the project management community, the concept of "project management maturity" is used to capture the extent to which the project management methodology is well documented, used systematically, and managed.

Project management is commonly conceived as a process or a set of processes (Kerzner, 2006). The concept of process is derived from the quality movement (Drummond, 1992). In the early 1990s, the concepts of process and of business process became a common part of the discourse of managers with the popularity of "business process re-engineering" (Davenport & Short, 1990; Hammer, 1990).

Within the field of software development, the Software Engineering Institute developed a way of evaluating the quality of software development processes, which is known as "capability maturity model integration," or CMMI (Paulk & Carnegie-Mellon University, Software Engineering Institute, 1994; Software Engineering Institute, 2010). This method for evaluating processes is used extensively worldwide in software development. The level of maturity is measured on a scale of 1 to 5, which is so commonly used that the concept and the scale have become elements of the vocabulary of most practitioners. The underlying assumption is that if the methodology is well documented and used more systematically, and if measures of effectiveness are gathered and used in continuous improvement efforts, then software development projects will be more effective and the results more predictable.

Because software development is a project-based industry and because practitioners in project management are aware of activities in the field of software development, the transfer of the concept of maturity to the evaluation of the quality of project management processes is seen as natural. From the late 1990s, project management maturity models became a common feature in the project management literature (Cooke-Davies, 2004; Project Management Institute, 2003). Both the concept and the scale of 1 to 5 have become a common part of the discourse of both practitioners and academics in project management. In organizations in project-intensive industries, it is not uncommon to hear statements such as "Our project management is currently at maturity level 2.3 and we have program to progress to level 3.0 in the next two years." This is a language for describing how good practitioners feel their organization is at managing projects, which researchers studying project teams in these environments need to be able to decode. Within the project management practitioner community it is widely assumed that improved project management maturity leads to improved project performance. However, this idea is not well accepted in the project management research community because attempts to demonstrate a link have failed (Thomas & Mullaly, 2008).

The Hierarchical Breakdown of the Project Task

Projects in which more than a small group of people participate must have some sort of structure and division of labor. Within the project management domain, a traditional way of structuring the activities of a project is to apply the concept of "work breakdown structure," or WBS, which is defined as "[a] deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It organizes and defines the total scope of the project" (Project Management Institute, 2008, p. 453). Note the inappropriate use of the term "project team" in this definition. The WBS breaks down the project activity to the level at which work is assigned to project participants, many of which are teams. This level of breakdown of the task is referred to as the "work package," which is defined as "[a] deliverable or project component at the lowest level of each branch of the WBS" (Project Management Institute, 2008, p. 453).[1] By assigning responsibility for project execution and the production of deliverables to people, teams, or subcontractors at the lowest level and assigning responsibility for coordination of the activities to successively higher levels of the WBS, this project planning approach creates a hierarchical organization of participants. In this approach, a team is created at each level, in each branch of the hierarchy. The team is composed of the person appointed to coordinate the activities of those that are immediately below in the hierarchy. The person responsible for coordination at one level is a member of the team at the next level up, in a role described by Likert (1967) as a "linking pin" between teams. The project team at the highest level is often referred to as the "core team," composed of the project manager, the people responsible for each of the branches of the WBS, and the people responsible for the overall planning and control of the project.

The planning approach based on a WBS requires that the project deliverables be known in sufficient detail to be able to break down the work and assign it to different groups. As the project progresses through the life cycle, the project deliverables become better defined through progressive elaboration. On longer duration projects, an approach that is often employed is to break the project deliverables down to successively finer detail as the project progresses; this approach is called "rolling wave planning," which is defined as "an iterative planning technique in which the work to be accomplished in the near term is planned in detail, while work in the future is planned at a higher level" (Project Management Institute, 2013a, p. 560).

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1. In most project management planning software packages, a "work package" is referred to as a "task."

Although the project planning approach based on the WBS is very common, not all projects are managed using an approach based on a WBS. The discussion of different project management approaches is beyond the scope of this chapter. Suffice it to say that those who are investigating projects that are too large to be executed by a small group of people are likely to find that this approach has been applied, but this must be verified empirically. If employed, the WBS provides a framework for describing the hierarchically nested set of teams found in many projects, which is discussed by Chiocchio (Chapter 3 of this volume).

Project Governance

The project manager typically receives a mandate to do the project from a person or an organizational unit to which he or she must report back and which has the authority to approve, modify, delay, or cancel the project. This relationship is the basis of project governance. This person or organizational unit has governance responsibilities analogous to those of a board of directors in its relationship with the top management of an organization (OECD, 2004). The project governance structure is responsible for (1) defining project objectives; (2) defining the means to attain the objectives; (3) monitoring project progress and results, including the realization of the benefits that justify the project; (4) insuring that the information it receives is valid; and (5) ensuring that the organization has the capabilities necessary for the adequate management of its projects (Association for Project Management, 2004).

A common practice is to appoint a member of senior management to fill the role of project sponsor. This person provides a link between the project and the parent organization. His or her role is to represent the parent organization's interest's vis-à-vis the project and to represent the project's interests within the parent organization (Crawford et al., 2008). For researchers investigating project teams, the project governance structure and the presence of a project sponsor and his or her role are important elements of the project context.

Multiproject Management

In some situations, the governance of projects is fulfilled for groups of projects, rather than projects taken individually. In these situations, the multiproject management structures and practices constitute the relevant context of projects. Two approaches have come to prominence over the last decade: programs of projects and project portfolios. A program of projects is a group of interdependent projects that are managed in a coordinated fashion in the pursuit of

a common strategic objective (Pellegrinelli, 1997). The person responsible for the program has governance responsibilities for the projects within the program. Unfortunately, the term "program" is used in many different contexts to mean many different things. For this reason and because the concept is relatively new in the project management community, the concept and the term are not used in a consistent manner, and caution must be exercised in the interpretation of the term.

The concept and the term "project portfolio" are used in a much more consistent manner (Project Managemet Institute, 2013b). All of the projects of any organization constitute its project portfolio. The projects are not necessarily interdependent, and they are carried out in the pursuit of a set of strategic objectives. Project portfolio management requires decision-making at a senior level. The primary considerations are (1) choosing the best projects among those that are available; (2) ensuring that this selection is aligned with the organization's strategy; (3) ensuring that the entire portfolio is balanced, with not too many or too few projects of any one type; and (4) ensuring that the organization has adequate resources to undertake all of the projects that it initiates (Cooper, Edgett, & Kleinschmidt, 2001). Project portfolio management is very closely linked to budgeting processes and is of a cyclical nature, linked to the budgeting cycle, with periodic reviews of the portfolio during the budgeting cycle. Portfolio management is a much less active management practice than program management described in the previous paragraph. In larger organizations, the overall project portfolio is often broken down into sub-portfolios that have a tendency to be aligned with the main elements of the organization's structure. Knowing whether a project is under the governance responsibilities of a program or a portfolio are elements of the context that those researching project teams should be aware of.

The Organizational Context: Functional, Matrix and Project-Based Organizations

The project management community has long been concerned with the structure of the organization within which projects are carried out. The continuum from functional structures through matrix structures to project structures, adapted from Galbraith (1973), has been very widely adopted and used within this community (see Figure 2.2). There were many publications on the topic in the 1980s, but the topic has not attracted interest from researchers since (Gobeli & Larson, 1987). The framework presented here is common knowledge among project management academics and practitioners.

In the representation in Figure 2.2, the balance of influence between functional and project management varies along a continuum, with the functional management dominating on the left and project management on the right. For many years, this model was applied to organizations that carry out projects using their own personnel to execute projects. In more recent years, it has also been applied to organizations where a portion of the human resources are not employees (see Söderlund, Chapter 4 of this volume).

In the functional structure on the left, the employees are grouped into functional departments based on their areas of expertise. This structure has been shown to be well suited to situations where developing and maintaining specialized areas of expertise are important. From a human resource perspective, this structure provides a stable social environment for specialists, with a department head who is of the same area of specialization. This organization tends to create functional silos, which may be very good within their areas of specialization but that have difficulty carrying out multidisciplinary projects.

In the project organization on the right, all the resources necessary to execute a project are under the responsibility of the project manager, who is the head of a temporary structure set up to manage the project. This type of organization is very good at delivering multidisciplinary projects that are well integrated and well adapted to customer needs within schedule. However, with the dismantlement of the structure at the end of the project, this type of organization performs less well in knowledge management and causes problems related to job security and transition of personnel to new projects. This structure is better suited to long-duration projects that require human resources on a full-time basis for long periods of time and contexts where developing and maintaining specialized knowledge are less critical. Historically, functional structures are found more in science-based industries and project-based structures in the construction industry (Ford & Randolph, 1992; Gobeli & Larson, 1987; Hobbs & Ménard, 1993). Project-based work and project teams

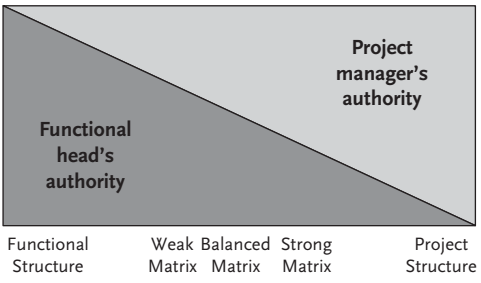

FIGURE 2.2 A continuum of types of organizations

are salient features of project-based organization. Söderlund (Chapter 4 of this volume) presents a discussion of project-based organizations in the context of the present economic environment.

The central idea of Galbraith's model is that varying the relative influence of functional and project management will tend to modify the organization's performance; the more influence the functional managers have, the more the organization will perform like a functional structure, with its strengths and weaknesses, and similarly for the project managers. The functional structure is made more project-based by adding project coordination mechanisms, including project managers, within the functional structure. Likewise, the project structure can be made more functionally based by adding functional coordination.

The middle section of the continuum is occupied by the matrix structure, with both functional and project hierarchies and a relative balance of power between the two (Kerzner & Cleland, 1985; Knight, 1976; Kolodny, 1979; Larson & Gobeli, 1987). This arrangement provides for the development and defense of both functional and project priorities. The composition of project teams is negotiated between functional managers, who are the permanent superiors of the human resources, and the project managers to whom they report while on a project team. This negotiation provides a mechanism to allocate and reallocate human resources to projects and to functional tasks and can lead to the effective use of human resources.

A person on a project team within this structure has two bosses while on a project, referred to as a dual command structure. In addition, the person may be on more than one project team simultaneously. The dual command structure is prone to conflict because of differences in the priorities of the functional and the project structures. For this reason, this type of structure has been difficult to implement and manage effectively. Research has shown that a clear division of responsibilities between the functional and the project managers is associated with better performance. However, higher performance is associated with shared responsibility for the evaluation of personnel under the dual command structure (Katz & Allen, 1985).

An organization managing a relatively large number of projects that require that significant expertise from several disciplines be integrated effectively has few choices but to implement some sort of matrix-like arrangement. Similarly, an organization that creates a project team that is composed of human resources that are drawn temporarily from different functional units creates a situation analogous to the matrix structure. It is for these reasons that the matrix structure is a relevant frame of reference in contexts where functional units exist and multidisciplinary projects are undertaken.

Organizations That Deliver Projects to Internal Versus External Customers

Within the literature on project management a distinction has been made between organizations that execute projects for external customers (Type I) and those that execute projects for customers that are internal to the organization (Type II) (Archibald, 1976). In Type I organizations, the majority of activities are organized by project because this is the mechanism through which the organization produces and delivers its products and services to external customers. These organizations have some activities that are not project-based, such as business development to make sure the organization has a stream of projects to execute, financial services, human resource management, and legal services. There are a few ongoing operational processes, for example, payroll activities. The vast majority of the personnel working on projects and composing project teams have considerable experience working on projects and project teams because this is the primary organizing mechanism in such organizations.

In many cases, the external customer organization has invested considerable time and effort into the project before calling on the supplier organization to execute the project for them. In these situations, the customer organization has often done the identification phase of the project independently of the supplier organization. The project is thus usually well defined before a mandate is awarded to the supplier organization. In this context, the task of the supplier organization is limited to producing the required deliverable. The project-based organizations discussed by Söderlund (Chapter 4 of this volume) are of Type I in which project-based work is the dominant form of organization.

Type II organizations do projects for themselves. The project initiation phase during which project objectives, constraints, context, and the solution to be implemented are identified is done within the organization that will receive the final product, creating a context quite different in this respect from Type I organizations. Type II organizations are also quite different in that they have substantial operational non-project activities. Typically, Type II organizations produce and deliver products and services to outside customers/users through ongoing operational processes. The role of projects is to modify existing products, services, and processes or to create new ones for the operational organization. The projects induce changes to the work processes and the competencies required within the operational organization. For this reason, change management is critically important in these organizations. The capacity of the operational organization to absorb several changes simultaneously is also an important issue. In Type II organizations it is not uncommon for human resources to be assigned to both project and operational activities sequentially and/or simultaneously.

Having people from operations on project teams is advantageous in that it brings the operational perspective to the project and thus facilitates adaptation to operational reality. It has the disadvantage of having people who are less experienced with projects and project teams. In addition, there are often conflicts between operational and project priorities, particularly for the availability of these people. The operations produce and deliver the products and services for which the organization exists, and for this reason operational priorities often take precedence over project priorities.

Because Type II organizations usually have more potential projects than they have the capacity to execute, project portfolio management in general and the process to select which projects will be executed in particular are much more salient in Type II organizations. In Type I organizations, the market plays an important role in selecting which projects the organization will receive mandates to execute. Projects in Type I organizations tend to be defined as more limited in scope than those in Type II organizations, because more pre-project and post-project work is done by the customer organization.

Stakeholder Management

The project management community has been very sensitive to the project's context for a long time. This context has a political dimension that is addressed in the project management community through stakeholder management. Both practitioners and academics have been aware of the need to manage stakeholders both inside the organization and in the external environment for some time (Cleland, 1986). The Guide to the Project Management Body of Knowledge (Project Management Institute, 2013a) is organized by "knowledge areas," one of which is dedicated to this subject. The reason is that the actions of stakeholders often have very important impacts on projects. Researchers doing studies in project-intensive organizations are likely to find that practitioners are very aware of stakeholder management and have integrated it into the management of the project task.

Contextual Variation in Project Management Practice

Research has shown that project management practice has both a strong generic component and significant contextual variability (Besner & Hobbs, 2008, 2012). Project management practice varies with both the characteristics of the project and the characteristics of the project's context. The distinction between Type I and Type II organizations (Archibald, 1976) and the distinctions between

functional, matrix, and project-based structures are examples of important variations in the organizational context. Variations in the characteristics of projects create types of projects. Many different variables are used to group projects into typologies (Besner & Hobbs, 2013; Crawford, Hobbs, & Turner, 2005).

Besner and Hobbs (2012) have shown that contextual factors tend to co-vary. For example, in their sample the comparison between engineering and construction projects and all other types of projects (ITC, software development, business services, and others) revealed that, on average, engineering and construction projects are significantly larger, better-defined, less innovative, and carried out more often by Type I organizations that have a contract with an external customer organization. All of these characteristics are significantly related to variations in project management practice. The adequate description of a project and its context must, therefore, identify several features of the project and of its context. Unfortunately, in the project management and organizational psychology literatures, the projects that are studied and their organizational contexts are not often identified adequately. It is, therefore, often difficult to know in which contexts the results can be applied.

In this chapter, it is not possible to present and discuss all the contextual factors that affect project management practice and thus the work of project teams. However, the extent to which the project is well defined at the outset is worthy of more consideration here. The recent research by Besner and Hobbs (2012) has shown that this contextual variable has the strongest effect on project management practice. As was discussed by Hobbs, Chiocchio, and Kelloway (Chapter 1 of this volume), the fact that the product or service the project is to deliver is not fully defined at the outset is a defining characteristic of projects. Both the project goal and process or method to be employed to reach the goal may be more or less well defined (J. R. Turner & Cochrane, 1993). The precision of the project definition is a question of degree. If the project goal is unclear, then the product or service to be delivered is likely to be unclear as well.

"Project Teams" in the Project Management Literature

The concept of "project team" is taken for granted in the project management literature. To the best of our knowledge, there has been no critical examination of the concept within this literature. Most articles addressing the subject do not provide a definition.

Definitions can be found within the practitioner-based literature. Archibald (2003, pp. 129–130) defined a project team as "[a]ll persons contributing to the project (up to several thousands) including people with the project's parent

organization, and stakeholders, consultants, contractors, venders and suppliers from outside the organization, as well the project's customer or client. Key team members are the project manager/leader, the functional project leaders, and the lead project support people." However, several thousand people cannot be considered a "team" as conceptualized within the literature from organizational psychology.

The Project Management Institute seems to have been struggling with the concept for some time, without addressing the question directly. The Institute revises its basic standard, The Project Management Body of Knowledge, every four years. The definition of project teams in this document has changed with each edition in recent years. In 2000, "project team" was not included as a term in the glossary. However, "project team members" were defined as "the persons who report either directly or indirectly to the project manager" (Project Management Institute, 2000, p. 206), which is consistent with Archibald's definition that could include thousands of people.

In 2004, a definition of the "project team" was added, defined as "[a]ll the project team members, including the project management team, the project manager and, for some projects, the project sponsor" (Project Management Institute, 2004, p. 370). The definition of "project team members" was modified to read "the persons who report either directly or indirectly to the project manager, and who are responsible for performing project work as a regular part of their assigned duties (Project Management Institute, 2004. p. 371). These definitions are consistent with Archibald's definition. However, the definition of the project team introduces a distinction between the project team and the project management team, defined as "[t]he members of the project team who are directly involved in project management activities. On some smaller projects, the project management team may include virtually all of the project team members."

In the 2008 version, the definition of the project management team was maintained, but the definitions of both the project team and of project team members were dropped from the glossary (Project Management Institute, 2008). In the 2013 edition, the definition of the project management team was maintained and a new definition of the project team was added: "[a] set of individuals who support the project manager in performing the work of the project to achieve objectives" (Project Management Institute, 2013, p. 556), which appears to be compatible with Archibald's definition. In the 2013 edition, there is no definition of project team members. In 2013, the Project Management Institute released the PMI Lexicon of Project Management Terms (Project Management Institute, 2014) in which the terms "project management team," "project team," and "project team members" were not included. The project management literature

does not provide an authoritative answer to the question, What is a project team? which is the subject of Chapter 3.

Conclusion

Chapters 1 and 2 have provided material from the project management literature that can contribute to two issues that are prevalent in the organizational psychology literature on teams:

- The contextualization of the study of project teams;
- The study of project team as they evolve over time.

Project contexts are highly structured and well understood. The study of teams in project environments can draw on both the well-defined structure of project life cycles and the understanding of the project context and its impacts on the way project work is carried out. The results of studies of project teams would be more useful if the project and the organizational context were well described. This would require that several contextual variables be reported.

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3 DEFINING PROJECT TEAMS

A REVIEW OF CONCEPTUAL UNDERPINNINGS

François Chiocchio

> It is somewhat ironic that scholars at the forefront of the knowledge base on teamwork would struggle to reach collaborative agreement on the most important types of teams that comprise the units of study in this field.
>
> —HOLLENBECK, BEERSMA, & SCHOUTEN, *2012, p. 103*

Introduction

Flying fish leap out of water and take advantage of updrafts on the surface of the ocean to travel as high as 8 meters in the air, over distances of 50 meters, before plunging back into the water (Davenport, 1992). But what makes them fish that can fly, rather than birds that can swim? Moreover, since flying is not the only thing flying fish do, why not name them, say, *swimming-eating-mating-flying fish*? Fins distinguish fish from birds, and wing-loading—the weight/wing-area ratio—distinguishes fish and birds that can fly from fish and birds that can't. But wing-loading itself cannot distinguish between fish and birds, as both animals can be measured to yield that ratio. Biologists would tell you that a number of agreed-upon underlying features analyzed under strict rules coalesce to help classify birds, fish, and different kinds of fish in different categories. I assume biologists would also suggest that *Exocoetidae* is the correct name for flying fish, while agreeing that popular names are practical yet imperfect shortcuts that bring some features to the foreground while leaving others in the background. Rest assured that this chapter is not about marine biology. However, the flying fish problem draws attention to issues that specialists in project management and organizational psychology face when trying to study and understand project teams and the work they do. What is a project team? What are the distinguishing features that make a project team different from, say, a service, production, management, or problem-solving team? Can people be on

different kinds of teams at once? What are the different kinds of project teams? Answering these questions requires some kind of classification scheme based on underlying features that coalesce into distinguishable entities people can relate to. Given that "a classification is no better than the dimensions or variables on which it is based" (Bailey, 1994, p. 2) this chapter aims at reviewing project team conceptualizations. This is necessary for several reasons.

First, project work is expanding beyond its traditional boundaries. Project teams are considered a high performance work practice with broad impact in terms of overall frequency globally and growth over time (Posthuma, Campion, Masimova, & Campion, 2013). Advancing the science of project teams means providing definitions that are robust to different contexts, on which practitioners and academics can rely on to do their jobs. Second, there is a void left between project management literature's tendency to focus on the project (or the project manager) as the unit of interest affected by higher-level contingencies and organizational psychology's tendency to focus on the individual within its proximal social entity (i.e., the team). Third, while many agree that the science of teams would benefit from conceptual precision (West & Lyubovnikova, 2012) and from distinguishing between different types of teams to better grasp social phenomena in the workplace (Cohen & Bailey, 1997), there are several problems with current classifications and reviews of teams' underlying features.

Typological classifications of teams can be problematic because they often rest on non-mutually exclusive groupings. For example, Lawler (1996) makes a distinction between problem-solving teams and project teams. Yet, his descriptions of these teams are very similar and imply—falsely, in my opinion—that project teams do not solve problems. When we combine knowledge from project management and organizational psychology, such problems are compounded. For example, project management defines projects in part as temporary organizations (i.e., temporary groupings of people) (Turner, 2007b), but organizational psychology scholars define other kinds of teams—not just project teams—that have temporary membership as well, such as crews (Webber & Klimoski, 2004). To resolve problems with typologies, Kozlowski, Gully, Nason, and Smith (1999) and more recently Hollenbeck, Beersma, and Schouten (2012) argue that it is more important to describe teams from a subset of common underlying features, rather than attempt to classify teams (see Pearce, Powers, & Kozlowski, Chapter 16 of this volume, for more on this observation). The issue is a dilemma because there is no consensus on underlying features or why some features would be more relevant than others. Furthermore, if features must be identified, one must first look at teams and not look at non-teams. In other words, we naturally consider entities as we look for their meaningful features. This chapter adds to the current state of knowledge by being the first to review and analyze project

team definitions. It does so by avoiding a fruitless "typology" versus "features" debate and by proposing conceptual underpinnings that result in a typology with clear features specific to project teams.

Understanding Project Teams

General Definition of a Team

Early definitions of teams stem from the study of groups in social psychology (McGrath, 1997) and have coalesced at the end of the 1990s around a few elements, such as interdependent people interacting toward common goals (Ilgen, 1999). But work is changing rapidly and becoming more complex (Landy, 2003; Tannenbaum, Mathieu, Salas, & Cohen, 2012b), and definitions of a team must reflect this evolution (Murase, Doty, Wax, DeChurch, & Contractor, 2012). This is exactly what key scholars in the team literature have done for what we can call the general definition of a team. I have combined recent definitions proposed by Salas, Rosen, Burke, and Goodwin (2009) and Kozlowski and colleagues (Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006)—themselves representing a compendium of many other definitions[1]—to yield the following definition:

> Teams are complex open systems forming entities characterized by two or more individuals who exist to perform organizationally relevant tasks, who interact socially, dynamically, recursively, adaptively, and often virtually; who have shared or common valued goals; who hold meaningful and high levels of task, feedback, and goal interdependencies; who are often hierarchically structured; whose group has a limited life span; whose expertise, roles, and responsibilities are distributed and who are bounded by and embedded within an organizational/environmental context that sets top-down constraints and that influences and is influenced by bottom-up phenomena occurring over time and enacted by competencies and processes, emergent cognitive and affective states, performance outcomes, exchanges with other teams, and stakeholder judgments of team member and team effectiveness.

1. For the reader interested in a history of teams and work groups, or in reviews on team effectiveness, I suggest reading the following: Guzzo and Dickson (1996), Ilgen (1999), Kozlowski and Bell (2003), Kozlowski and Ilgen (2006), Salas et al. (2007), Mathieu, Maynard, Rapp, and Gilson (2008), and Richardson (2010).

Compared to early definitions, this general definition of a team is striking because of its completeness. It casts teams well within open systems theory and thus subject to importation of energy, throughput, output, cyclicity, negative entropy, reception, coding and usage of negative feedback, homeostasis, differentiation, integrative coordination, and equifinality (see Katz & Kahn, 1978). It recognizes the organization as a team's immediate context (such as Richardson's [2010] definition of a "real team"), but does not restrict the notion of context to the organization. It addresses task interdependency from early work by Thompson (1967) (i.e., pooled, sequential, reciprocal) and Tesluk, Mathieu, Zaccaro, and Marks (1997) (i.e., who add intensive). Since this is a general definition of teams (i.e., it is meant to work for all teams), it is interesting to note that *all* teams have a finite life span when life span is defined as membership changes in team composition. Finally, this definition is in line with the last decade's theorizing on multilevel effects (see Klein & Kozlowski, 2000), as the multiple embeddedness of team members, teams, and organizations in their larger context is taken into account.[2] Since this is the general definition of a team, it is logical and worthwhile to dig deeper and examine what is more salient for project teams.

Review of Project Team Definitions

Table 3.1 shows a review of definitions of project teams. Examination of the definitions identifies similarities, but also underscores important problems and unanswered questions.

Before presenting a better definition that captures the communalities and positive elements of the definitions in Table 3.1 while bridging project management and organizational psychology literatures, an analysis of the problems of some of these definitions is necessary. The first problem can be characterized as the "flying fish problem." This problem occurs when a particular feature of a team is brought to the foreground and overemphasized, while leaving out other potentially important features. Almost all project team definitions suffer from this problem. For example, some definitions bring decision-making to the foreground (e.g., Klimoski & Jones, 1995). This particular feature is not good at distinguishing between kinds of teams or kinds of project teams. Indeed, many

2. An in-depth review of the literature on team effectiveness that takes an open system, multilevel, and temporally dynamic approach is beyond the scope of this chapter. Klein and Kozlowski (2000) and Salas, Goodwin, and Burke (2009) are important references in this field. Also key are reviews such as Ilgen, Hollenbeck, Johnson, and Jundt (2005), Baard, Rench, & Kozlowski (1997), and models such as Kozlowski et al. (1999) and Burke et al. (2006).

Table 3.1 Definitions of Project Teams Arranged in Chronological Order

Project team. Groups convened to develop a concrete piece of work, whose lives begin and end with the initiation and completion of special projects (Gersick, 1988, p. 13).

Research, design, planning. Highly trained professionals with expertise that requires years to develop, representing relatively unique projects with broad responsibility in deciding how to proceed, including research teams, architect teams, engineering project teams, product development groups, planning commissions. They have intensive specialization, wide scope of activities, extended temporal scope, few external interactions, little standardization, internal pacing, and little synchronization (Sundstrom & Altman, 1989, pp. 185, 186–187).

Advice, involvement team. A collection of individuals who work together on a restricted project for a restricted time, including committees, quality circles, employee involvement groups, tasks forces, and focus groups. They have a limited specialization, narrow scope of activity, limited temporal scope, few external interactions, little standardization, internal pacing, and little synchronization (Sundstrom & Altman, 1989, p. 185).

Project/Development team. Groups of white-collar professionals who collaborate on assigned or original projects. They have longer work cycles than in production and service groups, but their outputs may be complex and unique. They may have a mandate of innovation more than implementation, broad autonomy, and an extended team life span. Their performance may be difficult to assess (Sundstrom et al., 1990, p. 121).

Ad hoc task group. Ad hoc groups are convened for a particular purpose, consist of members who otherwise would not work together, and disband after completing their assigned task. They range from a search committee choosing a new college president to a blue ribbon panel, such as the Challenger commission (Finholt, Sproull, & Kiesler, 1990, p. 292).

Task force. Task forces are brought from different jobs or organizational units to work together on a special project in a limited time. The work is non-routine and aims at producing a one-of-a-kind one-time-only group product (Hackman, 1990, p. 87).

New product development team. Teams working on new product development (a major extension to an existing product line or the start of a new product line) over 18 to 36 months (Ancona & Caldwell, 1992, p. 327).

Cross-functional project team. Temporary groups or task forces performing non-routine tasks and assembled for the duration of a designated activity with responsibilities overlapping between two or more departments, and lateral contacts promoting cooperation across functional boundaries (Pinto, Pinto, & Prescott, 1993, pp. 1283–1284).

(continued)

Table 3.1 (Continued)

Problem-solving team. Teams with broad or narrow missions that disband once the job is done (Dumaine, 1994).

Professional (technical) decision-making team. This category encompasses many kinds of work teams with varying functions, structures, and processes. They aim at strategic, tactical, analytical, and creative decisions. This includes a cross-functional team put together to introduce a new product (Klimoski & Jones, 1995, pp. 296–297).

Problem-solving team. Teams that are formed to work on a particular problem. They have authority to make decisions, usually have a budget and a sponsor, and often have a completion date (Lawler III, 1996, pp. 132–134).

Project team. Teams typically formed to manufacture a particular product, develop new products, redesign existing ones, or deliver a service that has a known limited life expectancy. Team members can be on several project teams at once (Lawler III, 1996, pp. 137–138).

Cross-functional team. Working groups overlaid onto an existing functional organization with links to multiple subunits. These teams include planning teams, ad hoc project teams, quality teams, process improvement teams, and product development teams (Denison, Hart, & Kahn, 1996, pp. 1005, 1008).

Project team. Time-limited cross-functional teams that produce one-time outputs. Tasks are non-repetitive and involve considerable application of knowledge, judgment, and expertise. The work that a project team performs may represent either an incremental improvement over an existing concept or a radically different new idea (Cohen & Bailey, 1997, p. 242).

Core project team. A core project team is composed of representatives for each department involved in developing an implementing the new product of application; they stay on the project from beginning to end to direct the work of the people in the departments (Graham & Englund, 1997, pp. 92–93).

Management team. Groups of managers at the same organizational level who, as part of the organization's formal management structure, head different units with goals, funds, and people reporting to them, who report to the same manager, meet regularly to share information, and work together between meetings to complete shared projects or resolve common problems (McIntyre, 1998, pp. 2–3).

Ad hoc production team. Temporary teams formed on a case-by-case basis to build, construct, or assemble products. They can provide a public service, or perform artistically or competitively (Devine, Clayton, Philips, Dunford, & Melner, 1999, p. 684).

Ongoing project team. Standing teams with relatively stable membership that solve problems, make plans or decisions, or interact with clients or customers (Devine et al., 1999, pp. 683–684).

(continued)

Table 3.1 (Continued)

Autonomous work team. Teams whoses members experience peer-directed role-making interaction, have flexible and dynamic roles, and take responsibility for completion of a variety of tasks, including team maintenance functions (e.g., conflict resolution and team and individual performance feedback), work allocation, and identifying and solving ill-defined or poorly structured problems (Taggar, Hackew, & Saha, 1999, pp. 900–902).

Ad hoc project team. Ad hoc project teams exist for a finite period of time to solve problems, make plans or decisions, or interact with clients or customers (Devine et al., 1999, p. 683).

Cross-functional new product team. Teams with high absorptive capacity that facilitate the product development and marketing process that tap a broad array of external information and new knowledge by bringing together people from different disciplines and functions who have pertinent expertise about the proposed innovation problem (Lovelace, Shapiro, & Weingart, 2001, p. 779).

Commission. Special projects or investigations requiring judgments or plans. They exist for the duration of a particular mission; once that has been achieved, commissions break up and members return to their original jobs or get reassigned to another project team. Commissions are often cross-functional and tend to be heterogeneous in terms of individual difference characteristics (Devine, 2002, p. 301).

Design team. Design teams do hands-on work requiring creativity and/or technical innovation for an internal or external client. Membership is often cross-functional, although the distribution of functional backgrounds is sometimes uneven and suggestive of a "lead function" implicitly or explicitly expected to champion the effort. Like commissions, design teams are brought together for a specific purpose, and they disband when that purpose has been accomplished; they also have a unique role in their organization and tend to derive a certain amount of power from their lack of internal competition. Unlike commissions, however, their collective product is tangible and must be adapted from previous models or created anew, as opposed to being chosen from a set of options (Devine, 2002, p. 301).

Negotiation team. Negotiation teams engage in competitive intellectual tasks in which group members represent the interests of larger entities (e.g., a department, division, or organization) and attempt to maximize the outcomes of their constituents. They exist for the duration of a negotiation and disband once a settlement has been reached. Their task is usually fairly structured. Negotiation teams are often constrained by deadlines associated with upcoming events (e.g., contract expiration) (Devine, 2002, p. 301).

(continued)

Table 3.1 (Continued)

Advisory team. Advisory work groups investigate problems associated with the organization's sociotechnical systems and/or search for ways to improve organizational effectiveness. They are typically cross-functional and operate outside the organization's formal structure, serving an advisory role and possessing no authority to directly implement their suggestions. Their collective product is often a formal report or a set of recommendations regarding how things should be done differently. In theory, these groups are formed for a specific purpose such as solving a workflow problem or suggesting ways to improve organizational effectiveness. They are thus usually intended to be short-term in nature (Devine, 2002, p. 301).

Project team. Teams that perform uncertain, complex, and non-routine tasks such as (but not limited to) planning and decision-making (De Dreu & Weingart, 2003, p. 744).

Project team. All persons contributing to the project (up to several thousands) including people from the project's parent organization and stakeholders, consultants, contractors, vendors, and suppliers from outside the organization, as well the project's customer or client. Key team members are the project manager/leader, the functional project leaders, and the lead project support people (Archibald, 2003, pp. 129–130).

Project team. A project team consists of the project manager, the project office (whose members may or may not report directly to the project manager), and the functional or interface members (who must report horizontally as well as vertically for information flow); other members of the team may not have such titles (Kerzner, 2003, pp. 168–169, 174).

Project team. The project team is composed of the people who have assigned roles and responsibilities for completing the project and is composed of the project manager, the project management team (i.e., the persons who report either directly or indirectly to the project manager, and who are responsible for performing project work as a regular part of their assigned duties), and for some projects, the project sponsor (Project Management Institute, 2004, pp. 199, 370–371).

Project management team. The project management team is a subset of the project team responsible for project management activities such as planning, controlling, and closing. This group can be called the core, executive, or leadership team. On smaller projects this team can include virtually all of the project team members (Project Management Institute, 2004, pp. 199, 369).

Project team. A project team is composed of highly mutually interconnected specialists who share meanings, trust, and routines (Soda et al., 2004, p. 121).

Top management team. A group of senior managers (e.g., CEOs) that generally makes decisions that are important to the firm's future and take part in collective activities such as projects (Simsek, Veiga, Lubatkin, & Dino, 2005, p. 74).

(continued)

Table 3.1 (Continued)

Project workforce. Project workforces encompass different teams of specialized subject matter experts both inside and outside an organization that collaborate and cooperate. These teams achieve work that is differentiated, or compartmentalized, based on customer requirements, talent availability, and project scope, as well as business rules and objectives (Melik, 2007, p. 14).

Hybrid-project system. A setting in which several organizations govern projects, at least some participants can cross organizational boundaries, and both organizations and participants can influence project formation (Schwab & Miner, 2008, p. 1140).

Blended team. A business-to-business service organization's strategy for achieving co-production engagements that temporarily locates the project manager or project team within the client organization to enhance the design and delivery of the service (Webber, 2008, p. 73).

Project team. An association of people from diverse skills and backgrounds (e.g., from within the organization or consultants) assigned temporarily and that must be managed (Pons, 2008, p. 88).

Short-term team. Teams of short-tenure members assembled to accomplish a short-term goals and urgent missions. Cross-functional project teams existing for a limited period are considered short-term teams (Joshi & Roh, 2009, pp. 610, 613).

Global project. A transnational, temporary endeavor with a team made up of individuals from different countries, working in different cultures, business units, and functions, and possessing specialized knowledge for solving a common strategic task (Anantatmula & Thomas, 2010, p. 60).

Creative project teams. A temporary, self-managed organizations consisting of two or more individuals who engage in non-routine tasks to produce creative one-off outputs (Skilton & Dooley, 2010, p. 119).

Project team. Project teams only exist until the task outputs have been delivered to customers, meaning that the teams are dissolved upon the completion of their projects. New projects with new compositions of employees are continuously established as old projects are concluded (Reinholt, Pedersen, & Foss, 2011, p. 1283).

Project-based association. Situations where people work together for a short period of time to complete a task (M. Thompson, 2011, p. 766).

Project team. A project team is a group of people carrying out the project activities (Cobb, 2012, p. 18).

Project team. A project team is a complex human organization constrained by a context requiring project work (Chiocchio, Grenier, O'Neill, Savaria, & Willms, 2012, p. 5).

Note: Some definitions are adapted or paraphrased, rather than directly quoted from the cited articles.

counter-examples exist, since it is hard to imagine any kind of work carried out by a team that does not require some form of decision-making process (e.g., Cannon-Bowers & Salas, 1998; Salas & Fiore, 2004). DeDreu and Weingart (2003) emphasize uncertainty, complexity, and non-routine tasks in their definition of project teams. Left in the background is the fact that project teams can and often do include similar repeatable routines. Not all projects require creating entirely new means to achieve their result (Long & Ohsato, 2009; Peng, Schroeder, & Shah, 2008). Davies and Brady explain that organizational learning hinges on "economies of repetitions" and "recycling experiences" between projects (2000, p. 200). Another feature often brought to the foreground is cross-functionality. Here, too, counter-examples exist. For example, research and development (R&D) can be carried out by grouping people from a variety disciplines and/or functions; research and development (R&D) scholars describe specialized research projects that do not draw on multiple disciplines or that are carried out within a function (Djellal, Francoz, Gallouj, Gallouj, & Jacquin, 2003). Hence by bringing cross-functionality to the foreground, what is left behind is the principle that diversity/variety (i.e., differences of information, knowledge, or experience; see Harrison & Klein, 2007) is key and can be expressed in many ways, including within a function (Djellal et al., 2003) or between organizations (Webber, 2008). Finally, one element often brought to the foreground in many definitions is the idea that only one team carries out the project from beginning to end. This leaves out the possibility that complex projects are carried out by many teams, working together under a unified overarching project goal (e.g., Hoegl, Weinkauf, & Gemuenden, 2004). To summarize, although elements brought to the foreground are not inexact, a transversal examination of many definitions reveals a lack of consistency in what is characteristic of project work and project teams.

A second problem—the "people-do-only-one-type-of-work problem"—occurs when definitions of teams imply that specific people are confined to one type of work. For example, some definitions (i.e., Sundstrom, de Meuse, & Futrell, 1990) pinpoint white-collar workers, while the demonstration is not made that these workers are necessarily confined to project work or that other workers are necessarily excluded from project work. A description such as "project teams from five industrial R&D organizations engaged in the scientific instruments, semiconductor, energy, petrochemical, and aerospace industries" (Keller, 2006, p. 204) is a good example of this problem, but other examples exist (e.g., Hoegl et al., 2004). Such self-contained descriptions imply that research and development and/or certain organizations and/or certain industries inevitably lead to work carried out by project teams. Here, too, counter-examples exist.

For example, R&D activities are not confined to manufacturing, as implied by the organizations described above by Keller. They also include activities carried out in the service sector (Hipp & Grupp, 2005). Another form of this problem involves workers usually not dedicated to project work but who are involved in a project nonetheless. For example, teams of physicians, nurses, and other healthcare specialists can be described as "medical teams" that function on an ongoing basis to deliver health services (Devine, 2002; World Health Organization, 1985). However, they can also be involved in projects in addition to their ongoing activities, such as when they are involved in process re-engineering or service improvements (Chiocchio et al., 2010; Chiocchio, Lebel, et al., 2012). The same is true for management teams. Management teams operate on an ongoing basis most of the time, but can also be involved in projects as well (McIntyre, 1998), such as mergers for top management teams (Barkema & Schijven, 2008; Haleblian, Devers, McNamara, Carpenter, & Davison, 2009) or streamlining procedures for middle-level management teams (Singh & Shoura, 2006). To summarize, because projects are a way to organize work that is temporary, unique, and progressively elaborated, workers can become a project team whether or not the name of their type of team implies it directly.

This brings us to the third problem: terms within definitions of project teams are usually not defined clearly. Temporariness is the most striking example of this problem. For example, using the term "temporary project teams" (Tannenbaum et al., 2012b, p. 5) is pleonastic. My review of the project management literature has revealed that temporariness is used indiscriminately to mean different things: membership, duration, and process.

Temporariness-as-membership stems from the idea that project teams are said to "disband" once the project it is done (Turner, 2007b). However, there are a few problems with this notion. On the one hand, this situation is not unique to project work. For example, airline cockpit crews are picked and assembled temporarily from a pool of people, they perform their duties together, and they are returned to the pool afterward (Hackman, 1990)—they are temporary, but they are not project teams (Webber & Klimoski, 2004). On the other hand, the notion often implied in the project management literature is that projects unite people who have never worked together or who will never work together again. This particular situation is extreme. In fact, project streams exist in which the same people engage in multiple projects over time because they want to replicate a winning formula for the next project (Engwall, 2003; Skilton & Dooley, 2010; Soda, Usai, & Zaheer, 2004). In sum, nothing precludes having the same team members engage over time in multiple discrete temporary endeavors. What is frequent in project work in terms of temporariness-as-membership is that project work often implies *planned* membership changes throughout the project.

Temporariness-as-duration is another important concept, often restricted to mean that project teams are short lived. This implies that project teams may not last long enough to fully develop as mature functioning teams. A more conceptually stringent approach to team duration is to state that the project team cannot last longer than the project itself and to recognize that projects vary in duration. For example, the mean duration of highway construction and maintenance projects can vary from 127 to 244 days, but these projects can also last more than 800 days (Irfan, Khurshid, Anastasopoulos, Labi, & Moavenzadeh, 2011). A study of new product development shows that it takes on average 208 days from concept, to prototype, to production, with variations of about twice that number of days (Kim & Kim, 2009). The research projects on which I work usually have a three-year duration. Parker and Skitmore (2005) classify projects into short-term duration (1–2 years), medium duration (3–5 years) and those with longer durations (5–10 years). For some, "long" projects are those that last one year or more (Zwikael & Unger-Aviram, 2010). These durations cannot be seen as "short" and are long enough to establish rich interactions. Since projects vary greatly in duration, the key questions are the following: How long does temporariness last? What is the impact of that duration on teams? Another key question regarding temporariness-as-duration is, Does a project team need to last for the whole project to be a project team? Many definitions in Table 3.1 imply that the answer is yes, but this also needs to be nuanced. Graham (1997) suggests that a core project team should last for the full duration of the project but that other members move on and off the project, depending on when their expertise is needed. This duality is confirmed in more recent work on multi-team systems where the need to coordinate discrete component teams that play a specialized and temporary role in the overall project is recognized (Marks & Luvison, 2011). Accordingly, one must recognize that a single project can require many teams and that not all teams are required for the full duration of the project.

The third way in which the concept of temporariness is used refers to the process of the project. Turner (2009) clarifies temporariness-as-process by distinguishing between temporary tasks subsumed within operational work from tasks that take place in project work. He explains that the processes characteristic of operational work are meant to last, while project work processes will eventually be purposefully terminated. For example, a patient seen in a hospital emergency room will receive treatment by physicians and nurses. Even if each patient represents a temporary task, the standard processes defined by and tailored to the coupling of patients, specialists, and healthcare tasks characteristic of an emergency room are meant to last. This is in contrast to the work that physicians, nurses, and other hospital staff will perform to re-engineer an emergency room's triage procedures. The processes necessary to produce the new triage procedures

are not meant to last; they will be terminated once the new triage procedures have replaced the old ones. In fact, project work often precedes the launch of new or better operational work (Davies & Brady, 2000; Perminova, Gustafsson, & Wikström, 2008).

Other terms that are not clearly defined in project team definitions refer to non-routine or non-repetitive tasks. While it is often stated that project teams perform non-routine or non-repetitive tasks (e.g., Cohen & Bailey, 1997; Hackman, 1990), project management scholars also underscore counter-examples. Long and Ohsato (2009) explain that repetitive construction projects are common either because many units of the same model are built (i.e., a house) or because they share similarities (e.g., all pipeline projects are similar). Organizations can learn from past projects to improve future project management capability through repeatability (Ibbs, Reginato, & Hoon Kwak, 2007). Consequently, projects are not necessarily characterized by the absence of routines or by the absence of repetition.

The preceding discussion leads to the following six conclusions regarding project team definitions. First and foremost, it is difficult to see from these definitions how labels are chosen and how teams are being classified. Second, it is difficult to define some features and it is difficult to decipher which underlying features are pertinent. For example, most definitions do not distinguish concepts of temporariness. This leads to definitions that incorrectly imply that projects teams can only have a short existence, that project team members engage in entirely new and non-routine tasks, and that they have never worked together and never will again. *A contrario*, the project management literature reveals that these three forms of temporariness vary in degree and interact. Third, almost any element brought forth to define project teams can be met with documented counter-examples that diminish the validity of the element as a necessary or sufficient maker of project teams (i.e., cross-functionality). Fourth, most definitions of project teams attempt to succinctly define project work. However, as we have seen in Chapter 1, defining project work is not easy, nor can it be done succinctly. As a result, project team definitions do not provide a clear set of conditions to define project teams or to distinguish between different kinds of project teams. The former would help distinguish between project and non-project teams, and the latter would help to understand and develop targeted approaches and research to maximize project team effectiveness for different kinds of project teams. The issue of the different kinds of project teams is the fifth element that I think is important to underscore. There is a tendency in the literature to adopt a "one size fits all" approach to project teams, despite the fact that this approach has long been recognized as inappropriate when applied to projects (Shenhar, 2001). Finally, many definitions of project teams do not add to the general definition of

a team; they simply restate general principles of teams, such as working toward a common goal. What are needed are definitions that complement each other hierarchically. Clarifying this implies that definitions should go from a general definition of a team that works for all kinds of teams to a definition of project team, subsumed within it, that distinguishes project teams from non-project teams, and then to definitions of kinds of project teams, while avoiding repetitions of concepts. This hierarchical integration should capture the operational context in which the teams perform, as suggested by Klimoski (2012). What is also needed are definitions that complement each other logically (i.e., with mutually exclusive types of project teams). Clearly, alternatives and additional information are necessary.

A Critical Review of the Underlying Features of Teams

Many scholars of the team domain argue that definitions of teams are important, but that a clear knowledge of underlying features is more important to understand and describe teams. If an agreed-upon list of mutually exclusive features could be drawn, a given team would be described or defined specifically by the degrees to which each feature is represented. Comparative studies would be facilitated. A clear managerial approach could also be crafted for teams sharing features. But the "features" approach has problems worth noting.

Recent writings on underlying team features include Devine's (2002) seven features (i.e., fundamental work cycle, physical ability requirements, temporal duration, task structure, active resistance, hardware dependence, and health risk), Richardson's (2010) six criteria (i.e., interdependence, shared objectives, autonomy, reflexivity, boundedness, roles), and Hollenbeck et al.'s (2012) three-dimensional space system (i.e., skill differentiation, authority differentiation, temporal stability). Ironically, these systems do not overlap consistently. Also, while they might be helpful for other kinds of teams, they are not for project teams. For example, Sundstrom, de Meuse, and Futrell (1990) describe project/development teams as high on skill differentiation and with a life span as long as the mission of the team. But project teams are not described in terms of skill differentiation or temporal stability in Hollenbeck et al.'s (2012) three-dimensional system. Teams high on skill differentiation in Hollenbeck et al.'s system, such as cross-functional teams, are not described in terms of their temporal stability. Devine (2002) defines negotiation teams based on such underlying features as high task structure, low active resistance, mission-based temporal duration, and work cycles based on agreements. But he does not mention authority differentiation. In sum, while some of these features seem

pertinent to project teams, a number of them are similar (despite the label attached to them), not all of them relate directly to characteristics of project work, such as temporariness, uniqueness, and progressive elaboration, or not all of them help in clarifying the problems outlined above (e.g., flying fish problem, people-do-only-one-type-of-work problem, differing conceptualizations of temporariness).

Summary

What stems from this analysis of the general definition of a team, definitions of a project team, and underlying features of teams is that current literature seems insufficient to describe project teams in a compelling and robust way. On the one hand, ill-crafted definitions do not account for the different project teams that exist. On the other hand, team features do not stand out clearly or consistently across systems of features to shed light on project teams.

Putting Things Together: Defining Teams Working on Projects

Generic Definition of a Project Team

The analysis of the general definition of a team, the examination of the various definitions of project teams, and the review of teams' underlying features pertinent to project work have led me to propose the following definition:

> A project team unites people with varied knowledge, expertise, and experience who, within the life span of the project but over long work cycles, must acquire and pool large amounts of information in order to define or clarify their purpose, adapt or create the means to progressively elaborate an incrementally or radically new concept, service, product, activity, or more generally, to generate change.

As shown in Figure 3.1 and in line with taxonomy's requirement for hierarchy between definitions, this definition is meant to fit under the general definition of a team outlined earlier. As such, it avoids repeating what is similar between the two definitions. For example, since all teams involve some level of interdependency and since project teams fall under the general definition of a team, interdependency is not repeated in the definition of a project team.

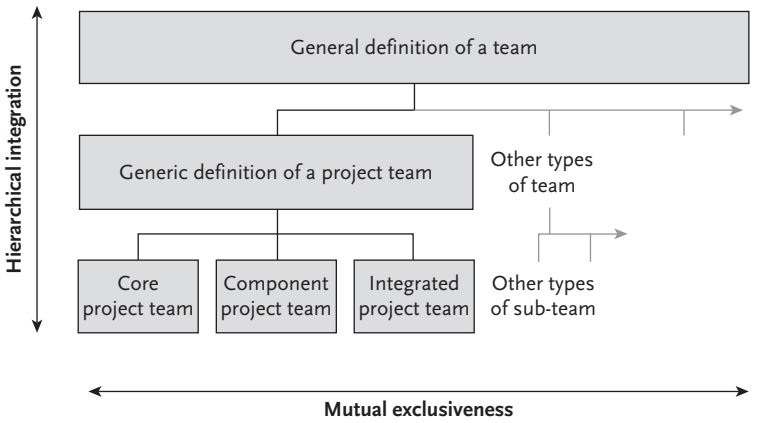

FIGURE 3.1 Visual representation of the organization of definitions

Defining Terms Within the Definition

Defining the terms of a definition is important for conceptual clarity, yet it is rarely done. The definition starts with the term "unites." Conceptually, team membership is defined in the generic definition of a team by the idea that togetherness implies a common work-related goal and some level of interdependency (i.e., at least pooled interdependence; J. D. Thompson, 1967). So, on the one hand, membership rules are not provided in the project team definition beyond these concepts. On the other hand, the project team definition goes further by addressing the people-do-only-one-type-of-work problem by carefully avoiding naming kinds of workers as potential members of a project team. Many definitions of project teams focus on specific workers being on the team (e.g., Wheelwright & Clark, 1992). However, worker characteristics in a team definition is limiting (Klimoski, 2012); projects as a way to organize work expand beyond traditional applications (Hobbs, Chapter 2 of this volume; Söderlund, Chapter 4 of this volume), so it follows that anybody can be part of a project team as long as team members are united by temporary processes that require progressive elaboration. In other words, the generic definition of a project team does not impose membership based on job title, or reject the notion that other people such as stakeholders, project sponsors, or client representatives can play an important role and can be members of the project team. Rather, the definition emphasizes the need to focus on interactions and task dependency (DeCostanza, DiRosa, Rogers, Slaughter, & Estrada, 2012).

To avoid the flying fish problem, the definition underscores that people have "varied knowledge, expertise, and experience" rather than limiting the concept

to cross-functionality. Expertise and experience can be achieved within a function. But it can also be achieved by spanning other boundaries, such as disciplines, professions, organizations, or nations. What follows from the recognition of informational boundaries is that project team members "must acquire and pool vast amounts of information" across these boundaries within the team or even from outside the team.

Time and cycles discussed in the general definition of a team are specified in the definition of a project team in two ways. First, any reference to a short life span is avoided. The key element is that the work performed by the project team must be contained within the life span of the project. This implies that the team can last as long as the project or only for the duration of a portion or phase of the project. The work cycle refers to Devine's (2002) definition of fundamental work cycle and is akin to Marks, Mathieu, and Zaccaro's (2001) definition of performance episodes as variable, distinguishable, and recurring chunks of input-process-outcomes, at the end of which feedback on goal accomplishment is available. At the project team level, the work cycle for which the organization can assess the work is a project phase where the project is assessed and decisions on the next phases are made (Kerzner, 2003). Project phases are usually not shorter than a few weeks and can last many months (e.g., Kim & Kim, 2009).

The other elements specific to project teams incorporate Turner and Cochran's (1993) seminal work on the need to reflect on what to do during the course of the project (i.e., "define or clarify their purpose") and/or the need to determine how to achieve the intended result (i.e., "adapt or create"). The terms "non-repetition" and "non-routiness" are avoided since project management scholars recognize that projects can adapt from previous routines (see Turner, 2009). However, the definition highlights that creating new routines is also possible.

The concept of progressive elaboration is a central distinction between ongoing work and project work. It is therefore important that the general definition of a team can capture both concepts, while the definition of a project team emphasizes progressive elaboration specifically. Progressive elaboration is a fundamental component on which project management scholars and practitioners agree. It captures concepts such as uncertainty, complexity, and the need to plan and define the project iteratively as information is gathered and work progresses (Chiocchio & Essiembre, 2009).

The last part of the definition defines what project team members must do regarding the output of the project. First, it is certainly the case that outputs can be entirely unique (Project Management Institute, 2008) (i.e., "radically new"). However, it is also recognized that outputs can be adapted from previous outputs (Koste & Malhotra, 1999) and that "[i]nnovation implies novelty, but not necessarily absolute novelty" (West, 2002, p. 357). This is why the definition includes

"incrementally." In other words, the terms "radical" and "incremental" borrow from innovation theory to describe what Dewar and Dutton label as "degree of newness" (1986, p. 1422). Second, project management scholars now agree that project outputs can be many things. The term "concept" is used to mean that projects can aim at producing something abstract (e.g., a design, a decision); the term "service" includes reorganizing business processes and information technology implementation; the term "product" is meant to include things that have a physical existence, such as a building, device, vehicle, or software code; the term "activity" refers to human actions, such as organizational change, a music festival, community fund-raising, a training program (Archibald, 2003; Project Management Institute, 2008; Turner, 2007a; Webster & Knutson, 2006). Referring to change in general is based on Turner's (2009) notion that the delivery of the project's result aims at a change in the recipient's organization, such as a new state, improved efficiency, or increased profitability.

Kinds of Project Teams

Although it is quite evident that projects can be carried out by more than one team (Söderlund, Chapter 4 of this volume), there are very good reasons to believe that there is more than one kind of project team. Two trends are clear from the definitions in Table 3.1. First, most definitions imply that one team carries out the project from beginning to end. Although this configuration is certainly frequent, a second trend shows the emergence of different configurations. For example, as seen in Table 3.1, Graham & Englund (1997), Reich (2007), and the Project Management Institute (2008) explain that projects can be managed from beginning to end by a core team responsible for planning, controlling, and closing the projects. Because this leaves out the execution component of the project, it must be that others take care of that aspect. Furthermore, the execution phase of a project is exactly that—a phase. Hence, while some teams such as a core team exist for the full duration of the project, other teams with a more specialized role may concentrate their contribution to a phase, a portion of a phase, or a subcomponent of the larger project (Hoegl et al., 2004). Core project teams have an integrative role, as they manage the project (Wheelwright & Clark, 1992). Also, definitions that appear recently in the project management literature point to blended or hybrid project teams and to situations in which multiple project teams interface within and/or between organizations (Melik, 2007; Schwab & Miner, 2008).

The existence of multiple interconnected project teams discussed by project management scholars (e.g., Hoegl et al., 2004) has echoes in the organizational psychology literature. Recently, organizational psychology scholars outlined multi-team

systems in which teams operate autonomously but in coordination with each other under a common goal (Zaccaro, Marks, & DeChurch, 2011b). Multi-team systems imply a network of discrete teams called component teams (Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005) that share input, process, and outcome interdependence (Mathieu, Marks, & Zaccaro, 2001). Similar to within-team interdependence, between-team interdependence can be pooled, sequential, reciprocal, or intense (see DeCostanza et al., 2012, for a discussion of multiplex interdependence).

Based on the preceding discussion, I propose three typical configurations consistent with the project management literature and in line with organizational psychology's theoretical work on multi-team and single-team systems. Similar to the generic project team definition's relationship to the definition of a team, elements of the generic definition of a project team are not repeated in descriptions of the three kinds of project teams.

Multi-team systems of project teams involve two kinds of teams. A *core project team* is composed of people responsible for overall integration of the project, and for the planning, control, and close-out of the project (Project Management Institute, 2008). Bridging this with multi-team systems theory implies that a core project team's role is to manage the flow of inputs and outputs to and from component teams and individual contributors in line with the overarching goal of the project. The core project team stays assembled for the full duration of the project. A *component project team* comprises people who contribute to the project, but only for specialized tasks within the project (e.g., during a specific phase or for a specific portion of the output) that the core project team cannot do for lack of time, because they do not have the availability, or because they do not have the skills. Projects can have one or more component project teams at once or throughout the project. In single-team systems, it follows that a project team combines all the roles required to undertake the project. The *integrated project team* configuration is the *do-it-all* team: it manages itself and the project, *and* executes the work required by the project.

Logically, projects are either carried out by single project teams or by multiple teams. Presumably, a small project can be completed by a well-resourced integrated *do-it-all* project team, and large projects require a large group of people that cannot be organized into a single team and thus should be organized as a system of teams. Furthermore, interdependent tasks require integration, and this need is filled to a large extent by the project manager on an integrated *do-it-all* project team, and by the core project team in multi-team systems. The presence of an integrated project team excludes the existence of the two others. Hence, the definition of these three project team configuration hinges on the role they play in producing the output of the project and the relation they have with their organizational environment. With this scheme in mind, it is now possible to discuss the key project team features presented earlier and to deploy them across the three kinds of project teams. This analysis is presented in Table 3.2.

Table 3.2 Levels or Degree of Definitional Features of Projects Teams Across Kinds of Project Teams

Definitional features	Core project team	Component project team	Integrated project team
People united	**Single generic goal**—Members of core project teams are together because they are interdependent regarding the management of the project.	**Single specific goal**—Members of component project teams are together because they are interdependent regarding the execution of a specific task in the project.	**Multiple varied goals**—Members of integrated project teams are together because they are interdependent regarding a variety of goals, ranging from management goals to multiple specific goals relevant to execution.
Variability of knowledge, expertise and experience	**Moderate variability**—Core project teams are limited to a management role. Hence its members should be highly knowledgeable and experienced experts, but they should also be somewhat homogeneous in this respect.	**Low variability**—Component project teams are limited to a specific aspect of project execution. Hence their members should be highly knowledgeable and experienced regarding a given task, but they should also be very homogeneous in this respect.	**High variability**—Because integrated project teams must manage and execute the projects, the variability in knowledge, expertise, and experience should be high but heterogeneous in this respect.
Project life span	**Full duration**—Independently of the duration of the project, core project teams last for the entire duration of the project.	**Shorter duration**—Independently of the duration of the project, component project teams have shorter life spans than the duration of the project. Life span interacts with work cycles.	**Full duration**—Independently of the duration of the project, integrated project teams last for the entire duration of the project. Life span interacts with work cycles.
Long work cycles	**Multiple**—Typical input-process-output-feedback cycles occur multiple times over the project life span.	**Few**—Typical input-process-output-feedback cycles occur once or only a few times over the project life span.	**Multiple**—Typical input-process-output-feedback cycles occur multiple times over the project life span.

(continued)

Table 3.2 (Continued)

Definitional features	Core project team	Component project team	Integrated project team
Acquisition and pooling of large amounts of information	**Very large**—Information relevant the overarching goal is integrated, while information pertinent to execution is treated within component teams, so decision-making pertinent to management is efficient and effective.	**Large**—Information relevant to specific goals of a given task is integrated so decision-making pertinent to execution is efficient and effective.	**Extremely large**—All information pertinent to the overarching goal and sub-goals are integrated so that managing and executing the project are efficient and effective.
Define and clarify purpose	**Elongated vertical and moderate horizontal processes**—Core project teams must clarify the purpose upward with project owners, integrated it horizontally across the moderate variability of its knowledge, expertise, and experience skill set to arrive at a definition of the purpose and then clarify it downward to component teams.	**Short vertical and narrow horizontal processes**—Component project teams must clarify their purpose upward with the core project team, clarify it horizontally across the low variability of its knowledge, expertise, and experience skill set to then enact this purpose and execute a specific part of the project.	**Short vertical and wide horizontal processes**—Integrated project teams must clarify the purpose upward with project owners, clarify it horizontally across the high variability of its knowledge, expertise. and experience skill set to then enact this purpose to manage and execute the project.
Adapt or create the means	**Focus on management**—Core project teams adapt or create management processes and routines pertinent to fostering the flow of information between component project teams across phases.	**Focus on execution**—Component project teams adapt or create execution processes and routines pertinent to their specific contribution within a phase.	**Focus on management and execution**—Integrated project teams adapt or create management and execution processes and routines specific to their contribution across phases.

Table 3.2 shows that core, component, and integrated project teams vary in terms of the definitional features of project teams. Core project teams have a single generic goal tackled by team members who do vary somewhat in terms of their knowledge, expertise, and experience. They last for the full duration of the project, engaging in multiple work cycles. They must integrate very large amounts of information vertically and horizontally. Finally, they must adapt or create management processes and routines. Component project teams pursue a single specific goal. They have a shorter life span and few work cycles. They are a homogenous group who must manage large amounts of information in close quarters with the core project team and within itself. They adapt in terms of execution processes and routines. Finally, integrated project teams have multiple varied goals that must be clarified across their heterogeneous membership and multiple work cycles. Extremely large amounts of information must be integrated as processes and routines must be adapted or created for managing the project as well as executing it.

Analyzing Table 3.2 makes it possible to more clearly hypothesize on issues of temporariness that are often mangled. For example, temporariness-as-duration distinguishes clearly ongoing work from project work. However, there is more to it than that. Indeed, motivating individuals and motivating teams are both influenced by the interaction of long/short projects and long/short cycle times (Chen & Kanfer, 2006; Sue-Chan, Rassouli, & Latham, Chapter 7 of this volume). Given that more feedback in rapid sequence is better than less feedback spread out in time, teams working on long projects with short cycle times experience feedback at each end of cycle (e.g., milestones) and thus have more opportunities to learn, adapt, and self-correct, compared to teams working on short projects with long cycle times. Furthermore, when teams span different phases of a project (i.e., core and integrated), they engage in qualitatively different work. In early phases, work is more conceptual and abstract; in later phases, it is more technical and concrete. So, on the one hand, core and integrated project teams experience more cycles and thus feedback, which should facilitate adaptation, but this adaptation must carry over qualitatively different work, which should make it more challenging. On the other hand, component project teams benefit from less frequent milestone-related feedback, but because the work is more focused, the adaptation should be easier.

Interesting research avenues exist to better understand the impact of temporariness-as-process on project teams. Here the issue is that while processes required to undertake a project will eventually be extinguished, the familiarity of these processes to the project team members is a key determinant of project success (Griffin, 1997). Given this, and the fact that temporariness-as-duration and temporariness-as-process interact, it is logical to hypothesize that long work

cycles in short projects characterized by entirely new processes will be performed less effectively than with long projects with many feedback opportunities for honing already familiar processes.

Interesting research questions also stem from Table 3.2 in terms of temporariness-as-membership. For example if core, component, or integrated project teams are well resourced to begin with, it seems plausible to hypothesize that unplanned membership turnover is less detrimental in core and component project teams than in integrated project teams. Indeed, core and component project teams are less differentiated in terms of skills. Core project team members are specialized in managing the project, and component project teams are specialized in executing a specific element of the project. Losing a member in these teams would increase the workload quantitatively for the remaining members, but would not increase it qualitatively. In integrated project teams, the unexpected loss of a member would also increase the workload quantitatively for each remaining team member, but in addition, the nature of the work may not be as easy to distribute to remaining members, leaving tasks without commensurate skills to tackle them.

Aside from problems with ill-defined concepts of temporariness, the proposed kinds of project teams may serve as footing to clarify project success or failure. For example, what is the impact on project success of a core or an integrated project team that does not last as long as the project itself? Also, project teams with ill-defined roles are problematic. For example, we can easily speculate that a core project team—with a skill set commensurate with managing component teams—that actually has to manage *and* execute a project will experience setbacks. Similarly, an integrated *do-it-all* project team having to manage component teams may interfere with component teams' role. In other words, when a specific project team's skill set is at odds with its role, project team performance and project success are less likely.

Finally, a number of multi-team systems questions arise that have not been studied systematically yet. If within-team role conflicts can be dealt with at the team level by carefully selecting team members (Allen & O'Neill, Chapter 12 of this volume) and by adequate conflict management (de Wit, Chapter 9 of this volume), how should overarching organizational structures such as project management offices work to clarify roles among teams? What is the impact of a poorly performing core project team on component project teams' performance? How must a core project team adapt to a poor performing component team? How do we change a project team's role mid-stream (e.g., from integrated to core)? Workflow between teams is a key concept in multi-team systems (Mathieu et al., 2001; Zaccaro, Marks, & DeChurch, 2011a). Should the core project team interact intensely with its different component project teams throughout the

phases of the project, or should interactions vary to include pooled or sequential interactions? Finally, systems of teams can be highly rigid vertically, with the core project team dictating courses of action to its component teams. But these systems can also be rather flat, with core and component teams sharing authority and leadership. Hence how power is distributed among project teams is an interesting line of future study.

Conclusion

Implications for Project Management

My experience with organizations that utilize project teams as a vector for change or growth is that they recognize the existence of "core" people and "other" important members that contribute to the project. However, they have difficulties identifying who is who and if they are members of the team or not. This is because they look at status and job titles as means to define membership. This is an important problem because without good rules for membership, project teams that should be managed as systems of core and component teams run the risk of being managed as integrated *do-it-all* teams—or worse—as unspecified teams prone to team-level role conflicts. Definitions provided here clarify the issue of membership by underscoring the need to locally define membership as interdependence between team members (DeCostanza et al., 2012) rather than by status of job title.

Furthermore, one cannot manage core, component, or integrated *do-it-all* project teams the same way. Team members and project managers can engage in reflective and team-building exercises using key concepts from this review as a backdrop to their particular context to share and establish best practices.

Implications for Future Research

A number of future research directions are evident throughout the chapter. Many of these questions hinge on the importance of context. Johns (2006) exhorts scholars to describe the context from which they collect their data as well as their samples. For example, Klimoski (2012) explains how context affects how we understand changes in team membership (i.e., churn; see also Mathieu, D'Innocenzo, & Kukenberger, Chapter 5 of this volume).

Project management hinges on progressive elaboration—the idea that what to achieve and/or how to achieve it must be iteratively clarified and planned by project teams as the project progresses (Chiocchio & Essiembre, 2009). This puts enormous pressures on project teams as information processors, that is, in terms

of "the degree to which information, ideas, or cognitive processes are shared, and are being shared, among the group members and how this sharing of information affects both individual- and group-level outcomes" (Hinsz, Tindale, & Vollrath, 1997, p. 43). How information is processed within and between project phases, and within and between different kinds of project teams, is worthy of future research for three reasons. First, temporal dynamics is recognized as a necessary yet understudied area of research on teams (Mohammed, Hamilton, & Lim, 2009), and is usually not carried out on project teams and over long work cycles (for exceptions, see Chiocchio, 2007; McComb, 2007). Second, projects typically move from conceptual work at the beginning to technical integration later on. How this can be achieved by the same group of people (i.e., integrated *do-it-all* teams) or between core and component project teams is an understudied area. Third, because of the dual role of integrated *do-it-all* project teams (i.e., management and execution of the project), they have presumably more vertically distributed authority, more variety in terms of expertise and skill, and have more chances of disagreeing (i.e., low task structure). Consequently, they may have more difficulty acquiring and maintaining shared representations of the work to perform and the methods to perform it. This is important for team performance because team members who share similar representations of the work situation have more efficient interactions and less conflict (Hinsz, 2004). Whereas core and component project teams are more internally similar—and presumably less affected by these problems—the challenge lies in the overall cognitive similarities of all teams in the multi-team system at transition points between teams (Rentsch & Staniewicz, 2011). These are uncharted territories as of yet.

Final Words

Typologies or definitions of underlying features are rarely the final word on any given topic, and this is not different when it comes to teams (Devine, 2002). However, the growth of project work beyond traditional boundaries requires practitioners and academics alike to move beyond the status quo regarding how they define project teams or take into consideration their operational context. Up to now, typologies were inconsistent with regard to defining project teams, a problem compounded by the absence of integration across the project management and organizational psychology literatures. Although critics of team typologies have valid grievances, as stated in the quote at the beginning of this chapter, systems of underlying features are not yet able to capture nuances pertinent to various project team types and roles. In other words, neither a pure "typology perspective" nor a pure "underlying features perspective" is entirely satisfying when it comes to understanding project teams in various contexts. As a response

to a call for "both definitional clarity and breath of research" (Tannenbaum, Mathieu, Salas, & Cohen, 2012a, p. 59), this review addresses this issue in two ways. First, it provides a hierarchically integrated and mutually exclusive set of definitions of project teams. Second, it deploys a set of features across types of project teams.

At a very broad level, this review suggests that ad hoc and hastily conceived definitions (i.e., without clearly defined terms) that do not address the flying fish problem or the people-do-only-one-type-of-work problem are a disservice to scholars and practitioners interested in project teams. Definitions of hierarchically integrated and mutually exclusive project teams that are robust to different contexts and tasks are necessary to organize past literature and to foster new research on project teams that can be generalized more clearly. The analysis presented here is a strong argument against a "one size fits all" approach to the meaning of "project team." This chapter provides conceptual footing to organize past research, accumulate future research, or synthetize research findings across studies (West & Lyubovnikova, 2012). For example, in addition to pursuing comparative studies on differences between project and non-project teams (e.g., Chiocchio & Essiembre, 2009; Cohen & Bailey, 1997), scholars and practitioners can now also focus on potential differences between project teams with different roles. Overall the hope is that this review serves as a steppingstone for scholars and practitioners from both the project management and the organizational psychology fields to establish joint endeavors of shared best practices, evidence-based management, and research projects on project teams. Some implications for practice and research are mentioned but only scratch the surface of the multitude of topics worthy of future work—to which the rest of this book is a testament.

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4 PROJECT-BASED ORGANIZATIONS

WHAT ARE THEY?

Jonas Söderlund

Introduction

In recent years, we have seen an upswing in the use of project-based structures, and we have continuously observed more and more attempts to reap the benefits of these kinds of organizational solutions. Of course, various kinds of project-based structures were also used earlier, as was pointed out in the first chapter of this book (Hobbs, Chiocchio, Kelloway, Chapter 1 of this volume). However, recent decades have witnessed a strong projectification of a wide range of sectors, industries, and regions (Barley & Kunda, 2004: Whittington et al., 1999; Whitley, 2005). Today, a majority of engineers and knowledge workers are occupied with work in project-based organizations—working either under the supervision of a single manager—the project manager—or under a dual authority, with one manager overseeing the project and one manager assuring the functional or business obligations of the firm (Hobday, 2000). In some cases, we have also noticed the emergence of a three-dimensional organization—or a hypertext organization, to use the terminology introduced by Nonaka and Takeuchi (1995)—where human resource (HR) and product responsibilities are split in two. In that respect, modern project-based organizations are common settings for engineering work, for complex problem-solving, and interdisciplinary work.

Scholars who have witnessed the rise of project-based structures often view this development as a simple variation of the classic matrix organization—with the pendulum now swinging toward the project end. In some sense, this is certainly the case. But there are also indications that projects are used purposefully

to drive innovation, to create a more dynamic organization, to shake up traditional rigid structures, to create improved preconditions for learning and knowledge integration, and to better govern the organization, to name a few of the diverse and many underlying reasons (see, for instance, Pettigrew et al., 2003). Traditional literature on matrix organization has tended to treat the project-based organization simplistically—primarily as a way to improve coordination and communication across functional units (Ford & Randolph, 1992). This is but one of the purposes of modern project-based organization in contemporary firms. In this chapter, I will review the emerging and more elaborate literature on project-based organization. I will also distill some of the interesting findings coming out in the last 15 years or so of research in this area and will try to summarize the most important implications of the research on the psychology and management of project teams in order to improve understanding of the contexts in which project teams normally operate.

The Basic Functions of Project-Based Organizations

To put it simply, project-based organizing is about integration; integrating professions and disciplines, knowledge bases and technologies, activities across functions, or even business units. Here I refer quite loosely to project-based organizations as those organizations that privilege projects in their organizational structure—a type of organization that carries out and coordinates most of its work in projects (Lindkvist, 2004).

Prior research in innovation and project management has primarily emphasized two variables in explaining the needs and variations of project-based organizations: subsystem interdependencies and rate of knowledge change (Allen, 1986; Midler, 1995). The first, subsystem interdependencies, speaks in favor of an organization that privileges the project dimension, since there is a need to coordinate across functional or disciplinary boundaries. The greater the subsystem interdependencies, the greater the need for communication, and thus the greater the need for a project-based organizational structure. The other variable—the rate of knowledge change and specifically the rate of disciplinary knowledge change—is negatively associated with the need for a project-based organizational structure. The higher the rate of knowledge change, the more the need for disciplinary communication and dialogue, and thus the better the payoffs for an organization that privileges functional departments, with moderate emphasis on the project dimension. Between these two dimensions we find various sorts of weak project-based organizations (or matrix organizations). Figure 4.1 summarizes the arguments.

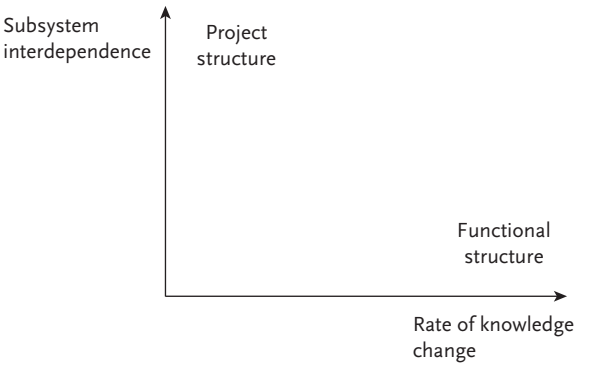

FIGURE 4.1 Dimensions of project-based organizations
Adapted from Allen, 1995

In many ways, this distinction echoes classic research on organization structure from the 1960s onward. In particular, one sees the resemblance to Lawrence and Lorsch's (1967) classic study of integration and differentiation and the work by Thompson (1967) on interdependencies and organizational structure. This has been, and still very much is, the story of project-based organizations, and it is even today very much the dominant line of reasoning when practitioners argue about the underlying motives for adopting a project-based organization. However, it is only half the story, and its prevalence does not accurately reflect recent findings and research about the project-based organization. Thus, in this chapter, I argue that there is a need to broaden the horizon—to add dimensions to the prevailing story about the underlying reasons for adopting project-based organizations. This seems particularly important if we are to address and understand project-based organizations as contexts for teamwork. Based on a review of the literature published in the past 15 years, I will give an overview of why organizations turn to project-based structures, and will discuss the nature of project-based organizations, the challenges of project-based organizations, and the comparative advantages of project-based organizations. By doing so, I hope to be able to give a more complete view—yet balanced with regard to its pros and cons—of the project-based organization.

The chapter is structured in the following way. First, I give a brief overview of the nature of project-based organizations, which will be followed by an illustrative example from our own research, which attempts to document the reasons that firms turn to project-based organizations. The idea of the example is to point out the need for a broader view of the reasons underpinning the project-based organization. This is followed by an overview of the literature on project-based organization and a discussion about its comparative advantages. Practical implications and directions for future research end the chapter.

The Advent of Project-Based Organizations

Over the years, me and my colleagues have studied many different efforts to improve integration within project teams, within projects, and across projects. One way of summarizing the advent of project-based organizations and the increasing use of projects is to separate activities into three types of projects: business projects, development projects, and change projects (Söderlund, 2005). Such a distinction would indicate that projectification is due to business-related changes, to technological changes, and to organizational changes. As for business projects, projectification would indicate that more and more firms are relying on projects to coordinate and deliver their offerings (bundles of products and services) to clients. This development has been documented since the 1970s, when scholars spoke about systems selling as the new strategy of industrial markets, and has been rejuvenated in recent research on integrated solutions (Davies et al., 2007) and solutions delivery (Galbraith, 2002). The basic idea is that companies that have previously been doing their business in either product or service delivery to an increasing extent seek to extend their offerings, for instance, by taking over responsibilities that were earlier held by clients or by bringing in new technology and knowledge to improve their offerings to clients. In either case, what now seems to be called for is a coordination mechanism that can handle the rising complexity. The increasing number of knowledge bases (technologies, services, products, etc.) adds to the "coordination complexity." This is even further augmented by the pressure for speedy deliveries. Increasing time requirements contribute to the coordination complexity (Williams, 1999), since if time was of limited importance, then obviously the need for a strong coordination mechanism would be lower. In sum, projects have thus become a key vehicle in carrying out business and coordinating deliveries and bundles of offerings to clients in a wide range of sectors, including telecommunications, information technology, power systems, and construction. This development has been covered in historic research by Söderlund and Tell (2009, 2011b) and in a number of case studies in the so-called Complex Products and Systems sectors (Acha et al., 2004; Davies et al., 2006).

We also observe the trend of organizing the firm's research and development activities as projects. This points to the increasing spread of development projects as part of the general projectification, which accordingly further underlines the need for a project-based organizational structure, even in those firms that might not be involved in business projects delivered to external clients (such as in the pharmaceutical industry and the automotive industry, where most development work is done in projects, but where the rest of the firm is principally based on a mass-market logic). This is evident in the rise of R&D spending worldwide and in the R&D intensity of the fastest growing industries of

our age (pharmaceutical, information, and communication technology). This development, paired with the need to integrate a larger number of knowledge bases and technologies (Brusoni et al., 2005), also increases the coordination complexity. Evidence of this is, for instance, seen in the number of technologies in "smart products" (for instance, smart phones, smart refrigerators, and intelligent trucks) and the number of knowledge bases/technologies that are needed to develop a new product today, compared to two decades ago. This has led innovation researchers to recognized that innovations and new patents are developed by more people, and thus that innovations normally are much more collective, and that corporations to an increasing extent adopt multitechnology properties (Granstrand & Oskarsson, 1994). This development is also nicely captured by Midler (1995) in his detailed account of the French automotive maker Renault, in which the R&D organization moved from a strong functional orientation, where projects played a rather insignificant role, to a stronger focus on projects, where project leaders were senior managers with significant power in the organizational hierarchy. Obviously, as Midler also points out, the increasing pressures on reducing time-to-market contribute to the emphasis on project-based structures. Again, coordination complexity increases due to the need for intense communication across functional and disciplinary boundaries.

Finally, project-based organizations not only deliver products and services and bundles to external clients, as well as develop new products, services, knowledge, and technologies as projects, they also develop and implement change in their organization as projects. Why? Partly because of the mounting coordination complexity, but also for other reasons—one of them being that the project mode of organizing activities has become a standard operating procedure. As has been singled out in research on project-based organizations, the organization of change is indeed a significant challenge in such contexts because pressure on speedy delivery to external clients is always at the top of the managerial agenda (Bresnen et al., 2005). However, managing change is a key factor for long-term survival. Furthermore, given the increasing complexity, for instance, in the more advanced technological systems needed in contemporary organizations and the interplay between organizations and technology, and so on, managing change projects would be a determining factor for organizational performance. As was pointed out in the extensive empirical work on innovative organizations, Pettigrew et al. (2003) observed that managers to an increasing extent rely on various sorts of projects to develop and implement new strategies, to set up new business units, to set up new market companies, and so on. Other scholars have pointed out that the emphasis on strategy execution also tends to trigger the use of projects to implement strategy (Morgan et al., 2008). Change projects—here referred to as projects that explicitly attempt to change the boundaries, processes,

and structures of the firms—are, therefore, significant mechanisms with which to manage the modern firm and are, as a result, an important part of the general projectification of society.

The general projectification and the fact that business activities, development activities, and change efforts to an increasing extent are organized as projects has also led strategy scholars to speak about the need for "getting their hands dirty" and to more thoroughly address projects as key drivers of strategy (Postrel, 2007) and more explicitly investigate "strategy projects" to see where the firm is going and what problems the firm is struggling with (Whittington et al., 2006). In many ways, this development echoes insights that Mintzberg and McHugh already discussed in 1985 in their study of strategy formation in the adhocratic organization (Mintzberg & McHugh, 1985). The best way to know where a project-based organization is going is to look at its projects. The best way to understand its strategy is to analyze the pattern of projects over time.

In sum, what we thus see is that projectification and the increasing reliance on project-based organizational structures are not explained by a single, unified development. Instead, there are numerous factors at play, although the increasing coordination complexity is definitely one of the major factors pushing for project-based organizational solutions. Correspondingly, when the number of knowledge bases increases (Sapsed, 2005), the numbers of organizational units involved also tend to increase (Brusoni & Prencipe, 2001). As a consequence, in many project-based industries we therefore observe the dual and simultaneous development of increasing numbers of knowledge bases and increasing numbers of organizational units (Gann & Salter, 1998). The former will be referred to as an indicator of increasing "coordination complexity" and the latter will be referred to as an indicator of increasing "cooperation complexity."

Toward a Project-Based Organization: An Illustrative Case

One of the most interesting examples of an organization that has turned toward a project-oriented organizational structure is that of Tetra Pak—an international company with some 30,000 employees in close to 30 countries. Tetra Pak is one of the leading players in packaging material and machinery systems. It operates on a worldwide basis with development sites in several continents. In one of their business units located in Europe, the top management was dissatisfied with the results of their projects. They thought that project lead-time was far too long and the quality of the delivered system was

substandard. They believed that one solution could be to put more emphasis on the project dimension and to downplay the role of the traditional line departments. Indeed, management decided to abolish the traditional line units and replace them with competence networks that were organized under the supervision of competence coaches (Bredin & Söderlund, 2007). Hence, the entire organizational structure was changed, not only to allow for better integration of technology and business processes, but also to enhance people and teamwork capabilities and to improve the support of people working in different kinds of project teams.

In one of our research projects, we focused on the reasons that the the subsidiary of Tetra Pak had changed its structure (Bredin & Söderlund, 2007). We interviewed the CEO, who gave us a quite extensive list of reasons, such as improved integration across knowledge areas, enhanced management capacity, and better possibilities for project managers to do their job. In that respect, the CEO primarily emphasized the importance of strengthening the integrative capability of the firm—to produce better quality, to improve system performance, to better make use of corporate resources, and to share knowledge across knowledge areas. However, a primary effect also concerned teamwork and people capabilities, most notably individual responsibilities for knowledge sharing, improving adaptability to better work in teams, and improved resource allocation; in effect, they thought the implementation of a project-based organization would make it easier for them to build stronger and more capable teams. The effects of implementing a project-based organization were pointed out by managers at the lower levels, including the managers who had project management responsibilities and managers who worked as "competence coaches." The latter was a change implemented to make a clear distinction between the old traditional line units and the new, more flexible, competence networks. The competence coaches were to focus on HR issues, career development, and competence enhancement—not the technical elements and the problem-solving activities in individual projects. They also pointed out the importance of job rotation, of meeting new people in projects, of creating a particular kind of project dynamics to allow for people to enter new roles, to try out new assignments, and to meet and learn from new people on a recurrent basis. In that respect, the lower level managers much more firmly underscored the significance of human resource effects and people capability issues, and not only the integration capability aspects that are traditionally seen as the main features of organizational structure.

Based on the study of Tetra Pak, we concluded that the project-based organization and the emphasis on projects were largely a solution to handling the dual and simultaneous requirements of increased coordination complexity and

increased cooperation complexity. Coordination complexity stems from a growing coordination problem (Grant, 1996)—that of communicating, feedback, and interacting across knowledge boundaries which are not only becoming more difficult as such because of knowledge specialization, but likewise because of the increasing number of knowledge bases that would need to play together to develop new products and solutions. Accordingly, intense technologies are a feature that normally triggers coordination complexity, which requires coordination modes such as mutual adjustment and team coordination (Thompson, 1967; Van de Ven et al., 1976). In contrast, cooperation complexity has to do with the number of separate organizational units involved, for instance, separate business units or, more often, soverign and autonomous firms. The risk for goal incongruence increases when participants in a project represent different organizations with different priority systems, since what might be good and profitable for one of the players may influence negatively the profit of the other players involved.

Figure 4.2 points out that three separate developments seem to be underway. On the one hand, there is the increasing coordination complexity, most notably observed in the number of knowledge bases (A) needed to bring contemporary projects to fruition. On the other hand, there is the development of the increasing number of autonomous organizational units involved in contemporary projects (B), evidenced in the number of subcontractors, suppliers, partners, and so on. Finally, there is the simultaneous development of increasing coordination and cooperation complexity (C), which I argue is common in many modern contexts facing project-based organizations.

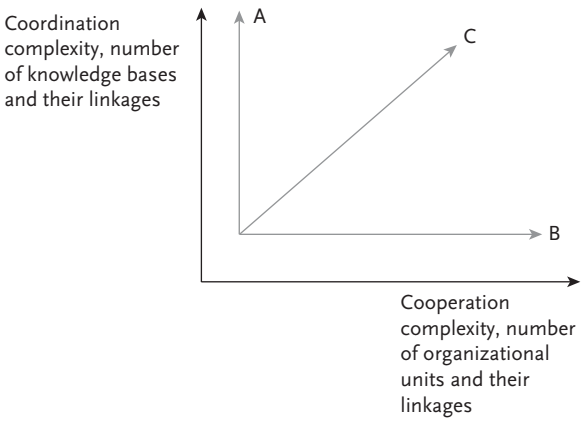

FIGURE 4.2 Directions for project-based organizations

The P-Form Corporation: Responding to Coordination and Cooperation Complexity

In previous research, we have formulated the underpinnings of the so-called P-form corporation (Project-Form) (Söderlund & Tell, 2009; Söderlund & Tell, 2011a; Söderlund & Tell, 2011b; Söderlund & Tell, 2011c). The idea behind the notion of the P-form corporation draws on research on organizational forms, most notably research into the M-form corporation (multidivisional forms) (see, for instance, Bartlett & Ghoshal, 1993; Hedlund, 1994). A key issue addressed by the notion of the P-form corporation is that this not only includes projects at the operational level in the organization, but signifies an organizational structure or rather organizational form which operates at the corporate level. In that respect, a firm that relies on P-form principles seeks to reap the benefits of coordination and integration across business units, divisions, and, in some cases, even firms.

Despite the many reports that projects constitute significant organizational pillars of modern corporations and that projects today to some extent play a similar role to those played by divisions in the M-form, the P-form characteristics have not been explicitly and readily addressed or academically examined (see Söderlund & Tell, 2011a, for a closer examination). To begin with, it seems pertinent to analyze in what context the P-form corporation is most suitable and to investigate the nature of the P-form corporation. To respond to this call, I therefore address three primary questions: (a) Under what contingencies do they operate? (b) What are their significant characteristics? and (c) What are their inherent problems?

In historical analyses, formal organizations have been discussed in terms of managerial hierarchies (Chandler & Daems, 1980). In Chandler's (1962, 1990) analysis, the M-form had a profound role in the explanation of growth and capability-building in large corporations from the 1920s until the 1970s. Previously, investments in the hierarchies of the unitary form (U-form) enabled American companies in the late nineteenth century and early twentieth century to exploit advantages of general technologies, standardization of operations, and the emergence of mass markets. Essentially, the U-form centered on grouping units according to functions (Lawrence & Lorsch, 1967) to exploit the economies of specialization and scale associated with such organizational forms. With the increasing proliferation of markets, the M-form came to replace the U-form. The prime reason was that the division into (semi-)autonomous units, governed by central headquarters, allowed for the utilization of related diversification strategies complementing economies of scale with economies of scope. Thus, an important rationale underpinning the

M-form was so-called "economies of throughput" requiring substantial investments in fixed capital equipment for the manufacturing of high volume and subsequent low unit cost (Nightingale et al., 2003). Chandler (1962) documented the emergence of organizational structures with divisions operating on distinct product markets as a common response to growth requirements and market and technology segmentations. Hence, divisions, which not only catered to local responsiveness but also alleviated administrative burdens at corporate headquarters, were the fundamental cornerstones of M-form corporations. The M-form idea was presented as an ideal type, as it incorporated the divisionalization and decomposition of companies to promote the evolution of managerial and leadership capabilities (Söderlund & Tell, 2011a). It generally paved the way for an elaborate understanding of large businesses, their growth, and core capabilities.

The P-form corporation has a number of salient characteristics (Söderlund & Tell, 2011a; 2011b). It is typically observed in situations where market conditions are differentiated and dynamic and where the output type produced by the corporation is customized and involves a large number of subsystems and a bundle of services and products. The user involvement is typically high, due to the extreme degree of customization, having normally many people from the client organization involved in the project. The production logic is unit- and deadline-centered. The economic rationale of the P-form corporation, contrary to the mass production logic of scale and scope, rests with economies of system—that is, to be able to integrate and reap the benefits of the interaction between multiple subsystems. Furthermore, and in line with conventional structural contingency theory, P-form corporations typically deal with non-routine technology and reciprocal interdependencies between activities and tasks (Thompson, 1967). The nature of tasks can also be described as heterogeneous, infrequent, and causally ambiguous. Looking at the structure of organizations, one might say that the problem nature typically associated with P-form corporations is nearly decomposable or even non-decomposable. The unit of production is the project—often involving multiple teams who bring the project to fruition. Team logic and coordination among teams call for horizontal communication. The decision structure, I suggest, can be viewed as one of "temporary decentralization"—in that the responsibility of a project is decentralized to a separate management structure, though only temporarily: when the project is completed, the responsibility is returned to the upper management echelon. Table 4.1 summarizes the main ideas presented above with regard to the contingencies and characteristics of P-form corporations.

Table 4.1 The Contingencies and Characteristics of P-Form Corporations

Contingencies and Characteristics	P-Form Corporation
Market conditions	Differentiated and dynamic
Type of output	Customized products, systems, and services
User involvement	High degree of user involvement in the innovation process
Time orientation	Deadline-centered
Mode of production	Unit production and small batch
Economic rationale	Economies of system
Type of technology	Engineering (and non-routine)
Type of interdependence	Reciprocal interdependence
Type of tasks	Heterogeneous, infrequent, and causally ambiguous
Dimensions of knowledge specialization	Breadth and depth
Type of problem	Nearly- and non-decomposable
Unit of production	Project
Grouping principle	Market and function
Type of communiction	Horizontal
Type of Capability	Knowledge integration
Decision structure	Temporarily decentralized

Based on Söderlund & Tell (2011a)

Types of Project-Based Organizations

Above, I concentrated on pointing out the similarities among project-based organizations. However, there are a number of important differences between them. Whitley (2006) presents an oft-cited framework suitable for the comparative analysis of project-based organizations. The framework centers on two variables: the singularity of goals (the uniqueness of projects) and the separation and stability of work roles. Based on these two variables, the author juxtaposes four different types of project-based organizations: organizational, craft, precarious, and hollow. Figure 4.3 gives an overview of these types of project-based organizations.

The underlying idea of the comparison is to emphasize the different preconditions that exist between different project-based organizations. Some of them operate largely with more or less similar kinds of projects with low degree of uniqueness and singularity of goals. In such contexts, one might expect repeatable solutions to be a natural part of the organizing process and of standardization and routines (Davies & Hobday, 2005). In other project-based

Separation and stability of work roles \ *Singularity of goals and output*	Low	High
Low	***Organizational PBFs*** producing multiple and varied outputs with different and changeable skills and roles. For example, strategic consultancy, enterprise software, innovative business services	***Precarious* PBFs** producing risky, unusual outputs with varied and changeable skills and roles. For example, some dedicated biotechnology firms, Internet software firms, such as many Silicon Valley companies
High	***Craft PBFs*** producing multiple, incrementally related outputs with distinct and stable roles and skills. For example, some business and professional services including London advertising firms, Danish furniture and machinery firms, some IT consulting	**Hollow *PBFs*** producing single outputs and coordinating tasks through standardized, separate and stable roles and skills. For example, complex construction projects, many feature films in the UK and USA.

FIGURE 4.3 Types of project-based firms

Reprinted from Whitley, R. (2006). Project-based firms: New organizational form or variations on a theme. *Industrial and Corporate Change, 15*(1). With permission from Oxford University Press.

organizations, the uniqueness is considerable, involving the production of risky and unusual outputs—creative and highly uncertain projects. Project-based organizations also differ with regard to the separation and stability of work roles. In some contexts, the separation and stability are high—with stable roles and established skill sets. Combined, this analysis leads to the identification of four types of project-based firms/organizations: the organizational project-based firm with comparatively repetitive projects and low separation and stability of work roles; the craft project-based firm with related projects and distinct and stable work roles; the precarious project-based firm with unique projects and varied and changeable skills and roles; and the hollow project-based firm, which produces unique projects but relies on standardized, separate, and stable work roles.

The Unique Challenges of Project-Based Organizations

In the following sections, I will summarize findings from prior research. The focus is particularly on the unique challenges of project-based organizations. The general idea is to point out the implications and preconditions of teamwork in

such organizational contexts. I will address such diverse topics as strategy, organizational capabilities, learning and knowledge transfer, time management, and human resource management.

Research into strategy and project-based organizations has detected a few unique elements inherent in project-based organizations when it comes to strategy formation. A significant study was performed by Mintzberg and McHugh (1985). The research stems from early work on the nature and dynamics of adhocracies (Mintzberg, 1979). Several of the points centered on the role played by individual projects, that is, that projects seem to drive and change the strategy of the firm, that projects create a stream of actions that constitute the strategy of the firm, and that strategy looks somewhat different in contexts of complex and dynamic environments. Some researchers have also tried to uncover the evolution of strategy in project-based organizations, most notably by identifying a series of strategic periods or epochs. For instance, Mintzberg and McHugh (1985) elicit a number of strategic periods in the history of the National Film Board in Canada, and Söderlund and Tell (2009) analyze four primary "project epochs" in the history of Asea Brown Boveri and their power systems activities between 1950 and 2000.

Organizational capabilities have been singled out as critical for the understanding of the nature and functions of organizations and firms. In that respect, it is no surprise that the notion of organizational capabilities has also been tried out in the context of project-based organizations. The research is rather diverse, ranging from studies that seek to understand the function played by so-called "project capabilities" to those that have addressed the core competencies of project-based organizations and the "project competence" of the firm. To begin with, Davies and Brady (2000) observed that the growth of firms very much seems to depend upon the ability to transfer solutions from one type of project to the next and to create new organizational units that can take on new projects and repeat the solutions from prior projects. Project capabilities refer to key activities, including bidding, project setup, and project organization, that are fundamental to delivering complex projects to external clients. There seems to be less scope for routinized learning in such low-volume contexts, but still "economies of repetition," the authors argue, play a decisive role in the ability of firms to carry out a growing number of similar projects at lower costs with higher efficiency: "Rather than embark on one-off projects, firms can offer 'repeatable solutions' by recycling experience from one bid or project for others in the same line of business" (Davies & Brady, 2000, p. 932).

Besides investigating project capabilities essential for growth and diversification in project business, research has also explored the nature of core competence in project-based firms. For instance, Lampel (2001) identified a set of

core competences critical for the sustainability and success of project-based organizations based on a multiyear research program. The author underscored the importance of entrepreneurial competences, technical competencies, evaluative competencies, and relational competencies. The entrepreneurial competences concern the creation and shaping of projects, and the evaluative competencies relate to the activities needed to determine the business value and risks involved in particular projects. The technical risks and relationship competencies revolve, to a great extent, around the implementation of projects and the linkages between technical and organizational problem-solving. Other related studies include Söderlund's (2005) multiple case research, which identified the importance of project generation, project organizing, project leadership, and project teamwork as four distinct building blocks of project competence needed to build successful project-based organizations.

Other writers have taken a more critical stance toward competence building in project-based organizations. Most notably, DeFillippi and Arthur (1998) added a critical perspective on project-based organizations, arguing that the most project-based organizations, in fact, represent a paradox for strategy. The authors claim that enterprises that display extreme features of projectification work at odds with most conventional ideas of strategy and organization and run the obvious risk of becoming little more than an administrative apparatus that adds little to value creation. The underlying point is that project-based organizations lack the long-term mechanisms that are needed to accumulate knowledge across projects.

Epitomized by the special issue edited by Sydow et al. (2004), knowledge and learning are frequent topics in the literature on project-based organizations. As a consequence, both knowledge management and learning processes have attracted considerable attention in the research on project-based organizations from a wide range of disciplines. Certainly, these topics have been explored in all kinds of organizational contexts during the same period of time, but the parallel developments of projectification and knowledge-intensification point to the challenges of transferring knowledge in highly projectified contexts—each project is unique, follows a particular dynamic, adapts to local conditions, recruits people for the specific purpose who move to other assignments when the project is completed, and operates under severe time pressure—all factors that might impede learning and knowledge transfer across projects. Prencipe and Tell (2001) identify three primary learning processes: experience accumulation, knowledge articulation, and knowledge codification. The authors argue that the choice between these learning processes largely depends on the frequency of projects, the heterogeneity of projects, and the causal ambiguity of projects (cf. Zollo &Winter, 2002).

Time is at the very center of project-based organizations, and some writers would even say that time is the primary organizational mechanisms in such settings (Lindkvist et al., 1998). No doubt, projects are compared to other structuring devices, including departments and divisions and their provisional nature—they are put in place through a temporary decentralization endeavor and are reintegrated with the rest of the organization upon completion. The dynamic is not only temporary, it is typically also time-pressured. The significance of time pressure has attracted considerable attention among organizational psychologists, including the effects that deadlines have on organizational processes (Gevers et al., 2006), communication patterns, and knowledge integration (Okhuysen & Eisenhardt, 2002), and the negative effects on time pressure (Horsman & Kelloway, Chapter 11 of this volume). Indeed, Lindkvist et al. (1998), drawing upon the work of Gersick (1988, 1989), have argued that people tend to become more collaboration-oriented when working under pressure from a deadline and that deadlines can also, under certain conditions, trigger strategic thinking and rethinking. For instance, people tend to get involved in goal-attainment processes such as "lagomizing" (Berggren, Järkvik, &Söderlund, 2008), determining what is "good enough" quality and what must be done, rather than determining what could be done, which is commonly associated with other kinds of goal-setting behavior (Söderlund, 2002).

The nature of the management of human resources is, to some extent, quite unique for a project-based organization, and its specific challenges have received some attention in the scholarly literature. For instance, Barley and Kunda (2006) have argued that the increasing use of project-based organizational structures also affects the use of external human resources—the more projects, the more the use of external human resources. Similar arguments have been presented by researchers who investigate industries where projects are important coordination mechanisms (Ekstedt et al., 1999). Observers have argued that, in such contexts, organizations to a greater extent rely on external contracts and external human resources hired to carry out assignments on particular projects. This observation is summarized by Barley and Kunda (2006, p. 55):

> . . . more and more organizations are turning to project teams as a model for organizing productive activities. Unlike functions or divisions, projects have limited life spans and rely on temporary concentrations of resources and personnel that can be jettisoned or redeployed at the project's end. Although high-technology firms have long organized themselves this way, project structures have gained popularity in industries as diverse as banking, health care, advertising, insurance, and education.

> Project structures and an increasing willingness to outsource partially account for firms' expanding use of contractors.

Others have documented the specific work conditions of people engaged in project-based work. For instance, organizational psychologists have examined the problem of "project overload" in project-based organizations that leave much of the decision authority to the individual worker (Zika et al., 2006). Bredin and Söderlund (2011) identified four different working conditions in the project-based organization based on two dimensions: team member intensity (project work as either focused or fragmented) and cross-functionality (project work as either intra-functional or inter-functional). Based on this distinction, the authors compared two ideal-typical working conditions: Type A and Type B. Type A represents situations where project workers primarily collaborate with colleagues from their own unit and work on several projects at the same time. They report and have a steady dialogue with the project manager, but most of their daily work is performed with people from their one functional line unit. Type B represents a very different working context. Here project work is focused and carried out together with colleagues with different professional and disciplinary backgrounds. The daily context with the project manager is an important part of the work. The authors argue that these two different ideal-typical work settings contribute to the understanding of personnel responsibilities, the role of the HR specialist, the problems faced by individual workers, and the kind of HR support that the individual workers need. In that respect, the study argues that human resource management and the human resource organization need to be built on the understanding of the fundamental differences across different kinds of project work conditions.

The Comparative Advantages of Project-Based Organizations

No doubt, project-based organizations have a series of advantages compared to functional organizations and multidivisional organizations. In this section, I concentrate on capability formation, knowledge management, time management, and human resource management (HRM). The reasons are simply because, within these four domains, prior research has been most extensive and numerous studies have supported these observations. I also believe that these four features are broad enough to give a fairly complete view of the nature and advantages of project-based organizations, ranging from macro-oriented strategy issues, organizational-level knowledge issues, and finally individual-level factors,

which might shed light on the linkages between project management and organizational psychology.

First, capability formation: as pointed out earlier, project-based organizations seem to be better at handling a number of challenges facing companies in dynamic and complex environments (Mintzberg, 1979). Project-based organizations also generally seem to be equipped to handle subsystem interdependencies and thus reap economies of system. More generally, however, I would like to stress the inherent property of project-based organizations to switch—of recombining existing capabilities and resources to meet unique client requirements and client needs (Lampel, 2001). The temporary nature of its constituent parts and elements would open the possibility of forming teams with unique skills and capabilities for specific purposes and allocating multiple teams to solve complex and unique problems. The fact that capabilities are loosely integrated in project-based organizations might, therefore, allow for flexible and combinative capabilities (Kogut & Zander, 1992) to respond to new challenges and new problem-solving situations on a recurring basis. Project-based organizations can thus escape the straitjacket that is normally worn by permanent organizations, including functional departments and multidivisional structures, and can recombine teams and technologies to match the challenge at hand.

Second, knowledge and learning, and, more specifically, the management of knowledge: typically, the scholarly literature has emphasized the drawbacks of project-based organizations and the problems of organizing for knowledge transfer. However, a number of studies have also identified a series of positive effects on learning and knowledge transfer (Lindkvist, 2004; Lindkvist, 2005). Since project participants can activate and develop personal networks and create new combinations (Söderlund & Bredin, 2011), a key issue is that of unlearning and organizational forgetting (Hedberg, 1981). A project-based organization would, therefore, have the possibility of behaving more like a "tent" than a "palace," which could generally be advantageous to developing new knowledge and to creating a better balance of experience accumulation and knowledge development (Hedberg et al., 1976). In that respect, what at first sight looks like a disadvantage and a fundamental problem of the project-based organization, in fact, constitutes one of its main advantages—to forget and start anew, looking upon the new challenges with fresh eyes.

Third, time management: as pointed out earlier, time is at the essence of the project-based organization—in fact, the project-based organization could be viewed as a permanent structure that thrives on temporariness, temporary relationships, and time pressure. As documented in prior research, the awareness of deadlines normally makes people aware of time as the most critical resource (Lindkvist et al., 1998). The effects of deadlines are that project participants become more mindful with regard to time and, under certain conditions, might

become more prone to collaborate with their colleagues and increasingly able to engage in strategic rethinking—for instance, with regard to how to solve a particular task or how to structure teamwork processes (Gersick, 1995). Additionally, time is in-built in the project-based organization due to the logic of temporary decentralization. Compared to classic departmentalization efforts, project-based organizations seek departmentalization through deadlines, signaling the maxim: whatever you do, stay within the set time limits! Such processes, in a sense, might curb creative and innovative thinking; however, research has pointed to an alternative view indicating that time pressure is at the center of creativity and innovative thinking (Gersick, 1995) and that, even in complex settings, tough deadlines might actually produce cooperative and goal-oriented behavior (Berggren et al., 2008).

Fourth, management and development of human resources: as indicated earlier, project-based organizations typically combine internal and external human resources to match the competence requirements for the specific project but also to handle fluctuating market demands. In that respect, they have the opportunity to hire for the purpose and to create teamwork conditions that are particularly suited for the task at hand (Barley & Kunda, 2004). By doing so, they might also have the ability to create new meeting places and ensure that individuals avoid the problems of group longevity (Katz, 1982), as, most notably, groups with long durations tend to spend comparatively a lot of time on retaining the internal harmony of the group instead of thinking about the productive task and obligations that the organization is set to do. This might indeed constitute a challenge to organizations in general and equally so for project-based organizations. In some industries, the policy is, among other things, to have project participants moving across teams and projects on a recurrent basis in order to set limits on unreflective comfort (Borg & Söderlund, 2014). This ongoing job rotation—reflective rotation—that is possible in project-based organizations, therefore, allows for "explosive meetings" with internal as well as internal colleagues—creating the opportunity to learn from strangers and stars (Groysberg & Lee, 2009) and ensuring that the project participants become more aware of external and internal requirements and more reflective about their role in the organizational process. Such effects might be positive for organizational effectiveness and individual competence development.

Table 4.2 documents the advantages discussed above. The table is not meant to be a complete summary of the nature and positive advantages of project-based organizations. Rather, the idea is to point out a few features where project-based organizations seem to have unique qualities. The idea here is to turn the conventional truths of project-based organizations slightly on their head by offering an alternative viewpoint, highlighting the nature of capability formation, knowledge management, time management, and human resource management.

Table 4.2 Comparative Advantages of the Project-Based Organization

Feature of Management and Organization	Comparative Advantages of the Project-Based Organization
Capability formation	Switching and recombining
Knowledge management	Unlearning and forgetting
Time management	Strategic mindfulness and cooperative behavior
Human resource management	Creative diversity and reflective rotation

As the table indicates, these comparative advantages all relate to aspects of teamwork and organizational psychology issues. Instead of project-based organizations and the matter of what they are, we might engage in a discussion about *why* they are. In that respect, we could make the case that project-based organizations are intended to stimulate many of the things that scholars have pointed out as being the drawback of such organizational forms, namely, that project-based organizations are used because remembering is a problem in organizations, because internal harmony is a possible threat, and that too much time is troublesome for creativity and cooperation. Instead, such organizations would need to build capabilities to master the recurring recombination of capabilities, to recombine teams, to rotate members across teams, and to temporarily decentralize to trigger cooperation and autonomy, and to reintegrate to see what should or should not be remembered.

Managerial Implications

What then are the practical implications for management? The main message of the present chapter is that the conventional idea of project-based organizations, as strictly explained by two primary variables, is far from complete when designing organizations in a project-intensive environment. Some firms might wish to purposefully make use of projects to promote change, dynamism, knowledge development, and a host of other factors. This chapter has pointed out the need to move beyond the traditional pendulum swinging between the requirements of the rate of knowledge change and the degree of subsystem interdependence. The chapter has argued for developing new forms of project-based organizations with the capacity to meet the dual requirements simultaneously, for instance, by developing alternatives to traditional line departments and opening the boundaries of the organization. Moving beyond the line is thus singled out as a critical issue for the knowledgeable, yet flexible, project-based organization. Subsystem

interdependencies, communication, and interaction are definitely critical issues, as are efforts to reduce the need for subsystem interaction. As for the latter, modularity is one measure of doing so, and constructing wiser ways of communicating, such as those found in tools like the Design Structure Matrix, one example of how this could be done. These have been developed in a range of studies on division and collaboration of teams in product development settings (Eppinger et al., 1994; Browning, 2001). In addition, despite efforts to create better modularization, there is also a need to better handle the remaining needs for information processing, including the formation of professional project management teams, advanced communication platforms, incremental and agile approaches, and so on (Sanchez & Mahoney, 1996). However, the critical issue emerges when these are paired with high requirements of deep knowledge development—to build project-based organizations that are capable of handling subsystem interdependencies and knowledge development simultaneously. To create such solutions, companies experiment, among other things, with dual organizational layers, separate knowledge organizations, competence networks, and communities-of-practice. To understand such organizational solutions requires a lens that is capable of detecting what happens outside the boundaries of the focal organization.

Directions for Future Research

Future research, I believe, would need to better tackle the linkages between individual-level factors with organizational-level factors. This is important for a number of reasons.

First, I believe there is a need to better understand the organizational capabilities required in project-based organizations, that is, what capabilities seem to be common across different industries and sectors and those capabilities that are unique to each sector or type of sector. In that respect, I also believe it is important to unveil the linkages between projects in the project-based organization. Here, I am not only thinking about the linkages between similar types of projects and repetitive learning processes, transferring learning to other projects, I am also thinking about the need to learn across different types of projects, for instance, how learning and knowledge are transferred across business projects and change projects, and how insights about project management are transferred from an internal change project to a business project for a client. This is a central, yet understudied issue in the expanding literature on inter-project learning (Prencipe & Tell, 2011). The capable project-based organization would be best at reaping the benefits from the variety of projects carried out—and then transferring the acquired knowledge to where it would make best use.

Second, and as argued earlier, project-based organizations have particularly been singled out as an organizational solution that is "fast but stupid" and having a number of features that are negative. However, as has been pointed out in research on organizational learning, organizational forgetting is not necessarily a negative attribute. In that respect, the often criticized problem of amnesia inherent in project-based organizations would therefore not be an obvious disadvantage (Grabher, 2004), but rather something that might even be cherished in dynamic environments. The problem is that we do not really know when these features are good and when they are bad—when there is a need to unlearn and when there is a need to learn (Hedberg, 1981). Accordingly, there seems to be a need to enhance our understanding of the role played by organizational forgetting: when it is called for, when it is detrimental, and the particular processes associated with forgetting and unlearning. One might argue that the important things to remember are difficult to remember, whereas the things that are easy to remember are less important, and sometimes even desirable to forget.

Third, I believe this could point out the linkages between organizational capabilities and individual skills. Organizational capabilities, for instance, concerning how to organize projects, need to be viewed in light of individual qualities and teamwork properties (Söderlund & Bredin, 2011). Likewise individual skills need to be viewed in light of organizational conditions (Borg & Söderlund, 2011b). Without the right individual qualities and teamwork conditions, organizational capabilities would fail to produce the accurate kind of organizational structure for projects. However, exactly how these two different sets of capabilities and skill sets match or should be matched are still very much open questions, despite recent interest into the micro-foundations of organizational capabilities (Abell et al., 2007).

Fourth, project-based organizations consist of projects, which in turn consist of teams. There is a need to better address the linkages between teams and projects, and vice versa. To a great extent, prior research has tended to define projects more or less as teams. This is indeed a rare case and would apply only to very small projects. For the majority of cases, it would instead be more accurate to view projects as "multiteam systems" (see Zaccaro, Marks & DeChurch, 2011). As suggested by Chiocchio in Chapter 3 of this volume, there is a need to better integrate multiteam systems literature with the literature on project teams. In general, this would also call for better linkages between team research and project research, between research on different kinds of teams (permanent, temporary), and on different complexities of multiteam structures. As a result, this might offer a new view on the nature of the project-based organization as a context for multiteam structures (Mathieu et al., 2001; Marks et al., 2005) and the single project as a multiteam structure, which would then call attention to the dynamics and linkages across

different teams, for instance, how temporary teams relate to permanent teams, how permanent teams relate to temporary teams, and how temporary team members relate to permanent team members.

Fifth, there is a need to better address project-based organizations as more than a simple solution to handling the grouping of market and functions. No doubt grouping market and functions and integrating technology and business are absolutely critical in most, if not all, firms. However, there are other factors that might be equally important factors, and which are not easily covered by distinction between market and functional grouping. As pointed out in this chapter, project-based organizations might serve other needs, including the needs of individuals, the need to boost organizational forgetting, the need to create new meeting places, and the need to better organize external human resources.

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5 CONTEXTUAL ISSUES IN PROJECT PERFORMANCE

A MULTILEVEL PERSPECTIVE

John E. Mathieu, Lauren D'Innocenzo, and Michael R. Kukenberger

Introduction

Context is an inherent and critical component of organizational research, including work on project teams. Broadly speaking, organizations are composed of individuals, who work in teams, which are a part of departments, and these organizations themselves are nested within larger organizational networks and environments. Subsequently, studying organizations requires measuring and analyzing phenomena at different levels within the organization. For instance, if we are interested in individual differences such as personality, we might survey individuals on the Big Five personality dimensions (see Judge, Heller, & Mount, 2002, for a review). Similarly, if we are interested in team performance, we might gather archival data to assess performance outputs specific to each team. While this information is important in understanding the phenomena at the focal level (i.e., individual or team), the hierarchical structure or "nesting" that exists in organizations (i.e., individuals within teams, within departments) creates influences on phenomena across levels (see Figure 5.1), requiring a broader lens to gain explanatory power.

Project teams are constituted and operate within an organizational context. The larger human resource management (HRM) system, as well as other organizational systems and processes, may support or undermine their operations. Some aspects of the work environment may facilitate and enable their effectiveness, whereas other factors may constrain them. In short, the context matters and may have significant influences on the effectiveness of a given project

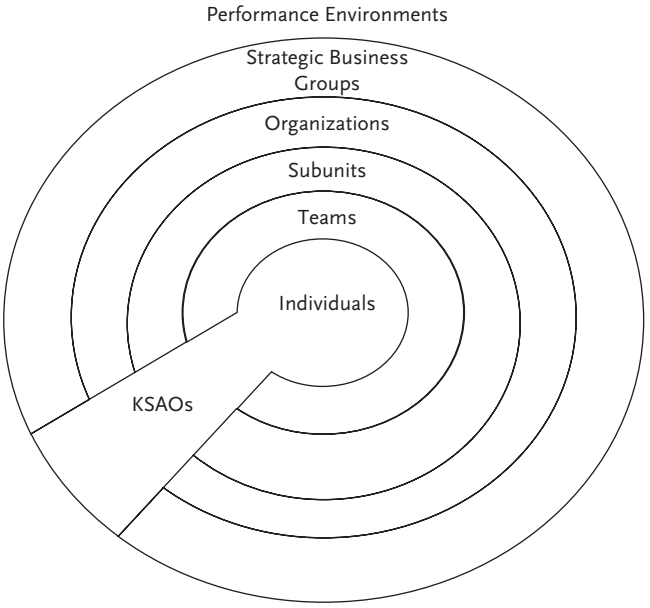

FIGURE 5.1 Multilevel nature of organizations

team. Accordingly, when studying a phenomenon, it is important to consider the context in which your focal phenomenon operates. The purpose of this chapter is to explore the multilevel influences on project teams by exploring contextual factors that affect project performance. We begin by explaining the multilevel or meso paradigm to gain a better understanding of multilevel research. Next, we frame our discussion of project performance by integrating the project team concepts from Hobbs, Chiocchio, and Kelloway (specifics of project context, Chapter 1 of this volume) and Chiocchio (project team definition, Chapter 3 of this volume) to adopt a life-cycle perspective within our multilevel approach. Finally, we present contextual influences on project performance such as the influences of human resource systems, organizational support, and climate.

To meet our objectives, we decided to focus on a particularly salient approach in studying project teams. While both top-down and bottom-up approaches exist in the literature, the cross-level approach that we employ embodies the growing tradition of modeling top→down relationships in meso-designs (c.f., Mathieu & Taylor, 2007). The logic of downward cross-level designs is that some feature(s) of the larger context exert influences on lower level processes. In the context of project teams, such influences would include human resource systems, rewards and punishments associated with teams, and general organizational supports and climate.

The guiding feature of the multilevel paradigm is that once the salient nesting arrangements have been identified, they represent potentially important sources of influence for theory and research alike. The reactions and behaviors of project team members are most directly a function of their individual knowledge, skills, abilities, and other characteristics (KSAOs) as applicable to the environment in which they operate. Features of their normal work environment (e.g., whether they are dedicated 100% to the project team, versus having it as a secondary obligation; see Chiocchio et al., 2010) are likely to be particularly salient to them, followed, to a lesser extent, by aspects of their team, leadership, and embedding organization. While this nesting arrangement of entities is a hallmark of multilevel models (Klein & Kozlowski, 2000), it is important to emphasize that when project teams are overlaid on a traditional design, their members have dual nesting arrangements—one associated with their formal work role, and a second associated with their project team.

Multilevel Research

While organizations have always contained nested structures, research integrating contextual issues has started to pick up steam. Research conducted prior to the 1990s tended to analyze features of organizations using either a micro or macro perspective (Mathieu & Chen, 2011). The micro perspective focused on individual differences, while the macro perspective used a systems approach and examined the greater organizational context. About 25 years ago, a fundamental paradigm shift occurred in management research, and scholars introduced the notion of using a meso or multilevel approach to study organizations (see House, Rousseau, & Thomas-Hunt, 1995; Rousseau, 1985). The main goal of the multilevel approach, research, and theory is to synthesize micro and macro organizational processes (House et al., 1995). Hence, we can look to both research streams to enlighten organizational studies and explore influences in areas such as project performance.

Following the shift toward a multilevel approach, Hackman (2003) proposed the strategy of bracketing as a technique to gain explanatory power and uncover additional forces that drive a particular phenomenon. Bracketing is a method that calls for including—both conceptually and empirically—constructs that exist at both a level below and a level above the focal level in order to understand the greater context in which the focal phenomena exists. Gully (2000) submitted that "to conduct research on work teams in the organizational context, the team has to be treated as the primary level of analysis" (p. 27). Accordingly, in our multilevel exploration of project team performance, we treat the project team as the primary level of analysis and look to the surrounding levels for influences on performance.

Bracketing down a level allows researchers to examine compositional influences on project teams such as diversity and individual personality characteristics. Many of these factors have been covered in earlier chapters in this book. For example, Allen and O'Neill (Chapter 12 of this volume) discussed issues related to project team design. Pearce, Powers, and Kozlowski (Chapter 16 of this volume) discussed how these individual-level characteristics vary over the development of the project team. These issues focus on the micro-level influences on project team performance. Bracketing up a level allows researchers to explore influences such as organizational climate and human resource management (HRM) systems. Hobbs, Chiocchio, and Kelloway (Chapter 1 of this volume) discuss some of these issues, including project governance and managing stakeholders. Beyerlein, Prasad, Cordas, and Shah (Chapter 15 of this volume) discuss additional contextual constraints on project teams in terms of the influences of virtuality. These issues focus on the macro-level influences on project team performance. In order to gain a greater understanding of project team performance, we advocate exploring both the micro- and macro-level influences by employing Hackman's (2003) bracketing strategy. While many of the other chapters in this book take a "bottom-up" approach and look at the individual-level influences on project performance, we focus our efforts on exploring the "top-down" influences to round out the picture on project teams.

The Project-Team Context

Project teams are generally defined as teams put together for a one-time purpose, such as for marketing a new product or service, or creating a new information system (Mankin, Cohen, & Bikson, 1996). Cohen and Bailey (1997) define the work that project teams do as involving either incremental changes or radical new ideas. De Dreu and Weingart (2003) suggest that project teams deal with tasks that are "most uncertain, most complex, and least routine" (p. 744). Additionally, project teams are time limited and require "considerable application of knowledge, judgment, and expertise" (Cohen & Bailey, 1997, p. 242). Despite these reported characteristics, Hollenbeck, Beersma, and Schouten (2012) suggested that what constitutes a specific type of team is not always clear in the literature (e.g., project teams versus production teams), as many typologies have emerged over the years (e.g., Cohen & Bailey, 1997; De Dreu & Weingart, 2003; Sundstrom et al., 1990) using different classification systems to delineate team types (see Chiocchio, Chapter 3 of this volume, for more on project team definitions and boundaries).

Despite the conceptual discrepancies, it is generally agreed that project teams possess a unique type of temporal phasing (i.e., Project Life Cycle; J. K. Pinto & Prescott, 1988) Adding to this, time is an important element to consider, as many studies have found a relationship between project life cycle and behavioral issues (e.g., Adams & Barndt, 1983; Barndt et al., 1977; Thamhain & Wilemon, 1975) which are critical to performance. Additionally, project performance is traditionally assessed in project teams using gateway reviews, which hinge on the movement between temporal phases in the life cycle of a project team. Specifically, gateway reviews scrutinize the progress of deliverables, provide an in-depth snapshot of project progress, are usually disruptive to team flow, and are completed by reviewers outside of the project team. These types of reviews are generally conducted at defined points in the project life cycle, for example at transition points between phases (Oakes, 2008). The timing of these reviews suggests that the needs of the project team change as they move from one phase to another and it is important to stay on course toward goal completion. This means that the multilevel influences surrounding project teams may vary at different time points as the team progresses from project identification to project termination (see Hobbs, Chapter 2 of this volume, for more information on project team life cycle).

Figure 5.2 represents the juxtaposition of the multilevel influences on project performance as the team moves through various temporal phases. This figure maintains the nesting feature of Figure 5.1 and depicts the larger organizational and environmental factors as potential external "top-down" influences on project

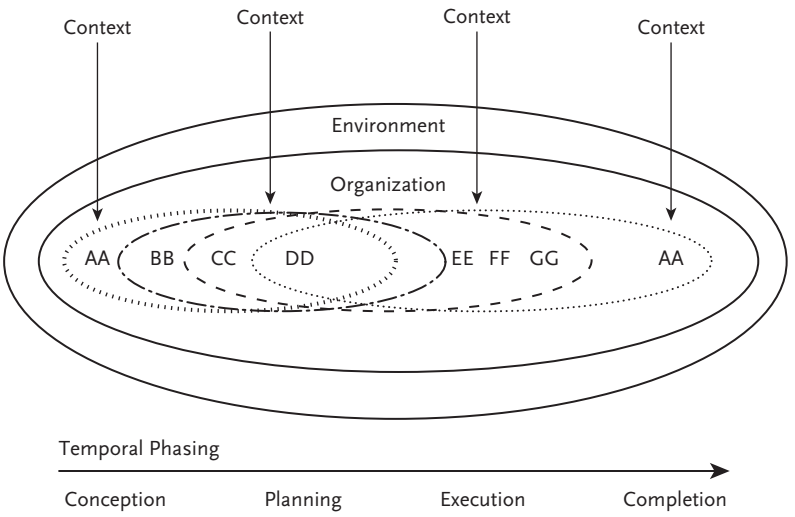

FIGURE 5.2 Project life cycle within in the multilevel perspective on project performance

team operations. Also depicted is the traditional project temporal phasing evolving from an identification phase, through definition and execution phases, and concluded in a termination phase. The double letters in the figure represent different team members working to complete the team task. Team members tend to possess differentiated roles with varied obligations (Belbin, 1993; Mumford et al., 2006) and these various capabilities may be required at different times throughout the life cycle of the team. In our example, team members "AA" and "BB" are members and play prominent roles during the identification and definition phases. As the project team transitions from the identification to the definition phases, team members "CC" and "DD" join the team and take on prominent roles, whereas members AA and BB may leave or take on reduced roles. Later transitions involve the additions of members EE, FF, and GG. As the team reaches project termination, team member "AA" cycles back and contributes toward finalizing the project. This example represents team member churn, or the cycling of team members in and out of the team throughout the team's life cycle. Team member churn can be planned or unplanned, and beneficial or harmful, to team functioning.

At the individual level, project teams need to handle team member churn, as team membership is a critical component of project performance (Mohrman, Cohen, & Mohrman, 1995). According to Arrow and McGrath (1995), examples such as the one described above are being observed more frequently in organizational settings, as more team members rotate in and out of projects on an as-needed basis. This type of churn may be beneficial, as the team possesses only the people who are necessary at each stage for successful performance. In addition, HRM systems can manage team member churn through planned entrances and exits so that each team member knows his or her responsibilities, both in terms of task needs and time requirements.

Research on team member churn, or team fluidity, has found that it plays a critical role in many team processes and outcomes. For example, team fluidity has been linked to team emergent states (i.e., collective efficacy), transitional processes (i.e., team creativity), action processes (i.e., internal communication), interpersonal processes (i.e., task conflict), and team performance (see Dineen & Noe, 2009). However, team member churn is not always structured or predetermined. Team members may drop out of the team due to other team commitments (O'Leary, Mortensen, & Woolley, 2011), job loss, or other unforeseen circumstances. Since team churn is a somewhat unavoidable occurrence (for planned or unplanned reasons), being able to adapt or handle rotating membership is vital for project performance.

Accordingly, teams must organize team membership to account for churn. One line of research recommends that we should consider different functions of

team members. Humphrey, Morgeson, and Mannor (2009) suggest that certain team members may exercise greater influence over the performance of the team. In their example using baseball teams, they suggest that pitchers and catchers play a greater role toward team performance than non-central players such as the right fielder. In the context of project teams, perhaps the team member with the most task-specific knowledge or the team member with the most experience may play a more central role than others as designated project leads. Therefore, it might be beneficial to identify the strategic core (Humphrey et al., 2009), or those individuals who play a crucial role in team performance, and make sure that those members are present throughout the task. Specifically, D. G. Ancona and Caldwell (1998) recommend having a "core" set of permanent members and a "periphery" of rotating members. Chiocchio (Chapter 3 of this volume) suggests that multiteam systems of project teams are composed of a core project team and component project teams. This strategy would maintain continuity of membership with the strongest team members, while leveraging contributions from others as needed throughout the life cycle of the team. Given the temporal phasing in project teams, these peripheral team members can often be identified before specific performance episodes (c.f., Marks, Mathieu, & Zaccaro, 2001) to aid in ensuring proper team functioning. In sum, the individual members who make up the project team are critical in determining performance (for more on individual-level influences on project performance, see Chapters 1–4 of this book).

In addition to personnel considerations, what is meant by project team performance is a critical distinction to consider. Team performance is widely acknowledged in the literature as a multidimensional construct (Denison, Hart, & Kahn, 1996; Hackman, 1987; Hoegl & Gemuenden, 2001; Pinto, Pinto, & Prescott, 1993). However, while performance is one of the "most widely studied criterion variable in the organizational behavior and human resource management literatures" (Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995, p. 587), it is also one of the "less systematically addressed" constructs (Ilgen, 1999, p. 131). Specifically, most of the work in teams research focuses on members' reactions, team functioning and coordination, and the type of work being performed, with relatively less emphasis devoted to the performance criterion.

In general, *team performance* is defined as the extent to which a team is able to meet established objectives. In terms of project teams, this could mean adherence to a predefined quality guideline, schedule (time), and budget (cost) objectives. For example, project performance could be measured as durability and robustness of the finished product. Using scheduling as the basis for performance, teams could be measured by meeting certain milestones through assessments during gateway reviews, and in the context of a multi-team system,

meeting deadlines for team handoffs could also be used. Additionally, performance could also be measured by looking at the costs associated with team activities such as testing and personnel.

The above are just examples of some the measures that can be used to assess performance. But it is important to clarify what is meant by performance. Specifically, we will focus on an often debated topic: *the distinction between project performance and project team performance*. Generally speaking, *project performance* refers to overall objective indices such as costs and time, whereas *project team performance* refers to outcomes that are attributable to the efforts of team members and byproducts of team activities. For the latter, researchers may gather information about how team members react to their team experience and whether they have learned and developed individually by virtue of their team participation. For instance, Kirkman, Tesluk, and Rosen (2004) used evaluations of satisfaction with team service. Tjosvold, Tang, and West (2004) had managers rate team innovativeness, and Ahearne, Mathieu, and Rapp (2005) employed measures of external customer satisfaction. On the other hand, project performance can be thought of in a number of ways, including the system makeup of the project teams. For example, in a single-team system, the integrated project team output (see Chiocchio, Chapter 3 of this volume) is the project's performance, whereas in a multi-team system, a combination of all component teams' outputs may constitute the project's performance.

While these conceptual differences are important, researchers should also consider the various metrics that are required in both project and project team performance. Along those lines, by the very nature of the metrics used, earned value management cannot be anything other than conceived as a set of project-specific metrics (Fleming & Koppelman, 1998). Similarly, team viability (Bell & Marentette, 2011) is inherently a project team-specific metric. Making these performance distinctions is important because what is meant by performance has tremendous implications for future research and generalizability. For example, Kirkman and Rosen (1999) used components of meeting or exceeding goals and completing tasks on time as relevant performance metrics in the four organizations they studied. However, for some teams, exceeding goals may be a relevant performance metric, whereas for others it may not. In other situations, budget or scheduling performance may not be as salient when researchers are more interested in how the team performance is perceived by others (e.g., customer service) or how likely the team will remain together (i.e, team viability; see Balkundi & Harrison, 2006; Barrick, Bradley, Kristof-Brown, & Colbert, 2007). These issues raise questions outside the triple constraint (cost, schedule, and quality) and suggest additional performance measures to consider. In particular, Shenhar and Dvir (2007) suggest that project performance encompasses

five elements: efficiency, impact on customer, impact on team, business and direct success, and preparation for the future. Accordingly, research needs to start to more clearly define performance to ensure that the outcomes measured are relevant, not only to the teams in question, but also to the entire organization.

In sum, there are many issues surrounding the project team context that are important to consider while doing research in this area. To extend our discussion, we begin the next section by briefly discussing some salient team-level influences on project performance before moving into larger contextual issues.

Team Context Influences on Project Performance

Team Size

Team size has been considered an important structural variable determining team processes and, subsequently, team performance (i.e., the effectiveness and efficiency of task completion). Some argue that larger teams are more effective (Magjuka & Baldwin, 1991; Yetton & Bottger, 1983), while others suggest that more team members cause problems in coordination and process loss (Gooding & Wagner III, 1985; Markham, Dansereau, & Alutto, 1982; Mullen, Symons, Hu, & Salas, 1989). Kozlowski and Bell (2003) have argued that the benefits of a larger team likely depend on the nature of the team and its environment. For example, Hill (1982) has proposed that larger teams may be more able to obtain resources such as time, energy, money, and expertise. In the context of project teams, being able to secure more resources could be the difference between project success and failure. In particular, Hoegl, Weinkauf, and Gemuenden (2004) argue that many project teams are traditionally composed of a large number of individuals (in some cases, too many) because project leaders want to ensure that project objectives can be met. Additionally, the cross-functional nature of many project teams often brings in members from every possible organizational department that may provide information or resources to the project, thus creating an overabundance of team members. In a meta-analytic review on the influence of team design and team performance, Stewart (2006) examined the relationship of team size to team performance. Overall, the effect was small, but positive across all team types. However, in line with Kozlowski and Bell's (2003) suggestion, the moderating effect of team type was included, and findings indicated that team size is positively related to team performance ($\rho = .09$) for project teams. The results from this meta-analysis suggest that project team size does impact performance; however, it is not apparent at what point these benefits decrease. It should be noted that Stewart (2006) is not clear on the mean number of members per project team in that analysis. Therefore, it is still important

to take a closer look at optimal levels of team size in different situations. Most research conducted on project teams (and teams in general) use team size as a covariate in research models, so it is difficult to tell when teams become too large and can actually harm project performance. Accordingly, this is certainly an important factor to consider when investigating any type of problem in the project team context.

Team Processes

Team processes have played a central role in most, if not all, team effectiveness models (Gist, 1987; Guzzo & Shea, 1992; Hackman, 1983). McGrath's (1964) input-process-outcome (IPO) model has served as a framework for organizational studies for many years. Inputs refer the antecedent factors that drive and inhibit team member interaction. These antecedents may include *individual team member characteristics* (e.g., knowledge, personalities), *team-level factors* (e.g., interdependencies, external leader influences), and *organizational and contextual factors* (e.g., HRM systems, environmental dynamism; Mathieu, Maynard, Rapp, & Gilson, 2008). Outcomes refer to a result that is valued by constituents. For example, in the context of project teams, an outcome may include timely completion, efficient use of resources, or quality of the product. The linking pins that facilitate the transfer of inputs to outcomes are team processes. Team processes refer to how team members interact toward project completion.

Marks et al. (2001) developed a taxonomy of processes that included three superordinate categories: transition, action, and interpersonal. *Transition* phases refer to activities such as mission analysis, planning, goal specification, and formulating strategies. In line with the project team life cycle advocated by Hobbs (Chapter 2 of this volume), transition phases correspond to identification and definition. *Action* phases refer to monitoring progress and systems, coordinating team members, and monitoring and backing up fellow team members. This where project execution happens and teams work toward task completion. Last, the *interpersonal* category includes conflict management, motivation and confidence building, and affect management, and may be salient across episodic phases. These processes are consistently linked to team performance (see LePine, Piccolo, Jackson, Mathieu, & Saul, 2008).

Transition Processes

Teams that engage in transition processes tend to perform better than those who do not. Specifically, teams that do engage in transition processes are more likely to focus on coordination issues, a tactic that ultimately contributes to improved performance (Weldon, Jehn, & Pradhan, 1991). In their examination of project

teams, Janicik and Bartel (2003) found that planning contributed to the development of norms concerning how teams would manage time (e.g., deadlines), which, in turn, related significantly to performance. Additionally, in a sample of winter road teams, Hiller, Day, and Vance (2006) found that collective leadership enactment, which included variables such as planning and organizing, positively predicted supervisor-rated team performance. Mathieu and Schulze (2006) explored student project teams participating in a strategy simulation. They collected data over four performance periods, using an episodic model of team processes, and found that dynamic planning (i.e., contingency and reactive planning) was positively related to performance. Additionally, Mathieu and Rapp (2009) examined the influence of team charters and performance strategies on the performance trajectories of 32 project teams. Results illustrated how initial team activities, such as the quality of deliberate performance plans and team charters, related significantly to the patterns of team performance exhibited over time.

While planning and transition processes can help to facilitate project success, proper execution of transition processes is not always easy. In particular, some teams may fall victim to deliberate poor planning or any number of planning fallacies. At first glance, it may seem ridiculous to consciously engage in poor planning, but it is a possibility in some areas of project planning. For example, project leaders may oversell a project plan in order to gain political clout in an organization or secure funding, knowing full well that they cannot deliver as planned. Politicians may use this strategy to gain following from constituents by discussing proposed project completion dates that may be overly ambitious. To attenuate situations like these, it is useful to have external reviewers involved in the process of determining the feasibility of deadlines, as well as participating in gateway reviews, as discussed above.

In addition to deliberate poor planning, individuals may engage in poor planning due to limitations in human capacity (i.e., bounded rationality; see Simon, 1972) or may fall victim to any number of planning fallacies. For instance, some projects may involve the adoption of new technologies where it is difficult to understand ahead of time how much time and money will need to be spent to adopt something that has never been used before. Specifically, these technologies may turn out to be much more complex and expensive than originally planned (Hall, 1980). Additionally, some people may truly believe that their own project will proceed as planned, knowing full well that the vast majority of similar projects run late (see Kahneman & Tversky, 1979). Along these lines, another concern is the way in which people tend to engage in planning processes. Zukier (1986) suggested that for many predictions (including those involving project planning), people adopt a "narrative mode" of thinking (i.e.,

sequential relationships among events, action-related structuring, and the integration of available information into a connected narrative). However, in doing so, planners become susceptible to a number of impediments. Specifically, project planners tend to focus on the future (i.e., the project at hand), which likely reduces the ability to engage in past experiences. As a result, this future-focus can make it difficult to learn from or build on past experiences. Furthermore, linking "similar" past events to current events is often difficult because many people are not able to clearly see a link between the current project and what has been done in the past (see Buehler, Griffin, & Ross, 1994). Planners may also fall into confirmation biases in which individuals use only the information that supports a decision, whereas contradictory information is pushed aside. This may cause planners to enter into contracts or project decisions that may be unfavorable. Taken together, these planning fallacies or unintentional poor planning problems present a salient issue for project planners. As such, this is a fruitful area for future research. In particular, researchers should explore the influence of individual biases and other reasons for poor planning in relation to project performance. Specifically, how can we overcome confirmation biases to improve performance? To what extent should planners be future-focused versus past-cognizant? From a multilevel perspective, what role do external leaders or the organizational environment play in attenuating these fallacies or biases?

Action Processes

There is an abundance of research that elucidates the critical role that action processes (e.g., communication and coordination) play in team performance (see LePine et al., 2008). Specifically, communication, cooperation, and coordination within teams have been linked to work group effectiveness (Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996; Gladstein, 1984). Communication is the way in which team members exchange information and can vary greatly between teams in terms of the quality of exchange. For instance, frequency of exchanges (i.e., time spent communicating), formalization (i.e., spontaneous or planned), and the communication structure (i.e., direct or indirect) can all influence the quality of action processes in terms of communication among team members (Griffin & Hauser, 1992; Hoegl & Gemuenden, 2001). Specifically, Katz and Allen (1984) found that high levels of within-team communication positively influenced project success. In their study of cross-functional project teams, Hauptman and Hirji (1996) found that frequently used communication structures involving two-way communication led to better performing teams.

Another component of action processes, coordination, enables teams to effectively respond to problems that arise during task progression. Coordination is

often cited as a critical component for project success (Baker, Murphy, & Fisher, 1983; Chiocchio, Grenier, O'Neill, Savaria, & Willms, 2012; Cleland & King, 1983; Jha & Iyer, 2006). For example, Tesluk and Mathieu (1999) examined 88 maintenance and construction road crews in a state department of transportation. They found that team coordination affected problem management actions; specifically, those teams that engaged in higher levels of coordination were able to manage problems and identify solutions, which led to higher levels of performance. C. K. W. De Dreu and West (2001) demonstrated the importance of team member participation. Research has shown that group leaders often seek compliance from team members and punish deviates, which creates a tendency toward conformity and alignment toward the majority perspective (Baron, Kerr, & Miller, 1993; J. R. Hackman & Morris, 1975; Janis, 1972). However, C. K. W. De Dreu and West (2001) found that teams produced more innovations with higher levels of minority dissent, but only when participation levels were high. Additionally, Porter (2005) demonstrated that backup behaviors, mission strategy adjustment, and team coordination had a positive relationship with decision-making performance.

Interpersonal Processes

The interpersonal process dimension includes conflict management, motivation, confidence building, and affect management. Most of the research conducted in this area focuses on team conflicts. Although conflict is generally thought to produce negative effects on team functioning and subsequent performance, not all conflict is bad. Karen A. Jehn (1994) has suggested that conflict can be divided between task and relationship conflict. Specifically, relationship conflict generally leads to a decrease in satisfaction and interferes with task performance, whereas task conflict can be beneficial to task performance when working on non-routine tasks. Relationship conflicts may involve disagreements about personal issues, which can heighten member anxiety (Dijkstra, van Dierendonck, Evers, & De Dreu, 2005), and often includes ego threats because the conflict issues are generally intertwined with self-concept. In contrast, task-related conflicts may facilitate innovativeness and superior group decision-making because they prevent premature consensus and stimulate more critical thinking (e.g., Amason, 1996; Jehn, 1995; Pelled, Eisenhardt, & Xin, 1999; Tjosvold, 2007; Van de Vliert & De Dreu, 1994).

In a meta-analysis on team conflict, De Dreu and Weingart (2003) found that both relationship and task conflict have strong, negative correlations with team performance and member satisfaction. Additionally, Jehn, Northcraft, and Neale (1999) focused on the potentially positive form of conflict—task conflict—and showed that it was the means by which informational diversity

positively influenced performance. More recently, de Wit, Greer, and Jehn (2012) conducted a meta-analysis on team conflict by examining its relationships using a number of distal and proximal outcomes. Distal outcomes of conflict represent constructs such as team performance, whereas proximal outcomes involve emergent states or team viability. Emergent states are mediating mechanisms (i.e., between inputs and outcomes) that involve cognitive, motivational, or affective states (Marks et al., 2001). Team viability represents the likelihood that a specific team will remain together. While de Wit et al.'s (2012) meta-analysis used a variety of team types, the findings are applicable to the project team setting because interpersonal processes, specifically conflict, play a crucial role in project success (for more on conflict in the project context, see de Wit, Chapter 9 of this volume). Results generally support past findings but also suggest that task conflicts (1) can occur without relationship conflicts also occurring, (2) are less likely to be emotional (Yang & Mossholder, 2004), (3) are less likely to escalate (Greer, Jehn, & Mannix, 2008), and (4) are less likely to impair group performance (Peterson & Behfar, 2003; Shaw et al., 2011; Simons & Peterson, 2000). Most interesting, however, relationship conflict was less negatively related to group performance among studies in which groups worked on project tasks. Said differently, project team performance was less affected by relationship conflict than other organizational teams. This finding is surprising and suggests an interesting area for future research. Why is project team performance not as affected by relationship conflict? Is it due to the short duration of some projects such that relationship conflicts do not have time to fester? Additionally, as mentioned earlier, the definition of project performance or project team performance should be considered. De Wit et al.'s (2012) meta-analysis used performance as a collapsed measure, which considered performance measurements as homogeneous. Flushing out different types of performance metrics (e.g., scheduling, budget, team effectiveness), as well as affective versus objective measures, may uncover unique effects and may help to explain the influence of conflict on project performance.

Contextual Influences on Project Performance

Leadership

Leadership is viewed primarily as an input factor that influences processes (e.g., coordination, creativity processes, knowledge sharing, problem management/action strategies, team learning), emergent states (e.g., affective tone, efficacy, empowerment, potency, organizational and team commitment, task, leader, and team satisfaction), and performance (Ahearn, Ferris, Hochwarter, Douglas, & Ammeter, 2004; Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Kirkman

& Rosen, 1999; Lim & Ployhart, 2004; Srivastava, Bartol, & Locke, 2006; Sy, Côté, & Saavedra, 2005). Despite the large range of literature on leadership, research on the influence of leadership on team performance is lacking (Burke et al., 2006). In terms of research on project performance, most leadership studies (c.f., Waldman & Atwater, 1994) emphasize that the project leader's authority and seniority are essential to lobby and overcome resistance and to interface with the wider organization (for more on leadership in the project context, see Byrne & Barling, Chapter 6 of this volume).

Leadership research has also taken a role-based approach to studying its influence on performance, suggesting that team leaders must be competent in a diverse array of leadership behaviors. Specifically, these models tend to measure the extent to which leaders promote teamwork, organize project work, manage relationships with external stakeholders (Mohrman et al., 1995), and stimulate creativity and innovation. In their mixed-method study, Ammeter and Dukerich (2002) found a number of leader behaviors to be essential in creating high performance project teams. Through interviews with project team members, communicating the desired goals and values of the team was noted as the most important function of project team leaders. In particular, this function of leaders helps to foster work ethic among team members, along with collegiality and communication across the team. Within the same vein, Lee, Gillespie, Mann, and Wearing (2010) discuss the effect of leadership on team knowledge sharing. Knowledge sharing in a team is not automatic, and the team's leader has the potential to strongly influence the extent of knowledge sharing (Srivastava et al., 2006). A leader who provides an atmosphere of psychological safety and trust may be able to facilitate the sharing of knowledge across team members. This is important because the sharing of knowledge is critical to team success, especially with higher levels of interdependence. That is, project team assignments that require more interaction with team members will benefit greatly from higher levels of knowledge sharing, particularly teams that are formed cross-functionally.

Multi-Team Systems

We discussed that project teams do not act in isolation. In fact, many project teams operate in a larger system composed of multiple teams working on the same project. This multi-team structure can help organizations to appropriately leverage the capabilities of project teams. Specifically, in order for organizations to remain competitive, they need to be able to innovate. Some innovations are incremental in nature, which involves small adjustments or minor changes to an already existing product. However, some innovations fundamentally differ from

existing products and create something new or radical in nature (e.g., Amabile, 1996; Kanter, 1988; Oldham & Cummings, 1996; Woodman, Sawyer, & Griffin, 1993). For example, Apple's development of the iPhone revolutionized the cellular phone industry and created new and different uses for smartphones beyond phone calls and e-mails. One of the most novel additions made by the iPhone was the introduction of applications, or "apps," which allow users to easily navigate through a number of different functions, including checking the weather, paying bills, and downloading presentations. These apps are constantly being updated and developed by both Apple employees and independent technology developers. In this example, both the development of the iPhone and the updates currently being made to iPhone apps are considered innovative, but each involves varying degrees of innovation.

Innovations with higher levels of complexity often exceed the capabilities of a single project team. As innovations become more complex, however, they often exceed the capacity of one single team. For example, for the development of new automobiles, aircraft, and large-scale software solutions, hundreds of experts may be necessary (Arrow & McGrath, 1995; Cusumano & Selby, 1995; Gerwin & Moffat, 1997; Kazanjian, Drazin, & Glynn, 2000). While these types of projects may not happen as frequently as smaller scale projects, the sheer magnitude of these projects places a premium on project success. In these cases, the difference between success and failure of project performance can also strongly influence organizational success. Accordingly, these complex projects often require coordination and input from multiple project teams charged with supporting various modules. For example, the development of a new aircraft may require a project team working on satellite communication capabilities and another team working on the mechanical underpinnings of the jet engine, among others. While these project teams may at times work independently of one another, the project architecture creates interdependencies between teams due to the relationship between modules of the ultimate product (Kazanjian et al., 2000; Von Hippel, 1990). This is an important context of project teams to consider and Chiocchio (Chapter 3 of this volume) provides a more detailed explanation of this phenomenon

Human Resource Management Systems

Human resource management (HRM) systems involve areas such as recognition, rewards, and training systems and have both direct and indirect effects on team effectiveness (Hyatt & Ruddy, 1997). Many researchers argue that the human resource function is one of the most crucial elements for organization success (Bredin & Söderlund, 2011) (for more on human resource management in the

project organization, see Söderlund, Chapter 4 of this volume). The Human Resource Planning Society defines five key knowledge areas for human resource (HR) practitioners: HR strategy and planning, leadership development, talent management, organizational effectiveness, and building a strategic HR function (Vosburgh, 2007). While these areas are traditionally focused on managing individuals' qualitative efforts (Wirtenberg, Harmon, Russell, & Fairfield, 2007), research has shown that collaboration and teamwork are increasingly becoming part of the HR function. Specifically, the ability to lead cross-functional collaborative project teams is seen as an important competency for HR to bring to the table. The cross-functional nature of project teams often requires HR to integrate different disciplines of people, using pathways for information transfer and building cross-functional physical (i.e., internal portals for information transfer) and psychological paths. Additionally, while working in a project environment can help to build commitment, autonomy, communication, support, and competence (Hovmark & Nordqvist, 1996), these environments can also create situations of role strain (Goodman, 1981), competence deterioration (Packendorff, 2002), and project overload (Zika-Viktorsson, Sundström, & Engwall, 2006), and can impact mental health (Chiocchio et al., 2010) and well-being (Horsman & Kelloway, Chapter 11 of this volume). Furthermore, many project team members operate in multiproject environments, which naturally increases workload and can lead to less time for reflection, learning, and recuperation between projects (Zika-Viktorsson et al., 2006); this acts to hinder both current and future project performance. Accordingly, managing individuals in project environments is a critical component and one of the reasons HRM is a particularly salient element in determining project success.

In its official definition of the Project Management Body of Knowledge, the Project Management Institute includes HRM as one of the six fundamental functions of project management (Project Management Institute, 2008). In seminal work by J. K. Pinto and Prescott (1988), they delineated 10 success factors for project teams. Historically, project success has focused primarily on technical systems and project performance (as discussed earlier). Specifically, this means focusing on results with the main objective of reaching target dates, achieving financial plans, and providing quality products. This has placed an emphasis on getting work done and creates various needs for the factors mentioned in Table 5.1 throughout the life cycle of the project team. Surprisingly, the only factor in Pinto and Prescott's research that was not found to be significantly predictive of project team performance and success was the personnel factor. While Pinto and Prescott's work is still highly cited today, the marginalization of the personnel factor is highly criticized, as it contradicts most of the HRM literature, which suggests this component plays a strong role in the

Table 5.1 Pinto and Prescott's Ten Success Factors

Project Mission	Initial clarity of objectives and general directions
Project Schedule	A detailed specification of the individual action steps required for project implementation
Client Consultation	Communication and consultation listening to all parties involved
Technical Tasks	Availability of the required technology and expertise to accomplish the specific technical action steps
Client Acceptance	The act of "selling" the final projects to their ultimate intended users
Monitoring and Feedback	Timely provision of comprehensive control information at each stage in the implementation process
Communication	The provision of an appropriate network and necessary data to all key actors
Trouble-shooting	Ability to handle unexpected crises and deviations from plan
Management Support	Willingness of top management to provide the necessary resources and authority/power for project success
Personnel	Recruitment, selection and training of the necessary personnel for the team

Source: Pinto, J. K., & Prescott, J. E. Variations in critical success factors over the stages in the project life cycle. *Journal of Management 14*(1), Copyright 1988. Reprinted by permission of SAGE Publications.

strategic performance of an organization. For example, Hubbard (1990) noted that most major project failures are related to social issues. Additionally, Todryk (1990) found that a well-trained project manager is a key factor linked with project success because he or she can create an effective team. More recently, Belout and Gauvreau (2004) have found evidence suggesting that the personnel factor does indeed correlate with project team success.

However, the focus on the technical systems comes at the cost of examining the influence of behavioral systems. Accordingly, the multilevel, contextual influences on behavioral systems in project teams are often neglected, providing an incomplete picture of the factors contributing to project team performance.

In terms of managing project teams, HRMs need to be able to put the best available skills to use, based on the supply and demand of manpower throughout the organization. Fabi and Pettersen (1992) note that it is difficult to anticipate what human resources will be required and at what time. Identifying necessary human resources is a crucial component during the identification phase of a project team. Along with identifying the task needs, identifying the human resources needed is critical to project team success.

Bredin and Söderlund (2011) suggest that to carry out these functions of HRM, four critical roles exist at the operational level of project organizations: HR specialists, line managers, project managers, and project workers. The role of HR specialists is to occupy the strategic function and to perform tasks such as developing recruitment strategies and employer branding, creating and revising policies and procedures around staffing, and coaching hiring managers. Line managers focus their efforts on competence management including project staffing, competence development, and career counseling (Clark & Wheelwright, 1992). Project managers play a critical role in the HR process (Söderlund & Bredin, 2006), as they act as the go-to between line managers and project workers. Specifically, project managers are typically the closest manager to any given project for extended periods of time. Accordingly, they are able to provide line managers with feedback and evaluation on project progress. Finally, the project worker is responsible for maintaining his or her own competence and driving his or her own career.

As we move forward and analyze how various HRM roles and functions influence project performance, there are a number of areas that can benefit from additional research. For example, future studies examining the relationship between project performance, project team performance, and personnel issues should focus on the specific performance metrics and the appropriate use of these metrics over time. For example, in the early stages of project management, the process of obtaining and using information about job applicants to determine who should be hired for long- or short-term positions within the team (i.e., *team selection*) is critical. Project team staffing requires fitting the right technical and functional expertise mix into what is often a cross-functional teaming mix. Within a project cross-functional team-based design, technical competence often includes a nuanced understanding of one's field, as team members are not tightly linked to a functional manager (Mohrman et al., 1995). In addition to considering functional competence, HRMs must consider employees' ability to function in a team environment. Being able to function and contribute in a project team environment requires teamwork-related knowledge and skills, including a capacity to collaborate and lead in an empowered environment. In order to adequately measure the personnel → project performance (or team performance)

in this stage of the team's task, researchers need to make sure they are measuring appropriate criterion. For example, person-team fit indices, functional diversity (to the extent it is desired), and team cohesion might be useful. Using budget or cost figures in this instance may be less desirable.

Specific objectives associated with additional HR activities such as job analysis (i.e., identifying jobs to be eliminated or combined, providing accurate job descriptions, and establishing career paths; see Brannick, Cadle, & Levine, 2012) have a prevailing impact on a project team environment. In addition to designing individual roles and responsibilities, HRMs are often responsible for the design of the work unit's structures, integrating teams, improving teams, and highlighting customer interfaces. Therefore, there is an interaction between an individual's specific role and how that "fits" with both the team and the organization. Project team organizations tend to have structures that are more dynamic than traditional organizations, because the appropriate configuration of teams may change with changes in market, phase of project, product mix, and so forth (Mohrman et al., 1995). In addition, temporary teams are often established for special purposes and with a limited life, changing both the depth and scope of the team.

Reward systems present a special problem for HRMs in project team–based settings. Project teams are often embedded within environment that is designed for an individual-based organizational logic. At the individual level, incentives are expected to stimulate sustained and directed effort toward attaining a valued goal; when a reward is attainable and valued by workers, they should increase their individual attention and effort toward attaining the goal (Locke, Feren, McCaleb, Shaw, & Denny, 1980; Staw, 1977). However, at the team level, motivational states are influenced by both individual- and team-level factors. Despite the growing commitment to teams, in our work with organizations, most of the companies have not moved toward a reward system that is compatible with project team design. They continue to use the traditional merit-pay system aimed at individual employees as the core compensation and reward practice. Champions of cooperative reward structures argue that team incentives motivate members to focus on mutual interaction (e.g., Harrison, Price, Gavin, & Florey, 2002), thus creating a pro-social motivation and perceived cooperative outcome and ultimately resulting in higher levels of team performance. However, prominent empirical work on team incentives focuses on free-riding associated with the sharing of a payoff (Holmstrom, 1982), and cooperative reward structures have been shown to have several potential pitfalls (Latané & Nida, 1981), as they reduce personal accountability and create dispensability of effort, leading team members to withhold effort (e.g., Karau & Williams, 1993). An alternative is to reward individual effort, expecting that the sum of the individual inputs will

lead to overall goal attainment. However, this system can lead members to focus simply on their own outcome, often without regard or even at the expense of the team (De Dreu, Baas, & Nijstad, 2008).

While there is qualitative evidence that rewarding for team performance often drives performance (Mohrman et al., 1995), traditional individual merit-pay practices are well embedded in organizations and therefore are part of the general psychological contract (see Sue-Chan, Rassouli, & Latham, Chapter 7 of this volume, for more on motivation in the project context). Therefore, we believe that a project team rewards systems should include some combination of team and individual incentives to maximize individual and team performance. Indeed, hybrid reward systems (systems having a combination of individual and team rewards) have been shown to lead to higher levels of team performance than individual and shared rewards, as a result of improvements in information allocation and reductions in social loafing (Pearsall, Christian, & Ellis, 2010).

Good practices for rewarding team performance require good practices for defining what the performance should be and for measuring, reviewing, and evaluating the performance. The positive impact of team reward practices on the performance is due largely to the fact that team reward practices are built on practices by which team performance is well defined, reviewed, and evaluated. In the organizations we have worked with, individual performance assessment and individual job designs are present, but the team equivalent is often lacking. While specific project team performance is often tied to the larger project, it is important to have proximal performance assessments. In addition to providing the team with proximal goals, this allows for an assessment of the overall project to see which team or unit has performed above or below expectation.

HR's role in individual training and development is considered essential. In a project team environment, in addition to training and development centered on individual knowledge, skills, and abilities (KSAs), HR would be well served to focus on team-level training and development. Recognizing the growing trend of team-based work designs, the training literature has also focused on the development of teams. This has come in the form of team-training approaches (e.g., Swezey & Salas, 1992), team interventions (see Klein et al., 2009, for a review), and team building (see Shuffler, DiazGranados, & Salas, 2011, for a review), with a focus on increasing team level behavior and effectiveness. Recent work has also demonstrated that informal learning (i.e., learning on the job) increases as a result of improving team processes and team empowerment though HR-driven team-empowerment-type interventions (Kukenberger, Mathieu, & Ruddy, 2012). HR intervention programs, while common at the individual level, are often lacking at the team level, even within team-based systems. Hollenbeck, DeRue, and Guzzo (2004) note that the human resource management (HRM) "literature

has focused, and continues to focus, on individual-level phenomena. However, as HRM continues the current trend of developing a more strategic focus, the need to be more inclusive of team-level phenomena will become more important. HRM's adoption of team-level phenomena is beginning to occur in the scientific domain but is lagging in the field of practice" (2004, p. 354). While this is often lagging, the ability to lead and train cross-functional collaborative teams is seen as an important competency for HR to bring to the table (Wirtenberg et al., 2007).

Organizational Support and Climate

Organizational support suggests that employees develop general beliefs about the extent to which the organization values and appreciates their contribution and cares about their well-being (Eisenberger, Cummings, Armeli, & Lynch, 1997). When employees feel that the organization supports their efforts, employees tend to reciprocate by showing greater work effort and positive work behaviors. In particular, Gelbard and Carmeli (2009) studied the influence of organizational support on project team success. In their sample of 191 information and communication technology (ICT) projects, they found that higher levels of perceived organizational support positively related to successful project team outcomes such as performance.

Organizational support can also come in the form of project-related instrument assistance. Specifically, there needs to be an infrastructure setup to be able to manage and handle the needs of project managers and to support the project management system. In particular, the system needs to be able to support project managers in a number of areas, for example, (1) access to information necessary for effective management, (2) receiving accurate forecasts of completion data, and (3) understanding project expectations (Crawford, 2006). In order to provide assistance for project management, many organizations followed the Total Quality Management (TQM) movement, in which the goal was to improve technical processes through the reduction in variability in the process, as well as a mean improvement in performance (Cooke-Davies & Arzymanow, 2003). Specifically, this idea refers to project maturity, which, at the organizational-level, suggests that organizations can advance through a series of five stages to maturity: initial level, repeatable level, defined level, managed level, and optimizing level. As organizations advance through these levels, process capabilities increase, which can lead to higher levels of performance (Ibbs & Kwak, 1997; Kerzner, 2001). In addition to the TQM movement, the development of a clear organizational structure, including the Project Management Office (PMO), has received much attention recently in providing support to project teams. In particular, PMOs help to support project teams through training,

easing scheduling demands, providing access to project management tools, offering consulting and mentoring to current staff, and disseminating standards of practice to project management. In short, the PMO can aid organizations in moving through these stages of maturity to achieve better overall project results (see Crawford, 2006; Hobbs & Aubry, 2010).

Team-based project organizations also require a culture that both encourages cross-functional project teams and establishes clearly communicated priorities for work done by cross-functional project teams. Johns (1999) outlined a number of steps, including (1) creating a clear policy, stating support of the project team's responsibility and authority to accomplish their missions, goals, and objectives; (2) emphasizing that the project teams are empowered to act; (3) making a point to understand the scope and priorities of the project teams in which their people are working; (4) clarifying the project team member's authority to represent his or her functional area's support of the project, and allowing the team member to exercise that authority; (5) regularly communicating with the project team members about the progress of their work, problems they are having, and actions they are taking to resolve problems; (6) soliciting feedback from the project team leader/manager regarding project team members' performance; and (7) allowing and encouraging project team members to complete their assignments and maintain an active involvement in resource planning and re-planning.

Creating an empowered project team requires a unique approach to leadership and climate development. Research has shown that giving control over team actions and decisions makes the role more complex and demanding than that of traditional team leadership and management (Beyerlein et al., 1996; J. R. Hackman, 1986). Indeed, the uniqueness and complexity of managing a project team–based system enhances its ambiguity, especially if the management has held a leadership position in a traditional work environment (Wall, Kemp, Jackson, & Clegg, 1986; Walton, 1982). Druskat and Wheeler (2004) outlined a number of areas important for managing a successful climate based on self-managing work teams. Specifically, their research showed that successful externals leaders of self-managing work teams include the following functions: *relating*, which includes demonstrating social and political awareness, building trust in the team leader and members, and caring about the team; *scouting*, which encompasses seeking information from managers, peers, and specialists, diagnosing member behavior, and investigating problems systematically; *persuading*, which includes obtaining external support and influencing the team; and *empowering*, including delegating authority, having flexibility regarding team decisions, and coaching.

In contrast to the prevailing view that external leaders should take a hands-off approach and focus on asking questions in self-managing team-based organizations (Courtright, Fairhurst, & Rogers, 1989) and on encouraging

appropriate strategies (Manz & Sims, 1987) often seen in the project team environment, Druskat and Wheeler's (2004) work suggests that the effective climate in this environment involves a wider range of hands-on and hands-off strategies and behaviors. Furthermore, one key area is that leaders must include a climate that demonstrates the need for project team coordination both inside and outside the team itself. Specifically, we believe it is worth emphasizing that a project team–based organizational climate must emphasize the importance of boundary-spanning activity for success. Theorists have proposed (see Cohen & Bailey, 1997; Cordery & Wall, 1985; Cummings, 1978; Hackman, 1986) and research has shown (Ancona & Caldwell, 1992) boundary spanning to be central to the role of teams. We believe that in a project team environment, there needs to be a climate that encourages a shifting attention and allegiance back and forth from a team to an organization.

Conclusion and Future Directions

Project teams represent an interesting organizational design that requires the integration of influences across levels to optimize their functioning and performance. Specifically, this chapter has intended to shed light on some of the contextual influences on project teams and project performance. Accordingly, we began by explaining the multilevel paradigm and integrating project team concepts introduced in previous chapters. Project teams by nature are embedded within a system that exerts influence from levels above (e.g., the organization) and levels below (e.g., project members). Additionally, whether the entire organization is structured around project teams, or whether they represent secondary assignments and obligations, has serious implications for their management. Member assignments, rotations, and churn are all salient factors that create a dynamic composition model. On one hand, such fluidity enables an organization to quickly transform and align its human capital with project demands. On the other hand, the churn and flow create opportunities for confusion for problems associated with hand-offs between members.

We then layered in a number of contextual influences, including human resource systems (HRM), organizational support, and climate. The larger context within which project teams operate has a powerful influence on the effectiveness of their functioning. From local team contextual effects, which include team size and leadership style, to larger system influences such as rewards, recognitions, and organizational supports, the effectiveness of project teams is a joint function of factors that arise from their composition, and trickle-down influences from the embedding context. Optimizing project team effectiveness requires a multilevel systems perspective.

Accordingly, in our discussions we've identified a number of particularly salient areas for future research. One theme that emanated throughout was understanding and parsing out the various conceptualizations of performance. In particular, performance can mean a number of things, from adherence to a pre-defined quality guideline, schedule (time), and budget (cost) objectives, or more subjective measures like team effectiveness or individual learning and competence building. As researchers begin to tackle new questions related to multilevel issues of project team performance, it is critical to identify salient performance measures and to understand how inputs into the project system may differentially influence performance measures. A second area of future research identified was in understanding influences on various team processes. In particular, how do individual biases affect team transition processes? Also, past research (see de Wit et al., 2012, meta-analysis) suggests that relationship conflict does not have as strong an influence in project teams as compared to other types of teams. Researchers should explore reasons for this finding by examining the influence of relationship conflict on various performance outcomes. A third area of future research exists in understanding the various roles with HRM systems and how these roles influence the future functioning of project teams. In particular, learning and competence building is often cited as an outcome of project teams, but there is little research examining the cross-level effects of project team functioning on individual-level outcomes. Additionally, Hackman (1987) proposed that a comprehensive assessment of team effectiveness should take into account both current team outcomes and consequences for the future. Exploring avenues to increase not only current team functioning but future team success is critical for organizational success.

In sum, understanding how project teams function and what it takes to be successful requires a multilevel perspective. Project teams do not operate in a vacuum, and they are subject to both top-down and bottom-up influences. As such, we encourage researchers to employ multilevel models in order to gain a greater understanding in this field.

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6 LEADERSHIP AND PROJECT TEAMS

Alyson Byrne and Julian Barling

Research in organizational psychology and project teams rarely overlaps, a recurring theme highlighted in this book. Researchers in both areas share similar goals, inasmuch as they seek to understand factors that can improve the way people work, whether as individuals, groups, project teams, or organizations. One important factor in this quest is leadership. Project teams have specific characteristics that make them distinguishable from traditional work teams, providing unique opportunities for studying leadership in non-traditional settings. As well, project team researchers have much to gain from the study of leadership conducted in traditional organizational settings. The leadership literature in organizational psychology has achieved both conceptual and empirical maturity (Cascio & Aguinis, 2008), which enables project team scholars to use existing theory and findings to understand what leadership behaviors operate best in project contexts.

Our goal in this chapter is to inspire scholars from both project teams and organizational psychology to recognize the opportunities that exist to study leadership in project teams. We primarily want to highlight ways in which those excited about studying leadership in project contexts can gain from the mature field of leadership in organizational psychology, while also capitalizing on the unique factors associated with project contexts. To do so, we first highlight the defining components of project contexts, and review the existing works that profile leadership within project contexts. Second, we review work on leadership from an organizational psychology perspective, specifically highlighting its incorporation within the project team literature. Finally, we propose future research directions in which project team scholars can build upon existing general management leadership literature to fill those gaps.

By highlighting these issues, we hope to address our goal for this chapter, which is to prompt new ideas for scholarship on leadership within project contexts. As such, we wish to minimize the existing gap of leadership within project contexts and organizational psychology, and maximize the opportunities to understand leadership in project teams.

Defining Characteristics of Project Teams

Project teams are different from traditional organizational work teams. A traditional organizational work group or team is defined as comprising the following:

> Individuals who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems, and who perform tasks that affect others. (Guzzo & Dickson, 1996, pp. 308–309)

While project teams certainly reflect all of the characteristics of traditional work teams, they have distinguishing components that make them unique. As defined by Chiocchio (Chapter 3 of this volume):

> A project team unites people with varied knowledge, expertise, and experience who, within the life span of the project but over long work cycles, must acquire and pool vast amounts of information in order to define or clarify their purpose, adapt or create the means to progressively elaborate an incrementally or radically new concept, service, product, activity, or more generally, to generate change.

Based on these above definitions, it is clear that project teams have key features that distinguish them from traditional work groups. First, project teams are temporal in nature, such that they vary in duration of time and are time-sensitive (see Hobbs, Chiocchio, & Kelloway, Chapter 1 of this volume). Second, project teams must clarify their goals and produce a unique product or service, distinct from traditional operations. Third, project teams operate in complex organizational contexts, adapting to the needs and demands of a variety of stakeholders and institutions. Finally, project teams differ in the ways of team member diversity, such that they unite people with varied knowledge and experience, which results in greater levels of diversity and distributed team members as compared to traditional work teams (see Horwitz, Chapter 13 of this volume).

The distinguishing features of project teams are what provide unique opportunities for furthering the study of leadership. Much of the leadership research conducted to date ignores issues of context (see Johns, 2006; Porter & McLaughlin, 2006). However, project teams are context specific, and studies of leadership within project contexts have highlighted interesting boundary conditions in which leadership manifests itself differently given these circumstances. The next section reviews this literature in greater detail.

The Temporal Nature of Project Teams

As outlined in the first chapter of this book, projects teams are inherently time sensitive—the temporary nature of project teams is one of their defining features, as highlighted by Atkinson (1999): "a finite time resource is possibly *the* feature that differentiates project management from other types of management" (p. 341). In addition, within those specified time frames, project teams experience project life cycles (see Hobbs, Chapter 2 of this volume), which adds a different temporal dimension to project teams. As such, the leadership of project teams is also time sensitive. How project managers' leadership skills and behaviors manifest themselves in project teams will be highly dependent upon the timing and stage of the project.

Earlier project researchers have pointed to the importance of recognizing the temporal nature of project contexts in determining the applicability of traditional leadership theories. Frame (1987) and Turner (1999) both stated that different leadership styles might be more appropriate at particular stages of the project life cycle. Pinto and Prescott (1988) examined the critical factors of success at various stages of project life cycles and found that, dependent on the stage, certain factors were deemed more important. For example, clarifying the goals and vision were most important at the conceptual stage, whereas troubleshooting was most important during the execution stage. In a multinational study, Prabhakar (2005) found that the most successful project leaders were those who were able to switch their leadership styles from autocratic to consultative, dependent upon the timing and the direction of the project. Moreover, the best project leaders are not only aware of their leadership skills over chronological time, but can identify the crucial moments in time when their behaviors have the most salience (Rämö, 2002).

Beyond the importance of different leadership behaviors across stages of projects, simply recognizing that projects are temporary will influence leaders' behavior, and how subordinates respond to those behaviors. Short-term projects may influence the types of leadership behaviors that project managers enact. Projects that last less than 10 months are more likely to result in task-oriented behaviors

by project leaders (Lee-Kelley & Leong, 2003), as do projects where leaders feel that time constraints are key issues (Kangis & Lee-Kelley, 2000). Finally, leaders' temporal orientations may matter. Project leaders who have present temporal orientations tend to excel in scheduling effectively and managing complex tasks, whereas project leaders with future temporal orientations are better at establishing the project's vision and handling contingency plans (Thomas & Pinto, 1999). In studying the ways in which project teams process information, Bakker, Boros, Kenis, and Oerlemans (2013) found that projects of a short-term duration are best matched to leaders with future orientation, such that the leaders' temporal skills complement the demands of the project, whereas project leaders with present orientation are better suited to project teams with a longer time frame.

Goal Uncertainty in Project Teams

Projects differ in terms of how well defined the goals of the project are, and how well defined are the methods to achieve these goals (Turner & Cochrane, 1993). While goal uncertainty along these dimensions is clarified in greater detail by Chiocchio (Chapter 3 of this volume), the degree to which project leaders are able to clearly define the goals of the project is a defining characteristic of project teams. Many projects, due to their requirements to generate change (Chiocchio, Chapter 3 of this volume) have ambiguous and ill-defined goals (Engwall & Jerbrandt, 2003). This contextual feature makes the study of leadership within project teams an important and interesting area for future research.

Scholars have sought ways in which project leaders can best operate within projects that have varying degrees of goal certainty. First, project leaders need to understand how well goals are understood. In cases where project goals are well defined and methods are clear, trying to develop highly detailed project plans will lead to poor performance (Payne & Turner, 1999); however, situations with unclear goals can lead to higher levels of employee stress (Beehr & Glazer, 2005; Horsman & Kelloway, Chapter 11 of this volume). Therefore, project leaders need to find ways to manage these types of projects, and several approaches have been suggested. Ward and Chapman (2003) suggest that project leaders plagued with unclear objectives and priorities need to be flexible, refining their objectives and performance criteria iteratively during the project. Adopting flexible leadership styles under conditions where projects are highly dynamic and have ill-defined project goals has been encouraged and suggested in other conceptual (Collyer & Warren, 2009) and qualitative works (Collyer, Warren, Hemsley, & Stevens, 2010). In examining project leaders' personalities, findings suggest that for projects deemed novel and complex (i.e., plagued with uncertainty and ambiguity), project leaders

with high levels of openness to experience and extraversion were best suited to these types of projects (Malach-Pines, Dvir, & Sadeh, 2009). Ultimately, findings imply that project leaders may have to tailor their leadership styles based on how well defined are the project's goals.

Organizational Context of Project Teams

Another important dimension of project work is the industry within which projects take place. The organizational context in which projects occur has significant influences on all aspects of project teams (e.g., Engwall, 2003; Hyvari, 2006), such that the type of industry influences levels of dynamism, complexity, and methodological maturity used in projects (Shenhar, 2001); similarly, leadership behaviors in project contexts are also influenced by the industry in which the project occurs. For example, project leaders in engineering, information systems, and organizational business sectors were compared in a series of works by Müller and Turner (2007a, 2007b, 2010). They found that different industries required different competencies of their project leaders. For example, engineering sectors require high levels of conscientiousness from project leaders, whereas information systems and business operations demand higher communication skills from their project leaders (Müller &Turner, 2007a). Certain competencies ranged in importance between sectors: high levels of vision are deemed most important for project leaders in organizational business sectors, of medium importance for project leaders in information systems, and of lower importance in leaders of engineering projects (Müller & Turner, 2010). Explanations offered for these findings re-emphasized the importance of industry sector: within the engineering sector, projects are often initiated with clear goals and expectations, whereas projects in organizational and information systems contexts often reflect more abstract goals.

Specific leadership behaviors may be more salient within certain project fields. For example, Thite's (2000) findings suggest that successful project leaders in the information systems and technology sectors are characterized by both transformational (namely, intellectual stimulation and charisma) and transactional (namely, contingent reward) leadership behaviors. Other findings suggest that these leadership behaviors have indirect effects on their project team's performance, such that when project leaders of construction teams use both transformational and transactional leadership styles, they positively impact team communication, collaboration, and cohesiveness, which subsequently impacts team performance (Yang, Huang, & Wu, 2011).

Project Teams: Members' Diversity and Distribution

Project teams require a breadth of knowledge and expertise; project teams' composition differs from that of traditional teams in that project teams are frequently composed of team members from all over the globe, with team members both co-located and distributed (Beyerlein, Pradas, Cordas, & Shah, Chapter 15 of this volume). Understanding the complexities associated with diverse teams, as well as the frequency with which project teams are composed of functionally and demographically diverse members, provides a significant opportunity to study leadership in this area of research.

Calls from project team scholars have been made for greater education on global awareness (Thomas & Mengel, 2008) and greater cultural sensitivity (Ochieng & Price, 2010) for project leaders in order to maximize potential benefits associated with project team diversity. Gassman (2001) suggests through case analyses that project leaders of multicultural research and development teams should maximize their team's diversity to increase overall creativity and innovation. This may be difficult, as project teams reflecting high levels of global diversity have greater interpersonal and behavioral challenges (McDonough, Kahn, & Barczak, 2001). However, specific leadership behaviors may minimize these concerns. Leaders of multicultural teams who engage in relationship-oriented leadership styles are more likely to have positive interactions with their culturally diverse team members, helping to maintain team cohesion and minimize cross-cultural problems (Mäkilouko, 2004).

Loosely associated with the notion of team composition is the issue of distributed teams. Project leaders of distributed teams need to manage various dimensions of team distribution: spatial distribution, measured by team members' physical distance apart; temporal distribution, measured by time zones and the extent to which team members' workdays overlap; and configural distribution, reflected in the arrangement of team members across physical sites (O'Leary & Cummings, 2007). Significant challenges are in place for leaders of distributed project teams. Teams with high levels of spatial distribution face greater issues of communication (Van den Bulte & Moenaert, 1998; Hinds & Mortensen, 2005); teams characterized by temporal distribution experience trouble in the coordination of schedules and deliverables (Cummings, Espinosa & Pickering, 2009; Rutkowski, Saunders, Vogel, & van Genuchten, 2007); and teams with configural distribution experience higher levels of conflict (Armstrong & Cole, 2002; Baba, Gluesing, Ratner, & Wagner, 2004). Of course, within each of these categories, dimensions of distribution often co-occur, or teams experience subgroups and fault lines, causing even greater levels of team conflict, coordination, and identification (O'Leary & Mortenson, 2009). Project leaders often face

these dimensions of distributed project team members, and strong leadership in these situations may be most necessary.

Project team researchers have highlighted issues with leadership in these types of contexts. For example, Henderson (2008) found that for geographically dispersed project teams, there also existed a negative relationship between geographical dispersion and team members' productivity. In order to combat lower levels of productivity, team leaders of dispersed teams may need to engage in specific leadership behaviors to encourage higher levels of success. One possible way is to properly manage autonomy; findings show that within teams characterized by high levels of geographic distribution, project leaders who give their employees higher levels of autonomy experience better decision-making processes, which leads to higher levels of team effectiveness (Bourgault, Drouin, & Hamel, 2008). Communication breakdowns are also a serious concern for geographically distributed project teams, and project team leaders must effectively communicate with their team members, clearly defining both roles and expectations in order to mitigate communication problems (Daim et al., 2012).

A separate concern for distributed teams is centered on low levels of identification with the team (O'Leary & Mortenson, 2009). Lee (2009) speaks to this issue, suggesting that by engaging in ethical "e-leadership," project leaders can encourage a sense of team spirit, where despite geographical distance, team members still feel a sense of belongingness to the team and a drive to work together. Similarly, Nauman, Khan, and Ehsan (2010) found that in configural virtual project teams, empowerment climate and relationship-oriented leadership style had significant positive relationships for team members' concern for the task, concern for people, and customer service. Opportunities to study various forms of distributed project teams and leadership are rampant in project teams, providing exciting opportunities for scholars across disciplines.

Opportunities for Traditional Leadership Research in Project Contexts

The contextual aspects of project teams provide innumerable opportunities for the furthering of leadership research. Some of the greatest gains, however, can be made when scholars integrate these contextual aspects of projects and develop research built upon traditional leadership theories and methodologies established in organizational psychology. The field of leadership is mature and well developed, and continues to be one of the most studied areas of research in organizational psychology. In this section, we review work conducted in project contexts that incorporates more traditional leadership perspectives (for extensive reviews

of research on organizational leadership more broadly, the reader is referred to Barling, Christie, & Hoption, 2010, and Judge, Woolf, Hurst, & Livingston, 2008). In addition, we propose new ways for project scholars to build upon this mature field, using traditional leadership theories and empirical methodologies that will advance research in project contexts, bridging the gap between project team psychology and organizational psychology.

Leadership Emergence: From Project Manager to Project Leader

The idea of leadership emergence, that is, who is selected to be a leader, is a key area of interest for organizational psychologists, as well as for project team researchers. While organizational psychologists have identified key factors that predict who becomes a leader, such as gender (Ayman & Korabik, 2010; Eagly & Johnson, 1990), physical attractiveness (Cherulink, Turns, & Wilderman, 1990; Sczesny & Kühnen, 2004), personality traits (Judge, Bono, Ilies, & Gerhardt, 2002), and most recently, genetic factors (Arvey, Zhang, Avolio, & Krueger, 2007), project team scholars have also taken a keen interest in understanding project leader selection. Recognizing that management and leadership are vastly different (see Kotter, 1990), the notion that project leaders emerge is misleading—rather, they are selected and assigned. Exactly who gets cast as a project leader can vary across contexts; however, research has emerged that predicts particular factors that highlight demographic variables, traits, and skills characteristic of those typically assigned to project leader positions that are separate from general leadership positions.

In one study, El-Sabaa (2001) found a number of key differences between who became a project manager versus a functional manager. He found that project managers tended to (a) be younger than functional managers, (b) have greater mobility across projects and positions, and (c) recognize greater levels of responsibility for planning their own career paths. In addition, while functional managers wanted stable jobs and leadership opportunities, project managers sought out opportunities for teamwork, creativity, and cross-training. Other studies have explored the differences between project managers' personality styles and those of functional managers. Turner, Müller, and Dulewicz (2009) compared project managers with traditional line managers, and found that project managers were scored higher on conscientiousness, sensitivity, and critical analysis than line managers, but they also scored lower on communication. Using the Myers Briggs questionnaire, project managers have been found to have higher levels of extraversion and sensing (Mills, Robey, & Smith, 1985; Shenhar & Wideman, 2000). It has also been suggested that project managers need strong political abilities, much more so than functional managers, as project managers do not

have similar stable bases of power, and therefore need to be willing and able to employ appropriate political strategies for project success (Pinto, 2000).

It is now also possible to isolate factors predicting who will lead different types of projects. For example, possibly raising the specter of an element of discrimination in selection, female leaders are more likely to manage smaller projects (less than one million dollars) than are male leaders (Henderson & Stackman, 2010). Within new product development teams, the demands of the product can determine who becomes project leader. In routine projects, having a project leader with high levels of experience is more desirable, whereas radical projects and projects demanding quick turnaround fit best with project leaders who are younger and who have less education, as the demands of the projects require leaders who energetic and are less likely to fall into the old patterns of the company (McDonough, 1993). Comparing engineers who selected project leader roles as compared to functional managerial roles, project leaders were more likely to be concerned with potential pay ceilings and sought out the potential monetary rewards associated with project management career paths (Tremblay, Wils, & Proulx, 2002).

Granted, these findings may be explained by a "selection" factor: the relationship between project management characteristics and project type may be bi-directional, such that the type of project often attracts leaders with characteristics that best fit the project, an avenue ripe for future exploration (for a full discussion on this issue, see Allen & O'Neill, Chapter 12 of this volume). In addition, many of the research projects undertaken examine project leader characteristics and their relation to project team effectiveness, rather than project leader selection, an approach frequently seen in traditional organizational research. Scholars often examine the leader characteristics of effective leaders, and this approach assumes congruence between leader emergence and effectiveness (Zacarro, 2007); however, meta-analytic results suggest that leader characteristics in leader emergence and leader effectiveness have both consistency and differences (Judge, et al., 2002). In narrowing the work to project leader selection, understanding whether project leader attributes that predict who becomes a project leader differ significantly from attributes that predict who becomes an effective project leader is an interesting area for future research.

Finally, an important area to pursue is to distinguish project managers from project leaders. As discussed, individuals are selected by organizations and are given the title of "project manager." Whereas management reflects behaviors such as setting goals to organizational needs, dividing tasks as appropriate, and being the liaison between employees and management, leadership involves a more holistic approach. Leaders seek to transform, to provide meaning to projects, and to communicate the organization's vision to followers (Plakhotnik,

Rocco, & Roberts, 2010). The differences in behaviors between project managers and project leaders should be reflected in future research, as the terms are often used interchangeably; however, the processes and outcomes are distinct.

Relational Leadership Perspectives in Project Contexts

At one time, behaviors typically expected of project leaders emphasized quantitative outcomes, including handling project costs, time, project quality, and communication with project stakeholders (Cooke-Davies, 2001); however, a greater emphasis has been placed on how project leaders develop relationships with their team members and how the interpersonal dynamics of project leaders influence project teams. We suggest that in order to gain a greater understanding about the relational dynamics impacting project leaders, exploration in this area should be gained through the application of traditional relational leadership perspectives developed from organizational psychology. As such, we explore some of the leadership theories and perspectives that have gained significant maturity in the organizational psychology leadership field that explore the relational side of leadership.

Leader-Member Exchange

Leader-member exchange theory proposes that effective leadership processes occur when leaders and followers develop reciprocal, high-quality relationships that are characterized by mutual respect, trust, liking, latitude, attention, and loyalty (Schriesheim, Castro, & Cogliser, 1999), which have substantial positive outcomes, such as increased follower satisfaction and commitment (Gerstner & Day, 1997) and citizenship behaviors (Ilies, Nahrgang, & Morgeson, 2007). Leader-member exchange theory considers leadership from both leaders' and followers' perspectives (Graen & Uhl-Bien, 1995).

Very little research has been conducted with regard to leader-member exchange theory and project contexts. There are several reasons as to why the study of leader-member exchange theory does not lend itself to the study of project teams. First, project teams are temporary in nature, and it may be difficult to develop high-quality relationships in a short time period. Second, until relatively recently, leader-member exchange theory was rarely studied in team contexts (e.g., Boies & Howell, 2006; Liao, Liu, & Loi, 2010; Liden, Erdogan, Wayne & Sparrowe, 2006), and project team researchers are specifically interested in understanding relationships at team levels, rather than individual or dyadic relationships. However, some research reveals interesting findings. In an ethnographic study, Kramer (2006) showed that project leaders attain high-quality relationships with all project team members through means of

strong communication and shared leadership. Stewart and Johnson's (2009) study supports this finding. They showed that in gender-diverse project teams, varying levels of leader-subordinate relationship quality within the same team had a positive relationship with group performance in an eight-day military simulation, indicating that variance in leadership-subordinate relationships is developed in short time periods, and may open opportunities for research in project contexts. This suggests that, despite the potential concerns with studying leader-member exchange theory in project contexts, understanding the impact of varying levels of relationship quality between project leaders and their team members may be an important area for future research.

In recognizing the complexity of studying leader-member exchange theory in teams, exciting methodological opportunities exist for studying this leadership perspective in project contexts. Specifically, leader-member exchange theory speaks to multilevel analysis, as it is a leadership theory that requires study at the group level (Dasborough, Ashkanasy, Tee, & Tse, 2009). For example, researchers interested in understanding how varying degrees of relationship quality between project leaders and their members can impact project effectiveness may be interested in using an individual within-group level of theory, studying individual relationships between project leaders and project members in relationship to the group average (Klein, Dansereau & Hall, 1994; Kozlowski & Klein, 2000). Researchers from project contexts interested in understanding varying degrees of relationship quality can build upon work conducted on this topic from traditional organizational psychology, similar to work by Henderson and colleagues (Henderson, Wayne, Bommer, Shore, & Tetrick, 2008). This particular research question may be most interesting when incorporating specific project features as boundary conditions, for example, how varying degrees of relationship quality between project leaders and project members are particularly influenced in projects where members are configurally distributed. We propose that by incorporating multilevel research and analysis techniques (see Chan, 1998; Kozlowski & Klein, 2000), research on project leaders and leader-member exchange theory provides innumerable opportunities for future research development.

Transformational Leadership

No leadership theory has received as much attention by organizational scholars over the last two decades as transformational leadership theory (Barling et al., 2010; Judge & Bono, 2000). Transformational leadership includes four separate behaviors, as defined by Bass (1985): (a) idealized influence, which suggests that leaders behave in ways that enable them to be role models; (b) inspirational motivation, in which leaders inspire their followers by providing meaning and challenge to their work; (c) intellectual stimulation, which

involves challenging subordinates to question assumptions; and (d) individualized consideration, which involves respecting subordinates' individual needs for achievement and growth. Transformational leadership behaviors have consistently demonstrated positive results for individual, group, and organizational level performance (e.g. Burke, Stagl, Klein, Goodwin, Salas & Halpin, 2006; Judge & Piccolo, 2004).

Project team scholars have embraced transformational leadership, as evidenced by research in project management journals and books. For example, Cleland (1995) offered a definition of project management that included responsibility for the needs and rights of the project team members. He argued that project leaders were responsible for more than traditional management competencies, and that they were responsible for articulating a clear vision while striving to do the right thing for team members and stakeholders. Similarly, Barber and Warn (2005) identified transformational leadership as integral to project management, suggesting that project leaders need to engage in both fire-lighting behaviors (pro-active transformational leadership behaviors) as well as fire-fighting behaviors (reactive, task-oriented leadership behaviors). Supporting these perspectives, others encouraged project leaders to articulate a clear vision that could spark energy in their team members, encourage others to work beyond their potential, and strive to do the right thing (Shenhar, 2004; Turner & Müller, 2003).

Recognizing these calls, project team researchers began gathering empirical evidence to test how transformational leadership behaviors operate in project team contexts. Direct positive relationships between transformational leadership behaviors and project effectiveness emerge consistently (e.g. Christenson & Walker, 2004; Prabhakar, 2005; Tishler, Dvir, Shenhar & Lipovestky, 1996). Others have found indirect effects, whereby project leaders' transformational leadership behaviors significantly influence the level of team cohesion, which directly impacts the overall team performance (Wang, Chou, & Jiang, 2005), further supporting one of the more consistent findings that cohesion in project teams has a stronger relationship with performance than in traditional teams (Chiocchio & Essiembre, 2009).

While transformational leadership may predict positive outcomes, some evidence exists to suggest that it may not have the same level of salience in project teams as it does in traditional organizational teams. Keegan and Den Hartog (2004) found that although project managers did not differ from line managers in terms of the level of perceived transformational leadership, project managers' transformational leadership was not associated with project team members' motivation, commitment, or stress, but line managers' transformational leadership was.

These contradictory findings raise the possibility that unique characteristics of project teams moderate the differential effectiveness of project and non-project teams. One potential characteristic mentioned earlier is that project teams are inherently temporary (Keegan & Den Hartog, 2004). In project teams, it may be that the element of continual employee development is compromised by the temporary nature of teams. However, the temporary nature of project teams may work in combination with the type of project undertaken. Keegan and Den Hartog's study examined the transformational leadership of project managers in technological teams and found little effect on performance; however, in Stewart and Johnson's (2009) military project teams, they found that high-quality relationships can be developed within a very short time period. Examining how the temporal and the organizational context of the project may influence manifestations of transformational leadership in project teams is an area for future research. Second, individuals engaged in project team work often report to multiple project leaders (Hoegl, Weinkauf, & Gemuenden, 2004). As such, the relationship developed with multiple project leaders may dilute the effects of a single project leader's transformational behaviors. Third, role ambiguity may be higher when working in a matrix management system (Ford & Randolph, 1992). It may be that the demands placed on individuals who are members of multiple project teams (O'Leary, Mortensen, & Woolley, 2011) and the demonstration of individualized consideration toward those members may have a greater impact than other transformational leadership behaviors. We suggest that while transformational leadership is a promising area of study within the project team literature, its usefulness may be limited or enhanced by characteristics that are unique to the nature of project teams, and that these characteristics provide opportunities for future research.

Emotional Intelligence

Emotional intelligence is not a leadership theory per se, but it has attracted significant attention within the project team literature. The most widely accepted definition of emotional intelligence is that emotional intelligence is "the ability to monitor one's own thoughts and emotions, to discriminate among them, and to use the information to guide one's thinking and actions" (Salovey & Mayer, 1990, p. 189). Emotional intelligence has been examined across diverse aspects of organizational functioning (Cherniss & Goleman, 2001; Goleman, 1996), on the assumption that emotional intelligence is positively associated with individual attitudes and performance. While much debate exists as to the importance of emotional intelligence as a core component of successful leadership (see Antonakis, Ashkanasay, & Dasborough, 2009, for a recent debate), it continues to be studied frequently in the organizational psychology leadership literature.

Project team researchers have shown significant interest in examining emotional intelligence and general emotions of project leaders, and empirical evidence has begun to accumulate suggesting the importance of project managers' abilities to regulate their own emotions and to value those of their employees. Clarke (2010) studied project leaders from the United Kingdom, and showed that project leaders who demonstrated higher levels of emotional intelligence and empathy were more likely to be seen as competent in terms of managing teamwork and conflict; similar associations also emerged with perceived transformational leadership, even after controlling for cognitive ability and personality. In a series of qualitative interviews with project leaders in Thailand, Sunindijo, Hadikusumo, and Ogunlan (2007) found that project leaders with higher levels of emotional intelligence tended to use open communication and proactive leadership behaviors, which related to positive outcomes for teams. With respect to overall emotions, project leaders' ability to infuse positive emotions into project teams has been linked to attaining competitive advantages over others (Davis & Cable, 2006).

This link between emotional intelligence and project success emerges within a variety of contexts and project teams (Dulewicz & Higgs, 2000; Müller & Turner, 2007a; Turner & Müller, 2005). Given the nature of project teams, greater understanding of the boundary conditions as to when project leaders' emotional intelligence matters is an area ripe for future exploration. In addition, while related research relating leaders' emotions to project team process and outcome is less developed, it remains an interesting and potentially important direction for further research.

Future Research Directions

In our review of trending leadership theories that have been considered in project contexts, we urge scholars to incorporate other leadership perspectives and to use contextual factors of projects that may serve as boundary conditions or explanatory components to further develop research across these two disciplines. As such, we may answer some of the more unanswered questions in the leadership literature. In this next section, we propose numerous opportunities that exist to integrate aspects of project teams with leadership traditions from organizational psychology.

One such question that needs further exploration is to understand which leadership styles are most effective dependent on clarity of goals and procedures (Porter & McLaughlin, 2006), and we suggest that a unique opportunity to explore this question exists in project teams. When employees are faced with

well-defined goals that require highly routinized and structured processes, they may require less leadership than when faced with ambiguous or poorly defined goals. These types of projects may benefit from what is referred to as substitutes-for-leadership theory, whereby the key to improving leadership effectiveness is to identify situational variables that can either substitute, neutralize, or enhance the effects of leaders' behaviors (Kerr & Jermier, 1978; for more recent discussion, see Dionne, Yammarino, Howell, & Villa, 2005). This perspective was supported in Keller's (2006) study, in which he found that project team members' ability and intrinsic satisfaction predicted team performance, explaining unique variance even after controlling for leadership behaviors. However, during times of goal uncertainty, certain leadership behaviors are more effective (i.e., transformational leadership, Keller, 1992; Nemanich & Keller, 2007; Waldman, Ramirez, House, & Puranam, 2001; structured and planning behaviors, Marta, Leritz, & Mumford, 2005). Leadership scholars interested in understanding how the varying degrees of goal uncertainty affect leadership would be well advised to partner with project team scholars, as the opportunities for examining leadership under these contexts are wide open.

A second opportunity exists to understand the impact that organizational contexts can have on the effectiveness of certain leadership styles. While organizational context plays a salient role in project research, the inclusion of organizational context as an explanatory variable within the traditional study of organizational leadership research is lacking. Far too often, scholars focus on top managers in large firms (for example, engineering), whereas smaller firms, middle managers, and industries such as construction receive less attention (O'Leary & Almond, 2009). Scholars frequently reference the impact of organizational climate and culture on leadership (see Porter & McLaughlin, 2006), ignoring the unique aspects inherent in different industries that can influence leadership styles and behaviors. We suggest that project contexts offer the chance to study leadership across lesser-studied organizational contexts and to study how it may express itself differently. For example, Elkins and Keller (2003, 2004) suggest that leadership styles will manifest differently within research and development sectors as compared to more traditional industries. They propose that transformational leadership will be a more effective leadership style within the dynamic and ever changing context of research and development industries (Elkins & Keller, 2004). They also suggest that project leaders should expect high variance in relationship quality with subordinates, such that in fast-paced contexts, leaders may not have the time necessary to develop high-quality relationships, or may not believe that the failure to do so will negatively impact team performance (Elkins & Keller, 2003). However, the same theory may operationalize differently in project teams within military contexts, where high-quality relationships

have been found even within short time frames (Stewart & Johnson, 2009). Recognizing that certain industries have inherent characteristics that will impact the ways projects are managed and executed, greater research of leadership style variation across industries provides innumerable opportunities for both project team and organizational psychology researchers.

Further, we suggest greater exploration of the interplay between the temporal nature of project contexts and leadership. Whereas most of the literature in organizational psychology has focused on identifying dimensions and behaviors that manifest themselves uniformly across people, contexts, tasks, and time (Kozlowski, Watola, Nowakowski, Kim, & Botero, 2008), we know that leadership behaviors are not consistent across time (Denis, Lamothe, & Langley, 2001). The opportunity to understand *when* certain leadership behaviors are effective is both necessary and demanded (Sonnentag, 2012), and in recognizing the importance of leader-follower relationships in project contexts, we must acknowledge that these relationships may be dependent upon time. For example, project team members may not even be able to recognize project managers' transformational leadership behaviors at the project identification period. Perhaps, transformational leadership behaviors are then more effective during project execution. Or, under situations of projects with short time frames, certain leadership styles, for example transformational or transactional leadership, may be of higher importance, whereas leader-member exchange theory may be of greater salience over longer-term projects. Given the inherent temporal nature of project teams, we suggest that this provides an important opportunity for researchers to address a critical gap in our understanding of leadership with temporal constraints

Thus far, we have suggested that future research should incorporate both factors from project contexts married with traditional leadership research; however, we also urge scholars to push beyond simple interactions. Projects operate such that all contextual factors described (and undoubtedly others that we have omitted) operate simultaneously—understanding the interaction effects that these factors have on leadership processes is a necessary next step. For example, we consider transformational leadership, which is undoubtedly the most frequently studied traditional leadership perspective in project contexts. Some research has already explored specific boundary conditions related to the transformational leadership in project contexts. For example, in Keller's (2006) five-year study on the effects of project managers' transformational leadership behaviors and initiating structure leadership, he found that while all leadership behaviors had positive relationships with team performance outcomes, transformational leadership was most effective in research-driven project teams, whereas initiating structure had its greater effects in technologically driven projects. In this case, we suggest that both the nature of the project work and the goal uncertainty associated with

these types of projects explain significant variance in the effectiveness of leadership style. This provides support in understanding leadership effectiveness and multiplicative contextual boundaries, such that under conditions of high goal uncertainty and projects of longer time periods, transformational leadership is most effective; however, each of those contextual variables in isolation is insufficient to understand when transformational leadership is most useful. Other research questions exist to suggest that perhaps under certain project contexts, such as when goals are clear and certain and team members are configurally distributed, transformational leadership may not be the most effective leadership style, and more task-oriented leadership styles are more successful. These types of research questions require greater incorporation of two-way, and even three-way, interaction models, demanding more sophisticated methodologies, and will provide greater refinement and understanding to leadership in project contexts.

Finally, we suggest for those wishing to explore leadership in project contexts that refinement and greater use of varied empirical and methodological designs are necessary. Currently, there stands an overreliance on single-source, cross-sectional studies when examining leadership in project contexts. This feature is not immune to project team researchers, as is evidenced by the overwhelming use of surveys (Aguinis, Pierce, Bosco, & Muslin, 2009). While researchers in organizational psychology have long lamented the concerns with cross-sectional research (see Spector & Brannick, 2009; Spector, 2006), and leadership researchers are prone to this reliance as well (Mumford, Friedrich, Coughran, & Antes, 2009), recent works have highlighted the variety of research methodologies that we believe could be instrumental in gaining greater understanding of leadership in project teams. Researchers interested in leadership in project contexts should consider incorporating longitudinal designs and multisource and/or mixed-methods approaches (Hunter, Bedell-Avers, & Mumford, 2007).

We also suggest studying project leader characteristics in more complex, multiplicative manners. Project leader characteristics are often studied in additive and linear ways; however, studying leader characteristics in curvilinear manners may be a new and interesting approach for project leader emergence. For example, cognitive ability is suggested to have a curvilinear relationship with leadership, such that very low levels or very high levels of intelligence have a negative relationship with leadership effectiveness (as discussed by Zacarro, 2007), and leader assertiveness has a similar relationship with leader effectiveness (Ames & Flynn, 2007). Perhaps certain project leader characteristics have similar complex and curvilinear relationship with leadership emergence? Examining project leaders' characteristics in more complex manners may give greater understanding to who becomes a project leader.

We urge researchers to take advantage of levels of analysis when studying leadership in project teams. The study of leadership in project contexts is inherently multilevel, given that the main variable (leadership) is at the individual level operationalized to impact groups (members of the project team). The need to operationalize these research questions appropriately demands careful design of cross-level analysis (see Kozlowski & Klein, 2000) and composition models (see Chan, 1998). In doing so, greater understanding of how leadership is effective in project contexts will emerge.

Practical Implications for Project Teams

The purpose of this chapter has been to address current gaps in the literature between project leadership and traditional leadership research, suggesting new ways in which scholars can minimize those gaps and further refine our understanding of leadership in project contexts. As research of leadership in project contexts continues to move away from task-oriented perspectives and build toward more relationship-oriented leadership styles, greater integration of the contextual boundaries of projects with more traditional organizational psychological perspectives of leadership will provide greater evidence-based management practices for project leadership. This can help illuminate when particular leadership styles are most effective and relevant given the project context. These findings can help further training and development practices for project leaders, ensuring that they are given the tools necessary to be more than just project managers, capable of moving the project along efficiently, but also leaders for their team members, able to develop positive working relationships and more effective team processes to facilitate greater success overall.

Perhaps more important, we suggest that this chapter and the proposed ways to further research of leadership in project contexts highlight an important opportunity for the field of project teams. As emphasized throughout this chapter, opportunities are rampant for the integration of research on leadership within project contexts. Researchers from project team perspectives can gain insight from working with leadership researchers in organizational psychology, where the field is more mature. In turn, scholars from organizational psychology have much to gain in studying leadership with the interesting and important contextual boundary conditions inherent in project contexts. As such, we suggest that this chapter provides practical opportunities to enhance both fields—project teams and organizational psychology—by approaching the study of leadership with a cross-disciplinary approach that will further advance and develop the understanding of leadership.

Conclusion

While the fields of project teams and organizational psychology have largely been studied in isolation from each other, the separate bodies of research findings on each of these areas highlight numerous opportunities for future research that might lead to greater understandings of how they influence each other. We suggest that the study of leadership within project contexts is an avenue that holds significant promise for researchers in both organizational psychology and project teams. By incorporating the many contextual features inherent in project teams into the study of leadership, researchers can strengthen and further our understanding of leadership.

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7 MOTIVATING PROJECT TEAMS THROUGH GOAL SETTING, TEAM MEMBERS' GOAL ORIENTATION, AND A COACH'S REGULATORY FOCUS

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With intense global competition for increasing market share, increasing profits, and decreasing costs, organizations are adopting ad hoc cross-functional structures in order to examine ways in which they can improve technology and customer service, discover new revenue streams, and meet, if not exceed, shareholder demands (Latham & Ford, 2012; Nicholas, 2001). These ad hoc cross-functional organizational structures are typically referred to as project teams (Eskrod & Blichfeldt, 2005; Cleland & King, 1983; Turner & Müller, 2003). Because of the necessity for organizations to increase their efficiency and effectiveness, capital investment in these teams represent approximately 20% of the world's economy (World Bank, 2012). Consequently, the number of universities offering, as well as the number of people receiving, project management certification has grown exponentially over the past two decades (Hobbs, Chiocchio, Kelloway, Chapter 1 of this volume).

Voluminous empirical studies has been conducted on ways of motivating an employee and the team of which an employee is a member (e.g., Locke & Latham, 2013; Kramer, Thayer, & Salas, 2013; Park, Spitzmuller, & Deshon, 2013). Nevertheless, knowledge of ways to motivate a project team per se is limited (Schmid & Adams, 2008). However, Dwivedula and Bredillet (2010) argued that work motivation theories and the results of the studies that have tested them, where the focus was on the employee or a traditional team, may not be strikingly different for project teams.

Our first objective in this chapter is to explain how goal setting as a state can be used by project managers to motivate a team and its members to attain the mission for which a project is responsible. One of the defining characteristics of a project is that it is created to attain a predetermined goal or set of goals (e.g., Cleland & King, 1983). A project charter specifies the superordinate goals, scope, and deliverables. The charter minimizes ambiguity as to "who is to do what" in a given time frame (Curtis, Hefley, & Miller, 2009). Thus, goal setting theory (Locke & Latham, 1990, 2013) and the research that has tested it provide insights on ways that project managers can motivate their team members to fulfill the team's mission. Predetermined goals that unify team members by directing project members' attention toward the attainment of agreed-upon outcomes are often referred to as superordinate goals (Bradford & Cohen, 1984). Pinto and Prescott (1988) referred to these goals as constituting a project's mission.

In the behavioral sciences, the variables studied are generally referred to as either a state, that is, a variable that can be applied to individuals, or a trait, that is, a predisposition of individuals to behave in given ways. Goals per se are a state. They can be set for or by any individual or team. A project's team members, however, bring with them traits that inherently influence their performance. Thus, a second purpose of this chapter is to introduce the concept of goal orientation, which complements goal setting, to increase our understanding of what motivates a project member. A team member's goal orientation may or may not "fit" with the type of project to which the person is assigned. Hence, context is also examined in terms of its motivational influence (Latham, 2012).

As project teams include leaders, their motivational focus also must be understood. Thus, a third objective of this chapter is to explain how a team leader's self-regulatory focus influences how team members are coached. We begin this chapter with an overview of project teams and the motivational concepts that are relevant to them.

Project Teams and Motivation

A "team" is defined as two or more individuals who have the same goals to attain, and who perform interdependent tasks collaboratively to produce shared deliverables (Chiocchio, Chapter 3 of this volume). A project team differs from a typical team in that it is formed on an ad hoc basis to discover solutions to a specific problem. Hence a unique feature of a project team is that it is temporary in nature. The team disbands when the solutions to a particular issue have been identified.

A team's success is usually defined in terms of the project being completed on time, within budget, and meeting a client's specifications (Peterson, 2007). A project manager's ability to attain these three goals depends not only on a project manager's technical skills, but on the manager's ability to motivate the team's members to pursue these goals. In fact, the Project Management Body of Knowledge (PMBOK) published by the Project Management Institute (2004) concluded that skill in motivating a team is a project manager's most important asset.

Motivation is a set of energetic forces that originate both within (e.g., goal orientation) as well as beyond an individual's being (i.e., context/environment) to initiate work-related behavior, and to determine its form, direction, intensity, and duration (Pinder, 1998; Latham & Pinder, 2005). To predict, understand, and increase work motivation, one must know the specific goal to which motivated energy is directed (Latham, 2012). As noted elsewhere, intensity or effort occurs to the extent that a goal is specific and difficult. Duration or persistence occurs to the extent that a goal is perceived by a team to be attainable and relevant (Latham, 2012; Locke & Latham, 2013).

Goal-Setting Theory

A goal refers to pursuing the attainment of a specific standard of proficiency on a given task, within a specified time limit (Locke & Latham, 1990, 2013). Goals that a team is committed to attain lead to action (Latham, 2012). Hence goal setting is a motivational technique that can be used by a project manager to motivate a team (Locke & Latham, 1984). Goal setting theory states that setting a specific, difficult goal leads to higher task performance than setting an easy goal or an abstract goal such as to "do your best" (Locke & Latham, 1990, 2013). This is because a goal focuses a team's attention. It specifies where the team should *choose* to focus its *efforts,* and to *persist* in doing so until the goal is attained. A goal cues the development of a *plan* or strategy for its attainment. Choice, effort, persistence, and a plan/strategy are the four mediators that explain the positive goal-performance relationship. However, this relationship is moderated, that is, strengthened or weakened by the presence or absence of four variables: namely, a team's ability, goal commitment, receipt of feedback on goal progress, and sufficient resources for goal attainment.

More than a thousand studies, conducted in field and laboratory settings, in all continents but Antartica, support the positive relationship between setting a specific, challenging goal and subsequent performance (Mitchell & Daniels, 2003; Rassouli, 2013). For example, a study of 163 groups revealed that the performance of those with a specific, high goal was one standard deviation above

the performance of those who were urged to do their best (O'Leary-Kelly, Martocchio, & Frink, 1994). A meta-analysis of teams revealed that the effect of team goal setting on a team's performance depends on the goals set by the teams' members. Group-centric goals set by individuals were shown to have a positive effect on a team's performance (Kleingeld, vanMierlo, & Arends, 2011). This is because they serve as a mechanism for instilling social identity. Group-centric goals give the team's members a common purpose (Haslam, Wegge, & Postmes, 2009).

However, consistent with goal setting theory, Kanfer and Ackerman (1989) found that on tasks where people lack the ability to perform a task effectively, setting a specific, high goal for performance significantly lowered performance relative to a vaguely worded goal for people to "do their best." Ability, as previously noted, is a moderator variable specified in goal setting theory.

Learning Versus Performance Goals

Goal setting theory posits four types of goals: namely, a vague or abstract goal, a specific performance goal, a specific learning goal, and a specific behavioral goal.[1]

Latham and his colleagues (Winters & Latham, 1996; Seijts & Latham, 2001; Seijts, Latham, Tasa, & Latham, 2004; Seijts, Latham, & Woodwark, 2013) conducted a series of experiments that demonstrated that when ability is lacking, a high performance goal does indeed lead to lower performance than is the case where people are urged to do their best. This is because the attention people need to devote to mastering the task is instead focused on attaining a specific, challenging performance outcome. However, when people are instructed to set a specific learning goal to discern how to perform a task that is complex for them (e.g., find and use six or more strategies to increase market share) with which they have no prior knowledge or familiarity, they perform better than people who have a specific, high performance goal (e.g., increase market share by 23%) as well as those people who are urged to do their best (e.g., Seijts et al., 2004).

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1. Behavioral goals are typically identified through a job analysis. Goal attainment is typically assessed using behavioral observation scales (Latham & Wexley, 1977). An example of a behavioral goal, set by a high level management team in Scott Paper Company is "Lets people know of decisions that have been made that will impact them before the decision is implemented" (Latham & Wexley, 1994). Behavioral goals were set for engineers/scientists in the Weyerhaeueser Company (Latham, Mitchell, & Dossett, 1978). No studies were found by the present authors in which a project team set behavioral goals. This is surprising, considering the amount of communication, coordination, mutual support, and sharing of information required among team members in order for a team to be successful. Hoegl and Parboteeah (2003) found that these behaviors moderate the goal-performance relationship in innovation teams.

In summary, a performance goal motivates high performance when people have the ability to perform the task; a learning goal increases performance when people lack the requisite competence to master the task. A learning goal has been found to be especially important for performance when a departmental team is operating in an environment of uncertainty and economic turbulence (Porter & Latham, 2013).

The practical significance of the effects of these two types of goals is that project managers need to be cognizant of the knowledge, skills, and abilities of team members in order to complete project tasks on time and within budget. This is important at the initial, intermediate, and especially in later phases of a project, when a team member's motivation may be low (Schmid & Adams, 2008). In many instances, learning goals should be set in the initial stages of a project, when creativity is required to discover ways that preset goals can be attained (cf. Gong, Huang, & Farh, 2009). Once appropriate strategies for goal attainment have been developed, a performance goal should be set to gauge progress and alert the team to troubleshoot obstacles that could derail the project.

Employee involvement in developing their team's charter and setting their project's goals typically stimulates information exchange. On complex tasks, the greater the knowledge sharing among a team's members, the higher the performance (Quigley, Tesluk, Locke, & Bartol, 2007).[2]

The Goal-Setting Process

SMART goals are those that are *s*pecific, *m*easurable, *a*ttainable, *r*elevant, and have a *ti*me frame (Locke & Latham, 1990). Specific, measurable goals are advised because, as previously noted, empirical evidence shows that these types of goals lead to better performance than vague, abstract goals such as "do your best" (Latham & Locke, 1991, 2007). Goal specificity has been shown to be critical for a project's success (Ang & Slaughter, 2001; Markus, Manville, & Agres, 2000; Turner, 2003). Attainability is important for a project manager to take into account because if supervisors perceive the goal as too high, they are likely to abuse their subordinates (Mawritz, Fogler, & Latham, 2013). Perceived relevance of the goals set is important because the extent to which team members agree on

2. In our opinion, behavioral goals should be set for the sharing of knowledge. Both behaviors and the resulting performance outcomes should be measured. To paraphrase Mason Haire, that which gets measured in relation to goals gets done (Locke & Latham, 1990). Note, too, that performance outcomes do not occur through osmosis. It is the behavior of people on the team that influences those outcomes. Hence it is no surprise that Latham and Wexley (1977) found, in a double cross-validation study, that job behaviors of groups, identified through a job analysis, correlate with sundry performance outcomes.

the importance of the team's goals correlates positively with group performance (Colbert, Kristof-Brown, Bradley, & Barrick, 2008). Disagreement among team members on goal importance has a negative relationship with a team's performance (Dierdorff, Bell, & Belohav, 2011). The time frame specifes when the goal is to be attained.[3]

The steps to setting SMART goals include (a) identifying whether primarily ability (hence, a learning goal) or motivation (hence, a performance goal) is required in a specific life cycle of a project; (b) setting SMART learning or performance goals for the project team and the individuals within the team; (c) acknowledging that what people are doing in relation to pursuing the goals is noticed and appreciated; and (d) giving them feedback on progress toward goal attainment (Latham, 2003).

Feedback is particularly important because feedback from the project manager to the team as a whole, as well as to individual members, motivates goal attainment (Latham, Macpherson, & Cheng, 2012). It lets the team and the individual members on the team know where they are relative to goal attainment. As noted earlier, feedback is a moderator variable in goal setting theory. Empirical research shows that the performance-enhancing effect of setting a specific, high goal is greatly diminished when feedback relative to goal pursuit is not provided (Locke, Cartledge, & Keoppel, 1968). Feedback is critical for project teams because members who contribute the most to a project's success are often the ones who are most in need of appreciation (Lewis, 2003). Feedback also provides team members with the information they need to correct behavior that is ineffective (Locke & Latham, 1990, 2013; Rassouli, 2013). Furthermore, feedback can increase a team's confidence, or collective efficacy, that they can attain their project's goals (Bandura, 1997; Prussia & Kinicki, 1996). Collective efficacy is a cognitive variable that works in conjunction with a team's specific, high goal to further increase motivation as those who attain their goals become more efficacious, leading them to perform at even higher levels and subsequently to set even higher goals to attain (Bandura, 1997). Tasa, Taggar, and Seijts (2007) found that there is a positive relationship between team member self-efficacy and such teamwork behaviors as managing deadlines, sharing task-relevant information, and developing a strategy. However, the feedback must be given to the team as a whole, not just to each individual alone. Providing the team feedback fosters

3. Recall President John F. Kennedy's goal for a moon landing: "I believe that the nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth." In 1969, within the decade Kennedy set this goal, the goal was attained.

a collective orientation that in turn fosters coordination toward the attainment of the team's goals (Van der Vegt, de Jong, Bunderson, & Molleman, 2010).

In a study of project teams, Liu (1999) found that the positive relationship between goal difficulty level and high performance is also moderated by goal commitment, a third moderator specified in goal setting theory (Locke & Latham 1990, 2013). Similarly, Aube and Rousseau (2005) concluded that a team's commitment to a specific, high goal is positively related to its effectiveness.

Goal Orientation

Historically, there has been a push-pull philosophy in both the behavioral sciences and in work settings between "grooming" people to succeed on the job and the selection of individuals with strong potential to be successful in a given context (Latham, 1988). The dichotomy is a needless one, as shown by the programmatic research by Dweck and her colleagues on a dispositional variable, namely a person's goal orientation, which should be taken into account when selecting an individual to serve on a project team.

Dweck and her colleagues (e.g., Dweck and Elliott, 1983) identified a trait that predisposes the way people express their need for achievement when they are in achievement situations. Dispositions predict what people will typically do in relatively autonomous settings. Originating in educational psychology, goal orientation has subsequently been found to be a robust predictor of a wide range of performance outcomes, ranging from an individual's creativity (Gong et al., 2009) to a team's performance (Mehta, Field, Armenakis, & Mehta, 2009).

Goal orientation is a trait that predicts and explains not only the tasks people choose, but what they do when ability, instead of motivation, is needed to perform complex tasks effectively (Dweck & Leggett, 1988; Seijts et al., 2004). This is because goal orientation is a "mental framework for how individuals interpret and respond to achievement situations" (Brett & VandeWalle, 1999, p. 864).

The way people view their ability is reflected in their goal orientation. They may interpret achievement situations as opportunities to learn and enhance their competence through the acquisition of skills, or as opportunities to demonstrate their present knowledge and skill and thereby gain favorable judgments of their proficiency from others (Elliott & Dweck, 1988).

There are two broad types of goal orientation: a learning goal orientation and a performance goal orientation. Individuals with a learning goal orientation focus on developing their competence by mastering new tasks (Brett & VandeWalle, 1999). They are predisposed to choose challenging tasks, even if the

tasks are presently beyond their current ability to perform them effectively. Their referent is the task itself and hence intrapersonal standards of performance. When confronted with the need to improve their knowledge/ability, learning goal oriented individuals focus on developing strategies to master the task (Elliott & McGregor, 2001). Porter (2005) found that the average of a team's score on a scale that assesses members learning goal orientation correlated positively with the extent to which the team's members supported one another, and with the team's overall performance. Park and DeShon (2010) found that individuals who disagreed with their team were more likely to voice their disagreement in teams characterized by a high learning rather than a performance goal orientation. Doing so improved team-level discussion, which in turn led to team decision effectiveness.

Individuals who have a performance goal orientation are predisposed to demonstrating their competency to others by choosing a task they are relatively certain they can perform well (Elliott & McGregor, 2001). Hence, those individuals prefer tasks that they already have the ability to do well (Brett & VandeWalle, 1999; VandeWalle, Brown, Cron, & Slocum, 1999). When there is an unanticipated change in the work environment, and the team is pursuing a difficult goal, the adaptability of the team to the change has been shown to decrease when a team's members have a performance rather than a learning goal orientation (LePine, 2005).

Person-Project Fit

Turner and Cochrane's (1993) typology of projects, shown in Figure 7.1, suggests that a person's goal orientation should be taken into account when assigning an individual to a project. To date, empirical research has yet to be done to test the validity of our suggestions. However, the advantage of theories in the behavioral sciences is that they provide a basis for predicting, explaining, and influencing an individual's and a team's behavior. Thus, on the basis of Dweck's goal orientation theory, we draw the following inferences.

For Type 1 projects, where the goals and plans for attaining them are clearly defined, team effectiveness will likely be enhanced if a team's membership consists of individuals with a performance goal orientation. These people relish the opportunity to demonstrate their capabilities. Type 1 project goals act as normative standards of performance, and performance goal oriented individuals are motivated to show others that they are high achievers. When project goals and the plans to attain them are well defined, the likelihood of project success is increased by following established procedures. In such projects, individuals who are motivated to avoid showing their incompetence will likely enhance

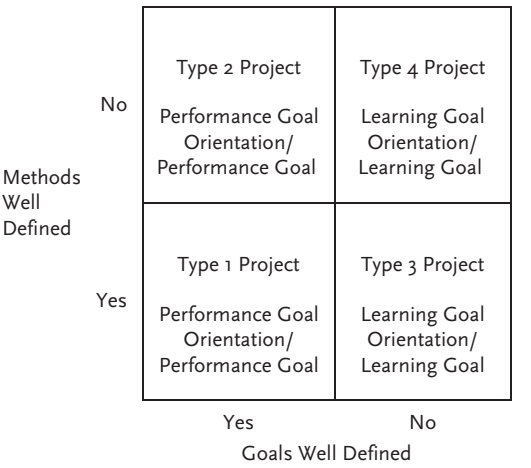

FIGURE 7.1 Methods and goals matrix: Project team member goal orientation and goal type

a project's success by making sure that they follow these procedures (Elliot & McGregor, 2001).

In a Type 2 project, where the goals are well defined, but the plans for goal attainment are not clear, again team members with a performance goal orientation may be particularly desirable because of the lack of clarity about what needs to be done to attain the project's goals. Being predisposed to do all that they can to demonstrate their competence to others, performance goal oriented employees, knowing the project goals to attain, will be predisposed to exploring different ways of using their extant abilities for attaining those goals. This is because they want to avoid demonstrating their lack of ability, and instead wish to prove to others that they are high performers. Drawing upon multiple extant strategies that are within their ability to execute allows them to do so.

For projects with vaguely defined goals, considerable learning is needed before the project goals and the means to attain them become clear to employees. Managers of these project teams may find that team members with a learning goal orientation are easier to motivate than those with a performance goal orientation. This is because the former are predisposed to acquire the knowledge and skills needed to minimize the uncertainty for attaining the project's goals. Setting time limits for learning goal oriented team members to devise new strategies allows a vaguely defined project to meet the constraints set by scope, costs, time, stakeholders, regulatory requirements, codes and standards, rules, procedures, policies, and so on. Unlike people with a learning goal orientation, performance oriented individuals, on the other hand, typically want to adhere to

the same plans for goal attainment used on previous projects, even though these plans will likely be ineffective on the new project.

When projects have goals that are ill defined, but the plans are clear (Type 3 Project), a project manager may find that learning goal oriented individuals are relatively easy to motivate, as their focus is on ensuring that mistakes are avoided while they strive to improve their ability. Examples of such individuals include perfectionists (Elliot & McGregor, 2001) who work on software development projects. These individuals typically take the steps necessary to ensure that they make no mistakes when writing software programs, while simultaneously developing novel software that requires them to continually increase their knowledge and ability.[4]

Type 4 projects have both unclear goals and strategies for attaining them. These projects are also likely best suited for team members with a learning goal orientation. For these projects, there are no prior normative standards to gauge success, and there are no proven plans to attain the project's goals. Learning goal oriented individuals thrive on self-discovery, risk-taking, and exploration. They are motivated to find the appropriate processes for project completion.

The advantage of setting specific high goals and, in addition, taking into account a person's goal orientation is at least twofold. First, goal setting as a state creates a "strong situation" (Mischel, 1968). That is, goals mask the effects of an individual's personality traits on job performance (Adler & Weiss, 1988). Given the presence of the four moderator variables discussed earlier, goal setting increases performance regardless of an individual's personality. Second, in relatively autonomous situations, when project goals are difficult to specify, an employee's goal disposition manifests itself (Seijts et al., 2004). Thus a project manager's awareness of the goal orientation differences among a team's members may prove helpful in dealing with the project's clients.

Pinto and Prescott (1988) found that client consultation and acceptance are critical for project implementation success. Client consultation requires a project team to consult with and listen to those affected by a project. Learning about project requirements and about how to satisfy client requirements fits the

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4. Perfectionists typically set very high goals. They are especially effective at performing tasks requiring maximum as opposed to typical performance (Hrabluik, Latham, & McCarthy, 2012). The former refers to the performance of an individual who has been instructed to devote maximum effort over a short duration when she or he is being observed, while the latter refers to what an individual does over a prolonged period of time when she or he is unaware of being observed (Sackett, Zedeck, & Fogli, 1988). Hence maximum performance measures assess what a person "can do," whereas a measure of typical performance assesses what a person "will do."

dispositional tendency of learning goal oriented individuals to learn in achievement situations. So, having project team members with a learning goal orientation should help the team consult effectively with external stakeholders in the conceptualization, execution, and termination stages of a project's life cycle. In addition to consultation, client acceptance is a critical success factor in the planning stage of a project life cycle (Pinto & Prescott, 1988). Client acceptance involves selling the project to intended users of the project. Pinto and Prescott found that client acceptance is particularly important in the planning stage of a project's life cycle because the project team needs to convince end users that they are capable of executing the team's strategic plan. In this planning stage, team members with a performance goal orientation who are focused on attaining outcomes and demonstrating their competence to others are likely to help their team gain a client's acceptance of the team's plan for attaining the project's goals.

In summary, at all stages of a project life cycle, a team's focus on attaining the superordinate goals of the project is critical for project success. Goal setting by the project leader translates a project's superordinate goals into micro goals for each team member to attain. The goal orientation of team members can be an advantage at different stages of a project life cycle, depending on whether a project team needs to consult with clients to increase their understanding of a client's needs, or try to convince a client that they have the ability to implement their approach to goal attainment.

Coaching the Team

Schwalbe (2004) observed that a project manager's leadership style can be helpful or detrimental to a team's performance. A coaching style of leadership generally has a positive effect (Luecke, 2004). The initial step in coaching is to involve the team in understanding a superordinate goal. A superordinate goal or vision gives the team a cause that the members can rally around, a cause that incites them to take action (Peterson, 2007; Rassouli, 2013). A shared vision leads to cooperation in pursuing goal attainment (Wong, Tjosvold, & Yu, 2005), and can be used for enlarging boundary lines to include the project team and the larger organization of which the team is a part. This minimizes feelings of in-groups versus out-groups. An example of a superordinate goal is Jack Welch's "boundaryless organization." Van Mierlo and Kleingeld (2010) reported that such a superordinate goal fosters collaborations and goal attainment. Emphasizing each team member's responsibilities in the early stages of a project has been found to be an effective way of obtaining a team's commitment to a project's goals (Peterson, 2007).

A second crucial step involved in coaching is to help the team see the relationship between what they are doing and the positive outcomes they can expect (e.g., job advancement, career development).[5] People only commit to a goal if they perceive it to be relevant to a team's success. Once the goal(s) is set, a coach must enable the team to see the relationship between what they are doing and the extent to which they are pursuing the correct strategy for goal attainment (Bandura, 1986; Latham, 2001).

Third, project leaders must take into account a team member's individual self-efficacy as well as the team's collective efficacy (e.g., Seijts et al., 2004). This is because even when a goal is specific and challenging, and even when the outcome expectancy for goal pursuit is clear, one or more of the team's members may not commit to pursuing the goal if one or more of them doubts that they can implement the strategy for goal attainment. Self-efficacy refers to one's perception that he or she can perform effectively in a specific task domain (Bandura, 1997; Latham, 2009). Collective efficacy is the shared belief in a team's conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments (Bandura, 1997). Team efficacy predicts a team's performance, even when the team's previous performance is controlled (Prussia & Kinicki, 1996).

The steps for increasing efficacy beliefs include (1) enactive mastery, that is, sequencing tasks in such a way that an individual or team can perform them effectively; (2) finding a role model with whom the individual and/or team identifies, an individual or team who has either mastered the task or is in the process of doing so; (3) having a "significant other," an individual whom the low self-efficacy individual or team respects, explain why she, he, or they can indeed attain the project's goals; and (4) engaging in functional self-talk. Field experiments have shown that the latter has proven to be especially effective in increasing confidence that goals are attainable (Latham & Budworth, 2006; Yanar, Budworth, & Latham, 2009).

The final step involves aligning the goals of the different individuals on the team with the overall goals of the project. Seijts and Latham (2000) found that when an individual's specific, difficult goals are aligned with their team's goals, the team's performance is enhanced. When this is not the case, an individual is likely to pursue his or her own goal to the detriment of the team. A meta-analysis conducted by Crown and Rosse (1995) showed that there is a

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5. In a questionnaire study of 100 project management employees of different nationalities from different industries, Dwivedula and Bredillet (2010) found that these individuals have a high need for self-esteem, and that opportunities for professional development were instrumental for satisfying that need.

significant decrease in a team's performance when the goals that are set are predominantly focused on benefiting oneself (egocentric) rather than on benefiting the group (group-centric). When the opposite is the case, that is, when the goals are group-centric, performance increases significantly.

Team playing is likely if the team sets the goals cooperatively and, as mentioned earlier, a superordinate goal is set (Wong et al., 2005). Goals and efficacy beliefs mediate the effect of a vision or superordinate goal on job performance. Self-efficacy and strategy not only mediate the effects of goal setting on performance, they have a reciprocal effect on one another. Developing a strategy for goal attainment increases efficacy beliefs, and increases in efficacy beliefs increase the likelihood of developing an effective strategy (Latham, Winters, & Locke, 1994; Seijts & Latham, 2001). The benefit of participatively set goals is that they stimulate information exchange for making decisions (Locke, Alavi, & Wagner, 1997). Project leaders reported that having personal conversations with team members is a strong motivational technique in itself (Schmid & Adams, 2008). The motivational benefits of this personal communication are enhanced by structuring these exchanges as opportunities to coach one or more team members.

Even though coaching and training are both goal-directed interactions between a manager and one or more employees (D'Abate, Eddy, & Tannenbaum, 2003), coaching as a management practice differs from a training program. Tews and Tracey (2008), for example, argued that coaching is a practice used to enhance post-training transfer, namely, after a trainee has returned to the job following training. This is an important distinction because empirical evidence suggests that formal training by itself does not necessarily play a significant role in the development of project-based teams (Aramo-Immonen et al., 2011). Project-based teams exist because they are an effective structure to manage the dynamic nature of the industries in which they are located. Despite the need for team members to continuously learn in order to sustain their competitive advantage, formal training is perceived to be an ineffective method for employee development in these companies. This is largely due to the fact that project team members usually lack the time to undergo formal training due to the urgency of ongoing project demands (Aramo-Immonen et al., 2011). Coaching overcomes this problem because it occurs on the job, in real time, and has as its objective the development of employees (Ellinger & Bostrom, 2002). For this reason, how a project leader frames the learning process and the associated desired behaviors is important because coaching by a project leader can induce recipients to pursue the same goal in one of two different ways, namely, a promotion or a prevention focus (Higgins, 1997, 1998).

Regulatory Focus Theory

Higgins's (1997, 1998) theory of regulatory focus states that the motivational orientation adopted in respect to goal pursuit leads individuals to use one of two different means to attain it. People with a promotion focus strive to attain desired, positive end states, such as goal attainment. The focus here is on moving from a neutral to a positive state (0 to 1). People with a prevention focus are motivated to avoid undesired, negative end states. For these individuals the avoidance of failure is motivational (Shah, Higgins, & Friedman, 1998). Metaphorically, this is equivalent to maintaining a neutral state in order to avoid a negative one (0 to -1).[6]

Sue-Chan, Wood, and Latham (2012) found that coaching by supervisors who framed feedback with a promotion rather than a prevention focus have a more positive effect on the performance of recipients, particularly for employees who believe that their abilities can be improved. Promotion-focused coaching may have resulted in higher performance because it subconsciously primed employees to focus on self-actualization, and consequently led to the setting of difficult, challenging goals to do so. As hard goals are difficult to attain, effort continues to be expended until they are reached. Given sufficient ability, a moderator in goal setting theory, an increase in effort leads to higher performance. In contrast, prevention-focused coaching may have resulted in lower performance because it subconsciously primed employees to avoid failure. This likely led employees to set goals that were relatively easy to attain. Once an easy goal is attained, effort ceases. Cessation of effort results in low performance. This explanatory mechanism for the influence of a promotion versus a prevention regulatory focus on performance through goals needs to be further examined empirically.

The behavioral content of coaching has also been shown to have an effect on the goals that people set. For example, Heslin, VandeWalle, and Latham (2006) operationalized coaching as consisting of three behavioral dimensions: facilitation, guidance, and inspiration. Inspiration involves a coach encouraging employees to develop and reach their potential. Guidance involves a coach providing clear expectations and feedback about how to improve an individual's performance, whereas facilitation requires a coach to help an individual to explore and evaluate the task, and to discover the correct ways for improving job performance.

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6. Note the similarity between a promotion focus disposition or trait and a learning goal orientation, as well as the similarity between a prevention focus and a performance goal orientation.

Building upon this work, Hui, Sue-Chan, and Wood (2013a, 2013b) argued that the facilitation versus guidance component behaviors of coaching have different consequences for learning and performing, as well as the goals people set for their performance. Although Heslin et al. (2006) argued that guidance and facilitation behaviors might be enacted in an integrated manner, a coach may place greater emphasis on one type of behavior to the exclusion of others, to the point that the dominant coaching style can be characterized as one of either guidance or facilitation.

A guidance style of coaching is directive. It places the coach in the role of the expert who provides solutions for performance problems, and directs the recipient's development through advice on what to do to improve performance. A guidance coach tells a recipient what to do and when to do it. When recipients make mistakes, a guidance coach points out how the behavior is incorrect and explains the correct way to perform the task. The emphasis of guidance-style coaching is on performing correctly through feedback from the coach. It is the coach who identifies problems, explains why the behavior is incorrect, and then describes and demonstrates the correct response.

In contrast, a facilitative style of coaching is much less directive. A coach's emphasis is placed on supporting the recipient in the identification and definition of problems, and the discovery of the correct behavior for performance improvement. During the facilitative coaching process, a coach engages a trainee in the learning process through such behaviors as listening, encouraging, questioning, and reframing ideas. Moreover, facilitative coaches encourage recipients to experiment with different responses, and to reflect on their experiences, so as to support their effort to learn from mistakes, rather than telling them how to correct their behavior.

In the context of a simulated software training firm, Hui et al. (2013b) found that a guidance coaching style is more effective than facilitation for enhancing performance on a familiar task (one that is similar to the one on which team members received coaching), but facilitation is more effective for enhancing performance on an unfamiliar, adaptive task (a task on which employees had not received coaching). This is because under guidance coaching, employees learn from the coach, while under facilitation coaching, employees learn from their own actions and strategies. When employees perform a familiar task, those who receive guidance coaching can see that they can transfer what they learned from the coach to perform the new yet familiar task, and they set high performance goals for performing this task. When employees perform an unfamiliar task, however, those who received guidance coaching can see that they cannot transfer what they learned from the coach to this new task, and hence they set low performance goals. Employees who have received facilitative coaching, however,

have acquired the skill of "learning how to learn." Consequently, they set high goals for unfamiliar, adaptive tasks.

Hui et al. (2013b) found that team members with a performance goal orientation respond more positively to guidance rather than facilitation coaching. This is because acquiring correct strategies for task performance from their coach enables them to demonstrate their competence. In contrast, the facilitation style of coaching may be better suited for individuals with both a learning goal and a learning goal orientation because their preference for self-discovery of appropriate strategies is enhanced by listening to and questioning their coach.

The practical significance of this research is that how a coach frames a coaching interaction, namely, as one of promotion versus prevention, and how a coach behaves (guide versus facilitate), needs to be considered when coaching a project team. Because project managers may be unaware of their own regulatory focus, let alone their goal orientation, that determines the type of coaching they provide (cf. Heslin et al., 2006), they may be subconsciously setting goals for their subordinates that are consistent with their own regulatory preference for promotion versus prevention, and learning versus goal orientation, rather than that of the members of their team.

Sue-Chan et al. (2012) examined whether the promotion versus prevention regulatory orientation of coaches influences recipients' performance depending upon the recipients' beliefs about the malleability of their abilities. In both a laboratory and a field study, the data indicated that the regulatory fit between the framing of coaching and recipients' implicit beliefs is associated with performance effectiveness. In particular, both studies showed that under prevention oriented coaching, recipients with an entity belief about their ability benefited from better regulatory fit relative to their colleagues with incremental beliefs. [7]

Conclusion

In this chapter, we have discussed the motivation of members of project teams. Goal setting theory explains the necessity for setting specific high team goals, and when a performance versus a learning goal should be set. Turner and Cochrane's (1993) goals-and-methods matrix of project teams suggests that team leaders should consider employees' learning versus performance goal orientations when selecting team members.

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7. People with entity beliefs view ability as relatively fixed, whereas those with incremental beliefs view ability as malleable (Dweck, 1996, 1999).

A team leader's self-regulatory focus affects the way a coaching interaction with team members is framed. This regulatory focus, in turn, interacts with an employee's implicit beliefs about the malleability of his or her abilities to improve performance. A team leader's choice of a directive, guidance style of coaching versus a less directive, facilitative style of coaching, in interaction with an employee's beliefs about the malleability of his or her abilities, influences the type of goals an employee sets.

Goals are a robust foundation upon which to build project team motivation. Goals lie at the heart of a project team's charter, and team member involvement in setting goals for a project team determines and reflects the work climate for the project team.

Directions for Future Research

Kleingeld et al. (2011) concluded that the findings of research on the effects of goal setting on an employee likely generalize to project teams. Nevertheless, research is needed on the social dynamics that lead to goal commitment, and the development of one or more strategies to attain specific challenging learning goals within a project team.

The discussion in this chapter on goal orientation is largely speculative. Nederveen Pieterse, van Knippenberg, and van Ginkel (2011) found that diversity within a team in terms of its members' goal orientation can have a deleterious effect on that team's performance. This is because task coordination among the different employees can suffer, and there is sometimes little consensus on task strategies. Should different employees, who share the same goal orientation, be hired to complete different project cycles? Nederveen Pieterse et al. (2011) suggest that the problem might be overcome by intensive training on team reflexivity, namely, constant assessment of the team's environment, and ensuring that every team member can do every team member's job well.

How can trust be built quickly among project team members, many of whom may never before have worked together, and between the project leader/coach and the team's members? When trust is lacking between the manager and the team, the latter is likely to perceive high goals as a way of exploiting them (Crossley, Cooper, & Wensing, 2013).

Practical Implications for Project Management

In closing this chapter, the action steps that project managers should take for motivating a project team are at least eightfold.

1. Develop a project charter that includes a superordinate goal and SMART goals, that is, goals that are *s*pecific, *m*easurable, *a*ttainable, *r*elevant, and with a *t*ime frame.
2. When people on the team have the ability to do what is required of them to ensure a project's success, set specific, high-performance goals. High goals lead to high performance.
3. When people on the team lack the knowledge as to how the project's goals can be attained, set specific, learning goals.
4. To ensure person-project fit, assess a person's goal orientation. To the extent that uncertainty characterizes the environment, select people with a learning goal orientation.
5. People with a performance goal orientation are likely to be effective in interactions with project clients in terms of assuring them that the team has an effective plan for attaining the project's goals.
6. The coach of a project team must, in addition to the above, focus on outcome expectancies as well as collective efficacy and self-efficacy. That is, a coach must help the team members see the relationship between what they are doing and the desired outcomes. The coach must instill confidence in the team as a whole and in its individual members that the project's goals are attainable.
7. A coach must understand the regulatory focus of each team member.
8. Finally, a coach needs to understand the difference between a guidance versus facilitative coaching style.

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8 IDENTIFICATION AND COMMITMENT IN PROJECT TEAMS

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This chapter is the fruition of two important trends. On the one hand, we know that project teams have become ubiquitous in organizations (Hobbs, Chiocchio, & Kelloway, Chapter 1 of this volume; Sundstrom, McIntyre, Halfhill, & Richards, 2000) and, therefore, interest has grown in identifying factors that enable successful projects and project teams. On the other hand, we also know from a vast pool of studies that committed individuals work harder (e.g., Mowday, Porter, & Steers, 1982) and display more organizational citizenship behavior (e.g., offer to help others accomplish their tasks, take initiative to solve a problem) (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Riketta, 2005). We also know that people who identify with their team or organization collaborate more in a team (Dutton, Dukerich, & Harquail, 1994; Tyler & Blader, 2001). Consequently, we will examine commitment and identification from the unique perspective of project work and project teams to provide a fresh perspective on employees' contribution to project success. Because of the dearth of studies on commitment and identification of people involved in project teams, we aim to provide a conceptual footing and preliminary guidance to describe and test the human factors that can derail projects, as well as those that can foster project success.

Commitment and identification are both well-studied organizational psychology concepts, but researchers rarely have applied them to project teams. Even if there is some evidence that specific aspects of the project context, such as the skills differentiation required to complete complex tasks, can either hinder or promote commitment and identification, we do not fully understand how core characteristics of projects (e.g., complexity and temporariness) affect commitment and

identification. A better understanding of how commitment and identification operate in the project context will provide project managers motivational levers to use with team members, and will give researchers means to better describe, explain, and predict team behaviors.

In this chapter, we investigate the following four questions: (1) How do the characteristics and the context of projects influence commitment and identification, and how do commitment and identification influence aspects of the project context? (2) How do commitment and identification foster or hinder project team effectiveness? (3) What are the different ways in which project managers can make use of the full potential of these two drivers? (4) What are important avenues for future research in the area of identification and commitment as applied to project teams?

Definition of Identification and Commitment

As it pertains to work, researchers have conceptualized both commitment (Klein, Becker, & Meyer, 2009; Meyer & Allen, 1997; Mowday et al., 1982) and identification (see Edwards, 2005, for an extensive review) in different ways. Without assessing the discord in each field, we will first suggest an agreed-upon definition of commitment and identification, then will provide a framework to differentiate them, and finally will address specific aspects of these concepts that will help us understand them in the context of the project.

What We Mean by Commitment and Its Consequences

Our discussion will focus on the three-component model of organizational commitment (Allen & Meyer, 1990; Meyer & Allen, 1991), given that it provides an integration of earlier conceptualizations. Meyer and Herscovitch define commitment as "a force that binds an individual to a course of action of relevance to one or more targets" (2001, p. 301). This force can take the form of different mindsets, which reflect a desire to pursue a course of action (i.e., affective commitment), a sense of obligation to persist in a course of action (i.e., normative commitment), and the perception of the costs associated with discontinuing a course of action (i.e., continuance commitment) (Meyer & Allen, 1997). Further, these three mindsets can combine to create commitment profiles, reflecting the relative strength of the three mindsets in an individual (see Meyer, Stanley, & Parfyonova, 2012). The optimal profiles depict people with a high level of affective commitment and low levels of normative and continuance commitments, or with high levels of affective and normative commitment.

These profiles, labeled *value-based commitment,* are optimal because they are known to characterize people who engage in organizational citizenship behaviors, which refer to the extent to which one engages in extra-role behaviors (Borman, 2004; Podsakoff, MacKenzie, Paine, & Bachrach, 2000) and exceeds job requirements (Meyer et al., 2002), or who experience well-being. People with the least desirable profiles have either low scores on all three components (*uncommitted*) or are characterized by strong continuance commitment alone or both strong continuance and normative commitment—in this last case, their profile is labeled *exchange-based commitment* (Meyer, Becker, & van Dick, 2006). For example, an engineer with an exchange-based profile would remain committed to a high-rise construction project because ending his involvement would be thought of as preventing him from getting a promotion. Another engineer, characterized by a value-based profile, would commit to the project because of an emotional attachment to the idea that adding a new building to the city skyline will boost tourism (i.e., affective commitment) and because he gave his word to the project manager that he would see it through (i.e., normative commitment).

What We Mean by Identification and Its Consequences

Identification is a complex, multidimensional construct. For the purpose of this chapter, we will focus on only specific aspects of this construct, described below. First, although there is some disagreement with regard to the conceptualization of identification, many researchers describe identification as both a process and an outcome (Ashforth, Harrison, & Corley, 2008). Seen as a process, identification is the way by which a social identity is acquired. Social identity is the answer to the question, "Who am I?" (or "Who are we?"), according to context (e.g., "I am an engineer, a member of project X, or a member of organization Z"). Moreover, identification can also be viewed as an outcome. In this case, outcome is the extent to which one has integrated group membership into his or her self-concept. Identification as an outcome is the answer to the question, "How much is project team ABC part of who I am?"

Second, it is important to mention that social identities acquired through the identification process are descriptive because they allow for a description of one's self in terms of the group's characteristics; prescriptive because each group identity includes norms regarding how one should think, act, and feel; and evaluative because they allow for a comparison between members of one's group and members of other groups based on characteristics such as values (Hogg, Terry & White, 1995). Moreover, social identification allows for social categorization,

which enables individuals to categorize themselves and others as members or non-members of a group (e.g., project team) (Haslam & Ellemers, 2005).

Third, while disagreement persists concerning the dimensionality of identification (see Edwards, 2005, for more on this issue), many researchers describe it as a cognitive construct related to the perception of being a member of the group, being one with the group, and experiencing the group's success and failure as one's own (Ashforth & Mael, 1989; Gautam, van Dick, & Wagner, 2004; Tajfel, 1978). It also includes an affective dimension, comprising feelings of belongingness, group membership, and interpersonal attraction (Ashmore, Deaux, & McLauglin-Volpe, 2004).

Finally, there is a distinction between what Rousseau (1998) has labeled "situated" and "deep structure" identification. This distinction occurs because there are as many possible identifications as there are social groups to identify with (Tajfel, 1978), and because it is the context that determines, in part, which identity is most salient (Randel, 2002). This is important since people can be working concurrently in multiple project teams (Chiocchio et al., 2010). However, context does not influence all identifications to the same extent. Rousseau described situated identification as the perception of belongingness to a group (i.e. "I" becoming "we"), created by situational cues indicating shared interest, common membership, and shared consequential events (Haslam et al., 2006). Such identification can develop within a few hours (Haslam et al., 2006) but is maintained only as long as relevant cues persist, such as the wearing of a uniform (Dovido et al., 1997), or—we speculate—having a project team name. Hence, situated identification does not modify the individual self-concept in a deep and lasting manner, while deep structure identification does (Ashforth et al., 2008), and, thus, the latter does not rely as much on contextual cues (see Rousseau, 1998, for an in-depth review).

Multiple Foci of Commitment and Identification

Traditionally, both commitment and identification, as they pertain to work, were focused on the organization. However, researchers recognized that employees can form multiple work-relevant commitments to targets such as the organization or the project (Meyer & Herscovitch, 2001). There is also a wide array of possible foci for identification in the organizational context (e.g., organization, unit, or project) (van Knippenberg & van Schie, 2000). This is of particular interest to the project context, as people often work on more than one project at a time, and one project team can include people from different units or even from different organizations (Chiocchio, Chapter 3 of this volume).

Commitment

It is particularly important to acknowledge the multiple foci of commitment in the context of the project, as an individual may take part in numerous teams, as we hinted above, but also because project milestones mark qualitatively different contexts from one phase to the next. In turn, this can influence individuals' commitment to the project and project team. For example, new product development requires much creativity, especially in early phases of the project (Vissers & Dankbaar, 2002), but the inter-individual learning at the base of team creativity takes time (Hirst, Knippenberg, & Zhou, 2009). Hence, individuals more open to learning might be more committed in early stages of product development, where learning interactions with teammates are intense. Learning interactions subsume in later stages, and people open to learning might be less committed. Some large construction projects can migrate from a culture of innovation to a culture of control and accountability as they progress toward completion (van Marrewijk, 2007). Future research could seek to investigate if value-based versus exchange-based individuals would react differently to such changes, and if there would be more consistency across multiple foci of commitment.

Although researchers can study commitments to various targets in isolation, in reality the targets are likely to be highly related and therefore should be studied concurrently. Several multi-foci models account for potential relations among some of the major foci (e.g., Meyer & Allen, 1997; Morrow, 1993) and can be used to understand the impact of specific target combinations. For example, organizational changes undertaken by healthcare project teams involve being part of a project team, but also being part of a unit performing "regular" work (Chiocchio et al., 2012b). Furthermore, because members often come from different units, both commitment to the unit and commitment to the organization might influence their commitments to the project's goals and to the project team. We believe that these multiple commitments interact with one another to influence project-relevant behavior and ultimately project performance. Because most projects take place alongside other projects in organizations, mid-course assignments of new project members (e.g., to solve particular problems or to speed things up) are not rare. Some of these changes can also occur to ensure some individuals' job security (Payne, 1995). Future research can investigate whether task-relevant effort would differ between a project team member driven by a value-based commitment profile and another driven by an exchange-based profile.

Identification

Multiple foci of identification are also found in the organizational context. The existence of multiple foci of identification is not inherently positive or negative

(Caza & Wilson, 2009). However, as the foci of identification multiply, the potential for conflict between identities grows as well (Ashforth & Kreiner, 1999; O'Leary, Mortensen, & Woolley, 2011) because of inconsistent or conflicting values (Ashforth, Rogers, & Corley, 2011; Caza & Wilson, 2009). For example, Pliskin, Romm, Lee, and Weber (1993) show that when implementing large information systems, a supplier that values innovation might be paired with a buyer that is risk avoidant and espouses more conservative values. Implementation project teams composed of members of both organizations identifying with these contradictory values are at high risk of failure. Yet, multiple identifications can also be beneficial by helping to provide a source of a wide range of direct (e.g., material) resources and social resources (e.g., advice on a project from members of another project team) (Caza & Wilson, 2009).

Commitment and Identification in the Realm of Projects

The preceding discussion leads us to examine how characteristic features of project work and project teams influence commitment and identification, and how commitment and identification affect the dynamics of project teams. We will examine commitment and identification with two sets of criteria. The first set of criteria has to do with features of the work: temporariness and different forms of complexity influence projects and the people who undertake them (Chiocchio, Chapter 3 of this volume; Hobbs, Chiocchio, & Kelloway, Chapter 1 of this volume). There are three subcategories of temporariness: membership, duration, and process (Chiocchio, Chapter 3 of this volume). "Temporariness as membership" is twofold. For one, members are put together for the purpose of the project, and disband at the end of it (Turner, 2007). Alternatively, people can come and go throughout the project to compensate for turnover or to fulfill the need for a specific skill set (Tannebaum, Mathieu, Salas, & Cohen, 2012). "Temporariness as duration" refers to the fact that projects are finite. Project teams exists as long as the project lasts (i.e., core and integrated project teams), or as long as their specialized involvement during the project requires (i.e., component project team). Finally, "temporariness as process" means that the way of doing things during the project will not last beyond the project. The novelty of the process can vary from incrementally to radically new (Engwall, 2003). Project management scholars discuss complexity as the interplay of structural complexity (number of elements and ways in which they are connected) and uncertainty (the extent to which the methods and goals are unknown) (Turner & Cochrane, 1993; Williams, 2011). The second set of criteria has to do with how interactions among team members evolve over time, from either external pressures or internal dynamics.

We refer to top-down influences to describe how the project-team context affects the way in which commitment and identification unfold, while bottom-up influences describe how commitment and identification influence the project and the project team and contribute to project success or failure. In the next sections, both commitment and identification will be discussed in terms of this twofold structure.

Top-Down Perspective on Temporariness

Commitment

In a project environment, individuals tend to be members of multiple entities (Payne, 1995). Possessing multiple and temporary memberships may lead to situations where there is a failure to align goals and interests. For example, Gutierrez and Friedman (2005, p. 515) speak of "a project management dilemma" when balance must be achieved regarding multiple valid, yet contradictory, goals and methods. They explain that large information management system implementations need buy-in from the users to be successful, which takes time. However, these systems are required as soon as possible to correct for inefficiencies and conformance issues. As membership changes to accommodate the various phases of these projects, past decisions made to secure user acceptance (e.g., large-scale consultation) might interfere with new directions made to ensure timely implementation (e.g., limit tailoring based on user feedback).The misalignment of goals and interests may lead to lower value-based commitment. If team members encounter such a scenario often, they may perceive a low level of support exhibited by the organization or project manager, which can impair affective commitment (e.g., Mottaz, 1988). Furthermore, if the demands required by different foci of commitment are competing, this may lead to role conflict, where individuals may be expected to behave in ways that are seemingly incompatible. Role conflict has been related to lower affective commitment (e.g. Mathieu & Zajac, 1990; Yousef, 2002). Role conflict is also likely to influence normative commitment negatively, as team members may experience high work demands in situations of role conflict, reducing the extent to which they feel obligated to the organization (Yousef, 2002).

Furthermore, cues from a recent meta-analysis lead us to believe that project team commitment might be more important for the project's success than project commitment alone. Indeed, Chiocchio and Essiembre (2009) conducted a meta-analysis on the cohesion-performance link in different types of teams, including project teams. They distinguished social cohesion from task cohesion. Social cohesion refers to a shared liking or attraction to the group (Evans &

Jarvis, 1980), emotional bonds of friendship, or enjoyment of others' company (MacCoun, 1996). Task cohesion corresponds to a group's shared commitment or attraction to the group task or goal (Hackman, 1976), as well as motivation to coordinate team efforts to achieve common work-related goals (MacCoun, 1996). To some extent, social cohesion is a commitment to people, and task cohesion is a commitment to the job that people need to do. Meta-analytic results show moderate to high positive correlations between social cohesion and task performance, organizational behaviors and project performance. Although not enough primary studies were found to test all relationships involving task cohesion, there is a moderate and positive correlation between task cohesion and project performance in student capstone projects. This leads us to speculate that project team commitment may be as important or even more important than project commitment alone for facilitating behaviors conducive to successfully achieving project goals. Team members who are more committed to a project may be more likely to be only task-oriented and focused on achieving the objectives of the project, whereas a team whose members are more committed to the team would also be more likely to engage in socially oriented behaviors that benefit their team, such as organizational citizenship behaviors. Future research should see if project context favors project team commitment over project commitment, and in turn if project team commitment is a better predictor for project performance than is project commitment.

By definition, projects end, and therefore they are temporary. However, they vary in duration, and future research should investigate the stability of commitment over the duration of projects. Indeed, when projects are short, there may be fewer chances for team members to exhibit supportive behavior, and as a result, individuals may be less likely to become committed to their team. However, researchers have also argued that project contexts involve frequent, intense interactions, as team members are required to work interdependently in reciprocal workflows (Chiocchio & Essiembre, 2009; Neininger, Lehmann-Willenbrock, Kauffeld, & Henschel, 2010). Neininger et al. (2010) suggested that such conditions foster greater support from team members and, thus, higher commitment to the team. Longer projects face different challenges. Garland and Conlon (1998) suggested that commitment increases as a project progresses toward completion, but it is unclear how the relative success of milestones impacts commitment across project phases. Milestones represent a sub-goal of the project outcome. Once completed, they are a form of feedback on the relative success of prior activities and help plan or adjust for the next phase. Longer projects have more milestones and, thus, offer more opportunities to gauge the continuing success or difficulties. There may be certain project milestones for which team members' commitment may vary, for example when tasks of that milestone are

perceived as more intrinsically interesting. Another issue that could be examined is the differential impact of a successful or less-than-successful milestone on team members' commitment in the following phase.

Project work entails creative problem-solving (Hargadon & Bechky, 2006) and requires a team to handle problems and circumstances that may not have been dealt with previously. Each project undertaken by a team involves some level of novel processes. This "temporariness as process" contextual factor has implications for commitment. For example, research has demonstrated that team goal commitment may be more important for performance in innovative tasks than for more routine processes. In Hoegl and Parboteeah's (2006) study, team goal commitment was found to be related to team performance in innovative team projects, but not in routine and structured projects. Innovative projects were defined as projects characterized by higher levels of task complexity, task novelty, and technical risk. The authors argue that high levels of commitment enable teams to address problems successfully and to maintain high performance in the face of uncertainty and confusion when completing innovative projects (Hoegl & Parboteeah, 2006). Moreover, we speculate that novel processes may facilitate the development of value-based commitment in cases where engaging in novel processes requires team members to learn and utilize new skill sets. In such cases, assuming that organizations provide adequate support to project teams, employees may view participation in these novel processes as valued opportunities for developing their skill sets. As a result, employees may respond by increasing their commitment to the project. However, testing this proposition in future research may be worthwhile, given a lack of research on this topic.

Identification

As mentioned above, temporariness as membership implies that project team members often come from different entities (e.g., organization, team, function) and have varied functional backgrounds (i.e., knowledge, experience), as project teams often require members with diverse skill sets (Chiocchio, Chapter 3 of this volume; Horwitz, Chapter 13 of this volume). Yet studies have shown that diversity among team members can generate perceptions of heterogeneity and dissimilarity. Perceived dissimilarity, based on functional specialization, for example, has been found to lower team identification (van der Vegt, van de Vliert, & Oosterhof, 2003). On the other hand, perceived similarity between the project team members, a sense of shared fate (i.e., the view that it is everyone's responsibility if the project fails or succeeds) (Mael & Ashforth, 1992) and a clear vision of who the project team is (van Veelen, Otten, & Hansen, 2012), can enhance project team identification.

In addition, the project team is one of many possible foci of identification. Although there is no account of limit on the number of foci one can identify with, future studies would benefit from examining the impact that identifying with too many foci might have on the strength of identification. For example, the time spent in a particular context (e.g., project team versus unit) could influence identification strength. Furthermore, identification strength, or the extent to which one develops a deep structure identification, might also be influenced by the perceived importance of a particular foci (Tannenbaum et al., 2012). For example, a deep structure identification with one's profession might supersede identification with a particular project, or could be contingent upon one's role in a project (e.g., project leader versus project advisor).

Not only can the time spent in a project influence identification strength, but the overall duration of this project can also impact identification. Indeed, situated identification is more likely to occur in a shorter span of time (a few hours) than deep structure identification, but, under the right circumstances, deep structure identification could occur even in a very short project (e.g., one month). Some of these conditions have been mentioned earlier, such as perceived similarity and a clear vision of who the project team is. Moreover, identification can occur rapidly when belonging to a team whose status and prestige are high compared to other entities (i.e., perceived distinctiveness) (Dutton, et al., 1994). Engwall (2003), for instance, described how engineers of a utility company viewed a specific project as exciting, interesting, and prestigious because it involved deploying a complex high-voltage direct current technology between countries, while other projects did not use that technology or were not international. As such, prestige could enable project team identification. Even though it has been suggested that it takes more time to achieve deep structure identification (Rousseau, 1998), researchers have not empirically tested the time frame required to generate and foster deep structure identification.

Top-Down Perspective on Complexity

Commitment

Failing to handle ambiguity and uncertainty effectively may result in team members being unclear about expectations regarding their roles and responsibilities, a failure to monitor progress adequately, and unclear project goals. In situations of task and role ambiguity, team members may be more likely to experience conflict with each other because the demands for coordination in the project environment may be too high. Greater conflict among team members over time may lead to lower perceived team support and, in turn, lower value-based commitment to the team. Although researchers have not tested this relation explicitly—and we

encourage them to do so—Jehn and Chatman (2000) found a negative relation between specific types of team conflict and a measure of team commitment.

In addition, a project may not have clearly defined objectives (Turner & Cochrane, 1993), or those objectives may change over the span of a project (Elonen & Artto, 2003). The novelty and complexity of projects may lead to ambiguous expectations with regard to the project's objectives. Hence, it may be difficult for team members to become committed to goals that they may consider vague and ambiguous moving targets. Past research in a laboratory setting investigated the effects of goal specificity on goal commitment and found that the level of specificity of an assigned goal was positively related to commitment to the goal (Wright & Kacmar, 1994). Given that goals may be ambiguous in the project context, which may negatively affect commitment to the objectives of the project, the study of the effects of goal specificity in a project team context is a worthy avenue of future research. We suspect that as objectives become clearer as the project progresses, so will commitment.

Identification

Uncertainty and ambiguity are well-known constraints in the project management literature (Pich, Loch, & Meyer, 2002). Task ambiguity and role ambiguity are well-studied phenomena in organizational psychology. Interestingly, one of the main drivers of identification is that it functions as an uncertainty reducer (Ashforth et al., 2008; Hogg, 2000). This is because identification with a profession, a team, or a project can help to guide how one should behave and interact (Reid & Hogg, 2005). For example, designers faced with a lot of uncertainty may make decisions based on how function should follow form. Engineers in the same situation may rely on "form follows function" decisions. The more a project carries uncertainty and ambiguity, the more it accentuates the salience of one's deep structure identification as a guide to behaviors. If team members identify with a teams' capacity to produce highly innovative products, perhaps form or function issues disappear to make place for more situated foci, such as trade-offs between time to market and development time (Cohen, Eliasberg, & Ho, 1996). Therefore, we hypothesise that project complexity acts as a catalyst for deep structure identification when the project team is not the focus of identification. When team members identify with the project team, uncertainty is a catalyst for situated identification.

Bottom-Up Perspective on Temporariness

Commitment

Commitment seems to facilitate the success of a project in many ways. For one, researchers have found that commitment to the project and project team could

lead to lower turnover (Bishop & Scott, 2000), hence less tacit knowledge and productivity loss (Droege & Hoobler, 2003). Moreover, because Parker and Skitmore (2005) found that most project turnover occurs during the execution phase, it appears important to foster early commitment, such as in the planning phase.

Projects are also characterized by the temporariness of their processes. Research on commitment to organizational change might help to inform us about how commitment to novel processes influences project team outcomes. Organizational change initiatives are similar to project procedures in that both may involve novel processes, are usually temporary, and are distinct from operational work (see Hobbs, Chapter 2 of this volume). In addition, organizational change initiatives and project procedures both work toward progressive elaboration, the goal of adapting or creating the means to an incrementally or radically new concept. In a study, Herscovitch and Meyer (2002) found that affective and normative commitment to a change led to better support for the change than continuance commitment. In addition, commitment to a change was more predictive of behavioral support for the change than was organizational commitment. This demonstrates the importance of matching the target of commitment as it relates to desired behavioral outcomes (Neininger et al., 2010; Riketta & van Dick, 2005). For example, we would expect project commitment to lead to behavior directed at achieving project success. Unsurprisingly, evidence in the literature has found that project commitment relates positively to team performance (Hoegl, Weinkauf, & Gemuenden, 2004).

Also, because a project is characterized by the temporariness of its duration, the work pace in a project context can be rather intense, especially near milestones (Chiocchio, 2007). Thus, team members near milestones often need to complete a great amount of work in a short time period. Hence, given the strong emphasis on stressful time constraints in project work (Chiocchio et al., 2010; Nordqvist, Hovmark, & Zika-Viktorsson, 2004; Zika-Viktorsson, Sundström, & Engwall, 2006), it is important that project team members develop commitment early on and maintain it until the end of a project to achieve project success, as committed team members are likely to sustain their motivation irrespective of external circumstances throughout the entire project.

Indeed, commitment can be harnessed to drive motivation throughout the project. Past research suggests that affective commitment may be facilitated by autonomous motivation (see Gagné & Deci, 2005). Autonomous motivation is generally characterized by wholly volitional activity and has been found to relate to greater task persistence (Gagné & Deci, 2005; Ryan & Connell, 1989).

Individuals who are autonomously motivated may also be intrinsically motivated, or interested in a task itself (Ryan & Deci, 2000). An individual who is intrinsically motivated to work on a project on the development of a sustainable design would find working on the project enjoyable and would be interested in gaining learning opportunities. This person is likely to be motivated because of his or her genuine interest in issues related to environmental responsibility. However, autonomously motivated individuals engage in an activity because of a freely made choice, and will sustain their motivation even if the task is not intrinsically interesting. Thus, individuals with strong affective commitment and autonomous motivation are likely to see the value of completing a project and are therefore willing to exert extra effort in difficult times, such as near a project milestone.

Identification

There are many ways in which project team identification seems to facilitate the success of a project. For one, because a project is characterized by the temporariness of its membership, dissimilarity among project team members is inherent, whether it is based on their position in the organization (e.g. unit, function) or on their skills (e.g. occupation, education). As mentioned above, perceived dissimilarity among project team members can impair project team identification. Yet, drawing on Bezrukova et al.'s (2009) findings, project team identification appears to be beneficial for project team effectiveness. This can be achieved through diverse means, such as transforming leadership practices (Walumba et al., 2008). This will prevent the perception of dissimilarity or the existence of subgroups (e.g., department, profession) within the team and negative consequences associated with both (e.g., conflicts, low performance). In addition, previous studies have linked organizational identification to lower employee turnover (Riketta, 2005). It would appear important to promote project team identification for retention purposes, as high unplanned/unforeseen turnover in projects could be very problematic, especially in component project teams that undertake specialized tasks of an even shorter duration than core or integrated project teams (Chiocchio, Chapter 3 of this volume).

Furthermore, high levels of team collaboration are important for project success (Chiocchio et al., 2012a). Identified group members deploy more collaborative behaviors because they see one another as more similar, in contrast with non-group members (Han & Harms, 2010). A strong identification creates a sense of belongingness and links the sense of survival of an individual to the survival of the group (Dutton et al., 1994; van Dick et al., 2008). Finally, project team identification would reduce conflict, since identified members do not pursue self-oriented goals over the goals of the project team (Dutton et al.,

1994) and develop more integrative communication processes (Mortensen & Hinds, 2001).

As mentioned above, a great amount of work sometimes needs to be done in a short time frame. Since identified project team members should experience the project team's successes and failures as their own (Lee, 2004), and see their fate as entangled with the project team's fate (Lee, 2004; Riketta, 2005; Tyler & Blader, 2001), they should strive for project team success, and thus exert extra effort if needed. In addition, identification has often been linked to organizational citizenship behaviors (Riketta, 2005; van Dick et al., 2008). This leads us to believe that identified project team members are more likely to put in extra effort or to help a project team member in order for the project team to succeed and meet the deadlines. The key issue is how to foster sustained project team identification across project phases.

Moreover, team members with a shared mental model (i.e., shared knowledge about the team, its objectives, and team roles) are more efficient at decision-making (Cannon-Bowers, Salas, & Converse, 1993) and coordination (Mathieu et al., 2000), and experience greater team efficacy (Marks, Zaccaro, & Mathieu, 2001). These characteristics should help project teams hindered by time constraints to be more successful. Moreover, because a project is also characterized by the temporariness of its processes, a shared mental model of the process of the project is a prerequisite to adequate decision-making regarding the outcome of the project. Identified project team members think and act according to the project team's perspective and, thus, have shared representations (Gautam et al., 2004; Hogg et al., 1995). Even if some authors suggest that identification could lead to groupthink (Terry & Hogg, 1996), it seems that because identified individuals are more abreast of team viability, highly identified members would dissent from the group decision if it was a threat to the group's viability (Packer & Chasteen, 2010).

Bottom-up Perspective on Complexity

Commitment

Two studies have found that commitment may lead to greater knowledge sharing (Chang, Yen, Chiang, & Parolia, 2013; van den Hooff & De Leeuw van Weenen, 2004), as committed team members are more likely to put in the extra effort to engage in behaviors helpful to the team that go beyond what is explicitly required of them. In addition, affective and normative commitment have been found to be positively related to organizational citizenship behavior (Meyer et al., 2002). This willingness to engage in discretionary behavior may be helpful in situations of task and role ambiguity in the project team context, as uncertainty in the environment may call team members to action when unexpected events occur.

In other words, highly committed people faced with high complexity will avoid passivity and will proactively share information, which is highly beneficial in project contexts. Greater knowledge sharing among team members is likely to facilitate higher project performance, as it leads to a more comprehensive consideration of alternatives and utilization of existing knowledge within a team (Stasser & Titus, 1985), and to effective team coordination as individuals learn more about the expertise of team members.

Identification

Project complexity can lead to the pursuit of irrelevant goals or following the wrong path. This can go unnoticed for a while because project work involves long performance episodes between milestones (Chiocchio, Chapter 3 of this volume). Yet, Ashforth & Mael (1989) suggest that identification acts as an uncertainty reducer by fostering shared mental models and increasing individuals' focus on common goals. Moreover, because the project encompasses a lot of uncertainty, it appears important that members share knowledge with other key individuals on the team, which is another aspect of complexity (i.e., structural complexity). Knowing who has pertinent knowledge refers to transactive memory: the extent to which team members *collectively* know who possesses what knowledge, trust the knowledge that one possesses, and can access the knowledge (Lewis, 2004). Identification can facilitate knowledge sharing through both collaboration and trust, and when identified members perceive that the knowledge they possess will benefit the project team (Liu & Phillips, 2011; van den Hooff, Elving, Meeuwsen, & Dumoulin, 2003). Hsu et al. (2012) examined transactive memory in implementation software development project teams and found that it was positively related to communication, coordination, and project performance. The key issue—not yet studied—is the moderating effect of the target of the identification. We believe that identification with the organization and with project goals are superior foci compared to identification with any subgroup within the team. However, if one identifies more strongly with a subgroup—such as similar professionals—transactive memory will be thwarted. This is because transactive memory requires *collective* beliefs regarding others' knowledge and a divisive form of identification (relative to the team) is not conducive to knowledge sharing. These are future research avenues worthy of investigation.

Conclusion

In summary, we have drawn an overview of commitment and identification constructs to launch a discussion on how practitioners can leverage these concepts

and provide scholars with objects of future studies. It is important to mention that for the sake of clarity and limited space we did not cover the distinction between those concepts, although articulated distinctions between those two constructs exist (see Gautam et al., 2004; Meyer et al., 2006, for an extensive review).

Implications for Project Management

We noted that commitment and identification in project contexts affect and are affected by many contextual, team, and individual factors. We also saw that many outcomes of value-based commitment and identification are crucial for project teams (e.g., increased effort, discretionary behaviors, knowledge sharing, collaboration, conflicts reduction, and shared mental models) and project success. Our review provides empirical evidence and theoretically driven suggestions pertinent to fostering commitment and identification and to using them as leverage toward effective project teams and successful projects. Project team identification can be attained through diverse means: enhancing the perception of common fate and common goals (Mael & Ashforth, 1992); enabling positive distinctiveness (Dutton et al., 1994); and promoting a clear and appealing vision of the project (van Veelen et al., 2012). Project managers are encouraged to engage in transformational leadership behaviors, as they are linked to enhanced identification (Kearney & Gebert, 2009; Walumbwa et al., 2008). Value-based commitment can be fostered through diverse means, depending on the foci of interest. For example, a project manager could emphasize the implication of the project outcomes on the environment and sustainability to appeal to individuals' environmental values and foster project commitment (Meyer & Herscovitch, 2001). Moreover, both project manager support and top management support are helpful for heightening project team members' commitment (e.g., Nah, Lau, & Kuang, 2001; Sumner, 1999; Swink, 2000; Neininger et al., 2010). Accordingly, organizations should work to clarify what is being done to support project teams and ensure that support is an adequate response to actual needs.

Future Research Avenues

Our examination of commitment and identity in the project context underscores multiple avenues for research. First and foremost, it is crucial to examine the interplay of multiple foci of commitment and identification with project success. As mentioned, numerous foci might hold inconsistent or even contradictory values and goals or, on the contrary, could be a resource for individuals to draw

on. Second, one cannot study projects and project teams without factoring in the passage of time. Future research should investigate how the amount of time spent on a project influences the individual's identification, and how progression through milestones and project phases impacts commitment and identification. Third, with regard to commitment, examining the relative importance of commitment to project goals in comparison to commitment toward the project team as a social entity for predicting project success may provide insight on whether project commitment or project team commitment should be leveraged. Differentiating the impact of commitment to the project team and commitment to the project may be pertinent in situations where it may be difficult to achieve high commitment to both foci. Fourth, because complexity is so important to project work, it would be interesting to test empirically the proposition from Hogg's (2000) uncertainty reduction theory that ambiguity and uncertainty, as they pertain to one's self-concept, foster a need for identification.

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9 CONFLICT IN PROJECT TEAMS

Frank R. C. de Wit

Project teams go through several stages during their project life cycle, and during each of these stages they may have to deal with conflict among their team members (e.g., Farh, Lee, & Farh, 2010; Jehn & Mannix, 2001). Project team members, for instance, may have different ideas about which features to add to a product or service. Likewise, they may fight about who is responsible for failing to meet a deadline. In this chapter, I will discuss the consequences of intragroup conflict for project team performance and address the question of when project teams are most likely to be hurt by intragroup conflict, as well as when they are able to benefit from it.

A better understanding of the consequences of intragroup conflict is important because project teams are likely to experience relatively high levels of intragroup conflict. A central element of project teams, for example, is that they tend to consist of team members who differ in terms of knowledge, expertise, and experience (see Chiocchio, Chapter 3 of this volume; Horwitz, Chapter 13 of this volume). Therefore, work-related disagreements are often lurking, as members of project teams are likely to have different viewpoints about important task and process-related issues (e.g., Homan, van Knippenberg, van Kleef, & De Dreu, 2007; Jehn, Northcraft, & Neale, 1999; Pelled, Eisenhardt, & Xin, 1999; Van Knippenberg, De Dreu, & Homan, 2004). This proneness to intragroup conflict is further enhanced by project teams' need to iteratively plan and define the task at hand. Because project teams often work on new and non-routine tasks, they often need to re-evaluate and change their course of action. This may create conflicts, especially if changes in the requirements of the project occur frequently (Liu, Chen, Chen, & Sheu, 2011) and when there is a lack of immediate communication among team members (Kankanhalli, Tan, & Wei, 2006).

Another issue is that project members can be involved in multiple projects at the same time. This may create conflicts, because due to other obligations and commitments, some team members may find it difficult to honor a project's deadlines and requirements. Social loafing may occur as well because due to their multiteam membership, team members may be inclined to put forth less effort working in a team than when working alone (Latané, Williams, & Harkins, 1979). Likewise, given that project teams last as long as the project or only for the duration of a portion or phase of the project (Chiocchio, Chapter 3 of this volume), team members may be relatively unconcerned with what other team members might think of them. They know that after the completion of the project they may go their own way. For some, this means there is little need to invest in building good relationships with other team members, and they therefore may be less inhibited in expressing grievances and/or taking out their frustration on their team members. This may especially be true for members of projects with a short duration and those in which members know they will not need to work together anymore in the near future.

Intragroup conflict is thus a central element of managing project teams, and it is important to understand when intragroup conflict will hurt or help project team performance. In this chapter I will review earlier research on intragroup conflict and derive propositions about the impact that conflicts may have on project team performance. I do this by first giving a brief overview of what is known from the organizational behavior literature about the consequences of intragroup conflict. Thereafter, I will discuss how these findings may apply to project teams, and will discuss possible differences among project and non-project teams. I will then discuss how some of the defining features of project teams may be important predictors of the way in which team members deal with conflict. In the final section of the chapter, I will discuss directions for future research and practical implications.

Intragroup Conflict and Team Performance

A distinction is typically made between three forms of intragroup conflict. These are task conflicts, which are disagreements dealing with the content and outcomes of a task; process conflicts, which are disagreements dealing with the logistics and distribution of assignments; and relationship conflicts, which are disagreements that are more personal in nature and that may arise because personalities do not match or because team members differ in their norms and values (e.g., Jehn, Northcraft, & Neale, 1999). To understand the difference between these different types of intragroup conflict, take for example a team

of software developers that is commissioned by one of their customers to design a new financial application. Team members may fight about the design of the application and the different features that the application should include (i.e., a task conflict). They could also fight about who will be responsible for building some of these features and when these features should be completed (i.e., a process conflict). Likewise, they could disagree about more personal issues, such as their preferences for a certain political party or their opinions regarding other members' behavior outside work (i.e., relationship conflict).

Recent meta-analyses of the intragroup conflict literature have illustrated that process and relationship conflicts tend to disrupt team processes and thereby lower team performance (e.g., De Wit, Greer, & Jehn, 2012; O'Neill, Allen, and Hastings, 2013). Relationship conflict, for instance, tends to create tensions among team members and causes team members to spend time on issues that are not relevant to the task at hand. It also reduces team members' willingness to communicate with each other and their commitment to the team (e.g., Amason, 1996; De Wit et al., 2012; Jehn, 1995). Teams that experience high levels of relationship conflict therefore tend to have relatively poor performance (e.g., Jehn, 1995; Jehn et al., 1999; Lau & Murnighan, 2005), and their team members tend to be more dissatisfied (e.g., Vodosek, 2007). Team members are also less trusting of each other (Simons & Peterson, 2000), and are less likely to show organizational citizenship behaviors, which are employee behaviors that are not critical to the task or part of the job description but serve to facilitate organizational functioning, such as helping out other team members (Choi & Sy, 2010; Lee & Allen, 2002).

Process conflict also tends to be negatively related to team outcomes (De Wit et al., 2012). One explanation for this negative effect of process conflict is that the issues that are debated during a process conflict, such as who will do what, and who will be responsible for certain aspects of the project, may quickly be taken "personally" and interpreted as signs of disrespect (cf. Jehn & Bendersky, 2003). Individuals may, for example, feel that they are assigned to a certain task because other team members do not believe in their capabilities to realize more sophisticated or complicated aspects of a task. As a result, they may interpret their specific task as a personal insult, which may cause frustration (Greer & Jehn, 2007), reduce team members' motivation to work for the team, and hamper team functioning (Greer, Jehn, & Mannix, 2008).

Regarding the impact of task conflict, research findings have been rather diverse. On one hand, especially experimental work on team decision-making has shown task-related dissent to facilitate superior decision-making (e.g., Nemeth, 1995; Schweiger, Sandberg, & Ragan, 1986; Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006). Task conflict may, for instance, encourage team

members to think more critically about their initial viewpoints. This may prevent team members from reaching premature consensus. Likewise, it may ensure that team members discuss alternative ideas and information that may otherwise remain unexamined (e.g., Schulz-Hardt et al., 2006). Together, this may result in superior and more innovative solutions. Moreover, it may increase the affective acceptance of a final decision because task conflict allows team members to voice their (alternative) viewpoints (Amason, 1996; De Dreu, 2006).

Despite the clear patterns found across experimental studies, studies on task conflict outside the lab reported less unequivocal results. Specifically, whereas several studies indeed reported a positive association between task conflict and team performance (Amason, 1996; De Dreu, 2006; Jehn, 1995; Li & Hambrick, 2005), many other studies found no or even a negative association between task conflict and team performance (e.g., Barsade, Ward, Turner, & Sonnenfeld, 2000; Jehn et al., 1999). Moreover, a meta-analysis of 25 studies on intragroup conflict showed that the average association between task conflict and team performance was as negative as that between relationship conflict and team performance (De Dreu & Weingart, 2003). This has led some to conclude that in many, if not most, circumstances, task conflict may hamper team effectiveness in the same way as relationship conflict and process conflict (e.g., De Dreu, 2008).

A more recent meta-analysis found no support for this conclusion, however. Across 95 studies that investigated task conflict, the average association between task conflict and team performance was neither negative nor positive (De Wit et al., 2012). The findings further suggested that teams can benefit from task conflict, but that this strongly depends on specific contextual characteristics. Task conflict and team performance, for example, were more positively related among studies where the correlations between task conflict and relationship were weak (rather than strong) and among studies conducted across top management teams rather than across teams lower in the organizational hierarchy.

Understanding the Effects of Task Conflict: A Contingency Approach

To better understand when teams can benefit from task conflict, several recent studies have investigated possible moderators of the relationship between task conflict and team performance. Figure 9.1 provides a brief summary of what has been found thus far. As can be seen in the figure, the effect of task conflict on team performance is mediated by an increased elaboration of the information available. Information elaboration entails the exchange of information and perspectives, individual-level processing of the information and perspectives, feeding back the results of this individual-level processing into the group, and

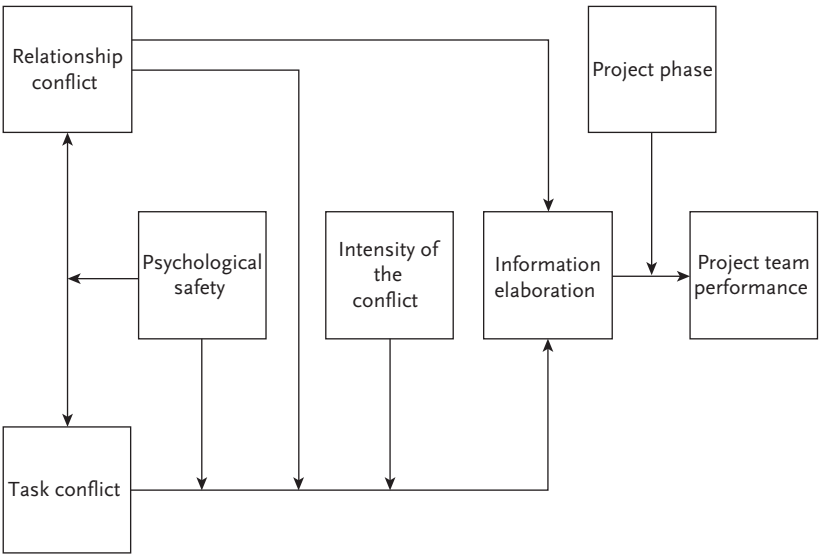

FIGURE 9.1 A task conflict–team performance moderated model

discussion and integration of their implications (Van Knippenberg, De Dreu, & Homan, 2004). There are at least four moderators of the association between task conflict, information elaboration, and team performance: the presence of relationship conflict, psychological safety, the timing of the conflict, and the intensity of the conflict.

The Presence of Relationship Conflict

Probably the most important factor determining whether teams can profit from task conflict is the absence (vs. presence) of relationship conflict. Meta-analyses of the intragroup conflict literature, for example, have shown that the reported association between task conflict and team performance has been more positive among studies that reported a weak (rather than a strong) association between task and relationship conflict (De Dreu & Weingart, 2003; De Wit et al., 2012). This suggests that teams may benefit from task conflict, but only when it does not come together with disagreement about more personal issues. Indeed, Shaw, Zhu, Duffy, Scott, and Shih (2011) recently found that when there is no or little relationship conflict among team members, moderate levels of task conflict may enable superior performance levels. Instead, when teams experience relatively high levels of relationship conflict, task conflict tends to be negatively related to team performance.

To better understand why teams fail to benefit from task conflict in the presence of relationship conflict, we recently conducted two experiments in

which we experimentally manipulated the presence (versus absence) of task and relationship conflict (De Wit, Jehn, & Scheepers, 2013). In the first study, we measured the extent to which participants misinterpreted the task conflict as a relationship conflict. In the second study, we experimentally manipulated the presence (versus absence) of relationship conflict. In both studies, our aim was to examine how the impact of the task conflict on decision-making was affected by the presence (vs. absence) of relationship conflict.

In line with Shaw et al. (2011), we again found that team members were more likely to benefit from task conflict when relationship conflict was absent. This occurred because team members were more willing to consider and accept diverging task-related viewpoints of other team members when relationship conflict was absent. Instead, when relationship conflict was present, and even when they knew that their own viewpoint was evidently incorrect, team members rigidly held on to their own initial viewpoint, rather than giving in to another team member's viewpoint. Additionally, team members started to process the available information in a more biased manner, such that they failed to consider and use information that contradicted their initial task-related viewpoint. As this information would have enabled them to find a mutually beneficial solution, team members ended up making suboptimal and incorrect decisions. As depicted in Figure 9.1, team members thus failed to reap the potential benefits of a task conflict due to relationship conflicts; it caused a lower elaboration of information, which subsequently caused inferior decisions due to an increased tendency of team members to hold on to their initially preferred but incorrect decision alternatives.

A crucial aspect in preventing a task conflict from co-occurring with relationship conflict is to prevent a task conflict from triggering a relationship conflict. This, however, is difficult because team members often take task conflicts too personally; people tend to experience scrutiny and/or rejection of their task-related viewpoints as a negative assessment of the self (e.g., Swann, Polzer, Seyle, & Ko, 2004). As a result, task conflicts are often perceived as personal attacks and regularly misinterpreted as relationship conflicts (e.g., Fisher & Ury, 1981; Simons & Peterson, 2000; Yang & Mossholder, 2004).

Psychological Safety

As shown in Figure 9.1, a crucial factor that may prevent task conflict to trigger relationship conflict is team members' feelings of psychological safety (i.e., the shared belief held by team members that the team is safe for interpersonal risk-taking, such as criticizing another's viewpoint and bringing up alternative ideas; Edmondson, 1999). Bradley, Postlethwaite, Klotz, Hamdani, and Brown (2012), for example, found that task conflicts have a more positive impact on team

performance when team members experience high levels of psychological safety, presumably, team members working in a psychologically safe environment "feel a sense of openness and avoid taking task disagreements personally" (Bradley et al., 2012, p. 152). Feelings of psychological safety are likely to be highest when team members approach other team members' diverging viewpoints in an open and considerate manner and when leaders encourage and welcome the team members inputs (e.g., Byrne & Barling, Chapter 6 of this volume; Nembhard & Edmondson, 2006). Together, these factors cause team members to feel more at ease when they want to express a diverging viewpoint, and to approach others in a less competitive and more understanding manner.

Intensity and Timing of Conflict

Figure 9.1 shows that, in addition to psychological safety and the level of relationship conflict, it is also important to consider the intensity of a task conflict and the time it arises during a team life cycle. With respect to the intensity of task conflicts in a team, De Dreu (2006), for example, found the effect on team innovation to have a curvilinear shape, such that team innovation was highest when teams experienced moderate levels of task conflict. One of the underlying reasons for this effect appeared to be that moderate levels of task conflict facilitated superior exchange of information, as well as more collaborative problem-solving, compared to low or high levels of task conflict.

In addition to the level of task conflict, it is also important to consider the timing of the task conflict. For instance, Jehn and Mannix (2001) found that the best performing MBA student teams experienced relatively low levels of task conflict during the first few weeks; then the level of task conflict rose during the middle weeks, and diminished again during the final weeks of the semester. The poor performing teams instead had moderate levels of task conflict during the early and middle stages of the semester, but experienced relatively high levels of task conflict during the last stages of the semester. Farh et al. (2010) found similar results with respect to creativity. In their study among project teams, creativity was highest at moderate levels of task conflict, yet only during the early phase of a project life cycle, not during later phases.

Teams may benefit from task conflict during the first stages of the project life cycle because during these first stages project teams formulate their task strategy. Because task conflict allows team members to share, debate, and integrate their diverging opinions regarding the strategy, it may facilitate greater information elaboration, and therefore lead to superior strategies and team effectiveness (see also Ford & Sullivan, 2004; Gersick, 1988). Moreover, as Farh et al. (2010) note, during the early stages of a project life cycle, team members are more able to dedicate the time and energy to adequately address

these diverging opinions. During the more mature phases of the project, this becomes more and more difficult, and changing the course of action will not come easily and without costs. Indeed "as one of the focal concern is to meet deadlines and keep costs within budget, teams can no longer afford to invest large amounts of time and resources needed to resolve and manage task conflict in a productive manner. As such, any potential for creativity due to moderate levels of task conflict may go unrealized during later phases of the team life cycle (Farh et al., 2010). Hence, as can be seen in Figure 9.1, although task conflict is likely to enhance information elaboration, the timing of the task conflict will determine whether this in turn has a positive effect on team performance.

The Impact of Conflict on Project Team Performance

The above discussion shows that teams tend to be hurt by process and relationship conflicts but may benefit from task conflict. It also shows that the positive impact of task conflict is contingent on specific moderating characteristics; teams should make sure they do not experience relationship conflict and should create a psychologically safe environment. Additionally, research shows that the level of task conflict should be kept at moderate levels and not occur too frequently, and can best be stimulated at the middle stages of task completion, rather than the early or last stages of task completion. The question is, however, whether these findings apply to project teams as well.

Relationship Conflict

The performance of project teams can be determined by at least three different indicators: the extent to which a project team meets its goals, whether it does so within the boundaries of the budget and schedule assigned to it, and whether the output is of high quality (Lewis, 1995; Liu et al., 2011). When teams experience relatively high levels of relationship conflict, it is very unlikely that they will score high on each of these performance indicators, first, because a relationship conflict causes team members to spend time and energy on issues unrelated to the task at hand. As a result, it will be more difficult for a project team to stay within the boundaries of the budget and schedule assigned to it. Second, as aforementioned, relationship conflict tends to hurt intragroup relationships. It, for example, makes it less likely that team members trust each other (e.g., Simons & Peterson, 2000), or that they show organizational citizenship behavior (e.g., Choi & Sy, 2010) and are truly committed to their team (e.g., Bayazit & Mannix,

2003). Relationship conflicts therefore make it less likely that project teams will attain their goals and deliver high-quality outputs.

Indeed, as can been in Table 9.1, a post hoc analysis of the meta-analytical data report by De Wit et al. (2012) shows that the overall association between relationship conflict and team performance in project teams is negative. Moreover, there is no significant difference between project teams and other types of teams when it comes to relationship conflict. In line with McGrath's (1984) task circumplex, these other types of teams include those working on (a) decision-making tasks where team members need to reach agreement about a certain solution but where there is no confirmable correct answer; (b) production tasks encompassing routine tasks that call for intellectual and physical task execution and where individuals try hard to meet certain standards; (c) creative tasks that call for innovation and/or creation of new products or ideas; and (d) a mix of the above tasks.

Table 9.1 Results for Categorical Moderator Analyses of Task Type Using the Data Reported by De Wit et al. (2012)[a]

Predictor	k	N	$\bar{r}$	$\hat{\rho}$	$SD_{\hat{\rho}}$	90% credibility interval		$SE_{\hat{\rho}}$	95% confidence interval	
Relationship Conflict—Group Performance										
Mixed	17	1,038	–.22	–.23	.20	–.55	.09	.06	–.35	–.12
Creativity	11	513	–.16	–.19	.16	–.45	.08	.07	–.32	–.05
Decision-making	21	1,931	–.13	–.14	.15	–.40	.11	.04	–.22	–.06
Project	16	1,073	–.11	–.12	.15	–.36	.11	.05	–.22	–.03
Production	8	530	–.20	–.24	.12	–.44	–.03	.07	–.36	–.11
Task Conflict—Group Performance										
Mixed	16	954	–.14	–.16	.18	–.46	.14	.06	–.27	–.04
Creativity	14	766	–.08	–.09	.26	–.52	.34	.08	–.25	.07
Decision-making	29	3,066	.08	.09	.21	–.25	.43	.04	.00	.17
Project	16	1,124	.00	.00	.18	–.29	.28	.06	–.11	.10
Production	12	688	–.17	–.21	.19	–.52	.09	.07	–.35	–.08

[a] The results presented here are new and were not presented in the De Wit et al. (2012) article.

Note: k = number of effect sizes; *N* = total sample size; $\bar{r}$ = mean estimate of uncorrected correlations; $\hat{\rho}$ = mean estimate of corrected population correlation, $SE_{\hat{\rho}}$ = estimated standard deviation of mean $\hat{\rho}$, $SE_{\hat{\rho}}$ = estimated standard error of mean $\hat{\rho}$.

Process Conflict

Only a handful of studies have examined the effect of process conflict in project teams; thus far, process conflict has been consistently linked with inferior performance levels in project teams (O'Neill et al., 2013). One might expect, however, that compared to other teams, process conflict might be less disruptive in project teams, for example, because the assignment of responsibilities is part of business-as-usual. Moreover, there is reason to believe that process conflicts may actually sometimes contribute positively to team performance (e.g., Jehn & Mannix, 2001). For example, at the early stages of a project team life cycle, process conflicts may assist team members in establishing specific work norms, which allows them to spend more time on the content of their tasks during later stages of the life cycle (e.g., Jehn & Mannix, 2001).

Indeed, a crucial aspect of the earlier project phases is to divide the different roles and responsibilities among the team members, making sure that everybody knows what to do and what is expected from them (e.g., Elonen & Artto, 2003; Gersick, 1988). Likewise, it is important during earlier phases to determine short- and longer-term goals. Research on project teams by Goncalo, Polman, and Maslach (2010) shows that it can therefore be problematic if project team members experience high levels of self-efficacy during earlier phases of the project. Indeed, Goncalo et al. (2010) argued and later found that "when collective efficacy is 'premature' by emerging at high levels too soon, it may actually suppress beneficial forms of conflict that are required in the early stages of a project to make long-term strategic decisions" (Goncalo et al., 2010, p. 21).

Other reasons that process conflict can be beneficial in project teams are that it overcomes issues such as groupthink or free-riding of team members. Groupthink refers to the inclination of team members to become overly concerned about maintaining team solidarity, causing them to fail to critically (re-)consider their decisions, initial opinions, and assumptions (e.g., Mullen, Anthony, Salas, & Driskell, 1994; Park, 1990). Process conflict helps to overcome groupthink by stimulating exactly such a critical evaluation and exchange of diverging process-related viewpoints. Likewise, by confronting people with their failure to meet deadlines or responsibilities, process conflict may overcome free-riding, which refers to a team member who contributes little to nothing but who ultimately benefits from the other team members' work. When doing so in the earlier phases of a project life cycle, process conflicts set a norm for other team members to contribute their share and to do so on time. Thus, process conflict may surmount one of the most common frustrations among the workforce: that team members may gain benefits from team membership but fail to bear a proportional share of the costs of providing the benefits

(Albanese & Van Fleet, 1985; Olson, 1965). In sum, although empirical evidence thus far has not shown project teams to benefit from process conflict, theory suggests that project teams may actually do so. I will return to this later in this chapter when I discuss possible moderators of the link between process conflict and project team performance. First, however, I will continue with how task conflict may affect project team performance.

Task Conflict

Three meta-analyses of the intragroup literature suggest that project and non-project teams differ in how task conflict affects team performance. The exact nature of this difference is unclear, however. Based on a meta-analysis of 28 studies, De Dreu and Weingart (2003), for instance, concluded that the relationship between task conflict and team performance has been more negative in studies conducted among project teams than in studies conducted among teams working on less complex tasks (e.g., assembly line work). No difference existed between project teams and other complex teams. For example, in studies among decision-making teams, the relationship between task conflict and team performance was found to be as negative as among project teams.

Also a more elaborate meta-analysis, recently conducted by O'Neill et al. (2013), found a significant moderating effect of the type of team. Yet, they found a different pattern than that observed by De Dreu and Weingart (2003). Based on a meta-analysis of 83 studies, they found that whereas task conflict tends to have a positive relation with team performance in studies on decision-making teams, the studies among all other types of teams are characterized by a negative relationship between task conflict and team performance. Hence, also among studies of project teams, the association between task conflict and team performance was found to be negative. This could lead one to conclude that compared to decision-making teams, task conflicts tend to have a more negative effect on team performance among project teams.

This conclusion should be taken with caution, however. De Wit et al.'s (2012) meta-analysis of 116 studies showed that when controlling for the influence of other moderators, such as the strength of the association between task and relationship conflict, the effect of team type on the strength of the conflict-performance relationship seems to disappear. This discrepancy between De Wit et al. (2012) and the other two meta-analyses can be ascribed to the methods used to analyze the data. Without going into much detail here, the difference lies in testing the effects of different moderators simultaneously (using WLS regression analysis, such as De Wit et al., 2012) or testing moderators in

isolation (using subgroup analyses, such as De Dreu and Weingart, 2003, and O'Neill et al., 2013).

For example, as can be seen in Table 9.1, a post hoc analysis of the data reported by De Wit et al. (2012) shows that the results are in fact highly similar to those of O'Neill et al. (2013) when using the same techniques as O'Neill et al. (2013) to assess the influence of the type of team. Indeed, when one does not control for the influence of other moderators, the data of De Wit et al. (2012) show that among decision-making teams, the task conflict-team performance relation is positive ($\rho = .09$) and significant (the confidence interval does not contain zero). Yet, the effect is neither negative nor positive among project teams, whereas it is significant and negative in mixed tasks ($\rho = -.16$) and production teams ($\rho = -.21$). Moreover, and similar to O'Neill et al. (2013), the difference between decision-making teams and mixed and production teams is significant.

Yet, in line with the findings earlier reported by De Wit et al. (2012), Table 9.2 shows that when one controls for other moderators (such as the strength of the correlation between task conflict and relationship conflict), the difference between decision-making teams and, for example, mixed-tasks teams is no

Table 9.2 WLS Regression Analysis Results for Group Performance Using the Data Reported by De Wit et al. (2012)[a]

Variable	Task Conflict—Performance			
	Model 1		Model 2	
1. Group Task				
a. Project	.22	(.10)*	.17	(.10)†
b. Creativity	.13	(.10)	.13	(.11)
c. Decision-making	.25	(.08)**	.10	(.10)
d. Production	−.05	(.11)	−.04	(.12)
2. Association task and relationship conflict			−.26	(.08)**
Constant	−.22	(.07)**	−.02	(.10)
R^2	.16		.24	
K	87		69	
Q_{model} (p)	16.29	(.003)	19.66	(.001)
$Q_{Residual}$ (p)	84.64	(.399)	62.39	(.498)
V		.05		

[a] The results presented here are new and were not presented in the De Wit et al. (2012) article.

Table 9.3 Results for Categorical Moderator Analyses of Task Type Regarding the Association Between Task and Relationship Conflict Using the Data Reported by De Wit et al. (2012)[a]

Predictor	k	N	$\bar{r}$	$\hat{\rho}$	$SD_{\hat{\rho}}$	90% credibility interval		$SE_{\hat{\rho}}$	95% confidence interval	
Relationship Conflict—Task Conflict										
Mixed	14	990	.47	.57	.28	.12	1.00	.08	.42	.73
Creativity	11	818	.41	.50	.27	.07	.94	.09	.33	.67
Decision-making	21	1,909	.06	.08	.61	−.93	1.00	.14	−.19	.34
Project	15	1,028	.49	.49	.34	−.08	1.00	.09	.30	.67
Production	8	521	.32	.38	.27	−.06	.83	.11	.17	.60

[a] The results presented here are new and were not presented in the De Wit et al. (2012) article.

Note: k = number of effect sizes; N = total sample size; $\bar{r}$ = mean estimate of uncorrected correlations; $\hat{\rho}$ = mean estimate of corrected population correlation, $SD_{\hat{\rho}}$ estimated standard deviation of mean $\hat{\rho}$, $SE_{\hat{\rho}}$ = estimated standard error of mean $\hat{\rho}$.

longer significant (see Table 9.2). In other words, the effect of team type disappears when one controls for the strength of the association between task conflict and relationship conflict. Hence, although it seems that teams may differ in how task conflict affects performance, there are stronger predictors of the association between task conflict and team performance that override any effect of the type of team.

There are a three things that have been left unnoted by De Wit et al. (2012) but that are particularly interesting for the current volume. First, as can be seen in Table 9.1, in studies among project teams the overall relation between task conflict and team performance was neither negative nor positive ($\rho = .00$) and was not significantly different from decision-making teams (see the overlapping confidence intervals). Second, as can be seen in Table 9.2, although the difference between decision-making teams and mixed-task teams (the reference category) is no longer significant when controlling for the strength of the co-occurrence of task and relationship conflict, the difference between project teams and mixed-tasks teams remains marginally significant ($p = .09$). Third, as shown in Table 9.3, in studies among decision-making teams the average strength of the correlation between task and relationship conflict is considerably lower ($\rho = .08$) than in the other types of teams, such as in project teams ($\rho = .49$).

What does this all say? Well, although the evidence is weak and indirect—as it is meta-analytical data and, thus, all based on study- and not team-level of

analyses, it hints that task conflict and team performance may be more positively related in studies among decision-making teams (see Table 9.1) because such teams are better at preventing task conflict from co-occurring with relationship conflict (see Tables 9.2 and 9.3). Put differently, the co-occurrence of task and relationship conflict might mediate the effect of team type on the association between task conflict and team performance. For example, decision-making teams differ significantly from mixed-task teams in terms of the association between task conflict and team performance (Table 9.1). Yet, they also differ in terms of the co-occurrence of task and relationship conflict (Table 9.3). And when both task type and the co-occurrence of task and relationship conflict are put in one WLS analysis to predict the association between task conflict and team performance, the effect of team type disappears, whereas the effect of the co-occurrence of task and relationship conflict remains significant, suggesting mediation (Table 9.2).

Yet, whereas the difference between decision-making teams and other teams might be explained by the fact that among decision-making teams task conflict does not co-occur with relationship conflict, this does not seem to be the case for project teams. Put differently, if indeed project teams are relatively unharmed by task conflict (see Table 9.1), this might *not* be because they are able to prevent task conflict from co-occurring with relationship conflict. This is because, as can been seen in Table 9.3, in project teams task conflicts seem to co-occur with relationship conflicts relatively frequently. Therefore, there should be another reason that project teams might be able to benefit from (or be hurt less by) task conflict than other types of teams. In the next section, I will propose that several project team–specific factors may explain why project teams may sometimes benefit from intragroup conflict.

The Impact of Intragroup Conflict in Project Teams: A Contingency Approach

The model depicted in Figure 9.2 presents a nuanced model of conflict in project teams, as it moves beyond the uniform positive or negative effects of intragroup conflict. A few things are similar to the model presented in Figure 9.1. The central idea, for example, is that conflicts affect team performance by lowering or enhancing team members' elaboration of work-related information. More specifically, whereas task and process conflict may enhance information elaboration, relationship conflict is likely to impair it. This can be directly, for example, because relationship conflicts distract people from the task. Yet, it can also be indirectly, because relationship conflicts obstruct a possible positive effect of task conflict by causing individuals to be biased toward information that supports

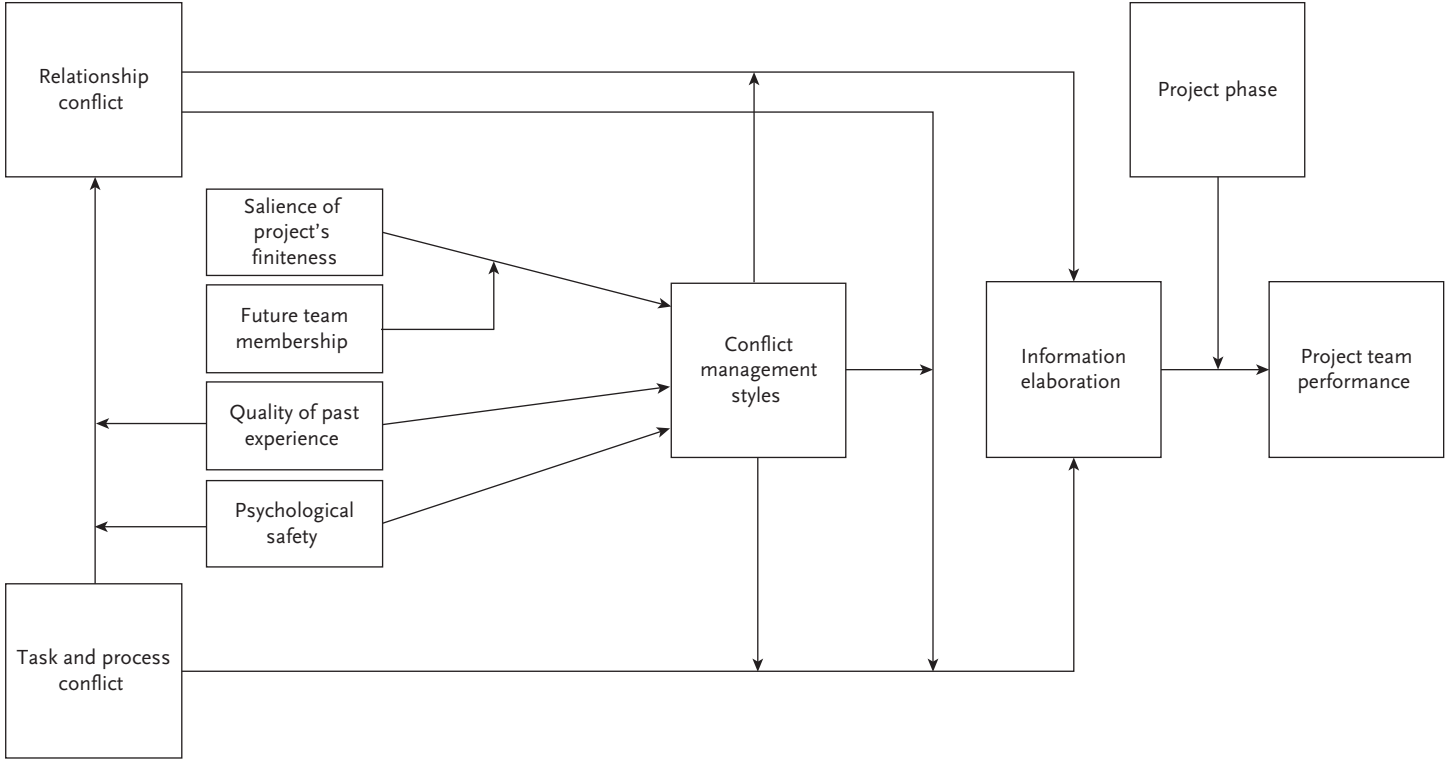

FIGURE 9.2 An intragroup conflict–project team performance moderated model

their own information during task conflict (see De Wit et al., 2013). The model also again includes the effects of psychological safety and the timing of the conflict. Feelings of psychological safety may prevent task conflict from triggering relationship conflict, as well as moderate the effect of task conflict on information elaboration and group performance (such that task conflict may improve information elaboration, yet only when team members feel psychologically safe; see Bradley et al., 2012). Likewise, for process conflict, and especially task conflict, the timing of a conflict is proposed to be important, such that moderate levels of both types of conflict may improve information elaboration, but only when it occurs in the early stages of a project life cycle (e.g., Farh et al., 2010).

Propositions

Conflict Management Styles

Most research on intragroup conflict has focused on the different types of conflict and their effects on team performance. Yet, an arguably equally important factor is the way a conflict is managed (DeChurch, Mesmer-Magnus, & Doty, 2013). When it comes to managing intragroup conflict, a distinction is typically made between three approaches: avoiding, collaborating, and competing (e.g., Putnam and Wilson, 1982). These approaches can be seen as "moving away," "moving toward," and "moving against" someone else during a conflict (e.g., De Dreu and Vianen, 2001). In other words, when people *avoid* a conflict, they simply ignore their diverging viewpoints and leave them for what they are. When people decide to *collaborate* with others during conflict, they try to find a solution that is acceptable to all (e.g., Thomas, 1992). When conflict parties *compete* with each other, they tend to focus on winning the debate and having others concede and embrace their ideas.

Research suggests that conflict management styles have an important effect on team functioning (e.g., Behfar, Peterson, Mannix, & Trochim, 2008). For example, compared to avoiding or competing, a collaborative approach during conflict is associated with higher levels of team-directed citizenship behaviors (Jackson, Colquitt, Wesson, & Zapata-Phelan, 2006), as well as team performance (Behfar et al., 2008). This can be explained by the fact that when team members manage intragroup conflict in a collaborative manner, they show a concern for other team members. Likewise, they show a tendency to cooperate with other team members to accomplish the team's goals. Conversely, when individuals avoid or compete during conflict, they show a greater tendency toward individual concerns and goal accomplishment because they "preserve individuality and subjugate the entitativity of the team to safeguard the disparate views of its members" (De Church et al., 2013, p. 561).

In project teams, it is therefore likely that team members' conflict management styles moderate the impact of intragroup conflict on team performance. First of all, a collaborative approach is likely to enable task and process conflict to have a positive effect on team performance. That is, when team members have different task- or process-related ideas, a collaborative approach may facilitate the effective integration of these ideas. Instead, when team members avoid task and process conflict, team members may fail to consider important alternative viewpoints and therefore forgo possible superior solutions to the task at hand (e.g., Schulz-Hardt et al., 2006). Likewise, a competitive approach to intragroup conflict increases team members' reluctance to disconfirm initial preferences and may also lead to derogation of counterparts, which may damage group functioning, in both the short term and the long term (De Dreu, 2008; De Dreu, Weingart, & Kwon, 2000; Rubin, Pruitt, & Kim, 1994; Tjosvold, 1998; Toma & Butera, 2009). Given all this, I propose the following:

> *Proposition 1*: Task and process conflicts may be positively related to information elaboration and project team performance, yet only when project team members adopt a collaborating conflict management style (rather than an avoiding or competing conflict management style).

In terms of relationship conflict, research shows that an avoiding response may actually be most beneficial. Across 27 organizational teams, De Dreu and van Vianen (2001), for example, found that the best performing teams were those that applied an avoiding conflict management style to relationship conflict, rather than more competitive or collaborative conflict management styles. It is likely that the same is true for project teams. By avoiding a relationship conflict (so ignoring the issue at the heart of relationship conflict), group members will be able to concentrate on the task itself. This makes it more likely that project teams attain the goals they have set for themselves and do so within the boundaries of the budget and schedule assigned to the team. Competitive approaches are instead likely to escalate relationship conflicts and to make them intractable. This is because the issues at the heart of relationship conflict are often very closely tied to individuals' self-concept, and when this is being attacked, very defensive responses are triggered. The same is true for more compromising approaches. Although the intentions are perhaps more constructive, finding a middle ground is often impossible because sudden changes in, for example, someone's political preferences are very unlikely. Indeed, seeking "mutually acceptable solutions through give and take is unlikely to solve the relationship conflict and instead make it loom bigger and intractable" (De Dreu & Van Vianen, 2001, p. 313). Thus far, it remains to be seen whether project teams may indeed be less

negatively affected by relationship conflict when they apply an avoiding conflict management style. I propose, however, the following:

> *Proposition 2*: Relationship conflicts are less likely to be negatively related to information elaboration and project team performance when project team members adopt an avoiding conflict management style, rather than a collaborating or competing conflict management style.

Salience of a Project's Finiteness

Figure 9.2 shows that a mix of project characteristics may determine how team members manage team conflicts. Central here is the question of whether project characteristics tend to increase or instead lower individuals' concern for their team and the other team members. Take, for example, the finiteness of project teams. This might be particularly salient for component project teams (see Chiocchio, Chapter 3 of this volume) or project teams with only a short duration and/or those that approach their completion. On the one hand, one can argue that the salience of a team's finiteness can make team members approach conflict with a more competitive mindset. As they know that after project completion they may go their own way, team members might be less concerned with what other team members might think of them. Likewise, they may also be less afraid of hurting their relationships with other group members. As a result, they may be less inhibited in expressing their grievances and taking out their frustration with their team members when this serves their own interests.

On the other hand, the finiteness of project teams may also prevent conflicts from escalating, and instead may make individuals more likely to avoid the conflict. That is, when team members work together for only a limited period of time, they might more easily "bite their tongue," as they know that soon enough they will not have to work with the other group members anymore. Whether the finiteness of a project teams triggers an avoidance or a competition response may depend on the likelihood that team members will be working together in the near future. For example, in some cases, team members know that there is high chance of working together on future projects. When the chance of such a future collaboration is high, the finiteness might trigger an avoiding response (they have something to lose, as any animosity may backfire during a next project). Yet when the finiteness of the project team is salient and the chance of a future collaboration is low, team members might more easily go for a competitive approach (they have little to

lose, as they will not be working together very soon). Hence, I propose the following:

> *Proposition 3*: When team members *do not* expect to work together on future projects, then the more salient the finiteness of a project team, the more likely that project team members will adopt a competing (vs. collaborating or avoiding) conflict management style.
> *Proposition 4*: When team members *do* expect to work together on future projects, then the more salient the finiteness of a project team, the more likely that project team members will adopt an avoiding (vs. collaborating or competing) conflict management style.

Future Team Memberships

Individuals often go from one project to another and may be involved in multiple projects at the same time (see Horsman & Kelloway, Chapter 11 of this volume, and Mathieu, D'Innocenzo, & Kukenberger, Chapter 5 of this volume, for more on multiple team membership). It is therefore not uncommon for project team members to work with the same people on multiple projects. As a result, team members may have a shared history, and any positive or negative experiences may easily carry over onto the current project. For example, when team members get into a nasty argument, this may affect how they will treat each other during future interactions. Relationship conflicts are very likely to carry over to other projects. Relationship conflicts are negatively associated with how much team members trust each other (Simons & Peterson, 2000) and the willingness of team members to approach each other with an open mind (De Wit et al., 2013). More broadly, one can argue that any negative past sentiment a team member has had regarding a fellow team member is likely to make him or her more competitive during conflict (Janssen, Van De Vliert, & Veenstra, 1999). Indeed, it may encourage hostile interpretations of each other's ideas and suggestions, thereby creating "a self-fulfilling prophecy of mutual hostility and conflict escalation" (Simons & Peterson, 2000, p. 104). Therefore I propose the following:

> *Proposition 5*: When project team members have negative (vs. positive) past interpersonal experiences, it will be more likely they will adopt a competing (vs. collaborating or avoiding) conflict management style when facing an intragroup conflict.

Discussion

Directions for Future Research

DeChurch et al. (2013) recently noted that "despite abundant prescriptive advice originating from both the applied and academic communities regarding how teams "should" manage differences, the development of practical evidence-based prescriptions has been impeded by an overemphasis on *what* teams are disagreeing about and an underemphasis on the manner in which they manage those differences." (p. 565). One direction for future research is therefore to examine (i) when and why project team members will adopt an avoiding, collaborating, or competing approach to an intragroup conflict, and (ii) how these conflict management styles affect the association between intragroup conflict and project team performance. In this chapter I have made a start by proposing that some of the defining features of project teams might predict how team members manage intragroup conflict. Future research may examine whether, for example, a project's finiteness makes it more likely that team members adopt a competitive approach to intragroup conflict, or instead whether it makes team members more likely to avoid conflict.

The propositions presented in this chapter can be tested by means of a field study in which the type, intensity, and style of managing conflicts will be assessed across different project phases and project teams. Future research, however, could also take an experimental approach (e.g., De Wit et al., 2013; Schulz-Hardt et al., 2006). For example, one can think of running an experimental study in which the salience of the finiteness of the team, as well the need for team members to work together on a future task, is manipulated. An intragroup conflict can subsequently be induced, and team members' management of the conflict assessed.

Another idea for future research is to examine whether project teams indeed may profit from task conflict, despite the fact that task conflicts co-occur with relationship conflict. As indicated by the results presented in Table 9.3, it might be that project teams may be able to profit from task conflict for other reasons than decision-making teams. That is, in decision-making teams task conflict tends to be relatively weakly correlated with relationship conflict, which may explain why decision-making teams are most likely to profit from task conflict. The typical correlation between task conflict and relationship in project teams has been found to be much higher. Future research might therefore examine when, if, and why project teams are able to overcome the negative effects of relationship conflict.

Finally, thus far, most research on intragroup conflict in project teams has been based on studies conducted on student teams (cf. Liu et al., 2011). Although such teams resemble real project teams in terms of the finiteness of the project, they differ in many respects from organizational project teams, for instance, because teams working in organizational settings "have a longer history of past interactions and may work on several different types of tasks" (Goncalo et al., 2010, p. 21). In addition, project teams are often not properly classified or recognized (Chiocchio & Essiembre, 2009) and organizational psychologists *typically* do not consult project management literature for a richer view of the project reality. Future research on intragroup conflict should therefore focus more on actual project teams and acknowledge the specific characteristics of project teams.

Practical Implications

An important implication of the research discussed in this chapter is that it is best for project teams to prevent process and relationship conflicts because these conflicts tend to hurt project team performance. Another implication is that when it comes to task conflict, project teams should try to use opposing viewpoints to their own advantage, as it may stimulate a greater elaboration of information and thereby enhance decision-making and creativity. This positive impact of task conflict depends on several moderating characteristics, however. For example, teams should make sure that task conflicts do not trigger relationship conflicts because as soon as things become too personal, people become defensive and rigid in holding on to their initial viewpoints. If conflicts do arise, teams conflicts should manage task and process conflict in a collaborative manner. In case of relationship conflict, it is probably best to ignore the conflict and focus on the task at hand. A final implication of this chapter is that the different conflict management styles might be closely related to the characteristics of the project team, and therefore an awareness about how these characteristics may shape conflict management is warranted.

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10 BULLYING IN PROJECT TEAMS

Catherine Loughlin and Lindsay Bryson

Workplace bullying appears to be a relatively new area in the field of organizational behavior, and there is an urgent need for empirical work that investigates the contexts, causes, and contingencies of bullying as well as its main consequences and ways of coping with it.

—LANGAN-FOX & SANKEY, *2007, p. 70*

Everyone is supposed to "get along" somehow. The only well-oiled teams I have seen are that way because of a project leader with the skills to make it work.

—SLEVIN & PINTO, *2007, p. 13*

Introduction

As our first quote suggests, the study of bullying in organizational behavior is relatively new, in the area of project management, the topic appears to be virtually nonexistent. Fortunately, there are well-developed literatures in several areas of psychology that can inform such a discussion (e.g., personality, social, organizational, and/or occupational health psychology). Because little has been written on the topic of bullying in project teams, much of this chapter will be speculative. However, we hope to raise some questions that can act as an impetus for future research. There is reason to believe that this issue will be a significant challenge for organizations in the future if global trends continue. In the pages that follow, we will discuss how bullying is defined in the organizational psychological literature, and some of the problems associated with applying these definitions to project contexts. We will consider common predictors of bullying (individual, social, and organizational), and will examine the extent to which bullying is a process that can be monitored and disrupted early in its development. Finally, we will discuss interventions aimed at each level of predictors in reducing this behavior in contemporary project teams.

Global Trends

In their classic article on teams, Allen and Hecht (2004) argue that much of the "romance" of teams lies in the powerful social-emotional and competence-related benefits they provide to members. The social support offered by teams and the power of working toward a common goal can be highly motivating. However, Delisle's (2007) review of five important trends now facing project teams suggests serious threats to the potential for such social-emotional and competence-related benefits in many modern project teams. Delisle (2007) describes organizations that are "losing their ability to plan and prioritize because they practice crises management to handle *dramatically increased workloads*" (p. 40). Second, she notes that over half of employees surveyed in project teams are now being forced to "donate" around 50 unpaid days of *overtime* a year for fear of losing their jobs. Third, she refers to "organizational anorexia" whereby organizations "chose downsizing as a preferred method for restoring competitiveness even when they know they have *too few resources* and exponentially increasing workloads" (p. 43). Fourth, she talks about senior executives' short tenures and resultant tendency to focus on implementation plans with "*shorter time frames* that focus on short-term business results" (p. 43). Finally, she highlights the need for globally mobile workers with technical and interpersonal skills. All of these trends have direct implications for work stress and the potential for bullying, as the pressure to do more with less becomes palpable in project teams. These global trends may be creating environments primed for bullying behavior.

Job-Design Theory Can Inform Practice in Project Teams

For some time now, researchers interested in public policy have argued that the costs of work and role overload in terms of work-life conflict and health problems were unsustainable (e.g., Duxbury & Higgins, 2001). When these trends are added to the inherent temporary, unique, and ambiguous nature of project teams, the result is potentially high levels of uncertainty and stress for those involved. We will argue that these stressors have now reached a point where we are creating environments ripe for abuse by some individuals, where bullying can become part of the culture in project teams if the appropriate structures are not built into organizational systems.

In the project management literature, leaders are told that if they want high-performing project teams they need to foster "mental toughness, cohesion, and motivation" (Delisle, 2007, p. 53) or strong "psychological contracts" (Huemann, Turner, & Keegan, 2007, p. 137) in their teams. However, there is little guidance on *how* to do this, and no discussion of how to design jobs that

might foster these attributes. "Job design" involves structuring jobs in such a way that organizational efficiency, quality, and productivity are increased, and individuals performing the jobs are satisfied and motivated (Griffin & McMahan, 1994). Authors in the project management literature seem to dismiss job design because "projects are unique and transient, with high uncertainty. It is often not possible to define precisely the requirements of the current job" (Huemann, Turner, & Keegan, 2007, p. 119). The social aspects of such teams are also routinely overlooked.

This attitude toward job design and interpersonal relationships is unfortunate, and no longer sustainable. There is a rich literature on job design in organizational psychology (and across disciplines) that can inform practice in project teams. For excellent reviews, see the *Journal of Organizational Behavior* (Grant et al., 2010), the *Journal of Industrial Relations* (Knox et al., 2011), or the recent special issue in *Human Relations* (e.g., Loughlin & Murray, 2013). In terms of the social aspects of teams, this defeatist attitude is also regrettable, as studies of teams have repeatedly demonstrated that even one team member who is low on interpersonal skills can decrease the performance of the entire workgroup (Kusy & Holloway, 2009). We will return to these issues shortly; however, suffice it to say, effective job design is a cornerstone of creating healthy workplaces free of bullying. In the next sections, we will discuss how bullying is defined in the literature (and some of the challenges this poses for identifying it in project teams); we will then discuss some consequences and causes of bullying, particularly in project teams. Although we will discuss individual-level predictors of bullying, most of our discussion will focus on how we can better learn from the job design literature in organizational psychology to build work environments that diminish the propensity for bullying in project teams. Finally, based on what we know from organizational psychology, we will identify five steps that organizations can take to reduce bullying in project teams.

Defining Bullying in Project Teams

> Call them what you will: control freaks, narcissists, manipulators, bullies, poisonous individuals, or humiliators … what these people do: poison, corrupt, pollute, and contaminate.
>
> —KUSY & HOLLOWAY, *2009, p. 3*

Bullying has been defined as negative behaviors directed toward one or more members of an organization that are *recurring, persistent, and continuous* (Einarsen & Skogstad, 1996; Vartia, 1996), typically *lasting at least six months* (Langan-Fox & Sankey, 2007). Studies have found that two out of three victims

report incidents lasting more than one year (Hoel & Cooper, 2000). Bullying is a form of interpersonal aggression or hostility (Salin, 2003). Some examples include visible acts of aggression, such as screaming or threatening, and passive aggressive acts such as social isolation, starting or spreading rumors about the target, excessive criticism or monitoring of an individual's work, and/or withholding information or responsibility. The latter are more difficult to detect, as they can be subtle and therefore harder to identify as aggression. Bullying differs from general violence and aggression in that it only occurs between members of an organization (Salin, 2003). (See Table 10.1 for a comparison of bullying to related constructs.)

Table 10.1 Definitions and Examples of Workplace Bullying and Related Constructs

Construct	Definition	Citation	Example
Abusive Supervision	Excluding physical contact, supervisor's ongoing display of hostile verbal and nonverbal behaviors.	Tepper, 2000	Public criticism, rudeness
Antisocial Work Behaviors	Behaviors demonstrating a lack of concern for the interests and needs of the organization and/or its members, such as violating workplace norms.	Aquino & Douglas, 2003	Retaliation, social loafing
Counterproductive Work Behaviors	Overt or passive acts that are intentional and meant to harm an organization or its members in a way that affects their functioning.	Spector & Fox, 2005	Overt: Stealing from an organization Passive: Refusal to follow instructions
Employee Emotional Abuse	Repetitive, targeted, destructive communication in an organization by more powerful members toward less powerful members.	Lutgen-Sandvik, 2003	Deliberately sabotaging subordinate's work, changing work responsibilities to force resignation.

(continued)

Table 10.1 (Continued)

Construct	Definition	Citation	Example
Mobbing	Harassment of a member by a group of other members. Term used widely in many European countries.	Sperry, 2009	Spreading rumors about a colleague, not inviting coworker to group gatherings.
Social Undermining	Intentional targeted behavior that inhibits work-related success, favorable reputation, and maintenance of interpersonal relationships.	Duffy, Ganster, & Pagon, 2002	Disregarding qualifications and voting against an employee's promotion
Workplace Aggression	Behaviors range from psychological acts to physical assault; aggressors may be anyone coming in contact with a worker.	LeBlanc & Barling, 2004	Silent treatment, destruction of property
Workplace Bullying	Aggressive or hostile behaviors directed toward one or more members of an organization that are persistent & recurring.	Einarsen & Skogstad, 1996; Vartia, 1996; Salin, 2003	Spreading rumors, social exclusion, undermining, removing responsibilities, yelling, blocking promotion, setting impossible deadlines, intruding on privacy, constant criticism.
Workplace Incivility	Violating workplace norms by acting with disregard for others in the workplace, less severe than workplace aggression.	Andersson & Pearson, 1999	Failing to say please or thank you, talking loudly when a coworker is on the phone
Workplace Ostracism	Being ignored or excluded by others. A radical form of peer pressure, involves exclusion of individual from interaction in a social group.	Ferris et al., 2008; Masclet, 2003	Avoiding eye contact, giving worker the "cold shoulder"

Definitions of bullying include a perceived *imbalance of power* between the perpetrator and the target, and bullies are often "leaders" or senior organizational members (Ashforth, 1994; Langan-Fox & Sankey, 2007; Zapf, Einarsen, Hoel, Vartia, 2003). Negative behaviors occurring between two parties are not typically considered bullying if both parties believe they hold the same amount of power (Einarsen & Skogstad, 1996; Vartia, 1996). If a power imbalance did not exist, it is assumed that the individual on the receiving end of the hostile behaviors would have the capacity to tolerate the aggression or to retaliate against the aggressor (Salin, 2003). Power does not necessarily refer only to an individual's position within the company; a perpetrator may use knowledge of a target's vulnerabilities to bully him or her, and this may be an informal source of power that contributes to bullying behaviors (Hodson, Roscigno, & Lopez, 2006; Hoel & Cooper, 2001).

Estimates of its prevalence across contexts vary widely, but bullying seems most common in large, male-dominated contexts (e.g., "total institutions" such as the military or paramilitary organizations typically have higher levels of bullying reported; about half of business school and medical professionals also report experiencing some form of bullying). Healthcare environments are an exception to this rule, where despite high levels of female representation, bullying, particularly from clients, is not uncommon (it is not unusual for one-third of healthcare respondents to report experiencing bullying in a given year; Langan-Fox & Sankey, 2007).

There are at least two challenges in generalizing these accepted definitions of bullying in the organizational psychology literature to project teams: first, according to these definitions, bullying is only categorized as such if it is recurring (e.g., lasting at least six months; Langan-Fox & Sankey, 2007). While one can appreciate the need to differentiate bullying from "isolated" workplace incidents, this definition may make little sense for project teams compared to other contexts. Projects are by definition temporary endeavors that are used to create results and are then designed to dissolve (Dinsmore & Cabanis-Brewin, 2006; Söderlund, 2011); consequently, some project teams themselves may exist for less than this duration. In our fast-paced global economy, where entire projects are completed in less time and at very high intensities, there is also the sense that time is being compressed to some extent. This has not been acknowledged in the literature. In the project management context, we may need to recognize the extent to which bullying is a "process" and look for signs of this behavior earlier in its progression. As we will discuss next, a better understanding of the "phases of bullying" may be a considerable step forward in this regard. This is important, not just in terms of understanding bullying in project teams but also in terms of timely interventions to

stop this behavior. Waiting six months to intervene may make little sense in the context of many project teams. Perhaps it makes more sense in the project context to talk about *frequency* rather than the duration of these negative interactions. Further, as the power differential between individuals increases, a lesser number of incidents (and of less severity) may be necessary to reach a critical threshold.

The second major challenge with applying current definitions of bullying in organizational psychology to project teams lies in the fact that power imbalances can be much more subtle in the project context. For example, there can be large power discrepancies between individuals who are nominally "peers" on the organizational chart (e.g., project managers vs. functional managers in a given context). The ranking of projects and initiatives by senior managers in strategy and alignment sessions is often far removed from the realities of the shop floor. Consequently, determining power differentials in modern project teams populated by subject matter experts can be anything but straightforward, particularly in project-based organizations with long-standing members. For example, it would not be unusual for a high-ranking process improvement executive brought in from outside an organization to head up a change initiative and to be bullied by a long-standing internal head of production (who may be opposed to the efforts). To our knowledge, the way in which definitions of bullying might differ for project teams in terms of power dynamics has not been considered in the literature, but this is definitely an area ripe for study. Issues around power are particularly interesting in this more fluid context, where one's position on the organizational chart may have little to do with controlling the resources or information necessary to get things done in a project context (e.g., where competing projects are vying for central shared services). Studies collecting data "in the field" could do much to inform our understanding of how power might be different in a project context and how this links to the potential for bullying behavior.

Interestingly, Bjorkqvist (2001) acknowledges that in workplace bullying a "single act may be regarded as bullying when characterized by abuse of power" (p. 438). This is an important exception in the literature that is particularly relevant to project teams. In situations where the stakes are high and people are proving their "metal" as subject matter experts, all it may take for a leader to severely "wound" a team member may be to publicly humiliate that person even once, particularly if done near the beginning of the project life cycle. People learn vicariously very quickly in such emotionally charged situations, and these types of symbolic acts carry a lot of weight. As Kusy and Holloway (2009) documented in their study of toxic workplaces, such acts can also lead peers to "back off" for fear of being targeted by association.

Phases of Bullying

Authors have noted that bullying is an evolving and escalating process (e.g., Einarsen and Skogstad, 1996; Langan-Fox & Sankey, 2007) and both three-phase (Bjorkqvist, 2001) and four-phase models (Leymann, 1996) of bullying have been proposed. In Leymann's model, a critical event triggers the conflictual situation, proceeding to bullying and stigmatization. The target then complains to management, and the cycle ends with the target leaving the organization. Bjorkqvist's model recognizes a first phase involving indirect methods such as spreading rumors, escalating to a second more direct phase where the person becomes isolated or humiliated in public (e.g., the butt of jokes). Finally, the bullying intensifies to the use of extreme aggression, whereby the target is openly threatened, and so forth. Both models suggest that there is little that a target can do to change the situation once the cycle has begun (at this point, bystanders and senior management are already complicit in accepting the behavior). Both models suggest that the "shame, humiliation, self-doubt, and isolation... disables any coping mechanisms a victim might employ" (Langan-Fox & Sankey, 2007, p. 68).

Projects also have phases (as discussed by Hobbs in Chapter 2 of this volume), and in contrast to the technical life cycle discussed in the project management literature (where uncertainty decreases as the project progresses), the opposite may well be true for the "human resources" working on many projects. As the project progresses, the uncertainty around their job security, for example, actually increases. Employees may become concerned about who they will have to work with on their next project, what the next project will be, and/or possibly if there will be a next project (Turner, 2007). This is only likely to exacerbate the likelihood of interpersonal conflict at particular phases of the project life cycle.

Research into how the phases of bullying interact with these project phases could be interesting (e.g., do the phases of bullying differ in short duration, particularly high intensity, project teams?). In a recent book edited by Sinclair, Wang, and Tetrick (2013), Schonfeld and Mazzola emphasize the utility of incorporating qualitative methods into theory development and discovery in occupational health research (in contrast to a rich tradition of quantitative research). This may be particularly illuminating in the project context, where so much in the environment is in constant flux. Mathieu et al. (2008) do an excellent job of outlining how complicated it has become to study team behavior given the dynamic nature of modern workplaces, and also suggest that we may need to begin thinking about different approaches to our research (e.g., more qualitative studies informed by context). To our knowledge, these issues have not been considered in the literature, and may benefit from being explored particularly

through qualitative research or mixed methods approaches (e.g., surveying members of a project team during each phase of the project for links to bullying behavior). Researchers will also need to be sensitive to the fact that the phases of a project may have distinctly different effects on "human resources" than on other "resources," and to the extent that within-subject stress scores increase as the project progresses, there may be implications for bullying behavior. In terms of better understanding bullying in project teams, two specific ways to move the literature forward in this regard would be to (1) study teams long enough to experience at least one full project cycle, so as to understand how these phases might interact with experiences of bullying; and (2) use methods that can address the complexity of context (e.g., previous interactions between teammates matter); diary methods (for example) could allow the complexity of experiences to emerge. This type of study would also allow researchers to assess how bullying in project teams might be different from more traditional work arrangements and would aid in creating a better definition of bullying within the context of project management (e.g., where does "pushing" to meet a deadline cross into bullying in a project context).

Consequences of Bullying Behavior

A recent study in the United Kingdom estimated the economic costs of bullying to organizations (i.e., from absenteeism, turnover, and productivity loses) at approximately 13.7 billion pounds per year (approximately $21.7 billion CAD; Giga, Hoel, & Lewis, 2008). When supervisors develop a bullying leadership style, employees working under them are at greater risk of mental and physical health problems. Bullying may also affect a target's self-esteem, cognitive functioning, and physical and emotional health (Brodsky, 1976; Einarsen & Mikkelsen, 2003; Keashly & Harvey, 2005). Employees who are bullied become stressed (Balshem, 1988), which can lead to increased risk of depression (Namie, 2003; Repetti, 1993) and burnout, characterized by overwhelming exhaustion, feelings of cynicism and detachment from the job, and a sense of ineffectiveness and lack of accomplishment (Maslach, Schaufeli, & Leiter, 2001, p. 399; Agervold & Mikkelsen, 2004). Lutgen-Sandvik (2002) found that the degree to which an employee was bullied correlated positively with stress. Exposure to this type of unhealthy working environment may lead to prolonged duress stress disorder, post-traumatic stress disorder, alcohol abuse, and in some cases even suicide (Scott & Stradling, 2001; Richman et al., 2001; Leymann & Gustafsson, 1996; Leymann, 1990). In a study conducted by O'Moore and Crowley (2011) on targets of bullying, over 90% of participants reported a loss of energy and

self-esteem, sleep disturbances, and 57% of psychologically bullied individuals reported thoughts of suicide. They also found that victims of bullying were equally affected, regardless of their personality profiles.

Bullying not only has an impact on individuals but on entire organizations. When employees are forced to deal with a bully in the workplace, this may contribute to mental and physical illness, which in turn increases absenteeism.[1] Turnover intent[2] is also higher in companies where bullying is a concern than in companies that do not have the same stressors (Vartia, 2001; Djurkovic et al., 2008; Houshmand et al., 2012). A study done by Detert, Trevino, Burris, and Andiappan (2007) found higher loss levels in restaurants where supervisors were perceived as abusive. Losses were incurred through problems with production, such as burned food, or property loss, such as theft. Employees who are bullied may suffer from long-term psychological and occupational impairment; in some cases, these effects may be permanent (Crawford, 2001; Leymann & Gustafsson, 1996). The relationship between bullying and turnover intention may be moderated by perceived organizational support; when participants in a study believed that the organizations they worked for valued their contributions and cared for their well-being, the correlation between bullying and intention to leave was non-significant (Djurkovic et al., 2008).

While turnover will pose a problem for any organization, it may be especially harmful to project teams on tight timelines. At a minimum, members are likely to feel the added stress of being one member short, which increases the workload for the remaining members—a tough scenario for already stretched teams. This added pressure can lead to increased stress levels, and as outlined above, can impact health and contribute to absenteeism, further exacerbating the problem. Perhaps the largest threat that turnover poses to project teams is the loss of knowledge that it creates. If one member of a team leaves, the rest of the team will lose the knowledge that employee possessed, which may have been vital to the success of the project (Turner, 2007). Consequently, losing even one employee creates the possibility of derailing an entire project. The project manager must be able to handle turnover in a way that allows the project to continue successfully by ensuring that the remaining members are able to complete their tasks, and by ensuring that individuals who are brought on the team to make up for the member who left receive all the needed information

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1. "A lack of physical presence at a behavior setting when and where one is expected to be" (Harrison & Price, 2003, p. 204; Agervold & Mikkelsen, 2004).

2. An employee's deliberate and conscious willingness to leave the organization for which they work (Bluedorn, 1982).

to contribute to the continued success of the project (Eskerod & Blichfeldt, 2005). While we are unaware of research on the consequences of bullying in project teams, given that members of these teams may be carefully chosen for their subject matter expertise (Allen & O'Neill, Chapter 12 of this volume; Horwitz, Chapter 13 of this volume), this could lead to some interesting research questions. For example, how quickly do the most mobile members of project teams respond to perceived incidents of workplace bullying? Are they at higher risk for turnover than those in traditional work arrangements? In contrast, if their expertise is highly specialized, are they more likely to persevere longer due to the unique opportunity presented in this team? Does this mitigate negative effects?

Consequences for individuals in organizations where bullying is occurring also extend beyond those directly involved. Lutgen-Sandvik et al. (2002) found that bullying in the workplace not only affects the targets of these actions; employees who work in an environment where they see others being bullied also experience higher levels of negativity than workers who are not exposed to such acts. Job satisfaction was also found to be lower, and stress levels higher for witnesses of workplace bullying than those who were not exposed. A study conducted by Houshmand and colleagues (2012) found that employees who were not the direct target of bullying but who were witness to bullying in the workplace reported higher turnover intentions.

Even those individuals who are accused of being perpetrators of bullying can be affected by it. A study conducted by Jenkins, Winefield, and Sarris (2011) found that regardless of whether participants had been found guilty, 66% of people accused of bullying scored within the moderate to extremely severe range on a depression scale, 73.3% on an anxiety scale, and 56% on a stress scale. Half of the participants reported taking time off due to these negative health effects. Accusations of bullying also increased turnover for these employees, even if they were found not guilty (25% of participants reported leaving their organization after being accused of bullying).

Perhaps more disconcerting is the finding that within environments exposed to bullying, employees who perform less antisocial behaviors (e.g., bullying) than the rest of their group are actually less satisfied with coworkers than employees whose behavior is similar to that of the group (Robinson & O'Leary-Kelly, 1998). Studies have found that as bullying events increase in frequency, the degree of negative impact also increases. The degree to which employees are bullied is inversely related to job satisfaction (Hauge, Skogstad, & Einarsen, 2007; Lutgen-Sandvik, et al., 2002). This behavior has a price for all involved. In project teams that are already working under tight schedules, cost, and quality constraints, these losses may be insurmountable.

What Causes Bullying?

There are many potential causes of bullying in the workplace discussed in the organizational psychological literature. It is rarely believed to be explained by one single factor, and it is often believed to be the result of an interaction between individual and situational factors (Salin, 2003).

Individual-Level Predictors

Bullies

Studies have found that one of the strongest predictors of becoming a workplace bully is previous exposure to bullying (33% of targets of bullying admitted to bullying others; Hague et al., 2009). Relationships have also been found between biological sex and rule-breaking (Hershcovis et al., 2007). Agervold and Mikkelsen (2004) examined bullying in three separate departments within a company. Ninety-seven percent of the departments with the most bullying were predominantly male. A study done by Hague, Skogstad, and Einersen (2009) found that males were much more likely to be the perpetrators of bullying than were women. An individual's personality is also used to predict how he or she will react to specific circumstances (Douglas & Martinko, 2001). Narcissism has been shown to predict bullying outside organizations, and within an organization it is clearly linked to counterproductive work behaviors (CWBs, or behaviors that are harmful to organizations and/or the people in them; Spector, Bauer, & Fox, 2010); narcissistic employees are also at an increased risk of becoming bullies in the workplace (Campbell, Hoffman, Campbell, & Marchisio, 2011).

Research has also shown that employees' state-based affect can impact on voluntary work behavior. Employees with higher positive affect are more likely to make positive contributions to an organization, such as helping others. Employees with higher negative affect are more likely to make negative contributions, such as counterproductive work behaviors (Hulin & Judge, 2003; Weiss & Cropanzano, 1996). Negative affect (NA) has been defined as a personality variable that describes a high frequency or intensity of troubling emotions, such as anger, hostility, fear, and anxiety (Watson & Clark, 1984). People higher in NA have a propensity to focus on the negative, are often perceived as hostile, demanding, and distant, and tend to be less satisfied with their lives (Robinson & O'Leary-Kelly, 1998; Watson & Pennebaker, 1989). NA can be exaggerated by an individual's displeasure in working as a part of a team. This suggests that organizations should choose members for project teams carefully.

Perhaps ironically, bullies are often "leaders" (Langton-Fox & Sankey, 2007; Sutton, 2007), who seem to thrive on self-aggrandizement and punishing,

belittling behavior toward "subordinates" (Ashforth, 1994). About 65% of nastiness in organizations is directed at subordinates, about 35% at peers, and less than 1% is focused upward (Sutton, 2007). According to Zapf et al. (2003), these "leaders" are often driven by a need to protect their self-esteem (which can be particularly threatened by highly competent, extroverted, and self-assured employees); a lack of social competency (e.g., in terms of anger management, self-reflection, and perspective taking); and finally by micro-political behavior (i.e., to maintain dominance). Judge and LePine (2007) note links between trait hostility and aggressive behaviors toward others, and speculate that impulsivity may link to workplace deviance (delinquent behavior and employee integrity; Oh et al., 2011), although there is surprisingly little organizational behavior research on this construct. These authors also note that while narcissistic managers rate themselves as significantly *higher* on leadership effectiveness, their peers and direct reports typically rate them as significantly *lower* on leadership effectiveness. This suggests the potential for interventions around guiding these individuals to move toward more realistic self-appraisals as one avenue for intervention in terms of propensity to bully.

According to Slevin and Pinto (2007), "project managers who are good communicators are becoming more and more difficult to find" (p. 10). Turner and Muller (2003) consider project managers to be equivalent to chief executive officers (CEOs) of temporary organizations (i.e., the project). According to Huemann, Turner, and Keegan (2007), project managers are very similar to CEOs in that they "delegate, guide project team members, motivate, set goals, provide information, make decisions, and give feedback" (p. 134) in order to deliver results within established time, cost, and quality parameters. However, they argue that the development and assessment of project managers rarely involves feedback in the form of 360-degree feedback or otherwise. Further, in terms of projects as a whole, "global feedback concerning project success occurs after it is completed, transferred, and used" (Slevin & Pinto, 2007, p. 5). This lack of feedback mechanisms is a serious threat to the optimal functioning of modern project teams.

According to Stoddard and Wycoff (2009), two-thirds of all chief executives are replaced within four years. Dotlich and Cairo (2003) argue that the most common reason for leaders' failure is their "inability to build or maintain a team" (p. xv), in large part due to the fact that the "vast majority of them do not receive adequate feedback or confrontation to help them understand their own personalities" (p. xxi). Their own arrogance, volatility, aloofness, entitlement, and so on, eventually destroy them. Environments are too diverse to know what will be a "derailer" in a given context for a particular leader, and some derailers can be both strengths and weaknesses (e.g., confidence). One common feature

across contexts, however, is that the higher up you go in an organization, the less likely people are to tell you about your negative behaviors, and many leaders stop reading social cues (Dotlich & Cairo, 2003). This can result in bullying behavior. As "CEOs of temporary organizations," project team leaders may be highly susceptible to these pitfalls. Feedback is also a potential avenue for research and intervention into how to reduce bullying in project teams (we will return to this issue shortly).

While not referring to a project context, Judge and LePine's (2007) discussion about the "upside" of "dark-side" traits might suggest that projects teams could be at particular risk for attracting individuals with "dark-side" personality traits (e.g., trait hostility, narcissism, and impulsivity): First, hostile individuals are often perceived to hold higher status and to be more competent, thus increasing the chances that they could be appointed to cross-functional project teams. Second, in competitive situations (e.g., distributive negotiation), hostility and narcissism are positively correlated with performance (albeit at the cost of lower joint outcomes). Therefore, those higher in these traits may be seen as "winners" who can dominate most opponents. Finally, those higher in impulsivity tend to thrive in novel situations, again making them ideally suited for project teams specifically formed to solve novel problems. In short, the very attributes that may land people spots on high-status project teams could also be those that make them more likely to engage in bullying behavior. Research exploring some of these suppositions could be very fruitful in opening up a yet undeveloped literature and assessing the extent to which they correlate with bullying behavior.

Targets

Victimization has been defined as "an individual's perception of having been exposed, either momentarily or repeatedly, to the aggressive acts of one or more other persons" (Aquino, Grover, Bradfield, & Allen, 1999). Anyone can be a target of bullying, but certain groups are more at risk than others. Women are more likely to report being targeted than men, and minorities and people with disabilities are also more likely to become victims (Hoel & Cooper, 2000). Men are rarely bullied by women (Langan-Fox & Sankey, 2007). The victim precipitation model suggests that individuals may become targets of aggression because they possess certain characteristics that elicit hostile behaviors from others. Schafer (1968) originally labeled these characteristics as "victim elements." One such element is negative affectivity; people with this personality trait are more likely to *report* being targets of coworkers' aggressive acts, and this relation seems to be strengthened by an individuals' low hierarchical status (Robinson & O'Leary-Kelly, 1998). Of course, it is difficult to separate *reporting* from *occurrence,* or the causal chain in terms of which came first (the bullying or the mood).

Aquino, Grover, Bradfield, and Allen (1999) found that employees who were lower in self-determination were targeted more than those who were higher in this characteristic. Self-determination captures the "quality of human functioning that involves the experience of choice, in other words, the experience of an internal perceived locus of causality" (Deci & Ryan, 1985, p. 38). This suggests that employees who feel as though they have little control over their environment may be at a higher risk of being bullied (again, determining causality is a challenge in such cases, as employees who are being bullied are also likely to feel they have little control over their environments). Employees who are bullied are typically ashamed of being victimized; they may otherwise be highly competent individuals who do not comprehend why they cannot protect themselves in these situations (Randall, 2001). The targets of workplace bullying often feel isolated, demoralized, and unable to escape or prevent the bully's attacks (Einarsen et al., 2003). In project teams in particular, where people are often assigned to a team due to their subject matter expertise (Dinsmore & Cabanis-Brewin, 2006), to admit that they are a victim of bullying may be very difficult for most people, either because they are ashamed to admit it, or because they are not completely aware that the negative behaviors they are being subjected to are bullying behaviors. Studies have found that professionals (such as managers) often under-report incidents of being bullied when asked to provide behavioral examples, but report much higher rates of being bullied when they are asked to indicate from a list of predefined negative acts the ones to which they have been exposed (Rayner, 1999; Zapf, 1999).

Organizational Environment

> . . . work conditions in large organizations are often fraught with uncertainties—prime environments that foster suspicion, competition, conflict, and unsettling feelings about the future, resulting in an organizational environment that is tense and stress-filled.
>
> Langan-Fox & Sankey, *2007, p. 63.*

One school of thought on bullying in the workplace is that stressful and poorly organized work environments foster a work atmosphere that encourages bullying (some authors go so far as to say that this is the primary cause of bullying at work; Langan-Fox & Sankey, 2007). Many researchers have explored stress and strain as antecedents to bullying (Agervold & Mikkelsen, 2004; Hauge et al., 2007). Stress is a state of increased anxiety and tension as a result of a short-term stressor, whereas strain is an individual's response to long-term stress (Francis & Barling, 2005; Horsman & Kelloway, Chapter 11 of this volume). Baillien, Neyens, DeWitte, and DeCuyper (2009) conducted a qualitative study

examining the phenomenon of stress and strain leading to bullying, and found that bullying began with individuals becoming frustrated; in turn, they displayed ineffective coping skills (i.e., taking their frustrations out on others).

The National Institute for Occupational Safety and Health (NIOSH, 2010) has outlined numerous work conditions that can lead to stress and/or strain on the job (e.g., noise or heat); however, the following section will outline some job conditions that are particularly relevant to project teams and the potential for bullying.

The first risk factor recognized by NIOSH as a stressor is the design of tasks, which includes workload and work pace. Appelberg et al. (1991) found that individuals who work under stressful conditions such as time pressures, have a high workload, or work in hectic environments report more interpersonal conflict in the workplace. Pearson et al. (2000) theorized that feelings of time pressure and role overload in particular leave individuals with little time for general politeness in the business context. Time pressure may be a large contributor to bullying in project teams. These teams are typically formed for the specific purpose of accomplishing a difficult task, so great pressure can be placed on the members to finish the job in a short period of time. For example, if a mechanical problem has been found in a motor vehicle line or there has been an oil spill, teams assigned to these projects will be under considerable pressure to produce solutions in a very short amount of time. Sequentially phased projects can be equally challenging, and need to be assessed regularly for bullying behavior. A sequential relationship exists when one phase of a project can only begin once the previous phase is completed (Project Management Institute, 2008). In this type of situation, there may be additional pressure to produce a deliverable; another team may be waiting. The stakes can also be high in terms of who is blamed for expensive production delays (e.g., scheduling, estimating, engineering), with those who are blamed suffering loses to reputation and credibility, not to mention access to future shared resources. These demands may only increase the time pressure and the chances that bullying will occur within these teams.

Although a larger load or faster pace may contribute to an unhealthy working environment, the amount of control a worker feels he or she has over these factors may be of greater significance. In some situations, members of a team may be brought into a project on a contractual basis (e.g., in a crisis situation) and again may not have any control over the duration or scope of the contract. A study conducted by Chiocchio et al. (2010) found that individuals who worked on projects but were from non-projectized organizations reported lower levels of mental health on the Project Involvement Index (PII) than individuals who were employed with projectized organizations; therefore the context in which individuals are used to working may also be highly relevant.

Role ambiguity refers to a lack of clarity about the behaviors expected in a specific job. Members may be brought into a team to assist in completing a goal, but they may not be given specific instructions for what is expected in their new role or how it fits into the larger picture. As these groups may be relatively small, members may also be expected to take on several different roles. *Role conflict* arises when an employee is expected to carry out duties that might be incompatible with each other. An example of this may be an employee who is expected to supervise a change management initiative while also contributing to ongoing production. The inability to complete the duties of one role due to the demands required of the second role produces role conflict. These role stressors may be especially pronounced in project teams. For example, a typical conflict that can arise in organizations with multiple ongoing projects is the competition between project teams for subject matter experts necessary for each project (e.g., a particular planner or scheduler who is needed in several places at once). Whether role stressors result from overload, or from ambiguous or conflicting expectations about a role, it is these stressors that may lead to rule-breaking behavior, such as bullying (Parks, Ma, & Gallagher, 2010).

Interpersonal relationships become a factor in any organization where people are required to work together. Although most workgroups are vulnerable to this problem, incompatible personalities may pose a particular problem in project teams for at least two reasons: first, "many of the problems of project teams result when various technical experts disagree on how different aspects of the project should be done" (Thoms & Kerwin, 2007, p. 84). The AMA Handbook of Project Management (2006) lists this differing of technical opinions as one of the major sources of conflict in project teams. By definition, project teams typically bring together functional experts who may or may not agree on how a job should be executed; add in a few "dark-side" traits in those experts, and you have a recipe for conflict in project teams, particularly given the second reason that interpersonal relationships can be challenging in project teams: individuals are often performing exacting tasks under incredible time pressure, precisely the kind of situations where bullying is more likely to occur (Hillier, 1995). We would suggest that this can create a "perfect storm" in many project contexts for bullying to occur. One avenue for future research would be to investigate the extent to which personality versus contextual variables ameliorate or amplify bullying in the project context.

Organizations typically conduct interviews to determine how well applicants' personalities will fit with an organization's culture. However, members of project teams are often selected for their subject matter expertise, and are chosen based on the knowledge, skills, and abilities they bring to the team; their personalities are often secondary when teams are being formed (and this presumes

that more than one expert is available to begin with). In some cases, members of teams may be chosen because they are the only individuals available at the time who meet the minimum qualifications required for the job (Turner, 2007). Whether chosen for their expertise or their availability, individuals may run a larger risk of being placed in a group where their personalities do not fit well with others, yet they are forced to work closely for some period of time to get a job done. This can have serious consequences, as interpersonal conflict has been associated with both psychological and physical health (Lubbers, Loughlin, & Zweig, 2005) and with accidents on the job (McCabe et al., 2008). Project teams may also be unique in the sense that their existence is intended to be finite and is often short-lived. If a team is assembled with the intention of achieving a particular goal, it is likely disbanded once the goal has been achieved. The salience of this finite life span may prevent members from modifying their behavior in order to improve relationships within the team (i.e., we only have to put up with each other for a short period of time).

In addition to the factors highlighted by NIOSH, other aspects of the work environment have been linked to bullying in the organizational psychology literature. *Organizational expedience* refers to workers' behaviors that are meant to fulfill objectives as prescribed or sanctioned by an organization, but also knowingly involve breaking or bending organizational rules, directives, or norms (Parks, Ma, & Gallagher, 2010). Someone who demonstrates organizational expedience is likely placing a great emphasis on reaching a certain goal and will ignore rules in order to attain it. In certain situations, individuals who perform bullying behaviors may believe they are increasing the productivity of the project team by doing so, and consequently may not see their actions as problematic. It is situations such as these that have caused disagreement among researchers as to the usefulness of including *intent* as a defining characteristic of bullying at work (Hoel & Cooper, 2001). Sometimes this expedience can lead to odd outcomes. For example, companies that place excessive emphasis on cooperation may inadvertently promote bullying in the workplace, as studies of Japanese teams have found (Smith, Carroll, & Ashford, 1995). Although cooperation in work groups is often necessary to complete a job, demanding cooperation from employees can actually have negative effects in some cases if people take it upon themselves to bully those they feel are being uncooperative or less productive. Team members may feel justified in doing this, as they believe they are simply promoting the company's values.

Management style has also been identified as a stressor in the workplace that can link to bullying behavior. An autocratic management style (dominating and showing little respect for other people's values and opinions; De Cremer, 2006) can be conducive to bullying (Hoel & Cooper, 2000).

Employees may feel more stress if managers do not allow them to participate in decision-making. This style of management is most evident in total institutions, such as the army or prisons, where bullying is more prevalent (Langan-Fox & Sankey, 2007). Seemingly on the opposite end of the spectrum, a laissez-faire style of management (avoiding decisions, hesitating to take action, being absent when needed; Hinkin & Schriesheim, 2008) also seems to encourage bullying between colleagues, as this type of "weak" leadership decreases the risk of perpetrators being caught (Einarsen et al., 1994; Hoel & Cooper, 2000). Bullying is more common in large organizations for the same reason (Einarsen & Skogstad, 1996). Kusy and Holloway (2009) note that toxic individuals within a company, such as bullies, may have forged relationships with other managers, who act as their protectors. These protectors can be either peers or superiors, and may contribute to the feelings and appearance of power that the toxic individual has over their targets.

A final factor recently identified in the organizational psychological literature that has been linked to bullying is the *decline of professional workplace behavior*. As companies become increasingly informal, the casual atmosphere may contribute to an unclear definition of "proper" or "professional" interpersonal behavior. This informal environment can contribute to bullying developing in some cases. For example, an individual might perceive a lack of professional behavior from a colleague as a negative event, and may choose to retaliate, prompting further negative behaviors from the original perpetrator (Andersson & Pearson, 1999). This informal environment might also contribute to an individual's low satisfaction with the social atmosphere in the workplace. Einarsen et al. (1994) and Vartia (1996) found significant correlations between bullying and low satisfaction levels with the social climate of an organization. Social exchange theory assumes that an individual is liable to seek retribution when he or she is dissatisfied with the outcome directly or indirectly resulting from his or her contribution to the organization (Adams, 1963). An individual might begin bullying with the intention of inflicting harm on either the company or another individual as a form of expressing his or her displeasure. If an employee is evaluated and remunerated based on the performance of the team to which he belongs, he may also want to "punish" or expel low-performing team members; this may lead to oppressive control from peers (Sewell & Wilkinson, 1992). Interestingly, collective bonus systems may actually reinforce some workers' desire to discipline their colleagues (Collinson, 1988). Organizations are systems, and all aspects of the environment must be taken into consideration if we are to understand bullying in project teams. We now turn to a discussion of how to better design these systems.

What Can Be Done? Five Steps to Reduce the Potential for Bullying in Project Teams

1. Carefully Select and Support the Team

The first line of defense against bullying in the workplace is to hire well. Proactively screening out individuals with a high potential for bullying behavior (e.g., narcissism) based on evidence-based personality measures and careful interviewing will offer a good return on investment (for a review of the "Big Five" personality traits and how they fit with different environments, see Judge & LePine, 2007). Further, this level of scrutiny should be occurring at *all* levels of the organization (including upper management). However, as discussed previously, one challenge with project teams is that they may be formed ad hoc based on subject matter expertise, after people have already been with the organization for varying amounts of time. In this case, at a minimum, it is critical to consider applicants' personalities for their fit with the team to which they will be assigned. If at all possible, current members of the project team should also be involved in interviewing new members. Not only does this allow them to determine who will fit best with the team in terms of personality, but it also gives them "skin in the game" (i.e., they are more likely to want to see someone succeed if they helped choose the person). In a case where two applicants are being interviewed for a position on a project team with similar qualifications but one meshes better with the group, it is better for the team to hire the individual with whom they feel most comfortable. An individual can learn a job as he or she begins to work at it, but the same cannot typically be said for conflicting personalities. Project teams will work better when they feel a sense of camaraderie.

In most cases, it is also wise to offer the team support once it has been formed, in terms of how to manage conflict constructively from the beginning (e.g., via training or access to a coach). It should not be assumed that a team will automatically work well together without these supports in place. Interpersonal relationships need to be recognized as an important aspect of healthy project teams; regardless of the size of the team or the duration of the project, the project manager should take care to provide opportunities for positive interaction. When disputes do arise between members that are not task driven (i.e., that are personality based), managers must be prepared to step in before issues escalate. In doing so, it is critical not to force the parties into a resolution by threatening sanctions, promising benefits, or imposing measures that could be viewed as procedurally unjust (Karambayya & Brett, 1989). Managers should assume a third-party role, and attempt to mediate a resolution. The best leadership strategy is always to combat bullying before it begins (even supportive leadership can't outweigh the harm done by bullying once the cycle has begun; Hauge et al., 2007). In their

comprehensive chapter on teamwork breakdowns, Sims and Salas (2007) outline five broad categories of factors that can lead to team derailment if not managed properly (i.e., coordination, cooperation, communication, organizational characteristics, and team leadership). Project managers would be well advised to heed the advice of these authors, who emphasize the critical importance of open communication and feedback in teams (we will return to this issue shortly). When managers of project teams foster trust and honest communication from all members in their teams, they can create the psychological safety necessary to thrive.

2. Proactive Job Design

As discussed, NIOSH has several recommendations for designing work to minimize psychosocial risk factors (e.g., emotional distress, chronic stress, low social support; Gallo et al., 2012; Sauter et al., 1990). First, organizations must monitor workloads. While people may be able to push forward during "crunch time," when this becomes an everyday occurrence with little opportunity for recovery, there will be personal and organizational consequences, as discussed throughout this chapter. Second, in terms of work pacing, although deadlines may be tight in project teams, employees could benefit greatly from having some input and measure of control over scheduling. Project managers delude themselves if they think they will hit certain milestones if no one has bought into the targets to begin with (as many find out the hard way), and this can lead to a lot of bad behavior along the way. Third, project managers can reduce role stressors in project teams by ensuring that responsibilities are clearly outlined, and each member of the team is clear about his or her role in the project and reporting obligations. Role ambiguity and role overload may play an integral part in the promotion of bullying in project teams. It is the project manager's responsibility to ensure that he or she has all of the information and resources necessary to implement an appropriate strategy to tackle the project (Pich, Loch, & de Meyer, 2002). If the project manager bases his or her strategy on complete and accurate information, he or she will then be able to delegate tasks effectively and unambiguously. This will help minimize role ambiguity and role overload, and may help stave off bullying behaviors in the team.

3. Proactively Monitor for Bullying Behavior

One way for companies to deal with toxic individuals who do make their way into teams is through planned monitoring. Some authors (e.g., Kusy and Holloway, 2009) suggest that exit interviews with employees who choose to leave the company can be an excellent way to find bullies in the workplace. These

employees should be made to feel as though they can be completely honest about their reasons for leaving, and this may uncover the truth behind bullying as an issue in the workplace. Some team members, however, might ask to leave the project yet remain with the organization. This poses a unique set of problems, as they may not want to disclose their reasons for wanting to leave the team for fear of retribution if they are placed on another team with the bully on a future project. It is also possible that the team may have acquired the bully through pre-assignment, where the project may have actually been designed specifically with that individual in mind (Dinsmore & Cabanis-Brewin, 2006). In this case, an individual may not wish to report the behavior, as the bully may have "protectors" in upper management and the victim may feel as though this disclosure might jeopardize his or her job security. Victims of bullying who remain with the project team may choose to endure the treatment if the project is short in duration, as they realize their time with the bully may be finite. Further, losing a member (even one who is a bully) may be the greater of the two evils, as it may increase the team's workload even more, and victims may not prefer that added stress, nor wish to be seen as the cause of the increase in workload by other team members. Consequently, a preferable strategy may be to proactively monitor for such bullying behavior.

Project managers are appointed to lead their team through one or more project phases. These leaders should routinely check in with the team and maintain a watchful eye for any signs that bullying may be taking place. Companies can audit for bullying in their organizations. There are measures that exist which can be distributed to employees to allow them the opportunity to anonymously report on the state of bullying in their workplace. The Negative Acts Questionnaire-Revised (NAQ-R) is an instrument designed specifically for this purpose; it is a 22-item questionnaire that measures personal bullying, work-related bullying, and physically intimidating forms of bullying (Einarsen, Hoel, & Notelaers, 2009). It allows employees to report on their exposure to bullying within the prior six months. It is a valuable resource for companies, as it is a valid and reliable measure of workplace bullying. It is imperative that companies utilize resources such as the NAQ-R. If organizations fail to audit the workplace for bullying behavior, they are inadvertently allowing the bullying to continue, with serious consequences for both the company and those within it, as discussed throughout this chapter.

4. Manage Performance

In terms of performance management, it is important to set a values-based bar with "rules of engagement" for workplace behavior, and to hold people

accountable to that standard (e.g., we will not yell or swear at each other, we will not talk behind each other's back, etc.). Further, it is important to consistently measure everyone on both financial *and* social outcomes. How people reach their targets matters. And this includes top producers. In fact, if a top performer is falling short socially, he or she may actually be hurting the team's overall bottom line. Researchers have seen firm productivity increase by 30% after firing supposed economic superstars (because of the damage being done to other employees and their productivity, which had gone unnoticed; Sutton, 2007).

While dysfunctional leadership in project management teams may emanate from certain dispositions in particular leaders (e.g., arrogance, self-aggrandisement), it requires a culture lacking in internal controls in order to thrive. Project managers must be prepared to ask difficult questions about how people do their work, on their own, and with others. Do people work together or fight against each other? This last question is particularly important. Whereas respectful conflict based on ideas or the work at hand can fuel productivity, a hostile work environment is detrimental to the well-being of all involved.

Organizations must carefully consider who they will choose to manage each project. Archibald (2003) lists several key qualities of successful leaders in project teams. First, project managers must be able to quickly change their leadership style to accommodate other people's behavior, which requires the ability to be sensitive to different team members' personalities. Second, project managers must have an awareness of the needs of the team so that they may make adjustments accordingly. Third, leaders must possess team-building skills in order to foster unity within the project team. Finally, project managers must have the ability to confront conflict and use a problem-solving approach to rectify the problem. A combination of these traits will be helpful in combating bullying in project teams, as these leaders will have the ability to perceive, identify, and work toward rectifying potential issues of bullying.

5. Adopt a Systems-Based Approach

When participants in a study were asked to provide solutions for dealing with bullies in the workplace, many replied that it would be best to fire the individual (Kusy & Holloway, 2009). While this is often the case, it is also important to realize that in any work group, large or small, simply removing a toxic individual does not typically fix the problem unless this person was very misaligned with the existing culture. Kusy and Holloway (2009) found that toxic personalities are part of a complex system, and employees who work around them adapt to their environment and learn to interact in response to it. The bullying would not have occurred without bystanders and senior management doing nothing for at

least some period of time. Although a bully may be removed from the environment, the employees will not easily abandon their old way of interacting, and so the harmful environment may persist after the stressor is no longer present. These issues need to be addressed before teams can be expected to operate at their full potential.

Feedback is critical. Research in organizations has shown that across contexts there is a need for leaders to be open to feedback. Project leaders need to create opportunities for others to safely provide feedback. While not specifically studying a project context, Finkelstein's (2004) comments are instructive:

> Creating an open culture in which mistakes come to light, and learning from them comes easily, requires a certain type of leader, a leader who believes in the importance of a culture of openness and who lives by the tenets that implies... openness means fighting the natural tendency to cover up unfavourable or distasteful information… a culture where people feel safe to say what they really think and to act on it. (p. 277)

Further, project managers must accept that they may not see the behaviors in question. Again, although gleaned from the general (versus project-based) literature, Kusy and Holloway's (2009) caution is insightful:

> Remember that toxic people are adept at masking the toxicity when it is to their advantage. They can turn their behaviors on and off depending on the impression they want to make on the boss, a direct report, a peer or a customer. As a leader, recognizing that you have toxicity problems in your team or group means understanding that complaints to you may not be consistent with your impression. Nonetheless, they are accurate renditions of team members' day-to-day experiences. (p. 22)

In a special issue on bullying in the workplace, Duffy (2009) argues that the best way to discourage bullying from occurring is by implementing a comprehensive anti-bullying organizational policy. She offers the following suggestions on how to successfully implement such a policy in a way that cultivates a high-care work environment.

The purpose of the policy should be clearly stated and tied in with the core values of the company. The organization should produce a statement that provides a clear definition of bullying, as well as an outline of the cost of bullying to organizations, and the effect it has on victims. A list with examples of bullying behaviors should be distributed with the intention of educating employees. Contacts at each level of the organization should be available to receive

reports of bullying instances. An informal resolution option should be available for employees should they choose to resolve bullying complaints in such a manner. An alternative dispute resolution option should be made available (e.g. mediation). Procedures for filing and handling a formal bullying charge should be made clear. A statement should be made available to all involved parties, ensuring due process and confidentiality. The organization should investigate charges of bullying in a short amount of time. Findings from any investigation should be provided to both parties separately, and they should be given the opportunity to have their questions answered. The organization should be accountable for bullying complaints and should work to change the factors that are contributing to bullying. Finally, an appeal process should be available for all workers.

Following these suggestions, organizations should be able to effectively implement an anti-bullying policy (Duffy, 2009). Finally, it is important for companies to remember that although a bullying situation might have ended, victims are left with the traumatic thoughts and emotions that developed during their bullying experiences. It is vital that companies continue to support the targets of bullying even after the situation has ended to ensure that the employee has the support he or she needs to be healthy and productive moving forward.

Concluding Thoughts

> Organizations with rigid hierarchical structures are more likely to have a culture where bullying can flourish. … This appears to be the case especially in "total institutions."
>
> Langan-Fox & Sankey, *2007, p. 63*

It is accepted that bullying is more common in "total institutions" (e.g., military, prisons, schools). We don't typically think of project teams as total institutions. However, project teams (particularly those with the most to lose) routinely

- Isolate members while working on a project and control communication (within and outside the group)
- Require extended work hours, often resulting in exhaustion
- Have strict behavioral norms for social cohesion (e.g., around hours, modes of conduct, etc.)
- Require assimilation into "the group" with little time or space away from the team
- Involve submission to leadership of the group
- Necessitate understanding of a unique vocabulary (e.g., six sigma)

- Involve identifying with the group
- Have clear lines between the "in group" and "out groups" ("us" versus "them").

Interestingly, these same eight characteristics are typically used to socialize individuals into "total institutions" (Lifton, 1961). In his classic text, *Thought Reform and the Psychology of Totalism,* Lifton deconstructs how these techniques can be used to "brainwash" members of such groups into at least overt compliance. This is not to suggest that project teams involve brainwashing. But upon reflection, they do share a striking resemblance to "total institutions". Consequently, we need to better understand the social dynamics of these groups and the power they can have over people's lives by virtue of their very nature. Modern project teams often come with a potential to impact the lives of those working within them in a way that very few traditional organizations can rival (especially if individuals are working at an isolated site or away from home). This is something that is only likely to increase in the days to come, given globalization and the compressed work schedules that we discussed at the beginning of this chapter. Consequently, there is a pressing need to better understand the social milieu of project teams, including negative aspects such as bullying, in environments so vulnerable for abuse. Only through a better understanding of their interpersonal dynamics will the social-emotional and competence-related benefits that Allen and Hecht (2004) envisioned be realized in contemporary project teams. There is a virtual green field for research at the intersection between organizational behavior on bullying in the workplace, and the nascent academic research in the project management context. We hope we have raised some questions that might contribute to a research agenda in this regard.

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11 OCCUPATIONAL HEALTH IN PROJECT TEAMS

CONSIDERATIONS FOR EMPLOYEE WELL-BEING

Patrick A. Horsman and E. Kevin Kelloway

> Capital is reckless of the health or length of life of the laborer, unless under compulsion from society.
>
> —KARL MARX, *1867*

The early chapters of this book have dealt with project teams—what they are, and how they can perform a specific function within an organization or across organizations to accomplish a specific goal. But what impact does project work have on individual health and well-being? When it comes to project teams as a specific work-unit and/or work-type, there are relatively few published research studies that examine occupational health issues. This is both surprising and interesting because we know that project teams tend to exist at the extreme ends of what might be called health and stress conditions. For instance, project teams often have a very clear and specific goal (Chiocchio & Essiembre, 2009), which should be beneficial to employee health; however, these goals often come with equally specific deadlines, which can lead to a great deal of time pressure (Nordqvist, Hovmark, & Zika-Viktorsson, 2004). The above quotation by Karl Marx serves as a reminder that ensuring employee health and well-being must be a conscious effort by employers and stakeholders. As such, no book on project teams would be complete without considering the fundamentals of employee health in a project team context.

There does exist some anecdotal evidence that project work in itself is stressful (Kim & Wilemon, 2002); but so is work in general (see Kelloway & Day, 2005), particularly when organizations give little consideration to occupational health issues. In reality, project work might in fact be healthier than routine work due to the variety that can accompany project work, the higher likelihood of one's skills being put to use, and aspects of the project team itself. As discussed by Chiocchio, Beaulieu, Boudrias, Rousseau, Aubé, and Morin (2010),

project work may actually mimic aspects of healthy organizations, whereby individuals receive opportunities for growth, and experience goal clarity, pride, and cohesiveness—all through project involvement. Thus specific stressors associated with project work might be counterbalanced by the inherent rewards associated with project work. In order to evaluate this premise, we must first consider what those stressors are likely to be. Therefore, the present chapter is intended to stimulate thought about occupational health issues in project teams, how they arise, and what project team managers and stakeholders can do to improve conditions for project team members. Where gaps in the literature exist, we will endeavor to use what we know about project teams and work stress in general to build a number of hypotheses and directions for future research. To accomplish this, we begin first with a brief primer on what occupational health is, and what it means to employees and employers. Next, we consider the unique aspects of project teams and how they might impact stress and well-being. Finally, we close by offering practical recommendations for project team managers to improve employee well-being.

A Primer on Stress and Well-being

If asked, most individuals would be able to conjure a general idea of what stress is, the feeling associated with being stressed, and what they find stressful. In the academic literature, however, stress refers to a specific process whereby individuals experience demands on their physical and mental resources (stressors), to which they may respond in a number of ways, depending on their resources, their coping style, the severity of the stressor, and other individual and situational characteristics (Lazarus & Folkman, 1984). Strains, on the other hand, are the result of exposure to stress and can manifest in a number of psychological, physiological, and behavioral outcomes for the individual (Griffin & Clarke, 2011), such as negative mood, fatigue, burnout, and psychological symptoms (e.g., Machin & Hoare, 2008), increased blood pressure (Kivimäki, Virtanen, Elovainio, Kouvonen, Väänänen, & Vahtera, 2006), and gambling and other addictive behaviors (e.g., Elman, Tschibelu, & Borsook, 2010).

Work-related stress also has an exceptionally negative impact on organizations, often leading to decreased organizational commitment (e.g., Klassen & Chiu, 2011; Meyer, Stanely, Herscovitch, & Topolnysky, 2002), decreased satisfaction with the job (e.g., Zangaro, & Soeken, 2007), increased turnover (Podsakoff, LePine, & LePine, 2007), absenteeism (Darr & Johns, 2008), and increased counterproductive work behaviors (e.g., Tucker, Sinclair, Mohr, Adler, Thomas, & Salvi, 2009), among other outcomes. For any organization, these

effects would be quite negative, but in a project team they could jeopardize the project itself. For example, periods of absenteeism among key members of the project team could lead to lengthy delays, especially if members of the team were specialized such that no one else could cover for the absent member. For more discussion on quantitative and qualitative workload increases, refer to Chiocchio (Chapter 3 of this volume).

There are many causes of workplace stress, such as organizational role stressors, difficult work schedules, organizational injustice, poor leadership, work-family conflict, harassment and discrimination, workplace aggression, the physical work environment, a lack of workplace safety, economic-related stress, technology stressors, problematic industrial relations, and even organizational politics (Barling, Kelloway, & Frone, 2005). These precipitating events are often referred to as stressors or demands, each of which an individual may appraise as either more or less stressful, depending on his or her own personal characteristics and other situational factors (Lazarus & Folkman, 1984).

There are many ways to understand workplace stress, although most modern discussions center around a transactional model, much like that described above (Cooper, Dewe, & O'Driscoll, 2001). Within the transactional model, some scholars have made the distinction between challenge and hindrance stressors, whereby challenge stressors promote active coping behaviors and trigger positive emotions, and hindrance stressors lead to passive or emotion-focused coping behaviors and have a tendency to manifest with negative emotional reactions (LePine, Podsakoff, & LePine, 2005). Challenge stressors consist of job demands, time pressure, and workload, while hindrance stressors include role stressors, interpersonal conflict, hassles, and poor leadership, among other issues (LePine, Podsakoff, & LePine, 2005). While continued exposure to both challenge and hindrance stressors will result in strain, on the whole challenge stressors tend to have a less negative impact and lead to better job performance than their hindrance counterparts (Podsakoff, LePine, & LePine, 2007). In this chapter we shall discuss both as they apply to project teams.

Researchers also make the distinction between acute stressors and chronic stressors. Barling (1990) has described the two as virtual opposites: chronic stressors exist for an extended duration and have a high likelihood of recurrence but often no clear onset to the exposed individual; acute stressors are of short duration and extreme intensity, with a clear onset, but they are considered one-off events and thus have a low likelihood of recurrence. Acute stressors are often characterized as accidents, catastrophes, or other random events, although this is not always the case, and they often result in almost immediate

distress (Eden, 1990). Most of the examples of workplace stressors that have been presented to this point are of the chronic distinction, as they are easier to capture and predict than acute stressors. Likewise, because chronic stressors are more common and more predictable, they apply to a much wider variety of organizations and, in this instance, project teams. For instance, a death or accident in the workplace would be considered a highly traumatic acute stressor but is extremely hard to predict and may be unlikely in the majority of project teams. More frequent may be a sudden major risk materializing or a drastic change to the project scope or deadline, based on factors outside the project team's control; however, this form of acute stressor, although more common, is also difficult to anticipate. Conversely, working for several weeks without taking lunch breaks due to workload is a far less intense but more chronic stressor that many participants in the final stages of a project may be subject to. Although we do not deny that incidents of acute stress may occur in project teams, we have chosen to focus primarily on chronic stressors, which are likely to apply to the majority of project teams and are easier to anticipate.

Also worth noting is that some characteristics of the work environment can buffer or exacerbate the effect of workplace stressors on individual health. Karasek's (1979) job demands–control model proposes that the impact of stress on strain is at its worst when job demands are high and job control, or the ability to make decisions concerning the job, are low. This is particularly relevant to project teams because it is easy to imagine a scenario where certain members of the team may have extremely low decision latitude because of project specifics, project leaders, or project scheduling. Johnson, Hall, and Theorell (1989) have added to this, demonstrating that a lack of social support is associated with even more detrimental effects if packaged with a high-demand and low-control environment. This is in part because social support and control are considered two core individual resources, without which individuals have far fewer options for coping with the negative impact of work-related stress (Schaufeli & Bakker, 2004). Thus we must also give some consideration to the resources that are gained through employment in a project team, in addition to the demands experienced.

Job demands–resources theory (Bakker & Demerouti, 2007) explicitly argues that all jobs consist of a variety of demands but also offer the individual a number of resources. These can range from control and social support, as previously mentioned, to increased personal energies, such as self-efficacy, feelings of accomplishment, or a sense of purpose, and physical resources such as pay, benefits, or status (Hobfoll, 2001). Indeed there are a number of positive benefits to working—a concept that is often overlooked. Jahoda (1981) has long since

argued that employment is central to our lives, and that overall health drastically decreases in the unemployed due to a lack of time structure, purpose, or accomplishment. It is simplistic to think that because all jobs consist of stressful demands that working is therefore bad for our health. There has long existed a negativity bias in occupational health research (Bakker & Derks, 2010) that discusses work from a strain-based perspective. Yet it is necessary to consider more than simply strain, or "ill health," but also the positive aspects of health and well-being that allow the individual to flourish (Warr, 2005). According to Ryff and Keyes (1995), there are six core indicators of wellness, which include self-acceptance, purpose in life, positive relations with others, personal growth, environmental mastery, and autonomy. Strain symptoms therefore make up only one piece of the puzzle and can be seen as negatively impacting overall wellness by manifesting as physical symptoms or detracting from one of the aforementioned wellness factors (Warr, 2005). Therefore, although project work may be considered *stressful* by some (e.g., Kim & Wilemon, 2002), we must be careful not to make the leap directly to the conclusion that project work is *bad for our health*.

Project Team–Specific Issues

As discussed by Hoobs, Chiocchio, and Kelloway (Chapter 1 of this volume), projects are temporary, they contribute original deliverables or results, and they reach the endpoint of the project through progressive elaboration. Given the unique characteristics of project teams (Chiocchio, Chapter 3 of this volume), members may experience unique challenges from an occupational health perspective. For instance, a clear end state for a project might be considered an advantage over routine operational work. However, the unique nature of that same short-term project may also mean that membership is new and there is not an established rapport among members of the project team. Further, stressors and other health characteristics may vary at different points in the project life cycle, as described by Hobbs (Chapter 2 of this volume). For example, uncertainty should decrease as the project moves through its life cycle, while time pressure might increase toward the end of a project. Likewise, a change in the plan or design early on may be a minor event, while late in the project it could have an incredible impact on workload and work-life balance. Therefore occupational health issues must be considered both in the context of a project team environment and the project life cycle. The following section of this chapter gives consideration to many common stressors and benefits and how they may impact occupational health in a project team environment.

Effort, Project Load, and Time Pressure

The term "job demands" is often used to describe the entirety of stressors experienced in the workplace (e.g., Chiocchio, Beaulieu, Boudrias, Rousseau, Aubé, & Morin, 2010). However, Karasek (1979) described job demands as the parts of the job that require continued physical, psychological, or emotional effort. In this segment we expand on the term "effort" as it is created via challenge stressors that pressure the individual to perform. Packaged thusly, these demands include the physical and mental requirements of the job, performance pressure, time pressure, and workload. Because these are challenge stressors, the expectation is that effort will reduce the demand via goal fulfillment (LePine, Podsakoff, & LePine, 2005).

It is difficult to capture how much physical and mental effort may be involved in project work, as the definition of project teams has expanded beyond the construction industry. Project teams now include specialties from contractors, to computer programmers, R&D specialists, marketing professionals, health professionals, and even people from the performing arts. The skills and effort required to perform these jobs are incredibly varied and therefore difficult to classify. Instead, we will focus on workload. Workload is the amount of work that one individual or team within the project is responsible for and if incorrectly balanced can leave an employee feeling like he or she has nothing to contribute, or it can result in overload, which is in essence having more work to do than can be reasonably accomplished in the expected time frame. In project teams, workload can peak when a new project is started, when people leave the project, or when deadlines approach (Turner, Huemann, & Keegan, 2008). Workload can be difficult to manage in project teams, as typically one project manager or group leader is responsible for monitoring and assigning tasks and deadlines. Further, as a project is elaborated over time, those who are not in close contact with the work being performed may have difficulty understanding the specific demands of that work or what must be accomplished to complete the task. Raiden, Dainty, and Neale (2004) have proposed that a participatory process of deploying resources and workload can assist in achieving balance, as evidenced by practices in the construction industry.

Perhaps of greater concern in projectized organizations is when employees become involved in multiple projects and experience competing commitments and disruption as a consequence (Zika-Viktorsson, Sundstrom, & Engwall, 2006). One might expect that having too high a project load would be detrimental to individual health. Interestingly, one of the few research studies aimed specifically at examining occupational health in project teams

was the development of a project-specific measurement instrument called the Project Involvement Index (PII), which is a composite of the number of projects an individual is involved in and the amount of time spent on each (Chiocchio, Beaulieu, Boudrias, Rousseau, Aubé, & Morin, 2010). Using the PII, Chiocchio et al. (2010) demonstrated that moderate levels of project involvement were associated with increased mental health and fewer negative symptoms. In this regard, having too little or too great a project load was associated with more distress, which fits with the literature on challenge stressors and the need for involvement. Further, employees from projectized organizations reported less psychological distress when completing project work in comparison to those from non-projectized organizations (Chiocchio et al., 2010), which perhaps indicates that employees who are trained to handle projects or who are from organizations that are structured to support projects are better able to handle a project load. The exact feature that creates this disparity is a logical follow-on study that could inform how organizations prepare for the implementation of project teams.

Perhaps the defining characteristic of a project team is its temporary nature, as it is tied to the project deadline. In project teams, interim goals are often set in order to maintain forward momentum and member involvement (Nordqvist, Hovmark, & Zika-Viktorsson, 2004), but this can create an environment of sustained time pressure. Excess time pressure is traditionally thought to lead to high levels of stress, burnout, and subsequently disengagement from the task (Carver, 1996). Yet, Nordqvist, Hovmark, and Zika-Viktorsson (2004) found that time pressure was only weakly related to decreased job satisfaction and estimated goal fulfillment in a study of Swedish project teams, and this relationship disappeared entirely in conditions of high team support and estimated collective ability. This relationship is not surprising, as time pressure is a challenge stressor and is thus expected to promote motivation and have only a small impact on context-specific measures of work stress, such as job satisfaction. This result also conforms to the job demands-control-support model, as proposed by Johnson, Hall, and Theorell (1989), and modifications that Chiocchio, Lebel, Therriault, Boucher, Hass, Rabbat, and Bouchard (2012) have proposed for more specific use with project teams. Instead of "social support" as traditionally defined in a routine work context, Chiocchio et al. have replaced it with collaboration, which is a process of communication, coordination, and cooperation achieved by functioning project teams that can foster team cohesiveness and collective efficacy. In either regard, challenge stressors appear to perform as would be expected in a project team environment.

Role Stressors

Broadly defined, role stressors originate from the manner in which work is assigned to employees and conventionally include role ambiguity, role overload, and role conflict (Jex, 1998). Role ambiguity is defined as having an inadequate understanding of not only the tasks to be completed but also what steps are to be taken in order to accomplish those tasks (Katz & Kahn, 1978). In contrast, role overload is seen as having more work than is possible to complete based on the time and resources available (Rizzo, House, & Lirtzman, 1970). Role conflict is most closely related to overload, and occurs when an employee cannot balance the expectations associated with multiple work roles or assignments (Katz & Kahn, 1978). As role stressors have received a great deal of academic attention over the years, there is now plenty of evidence supporting the negative impact of role stressors on individual and organizational outcomes such as absenteeism and strain (see Jex & Beehr, 1991; O'Driscoll & Beehr, 1994). Further, scholars have used meta-analysis to demonstrate that these relationships vary: role overload tends to be most highly related to emotional exhaustion, propensity to quit, and tension; ambiguity, on the other hand, is also related to decreased job satisfaction and commitment (Örtqvist & Wincent, 2006).

Scholars have also addressed the concept of ambiguity at the project level, arguing that a project can be judged by how well it defines its goals and its methods for achieving them. Turner and Cochrane (1993) refer to this as the 2 x 2 goals and methods matrix, which creates one of four possible outcomes by crossing each category: type 1 projects are those that have both clearly defined goals and methods; type 2 are those that have well-defined goals but the method or process is not clearly defined; type 3 are those in which the goal is unclear but the work process is detailed; and type 4 are those in which neither the goals nor the methods of the project are defined. As will be discussed later in this chapter, the goals and methods matrix is a very interesting lens through which to examine the potential for occupational health issues in project teams. Interestingly, Turner and Cochrane (1993) suggest that simply by knowing which category your project starts in gives you a potential solution for moving forward; when methods are ill defined, they suggest the use of milestone planning to add procedural structure, and when the goal is unclear, configuration management can be used to elaborate the goal or specific deliverables as the process unfolds.

Despite this, we still do not know a great deal about role stressors at the individual level in project teams. Further, those studies that have examined role of stressors typically do so in the context of performance, rather than with a focus on individual health outcomes. According to Turner, Huemann, and Keegan (2008), the start of a project can lead to intense workloads, which

bring the potential for overload, and uncertainty about assignments, deadlines, team members, and job requirements. In their study of project-based human resource (HR) practices, they found that HR managers are overwhelmingly employed as management support in order to solve project management, staffing, workload, and work assignment concerns and are rarely used in an employee support role to care for the well-being of the project members. Huemann, Turner, and Keegan (2004) report that organizations often have problems understanding the circumstances of project members and do not know how to manage issues of role overload and conflict. This is likely because as a project becomes elaborated it takes on a "life of its own," and higher levels of management are no longer in touch with the requirements and demands of the project team members.

Despite knowing that these issues exist, there appears to have been no thorough investigations of role stressors in project teams, when they are most prominent in the project life cycle, or their impact on employee health. In theory, role stressors should conform to the project life cycle described by Hobbs (Chapter 2 of this volume) such that ambiguity is most prevalent at the beginning of a project when uncertainty is high, and overload should peak as each deadline approaches. There is some evidence to support this, as Kagioglou, Cooper, Aouad, and Sexton (2000) have previously reported on the phases of construction projects in the United Kingdom and what they term the "fuzzy front end." Yet these cycles describe the optimal project team, and we have no evidence on how understaffing, poor management, or situational events might impact role stressors and subsequent health in project team members.

There are also questions of moderation and group level processes that as of yet have not been answered. If ambiguity should be at its worst early in the project and taper off moving forward, what is the impact of ambiguity on mental health at later stages in the project? In other words, does the relationship intensify as the project moves forward such that ambiguity late in the project leads to more negative outcomes? Would the same apply to role conflict or other stressors entirely? In another vein of research, there is evidence that project teams might be subject to team-level role stressors, in addition to those experienced at the individual level. A study of 38 Dutch project teams found support for a hierarchical set of role stressors, such that team-level overload impeded individual and team-level performance by interfering with learning behaviors and by increasing individual-level overload (Savelsbergh, Gevers, van der Heijden, & Poell, 2012). Yet, much like with individual-level processes, the focus has been on productivity, not employee health. These questions warrant research attention moving forward if we are to establish a literature on occupational health in project teams.

Interpersonal and Intra-Group Conflict

The realm of interpersonal conflict is perhaps the area of occupational health in project teams that we actually know the most about! Interpersonal conflict and how it applies to project teams has already been introduced thoroughly in an earlier chapter (see de Wit, Chapter 9 of this volume; see also Loughlin & Bryson, Chapter 10 of this volume). Expanding what we know into a health context, conflict behaviors in the workplace predict health problems such as anxiety, depression, and health symptoms, as well as problems for the organization (Spector & Jex, 1998), and these effects may depend on whom the conflict is with. Frone (2000) found that conflict with supervisors was most highly related to organizational outcomes, such as decreased job satisfaction, lowered commitment, and heightened turnover intentions. When conflict occurred with coworkers, it was more likely to predict depression, lowered self-esteem, and somatic symptoms. In essence, interpersonal conflict at work is stressful for the individual because it contributes to a decreased sense of control, undermines individual self-efficacy, and leads to social conflicts, which can violate an individual's need for group belonging (Giebels & Janssen, 2005). In this regard, conflict not only directly impacts emotions and mood, but also damages important individual resources that are particularly important in a project team environment.

Intra-group conflict has long been researched in the context of organizations, as evidenced by a number of meta-analysis on the topic (e.g., De Dreu & Weingart, 2003; de Wit, Greer, & Jehn, 2012). Although there are different kinds of group conflict, such as relational, task, and process conflicts, and they may impact teams differently, the weight of evidence suggests that in project teams, all three forms of conflict will have a negative impact on health. Some scholars have argued that task conflict is necessary to prevent premature decision-making and to encourage innovative thinking based on initial evidence (e.g., Jehn, 1995) and therefore task conflict on its own might be useful to a certain extent. This viewpoint is actually somewhat supported by a comprehensive meta-analysis conducted de Wit, Greer, and Jehn (2012), which demonstrated that the relationship between each of the three conflict types and measures of job satisfaction and group cohesion is negative, but that the strength of the relationship is weaker in the case of task conflict. Further, the relationship between task conflict and outcomes depended heavily on the presence of the other types of conflict; when task conflict existed alone without relationship or process conflict, the relationship became considerably more positive, which would suggest a profile-based approach to examining intra-group conflict.

Yet, in the context of project teams, the relationship is probably even more complex than conflict types or profile patterns; for instance, a study of 71 information technology project teams in China found that the relationship between

task conflict and creativity was curvilinear and was based on the project life cycle such that moderate levels of task conflict were associated with increased creativity in the early phases of project, but as the project progressed this relationship disappeared (Farh, Lee, & Farh, 2010). Clearly this is a precarious relationship, as it exists only as a function of the conflict type, the intensity of that conflict, the project phase, and the outcome of interest. Furthermore, a new meta-analysis completed by O'Neill, Allen, and Hastings (2013) was able to incorporate team type as a moderator, and found that in project teams specifically, task conflict was negatively associated with team performance and there was no relationship between task conflict and innovation. Given the negative impact of all types of conflict on individual health and the highly complex relationship between task conflict and innovation, there are likely better ways to foster creativity without creating an environment where conflict, even at the task level, is encouraged. These may include using structured brainstorming sessions or idea generation tasks when a creative solution is desired.

When it comes to preparing for or dealing with group conflict, there are several viable approaches that project teams or project team managers can take. Behfar, Peterson, Mannix, and Trochim (2008) conducted a qualitative study of 57 autonomous project teams and found that the highest performing teams over time shared three communalities: they focused on the content of group discussions rather than delivery style; they made sure to explicitly discuss the rationale behind how work was assigned to and accepted by group members; and they endeavored to assign work based on expertise rather than to those who volunteered, or to balance workload evenly. This last point, especially, should bode well for project teams, as the best ones are by nature designed to incorporate the skills and expertise of individuals in different areas (see Horwitz, Chapter 13 of this volume). Additionally, the highest performing teams tend to be proactive in anticipating the need for conflict resolution and pluralistic in applying strategies for dealing with conflict to all members of the group (Behfar, Peterson, Mannix, & Trochim, 2008). One strategy in this regard may be to enlist the help of a conflict mediator or third party. Although conflict stress is related to absenteeism, emotional exhaustion, and turnover intentions, Giebels and Janssen (2005) found that when third-party help is high, these relationships mostly disappear. In either case, an active response to conflict is desirable; research has demonstrated that when responses to conflict in the workplace are passive, employee strain outcomes become amplified (Dijkstra, De, Carsten, Evers, & van Dierendonck, 2009). Therefore teams should consider assigning an individual to actively manage group conflict by addressing potential issues in the beginning, providing advice throughout the course of the project, and mediating disputes within the team as required.

Work-Life Balance

Because project work is cyclical, the peaks and valleys of the project life cycle can often lead to work-life balance issues for project team members (Turner, Huemann, & Keegan, 2008). Balance in this regard refers to the competing demands of personal and work life and how they are managed, resulting in conflict between the two, facilitation from one to the other, or even integration in a symbiotic fashion (Greenhaus & Parasuraman, 1999). The terms "work-life balance" and "work-family conflict" are often used interchangeably, although work-life balance has to do with the broader balance of personal needs outside the work sphere, such as time for personal pursuits or to do necessary chores or attend appointments, while work-family conflict refers to interference from or into the family role specifically (Kelloway, Gottlieb, & Barham, 1999). Project work can place many demands on the individual, especially around deadlines and at times of high overload. This can lead to work interfering with family or personal needs (Frone, 2003), throwing off the balance between the two spheres. Scholars often differentiate between both the nature and direction of work-family conflicts. According to Kelloway, Gottlieb, and Barham (1999), conflicts can be both time-based and strain-based, where time-based conflicts occur when time spent in one role takes time away from that spent in the other, and strain-based conflicts are those where stress or fatigue as a result of one role negatively impacts the other. Further, these conflicts can occur such that work interferes with family, or family interferes with work. For instance, a project meeting that is scheduled outside normal working hours and takes away from family time would be considered time-based work interfering with family, while stress-induced fatigue from a high project load that limits engagement during family time would be strain-based work interfering with family. In either regard, interference or stress from project work can be perpetuated as work-family conflict adds another stressor to the individual, which can lead to decreased satisfaction and increased absenteeism and turnover.

Based on this framework, a study of the Chinese construction industry found that project managers indicated that they experienced significantly more strain-based and time-based work interfering with family than they did conflict in the opposite direction (Liu & Low, 2011). Given that project work and project management in the construction industry are particularly prone to work-family conflicts and other stressors, Lingard, Francis, and Turner (2012) piloted a participatory work-life balance intervention in a medium-sized Australian construction firm. By following employees for 25 weeks, they found that the number of hours spent at work each week were an excellent predictor of overall work-life balance and an individual's capacity to complete tasks both at home and on the job. When a long weekend also co-occurred with a scheduled day off from work,

participants indicated that they were best able to deal with tasks at home that they could not find time for on a regular basis. Further, when asked how the organization could improve their work-life balance efforts, they indicated that training on work-life strategies would be helpful and that addressing the existing culture, which promoted long working hours, was necessary. These findings reinforce that expected working hours, vacation days, and awareness about work-life issues all play an important role in the work-life balance of projectized employees.

Several organizations have piloted work-life interventions, such as virtual team toolkits and telecommuting, which allow individuals to work from home or on the go. Some of these approaches have been trialed in computer programming teams and professional employees with mixed results. Extensive telecommuting has been shown to decrease work interfering with family but created an increase in the opposite direction, such that family more frequently interfered with work (Golden, Veiga, & Simsek, 2006). This is likely due to a lack of structure defining work and family spheres when working from home. Further, job autonomy and schedule flexibility moderated these effects such that the positive decreases in work interfering with family required higher levels of both. This is especially important to project teams, as often schedule flexibility and some aspects of autonomy (depending on role in the project team) are quite low. In a similar study conducted in software teams at IBM, it was revealed that virtual office workers reported higher productivity and schedule flexibility than their traditional counterparts, but also an unequivocal impact on work-life balance and a negative impact on teamwork (Hill, Millar, Weiner, & Colihan, 1998). Given the importance of teamwork, collaboration, and other team-based outcomes, it is necessary to further examine the impact of virtual teams in a project environment with a specific focus on health outcomes. However, Beyerlein, Prasad, Cordas, and Shah (Chapter 15 of this volume) do offer some practical recommendations for leading virtual project teams, with a focus on workflow, team development, communication, adequate information technology training, stress, and a preparedness for turnover; these elements form a great set of potential moderators or mediators for a study examining the relationship between virtual teamwork and occupational health outcomes.

Also somewhat related to the concept of balance is the necessity for stress recovery. Recovery is a process by which individuals restore their internal resources, which can become depleted during the stress experience (Sonnentag & Fritz, 2007), and is akin to the process of unwinding, restoration, or rejuvenation (Binnewies, Sonnentag, & Mojza, 2010). Recovery is thought to occur when individuals engage in an activity that promotes a recovery experience, such as psychological detachment from the stressor, relaxation, mastery pursuits or learning experiences, activities that promote feelings of control, or those that

engage social affiliation with others (Meijman & Mulder, 1998; Sonnentag & Fritz, 2007). Recovery is an integral part of the stress experience, as it allows individuals to return to pre-stressor levels and buffers the negative impact of workplace stress (Fritz & Sonnentag, 2005). As recovery is yet an emerging field in stress research, it is not surprising that it has received no attention in a project-specific context. Initial studies might examine how the project life cycle, quantity of projects, and organizational tempo impact recovery experiences for team members. For instance, if we adopt a within-project perspective, there are probably clear "peaks and valleys" to workload and time requirements, and those valleys will to some extent provide better opportunities for recovery. However, if we adopt an across-project perspective for individuals who might be involved in more than one project, the low period during one project may correspond to a high period for another, thus severely limiting recovery opportunities. We would suggest that a study adapting Chiocchio, Beaulieu, Boudrias, Rousseau, Aubé, and Morin's (2010) Project Involvement Index study to include measures of recovery experiences as a mediator and whether the project cycles are synchronous (overlapping), semi-synchronous (partially overlapping), or dis-synchronous (virtual opposites) as a moderator would be a good starting point to address this question.

Although research on recovery has not been carried out in a project context, all evidence thus far indicates that it may be instrumental; and therefore it is necessary for individuals engaged in project work to have adequate time to recover following any stressful peaks in the project cycle. This could be incorporated by practitioners via mandating time off following particularly difficult deadlines and after the intense rush often experienced as a project wraps up. Additionally, recovery can also be managed at the day level by supervisors ensuring that their team members don't work overtime when it is not necessary and providing the opportunity for psychological detachment during off-work time by limiting after-hours communication. However, both recommendations are difficult to implement within a traditional project structure because of its often temporary nature. One way to track and subsequently manage employee stressors and stress recovery would be via incorporating a wellness function within Project Management Offices (PMOs). PMOs are put in place to act as knowledge brokers in an organization and to liaise between organizational interests and ongoing projects (Pemsel & Wiewiora, 2013). The basic premise is to reduce economy of effort over time by developing internal project structures and start-up routines, preparing training packages, team planning, knowledge storage, and other project-related functions that bridge what has been learned to date with new projects, rather than starting from scratch. PMOs are not a new phenomenon, but have traditionally been used to emphasize the technical side

of running projects and tracking progress metrics from a production standpoint. However, if a wellness function was built into the PMO, it might provide an equally valuable knowledge base on how to balance workload, address role stressors, conflict, recovery, and other work-life balance issues. Given the opportunity to develop this capacity over time, a PMO might then be equipped to advise on best practices and to develop specific management guidelines to be enacted on each project. Further, a PMO would be better equipped to track individual project involvement across projects, using a metric such as the PII (Chiocchio, Beaulieu, Boudrias, Rousseau, Aubé, & Morin, 2010) and knowledge of vacation cycles and other macro-level processes, thus addressing a pressing concern for wellness and recovery.

Leadership

One final subcategory of stressors that are highly applicable to project teams, and perhaps the most important, may be leadership. Some scholars have argued that poor leadership should be considered as the root cause of workplace stressors because leaders often control both the existence and their intensity of stressors (Kelloway, Sivanathan, Francis, & Barling, 2005). Poor leadership is perhaps best conceptualized as two distinct behavior patterns: abusive leadership and passive leadership. Abusive leaders are those who act in an aggressive, threatening, and punitive manner toward their employees, therefore making their working lives miserable (Kelloway, Sivanathan, Francis, & Barling, 2005). Passive and laissez-faire leaders represent the absence of any kind of active leadership and thus can create an environment where stressors like ambiguity, interpersonal conflict, or work-life balance issues thrive (Bass, 1990). Both of these styles stand in stark contrast to the transformational leader who promotes ideals within the organization, inspires and motivates his or her followers to accomplish common goals, stimulates his or her followers intellectually with challenging and rewarding work assignments, and displays consideration for the needs of each individual (Bass & Avolio, 1997; Byrne & Barling, Chapter 6 of this volume). In a study of 118 R&D project teams, Keller (2006) found that transformational leadership predicted technical quality, schedule performance, and cost performance after one year, and profitability and speed to market after five years. Unfortunately, we do not know of any studies that have examined the effect of transformational leadership on occupational health in project teams, which is consistent with the research focus thus far that examines stressors only in the context of productivity.

Poor leadership can result in subordinate issues with workload, role stressors, career concerns, work scheduling issues that can lead to work-life balance

problems, interpersonal conflict, a lack of support, and uninteresting work assignments, among other issues (Kelloway, Sivanathan, Francis, & Barling, 2005). Both abusive and passive leaders can create these problems for their followers, although they may do so in different ways. Take, for instance, issues with scheduling and schedule performance. Abusive leaders might actively seek to punish by assigning valueless work or altering an individual's shift schedule—both of which impact the employee negatively but also impact the project schedule. Passive leaders, who are defined by a reactive approach to managing work, may put no effort into planning work assignments or work schedules, which may also lead to a failure to deliver on time and, as discussed earlier in this chapter, a drastic increase in quantitative workload near the end of a project. Perhaps the most startling difference is that abusive leadership is somewhat easier to recognize, while passive leadership can create the same environment, but does so in ways that can go largely undetected. Skogstad, Einarsen, Torsheim, Aasland, and Hetland (2007) examined the destructive qualities of laissez-faire leadership and found that it predicted role ambiguity, role conflict, and interpersonal conflict with coworkers. Even worse, each of these mediated the relationship between laissez-faire leadership and workplace aggression, which in turn predicted psychological distress. Thus not only did passive leadership increase stressful demands in the workplace, but it also fostered an environment of aggression, which increased psychological distress. Given the progressive nature of projects, this may be amplified toward the end as pressure builds, resulting in extreme strain on team members. Although seemingly complicated, this moderated-mediation hypothesis could be tested by making clever use of a virtual work interface that is able to present short, targeted employee questionnaires or another data collection mechanism embedded in the project life cycle. Another potential research avenue involves simple interactions; specifically, we would expect that the behaviors exhibited by a leader (leadership style) would interact with the project phase to predict radically different strain outcomes.

The health of the project leaders is also of concern. Project team managers must make decisions about how to manage the project life cycle, and this in turn will have an impact on how the project unfolds. As discussed by Hobbs (Chapter 2 of this volume), the waterfall approach lacks flexibility and is time intensive because work must be carried out in stages without moving backward. However, it also provides good control over the progression and completion of the project. In comparison, the fast track approach requires a great deal more coordination, and often costs more, but can often be delivered more quickly. There are likely pros and cons for the health and well-being of leaders to each approach, based on the job demands–control model (Karasek, 1979). Gallstedt

(2003) identified nine incident types that were especially stressful, frustrating, or otherwise detrimental to project managers: (1) the vanishing of valuable resources, (2) the dry-out to other organizational duties, (3) the betrayal of project or self, (4) the circling design-loops, (5) the changes in project-owner preferences, (6) the assistance others depend upon, (7) the prioritizing of other projects, (8) the premature close-down of projects, and (9) the human absence. Given that leadership has an important impact on follower health, and that leader health is likely to impact the leader's own performance, it seems obvious that research activities should also focus on the well-being of project managers moving forward.

Positive Aspects of Project Teams

Of course, there are many positive aspects of project work that should be considered in tandem with the potential stressors described previously. Ryff and Keyes (1995) present six core indicators of wellness, which include self-acceptance, purpose in life, positive relations with others, personal growth, environmental mastery, and autonomy. Project work can provide a clear purpose, opportunities for positive relations with others, environmental mastery, and autonomy in some cases. Based on the characteristics of a particular project team, it may be more or less aligned with these wellness goals. For example, if we adopt the goals-methods matrix (Turner & Cochrane, 1993) discussed earlier in this chapter, we might expect that projects in quadrant 2 (clearly defined goals) would present a clear purpose, while those in quadrant 3 (clearly defined process) might offer more autonomy and mastery as team members are allowed to and are empowered to go about their work. Quadrant 4, offering little in terms of goal definition and process elaboration, may create a predisposition for a project to have a negative impact on individual wellness—a perfectly testable hypothesis in the project context.

Another way to view project work is by what features it offers as a form of employment. In Warr's (2005) review of work, well-being, and mental health, he describes 10 features that are associated with mental health, including opportunities for skill use, personal control, interpersonal contact, physical security, financial security, support, environmental clarity, goal generation, variety, and social status. Consistent with job demands–resources theory and other positive psychology views, participating as a member of a project team could be highly beneficial in that project teams are uniquely structured to promote many of these job features. Let us consider each in turn, based on participation in what we might call an optimally structured or "high-functioning" project team:

1. Project members are likely to have moderate levels of personal control. On the one hand, they will often be told the details of what needs to be done, given deadlines, and monitored heavily. On the other hand, they should be able to participate in the decision-making process at the team level, make choices about which activities to carry out, and experience autonomy between progress updates as they work within their own sphere.
2. Project members should have many opportunities for skill use; in fact, you would expect this to be extremely high, as most project team members will be working within their specialty and making unique contributions to the whole.
3. Externally generated goals will be extremely common within project teams, as deadlines are often set by managers or stakeholders. However, most teams will be free to set their own goals and deadlines within the framework that has been laid out, to make decisions about how workload will be distributed, and to adapt accordingly.
4. Project team members are likely to experience variety in that the definition of project work includes producing a unique deliverable. At the macro level, this means that no two projects should be identical, and each should therefore be unique. At the micro level, they may experience some repetitive skill use.
5. Project team members should experience high environmental clarity. They know when the project ends, the consequences of failing to meet deadlines, and what is expected of them.
6. Because of the variety of project teams and project work, it is difficult to forecast issues regarding pay and incentives.
7. In a high-functioning project team, physical safety should be of the utmost importance. The integration of Occupational Health & Safety legislation has been examined a great deal in construction projects but not in other industries (Badri, Gbodossou, & Nadeau, 2012). Project managers are in a unique position to promote safety objectives as priority project goals.
8. Supportive supervision and effective leadership, as discussed previously, are core job features that support employee mental health. Highly trained project managers who are also effective leaders can be selected to meet these criteria.
9. Project team members should experience a number of opportunities for interpersonal contact, the quality of which will be determined by many characteristics of the team members, group dynamics, and other factors.
10. Although project team members may not achieve a valued social position on a societal scale, their evaluations of their own task significance and the meaningfulness of what they are doing is likely to be quite high.

As can be seen, working in a high-functioning project team is likely to align with many of the job features that impact mental health as described by Warr (2005). It is up to organizations that employ or make use of project teams to structure them effectively in order to promote many of these features. Future research should examine to what extent each of these features is present in the average project team, and how these features vary by industry, region, and in the highest and lowest performing project teams.

Project Teams as Healthy Workplaces

Of final note is the assertion that project work may actually mimic aspects of healthy organizations. Healthy work is characterized by an environment that both supports and adds to the well-being of employees (Turner, Barling, & Zacharatos, 2002). Kelloway and Day (2005) have described six factors that contribute to a healthy work environment, which include health and safety; a culture that promotes fairness and support; high-quality interpersonal relationships and interactions; employee involvement and engagement; positive work characteristics such as meaningful work, job control, and reasonable working hours; and work-life balance. This chapter has already discussed how project teams can influence work-life balance, health at work, and other aspects of the work environment. Chiocchio et al. (2010) point out that individuals involved in project work also receive opportunities for growth and experience goal clarity, pride, and cohesiveness—all through project involvement. In combination, this means that project work can be arranged as a healthy work environment and has the ability to satisfy some of the more difficult intrinsic needs of individuals. Perhaps the only two issues concerning project teams as healthy workplaces are questions about their ability to conform to reasonable working hours and to promote job control for all members. These and other healthy workplace questions have yet to be examined or answered in a project team context.

The unique challenge for project teams is that they are often small and dynamic, so it is difficult to implement and maintain healthy workplace initiatives. Project teams likely mirror components of small and medium-sized enterprises, which, as pointed out by Day (2011), have limited resources, in terms of both financials and manpower, with which to initiate healthy workplace initiatives. However, smaller organizations tend to have a natural advantage when it comes to healthy workplace practices because initiatives are often easier to implement and employee concerns are easier to hear and address. One mechanism by which project teams might engage planning and support for healthy workplace initiatives has already been described in this chapter: specifically, integrating it as a function within the PMO. From a research perspective it would also be sensible

to inventory what different project types typically afford in terms of healthy workplace practices, healthy features of work, and wellness mechanisms. If such a study made use of Turner and Cochrane's (1993) goals-methods matrix as the structure for project types, we would hypothesis that quadrant 1 projects have the potential to be much healthier than quadrant 4 projects, whereas quadrant 2 and 3 project types should fall somewhere in between.

Recommendations for Project Managers

Based on the review of the current state of research on occupational health and safety in project teams, we suggest the following broad advice, in addition to specific recommendations presented throughout, which should be considered by stakeholders, organizations, and project team leaders when implementing and designing project teams in order to address occupational health issues:

1. *Design a healthy project team:* Based on the principles laid out in this chapter, team members should be stimulated and challenged by their work and placed in roles where they will be able to demonstrate their competence and provide a valued output (Chiocchio et al., 2010). Having team members who specialize in different areas is perhaps optimal in this regard. Consider how you might balance workload while maintaining autonomy at this stage. Make sure everyone has a clear role and knows to whom they report. Turner, Huemann, and Keegan (2008) suggest that, if at all possible, organizations should assign one manager to deal with people issues exclusively. As discussed earlier, one viable option is to assign this responsibility to a specific person inside a PMO; this manager would work on maintaining reasonable working hours and workload as associated with work-life balance, deal with absences and person-focused contingencies, provide training opportunities to project team members, and act as a third-party mediator in interpersonal conflicts—measures that all have been found to be quite helpful in limiting resultant stress (Giebels & Janssen, 2005).
2. *Kick the project off right*: Using a structured series of kick-off meetings, such as collaborative discussions and training packages, at the onset of team involvement has been previously shown to reduce work-related pressure and stress (e.g., Sharkey & Sharples, 2003). Members may be new to the project environment and would benefit from a cursory overview of the project, its goals, and the expected deadlines. This will also provide an opportunity to clear up ambiguity, build team cohesion, and provide resources. Project team members have previously indicated that training on work-life issues would be

helpful (Lingard, Francis, & Turner, 2012), and this could extend to other aspects of team cohesion, such as intra-group conflict and stress management.

3. *Provide quality leadership*: As we have already discussed, leaders can quite easily become the root cause of many stressors in the working environment (Kelloway, Sivanathan, Francis, & Barling, 2005). Having better leadership promotes a healthier environment both directly by limiting the exposure to stressors and as a secondary intervention in actively dealing with stressors as they emerge.
4. *Plan ahead for health issues*: Some parts of the project life cycle are predictable. Planning training at the onset can save valuable time as the project gets off the ground. Scheduling days off so that they coincide with weekends and provide an opportunity for employees to balance out demands at home is desirable and encouraged (Lingard, Francis, & Turner, 2012). Plan to include healthy workplace practices at the onset of the project, and make employee health a project goal. For projectized organizations, as the end of the project nears, look ahead to coming projects and pass along any information so that employees are not uncertain about their future assignments.

While this is merely preliminary advice, it does offer a framework for the successful implementation of practices that support employee well-being. As research in this sphere advances, it can be used to make more detailed and specific suggestions inside of each of the four points noted above.

Considerations for Future Research

In this chapter we have suggested several avenues for future research on occupational health in project teams. While there are many ideas scattered throughout this review, we would suggest that the following questions deserve particular attention:

1. *Stressors, well-being, and the project lifecycle*: What is the impact of different stressors as they are introduced or maintained throughout different stages of the project life cycle? Conversely, how does the life cycle itself promote or inhibit the manifestation of certain stressors? For example, do different stages of the project life cycle increase or decrease role stressors such as overload or ambiguity? What is the effect of role stressors on individual well-being during different stages of the project? Is there a moderation effect such that the impact of these stressors becomes more intense later in the project?

A longitudinal/diary study of a project life cycle may shed light on research questions related to the project life cycle.

2. *Involvement in multiple projects*: Related to the foregoing, what are the individual consequences of multiple project involvements? Recognizing that individuals can be members of multiple project teams raises interesting questions from the standpoint of individual well-being. Are the demands of each project cumulative? Or does involvement in multiple projects at different stages create opportunities for a form of on-the-job recovery, whereby an individual may recover from one set of project demands by engaging in other activities on a separate project?
3. *The effect of team level processes*: Briefly put, is the nature of occupational health and stress in project teams hierarchical? In other words, do unit- or team-level measures of stressors, collaboration, support, or commitment (etc.) contribute additional variance to the prediction of individual well-being and project success beyond those reported by individual team members? A nested analysis such as hierarchical linear modeling may be used to answer such questions.
4. *Intervention studies*: Knowing that some aspects of project work are particularly stressful, what sorts of interventions are likely to be the most beneficial to project team members? Project team members have previously called for training on work-life balance; can the same be applied to managers? Should this also include stress recovery? Collaborative training in regard to group decision-making and conflict resolution might also have a healthy impact, but we will not know until a formal intervention study is conducted using a rigorous methodology.
5. *Understanding and amplifying the positive aspects of project work*: As has been previously mentioned, some aspects of project work have been tied to positive individual well-being and healthy workplace practices. Early research in this vein should attempt to quantify the possible benefits outlined herein and then expand on how these positive aspects can be leveraged by project team mangers and organizations. Specifically, what characteristics make a project team a healthy workplace, and how can we ensure that every project team created in the organization shares as many of these attributes as possible?

These are merely suggestions for broad categories of future research within the area of occupational health in project teams. Although the specific research question may vary considerably, research should address each of these five areas to increase our understanding in this realm to the point where we can make more refined suggestions to practitioners about how best to proceed.

Summary

Project teams are unique in that they are cyclical, produce unique deliverables, and require a great deal of coordination and collaboration in order to function. This means that project team members are likely to experience a variety of occupational health issues not found in all forms of routinized work. In this chapter we have identified which demands project team members are likely to experience and how project managers can limit their scope and invasiveness. We have also described several resources that members might gain from project work, such as a sense of accomplishment, skill use, reward, goal attainment, and competence, all of which promote environmental mastery, cohesiveness, and social support from high-quality team interactions and group belonging, which relate to social affiliation, as well as physical resources such as pay and benefits. Further, we have also demonstrated that project work fits within the current framework of stress theories, having applied aspects of job demands–resources theory, the job demands-control-support model, the challenge-hindrance model, the psychologically healthy workplace model, and the transactional model of stress coping to different aspects of the project team environment.

Despite the research that has been included in this chapter, there is a striking deficiency of occupational health research in a project team context. There are several studies that have examined stressors in the project team environment, but they focus on context-specific (i.e., organizational) outcomes and rarely measure individual health or well-being. Those studies that do examine psychological distress or other indicators of well-being have made the initial foray, but a great deal more research remains to be done in this sphere. This chapter is scattered with a litany of potential research projects on demands in project teams, potential interventions, and the positive aspects of project work. Project team research would benefit greatly from adopting a contingency approach based on industry and life-cycle phase. Likewise, this research should grow in complexity, adopting a hierarchical approach to team-based concepts, using latent growth curve modeling for effects over time, and by incorporating moderating variables as necessary into structural models. Only in this fashion will research on occupational health in project teams meet the needs of today's practitioners and tomorrow's researchers.

At this point it is fair to say that project teams are here to stay. They have expanded far beyond their construction industry roots and are now a part of the modern organization. Research on occupational health in project teams will continue to advance, but for now, occupational health must remain a focus for

projectized organizations and project stakeholders, as project success depends on the performance and contributions of its team members.

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12 TEAM COMPOSITION AND PERFORMANCE

CONSIDERING THE PROJECT-TEAM CHALLENGE

Natalie J. Allen and Thomas O'Neill

Team composition is an option from a set of possible choices and managers need to minimize the risk of wrong team configuration.

—FERRIANI, CATTANI, & BADEN-FULLER, *2009, p. 1556*

Introduction

In this chapter we consider an issue that has challenged and intrigued organizational psychologists for many years—how to assemble, from the available candidates, the best work team possible. We have two major objectives. First, we provide a "where are we now?" overview of psychological research that examines the relation between team composition and team performance. In doing so, we describe the dominant approaches taken in this research and summarize its major findings, and we speculate about whether differences between project and non-project teams have implications for the role that team composition plays in shaping performance. Consistent with the goal of this volume, we then focus particular attention on research conducted within project teams, summarizing findings and noting challenges. Second, we make the case for a consortium approach to team composition research, arguing that it represents the ideal mechanism to bring together the expertise and resources needed to address these challenges and, thus, to provide evidence-based recommendation for practice.

Assembling High-Functioning Teams

Theoretically, at least, the general idea is simple enough. When one knows what characterizes the members of a high-functioning team, and in which combination these characteristics work best, it should be possible to use this knowledge to inform selection and team design decisions that will, in turn, enhance team performance and other key outcomes.

At the basis of any such selection/design advice, of course, must be sound empirical evidence that the team member characteristics in question are related to measurable team performance and other key outcomes. Gathering such evidence is easier said than done. Nonetheless, the field of organizational psychology has produced a sizable body of relevant research (e.g., Barrick, Stewart, Neubert, & Mount, 1998; Barry & Stewart, 1997; English, Griffith, & Steelman, 2004; Kichuk & Wiesner, 1997; LePine, Buckman, Crawford, & Methot, 2011), referred to hereafter as "team composition research." At the risk of oversimplifying somewhat, research tackling the team composition challenge has taken two basic approaches, which we refer to here as the "individual characteristics approach" and, perhaps more fancifully, the "jigsaw puzzle approach."

Individual Characteristics Approach

This approach is based on the general assumption that, when it comes to predicting a team's performance, some personal characteristics will matter a great deal more than others. Determining what these relevant characteristics are—and how the distribution of each, within a team, relates to the team's performance—becomes the goal of the team composition researcher who takes this approach. Such information can provide valuable guidance regarding what characteristics to focus on and how best to use these characteristics to build a high-functioning team. Because personal characteristics are individual-level constructs and team performance is a group-level construct, however, researchers taking this approach must operationalize personal characteristics at the group level. (For an overview of this general issue, see Muchinsky, 2012, pp. 275–277.) Most commonly, this is done using the team mean, or the team variability, on the characteristic in question. As outlined below, these two ways of operationalizing a team-level characteristic allow researchers to investigate two different types of team composition questions. Does a team perform better when it has a high (or low) *overall level* of the characteristic in question? Or is it *variability* that matters, such that teams that are diverse on the particular characteristic might perform better (or worse) than those that are homogenous?

Suppose, for example, that it is established empirically that those teams in which the mean of "characteristic M" (i.e., averaged across the team's members) is quite high perform *much* better than teams wherein the mean of "M" is low. The implication for selection here is straightforward. When choosing team members, the higher their "M-ness," the better. Suppose, instead, that a particular characteristic's relevance for team performance lies not in its overall level in the team, but in the manner in which it *varies* across the membership of the team. For example, imagine that it is established empirically that teams whose

members differ greatly with respect to "characteristic V" perform much better than those teams in which the members have quite similar V scores. This, too, will have implications for selection. In this case, when choosing team members, it will be important to choose those whose inclusion in the team will increase the team's "V-diversity."

Jigsaw-Puzzle Approach

For the most part, research that takes the approach outlined above examines characteristics on a one-at-a-time basis. Several years ago, Allen and West (2005) used the term "jigsaw puzzle studies" to refer to those, arguably more complex, efforts to understand team composition in which several team member characteristics are considered in terms of the configuration (or jigsaw puzzle) that they create. Here the question is not whether the team's mean or variability on a *single* variable influences performance (as in the research outlined above). Rather, this general approach considers whether a team's members "fit together"—or complement each other—based on the particular combination, or profile, of several variables associated with each member. Just as a given puzzle piece will not fit into all existing sets of interlocking pieces, a given person will fit successfully into teams with some people configurations, but not others.

The team composition theories that take this general perspective differ, of course, with respect to what characteristics they emphasize (e.g., expertise, roles, personal styles), and each theory is not only complex, but challenging to test. If a given jigsaw puzzle theory is correct, however, the implications for team design and selection are somewhat clear. When assembling a *brand new* team, attention should be paid to how well the various "types" that the potential members represent actually fit together. Similarly, when selecting a new member for an *existing* team, attention must be paid to the newcomer's ability to fit with the team's current membership.

Team Composition Research Within Organizational Psychology

Research examining the relations between personal characteristics and team performance is voluminous and, hence, somewhat difficult to summarize briefly. It is also complex, both conceptually and methodologically. Because the types of work that teams carry out, and the contexts in which they do this work, differ substantially, it seems likely that different characteristics will be needed across teams. There is, of course, no shortage of characteristics that

can be examined in this regard: various personality traits, mental/cognitive abilities, work values, demographic variables, knowledge, skills—the list goes on and on. Although the valid and reliable measurement of these individual characteristics is challenging, psychologists have, fortunately, made enormous progress in this regard (for reviews and best practices, see Chernyshenko, Stark, & Drasgow, 2011; Guion, 2011; Hinkin, 1995). Progress has also been made in our ability to assess team performance although, in this regard, many challenges still exist (e.g., Salas, Cooke, & Rosen, 2008). Moreover, as noted above, the underlying strategies for examining links between team composition and team performance differ considerably. For example, because personal characteristics are individual-level constructs and team performance is a group-level construct, researchers who take the individual characteristics approach must either conduct cross-level research or, as is more typical, develop group-level instantiations of individual characteristics (hence, the use of group means and variability in such research, as described above) and then must examine their relations with team performance. Researchers assessing jigsaw puzzle theories have an equally serious challenge as, in order to legitimately compare how well different combinations of team members perform, it is critical that research samples include numerous teams representing each of several possible combinations.

These complications aside, the body of work has grown in sophistication and volume, and the links between some team member characteristics and team performance have been examined often enough, across various samples, so as to allow for meta-analytic examination. In what follows, we summarize briefly the major findings from psychological research on team composition that takes either the individual characteristics or the jigsaw puzzle approach.

Individual Characteristics Research

Personality

Not surprisingly, personality figures prominently in team composition research. Although personality has been conceptualized in many ways, the dominant model at present would appear to be the "Big Five" (e.g., Goldberg, 1990) or Five-Factor Model (Costa & McCrae, 1992). These models were developed using two different methodologies, but converged on the same five factors of personality: Agreeableness (warm, polite, trusting), Conscientiousness (achievement-driven, diligent, organized), Extraversion (sociable, gregarious, active), Emotional Stability (low anxiety, anger, and self-consciousness), and Openness to Experience (intellectual, artistic). Recent, and compelling, evidence

also supports a sixth factor, referred to as Honesty-Humility; it involves sincerity, lack of greed, modesty, and fairness (Lee & Ashton, 2004, 2012).

Two recent meta-analytic studies support the relevance of team personality composition operationalized as the group mean. Bell (2007) found that for each of the Big Five personality traits, group means were positively related to team performance. Prewett, Walvoord, Stilson, Rossi, and Brannick (2009) examined all but one of these traits (Openness to Experience) and reported similar patterns. Not surprisingly, moderator variables were examined in these meta-analyses. Bell found that mean personality was more predictive in field studies than in teams studied in academic settings (e.g., course-based student teams, laboratory teams). Among field teams, she reported that Conscientiousness ($\rho = .33$), Agreeableness ($\rho = .34$), Openness to Experience ($\rho = .25$), Extraversion ($\rho = .18$), and Emotional Stability ($\rho = .21$) were related to team performance (ρ is the meta-analytic correlation involving two variables that have been corrected for sources of error). A similar field versus lab pattern, particularly with respect to Conscientiousness and Agreeableness, was reported by Prewett et al. Taken together, this research suggests that team-level personality, operationalized using the mean, may have a more important impact in teams whose members work together for a significant proportion of time and who work on more consequential team-related tasks.

Both Bell (2007) and Prewett et al. (2009) also investigated whether team member *diversity* (with respect to each of the traits) was related to team performance. Within field teams, diversity effects on performance were generally weaker than mean effects. Bell provided some evidence, however, that diversity with respect to both Conscientiousness and Openness to Experience could be problematic for field teams. Evidence from Prewett et al. suggested a somewhat more complex pattern. Specifically, diversity with respect to both Conscientiousness and Agreeableness tended to be somewhat problematic, but only for reciprocal tasks (in which work is circulated back and forth among specific team members; Tesluk, Mathieu, Zaccaro, & Marks, 1997; Thompson, 1967). Sample sizes for these nuanced "Trait/Task Type" findings were relatively small, however, and it is unclear whether the pattern of results will hold in future research.

Knowledge, Skills, and Abilities

It has been suggested that some individuals are simply better at teamwork than others. To evaluate this possibility, the Teamwork Knowledge, Skills, and Abilities Test (Teamwork-KSA Test) was developed, and its links with team performance have been examined. The Teamwork-KSA Test is a 35-item

multiple-choice test constructed by Stevens and Campion (1994, 1999). The test provides an overall Teamwork KSA score, as well as scores for two general domains: Interpersonal KSAs and Self-management KSAs. Further, the Interpersonal KSA domain is subdivided and measured with scales that assess Conflict Resolution, Collaborative Problem Solving, and Communication KSAs; Self-management KSAs are measured with the scales Goal Setting and Performance Management KSAs, and Planning and Coordination KSAs.

In a recent study, O'Neill, Goffin, and Gellatly (2012) raised several questions regarding the Teamwork-KSA Test. Specifically, there were issues involving reliability, particularly at the general- and KSA-domain levels. Further, the test lacked a meaningful factor structure, and adequate evidence with respect to concurrent and criterion validity. Finally, test scores correlated with general mental ability at $\rho = .99$ (Stevens & Campion, 1999), suggesting that test scores may reflect respondents' ability to determine the correct test responses as much as, or more than, their actual *teamwork* KSAs. These issues aside, the Teamwork-KSA Test has received considerable attention in the literature, and *mean team-level* relations involving it and team performance were noteworthy in several studies. Stevens, Jones, and Fisher (2002) found that the team mean on the Teamwork KSA Test correlated ($r = .25$) with the performance of metal refinery production teams. In a sample of steel and photographic paper production teams, test scores correlated with managerial ratings of team performance at .51 (Leach, Wall, Rogelberg, & Jackson, 2005). Ellis, Bell, Ployhart, Hollenbeck, and Ilgen (2005) found relations involving the Teamwork KSA Test and observer ratings of planning and task coordination (.36), collaborative problem-solving (.20), and communication skills (.49) in ad hoc laboratory teams. Using self-ratings of interpersonal and self-management KSAs (as opposed to the ability-based measurement proposed by Stevens & Campion), Kickul and Neuman (2000) found no relation between KSAs and the performance of ad hoc laboratory teams on a decision-making task.

Other researchers have focused on more broad-based forms of ability. Devine and Philips (2001) meta-analyzed the relation involving average general mental ability (GMA, or "cognitive ability") and team performance. Uncorrected relations across studies averaged to .29. However, GMA was more strongly related to team performance in laboratory settings ($r = .37$) than it was in field settings ($r = .14$). Bell (2007) also reported the meta-analytic relation between mean GMA and team performance, which was $\rho = .31$ overall. Here also, the relation was slightly stronger in laboratory ($\rho = .33$) than it was in field settings ($\rho = .26$). It should be noted that several of the field studies that Bell examined in her moderator analysis involving GMA focused on teams that carried out physical jobs. It seems quite likely that the relation involving GMA and team performance would be stronger in jobs that are higher on complexity.

Bell (2007) also reported a meta-analytic estimate of the relation involving diversity on GMA and team performance of only $\rho = .01$; further, she showed that the laboratory versus field setting distinction did not operate as a powerful moderator. Similar findings were reported in an earlier meta-analysis by Bowers, Pharmer, and Salas (2000). Thus, it appears that diversity on GMA is a much less important way to consider team composition than is the team's mean GMA.

Jigsaw-Puzzle Research

Personal Compatibility

Perhaps one of the intuitive reasons that personality seems relevant to team functioning is because there is a need for compatibility among team members. In other words, team members' personalities may need to be complementary—or "fit together"—in order for the team to achieve its potential. Some personality types may work well together, while others might not.

Research examining this particular jigsaw puzzle approach to personality has been surprisingly limited, however, in both scope and rigor. Many years ago, Schutz (1955, 1958) forwarded the Fundamental Interpersonal Relations Orientations (FIRO) theory based on this general notion of compatibility. The premise of this theory is that there are three human *needs* relevant to teamwork—need for inclusion, need for control, and need for affection—and that teams whose members have compatible needs will be most effective. Compatibility, according to Schutz's theory, involves a balance of individuals with high and low levels of the different needs. As the theory goes, an individual who is high on one need can only have that need satisfied by an individual who is low on the same need. For example, if *everyone* on a team was high on "need for control," then there might be agitation and frustration as team members jockeyed for positions of power and leadership. As a result, team performance would likely suffer. The FIRO-B survey developed by Schutz (1958) assesses proposed needs, which could, in theory, be used for team personnel selection purposes. Unfortunately, most relevant research has not found robust relationships involving compatibility on the needs measured by the FIRO-B and team performance (Moos & Speisman, 1962; Shaw & Webb, 1982). Even more troublesome, Hill (1975) reported that teams whose members were judged to be incompatible, using Schutz's approach, actually performed *better* than those considered to have compatible members. Interestingly, our literature review did not uncover recent empirical studies on the FIRO-B and team member compatibility, suggesting that this theory may not be as persuasive as are current personality models, such as the "Big Five" discussed above.

Team Roles

Other jigsaw puzzle theories emphasize the *roles* that individuals play in teams. This is an important approach because roles have been recognized as necessary for effective execution of task and social team activities (e.g., Hackman, 1987). Most prominent among the team role approaches is Belbin's Team Role Theory (1981, 1993). In essence, Belbin argues that there are nine team roles required for effective teamwork and that an optimal balance of these roles is needed within a team. Examples of these roles include coordinator, resource investigator, shaper, and implementer. It is acknowledged that an individual's style might allow him or her to naturally gravitate toward multiple roles simultaneously; thus, even a team of three or four can potentially cover all nine roles. To test the theory, Belbin's measure of team roles (Belbin Team Role Self-Perception Inventory) is administered to team members, and the team is considered balanced (and, thus, theoretically, a high-performance team) when at least one member has a high score on each role (e.g., Senior, 1997).

Similar to the FIRO-B issues raised above, however, there is a lack of strong evidence supporting Belbin's theoretical arguments. Although there is some debate about this (Swailes & McIntyre-Bhatty, 2002), one major problem seems to be that the Team Role Self-Perception Inventory, used to assess roles and thus critical to assessing the theory, does not have convincing psychometric properties (see Anderson & Sleap, 2004; Broucek & Randell, 1996; Furnham, Steele, & Pendleton, 1993; van Dierendonck & Groen, 2011). Overall, although some limited support for the theory has been reported in studies with very small samples (e.g., ~10 teams; Senior, 1997), team role balance, as determined using the Belbin measure, tends not to be related to team performance (e.g., Partington & Harris, 1999).

A newer role theory, which has been the subject of one empirical study, divides roles into social and task roles (Stewart, Fulmer, & Barrick, 2005). Specifically, Stewart et al. found that mean levels of the extent to which team members engaged in social roles correlated positively with *team cohesion*, although neither mean team social roles nor task roles related to *team performance*. They also proposed a team "social role bloc" and a team "task role bloc." This operationalization method allows one to investigate how the team members cluster at a certain level of a team role by analyzing the skew of member role scores. Results suggested that a negative skew on social roles (e.g., most members scoring high on team roles) was positively related to team cohesion. No relations involving team task bloc or team performance were found. A similar role theory, with an accompanying measure of individuals' "team role knowledge," has been developed by Mumford and colleagues (Mumford, Campion, & Morgeson, 2006; Mumford, Van Iddekinge, Morgeson, & Campion, 2008). Although promising,

to our knowledge, validation has only been done with respect to individual-level variables; thus relations with team performance remain unclear.

Team Composition, Project Teams, and Non-project Teams

Perhaps not surprisingly, the literature summarized above represents research conducted on a wide range of teams in various settings. As always, one has to wonder whether a particular set of findings obtained with one type of team will generalize to another. Interestingly, the team composition/performance issue has received little empirical attention in the project world. Indeed, it is safe to say that few of the organizational psychology studies summarized above were conducted in teams that carry out "projectified" work, as described by the Project Management Institute (2008).

Does this matter? That is, are there lessons in this literature that can be usefully applied to project teams? Or are project teams simply too different from non-project teams? At this point, it is impossible to know for sure. Teams are classically defined as "two or more people working interactively toward a common goal" (Hackman, 1987; see also Chiocchio, Chapter 3 of this volume, for a discussion of team definitions). On the one hand, therefore, it could be argued that "teamwork is teamwork" and that most psychological variables that have to do with interaction among team members will behave similarly across a wide variety of teams. On the other hand, project work does seem to differ in some important ways from non-project work and it is certainly possible, as some have argued (e.g., Chiocchio & Essiembre, 2009; Chiocchio, Grenier, O'Neill, Willms, & Savaria, 2012), that these differences have important implications. To our knowledge, however, little direct attention has been paid to outlining *why* this might be the case with respect to the impact of team composition on performance. Thus, we proceed by speculating about those differences between project teams and non-project teams that might have implications for the following questions: Why *would* the links between composition and performance differ in these two types of teams? That is, what features of project teams might lead us to *expect* different patterns of team composition findings than are observed in the "non-project" literature? In what ways might getting team composition effects "right" be more, or less, critical in project teams?

We follow this with a discussion and critique of empirical project management research in which team composition/performance relations have been examined and offer some thoughts about how the apparent gap between the "organizational psychology" and the "project management" approaches to understanding team composition might fruitfully be bridged.

Considering Project Teams and Composition

In thinking about team composition issues with respect to project teams, we readily admit to feeling a bit like tourists making one of our first visits to a land that seems somewhat, but not entirely, foreign. Much is familiar, but not everything is. Just as tourists do, we inevitably see things through the frame of our experience and, in so doing, may overemphasize some features, underemphasize others, and omit some altogether. That caveat aside, in what follows we speculate about the particular relevance that team composition holds for project teams and whether one might expect some different team composition-performance patterns in project versus non-projects teams.

Project Teams and Time

Because projects have a beginning, middle, and end, the work of project teams is temporally bounded. It is critical that project teams develop plans for, and move smoothly through, project stages and milestones (Chiocchio, 2007; Chiocchio & Lafrenière, 2009). Moreover, although the time frames of projects can vary considerably, it is likely that, *on average*, members of project teams will work together for a shorter period of time than the typical non-project, or operational, team. This raises a couple of issues.

Perhaps most important, it suggests that getting team composition "right" might be *especially* important in project teams. Because time is shorter, there is less and, possibly, insufficient time to work out the process "bugs"—such as increased conflict and reduced cohesion—that are associated with less than ideal team composition. And, interestingly, recent meta-analytic evidence suggests that these processes are *particularly* important in project teams. Specifically, this evidence shows that both the negative relation between task conflict (when members have divergent views about the task) and performance (O'Neill, Allen, & Hastings, 2013) and the positive relation between team cohesion and performance (Chiocchio & Essiembre, 2009) are stronger in project teams than in non-project teams. In addition, it seems likely that time pressures themselves can serve to exacerbate composition-related problems, such as reduced cohesion and increased team conflict, thus creating a vicious cycle. For all these reasons, we argue that those interested in project teams will benefit from the knowledge that well-designed team composition research may offer.

Another time-related team composition issue is based on the theoretical distinction, made in the organizational psychology literature, between so-called "surface" and "deep" person characteristics (e.g., Harrison, Price, & Bell, 1998; Harrison, Price, Gavin, & Florey, 2002). Examples of the former are

easily detectable characteristics such as gender, ethnicity, and age/status. The latter include personality, values, work styles, and the like—all characteristics that may take somewhat longer for team members to detect in each other. The argument underlying the surface/deep hypothesis highlights the role of time and is as follows. Early team interaction—when new team members have been together for only a short time—is more likely than later interaction to be affected by within-team variation (or "diversity") on surface variables. In contrast, within-team variation on deep variables is less strongly related to teams in their early stages, but may exert effects once the team has spent more time together. Although this hypothesis has attracted a fair bit of attention, well-designed tests are relatively few (Allen & Williams, 2010). At this point, however, relevant evidence seems somewhat stronger with respect to the role of surface-level variables (e.g., Harrison et al.,1998; Watson, Kumar, & Michaelsen, 1993). This suggests that managers of shorter-term projects, particularly if team members are brought together for the first time, must be sensitive to the potential for surface-level diversity to hamper early-stage team cohesion and performance—and must manage this diversity accordingly.

Project Teams, Membership Fluctuation, and the Assessment of Team Composition

Although it is tempting to describe teams as if they have stable and well-bounded memberships, this is not always the case, regardless of setting or team type. For various reasons, people come and go from teams, and some are members of more than one team (see also Mathieu, D'Innocenzo, & Kukenberger, Chapter 5 of this volume). Our reading of the project management literature suggests, however, that this fluctuation may be *particularly* common in complex project teams (Chiocchio et al., 2012). Indeed, this literature (e.g., Turner & Müller, 2003) points to the very sensible idea that the composition of the core team ought to reflect the project's needs at that specific point in time.

Eskerod and Blichfeldt (2005) provide a valuable set of practical suggestions about how to handle these personnel changes so as to reduce any negative effects on members and on the quality of their work. One can easily see, however, that little can be done to reduce the complication that member fluctuation creates for the measurement of a team's "composition," and, in turn, for the assessment of composition/performance effects. For project management researchers interested in providing useful team composition advice, this raises some special challenges. One strategy that may be helpful is to consider team composition effects with respect to subgroups of the team—either in terms of structure or, perhaps better still, temporal stages. Regarding structural subgrouping, recent work

examining team composition in terms of "core" and "peripheral" members (e.g., Humphrey, Morgeson, & Mannor, 2009) provides a model for how this might be done. Temporal stage assessment would seem fairly straightforward in project teams given their routine measurement of performance at each project milestone (e.g., Chiocchio, 2007).

The Field of Project Management

Perhaps one of the most striking features of project management as a field lies in the rigorous approach—with respect to a wide variety of activities—that it offers its practitioners. Axioms, rules, procedures abound, and the Project Management Institute (PMI) offers a "PMI Lexicon of Project Management Terms" and the Project Management Book of Knowledge (PMBOK; PMI, 2008) in order to facilitate standardization.

One might be tempted here to recruit classic arguments that "strong situations" reduce variation in how people behave (Mischel, 1968; see also Meyer, Dalal, & Hermida, 2010) and speculate, therefore, that personality characteristics, in particular, might play a *minimal* role in influencing behavior within project work. We lean toward dismissing this for a couple reasons. First, serious questions about the legitimacy of this hypothesis have been raised, both empirically and conceptually (e.g., Cooper & Withey, 2009). Second, and more important, we see a qualitative difference between the rigor that project management imposes on practitioners and that described by strong situation theorists. Indeed, our reading of the project management literature suggests that the extraordinary complexity of most project work likely leaves much "room" for personal characteristics to play their roles.

Our take on the interplay between personality and project work lies in a somewhat different direction—one that we see as worthy of empirical examination. Specifically, it seems possible that the nature of project work makes it especially suited to individuals with specific characteristics. For example, while conscientiousness has been shown to generalize across numerous jobs and to serve various types of teams well (e.g., Bell, 2007), it is possible that its relations with project team performance might be even stronger than for non-project work. Similarly, the precision and structure associated with some project work may benefit from team members with a methodical, detail-oriented approach. Finally, given the role that time-based planning and time management appear to play in project work (Chiocchio, 2007), it might be that team composition based on time orientation variables (e.g., multi- vs. single-tasking, Bluedorn, 2002; pacing styles, Gevers, Claessens, van Eerde & Rutte, 2008) is more strongly related to project team performance than to the performance of non-project teams.

In raising these various possibilities—all of which require empirical scrutiny—we are not suggesting that these characteristics are needed by all members of a project team. Rather, it might be that only one member who is strong on these personal characteristics is critical to project teams; failing to have that one, however, might lead to serious performance problems.

Team Composition Research in Project Teams

Above we speculated about project/non-project team differences that might have relevance for understanding how team composition influences performance. At this point, we are unsure whether our observations about the project management world are accurate, way off-base, or somewhere in between. Nor are we confident about whether these observations make a legitimate case for expecting differences in team composition effects in project and non-project research. One way to determine what is known about team composition effects in the projectified world, of course, is obvious: have a look. In what follows, therefore, we focus on two lines of research.

The first, largely conducted by organizational psychologists, involves analogue research examining student project teams. Far from being typical "lab studies," this work involves teams of university students working, within academic settings, on lengthy, time-bound, and consequential team projects, typically within engineering and business faculties. Are these projects *as consequential* as projects carried out in work organizations? Perhaps not. For most students, however, the consequences associated with receiving a poor grade on a sizable portion of a key professional course cannot be considered trivial. One can certainly argue, however, that these teams do not generalize perfectly to project teams in organizations because students typically lack explicit training in project management. The facts that many organizations adopt a somewhat ad hoc approach to this training issue *and* that they often staff their teams with members who do not have formal project management training (see Chiocchio, 2007) suggest, however, that this generalizability concern may be quite minor. On balance, we suggest that most project teams in academic/professional schools are more similar to organizational project teams than they are different (O'Neill & Allen, 2011). The second line of research was drawn from the academic project management literature and, as such, was conducted in field settings. In both these lines of research, the same general question is addressed: What is the relationship between the personal characteristics of project teams' members and the performance of those teams?

Research with Student Project Teams

Personality, and personality-related, variables have received a fair bit of attention in research conducted on student project teams. Key findings from these studies, and from research examining other variables, are summarized below.

Personality and Related Personal Characteristics

Van Vianen and De Dreu (2001) investigated student project teams that carried research projects and received team performance ratings from their instructors. In this study, mean levels of Agreeableness and Autonomy (described as "Independence") were positively, and negatively, related to team performance, respectively. This suggests that having team members with strong cooperative tendencies and inclinations to trust others is helpful, whereas having team members with strong needs for independence and detachment from others is unhelpful. This is important for project teams given that the dynamics of projects create interdependencies that require effective coordination, and a cohesive unit (Chiocchio & Essiembre, 2009; Chiocchio et al., 2012).

Mohammed and Angell (2003) examined student project teams tasked with carrying out process-improvement projects based on problems identified in organizational settings. Team performance consisted of both written and oral reports outlining the teams' recommendations for process improvements. To determine the potential role that team composition based on personality might play, the researchers assessed Agreeableness, Conscientiousness, Extraversion, Emotional Stability, and team orientation; each was operationalized using the team mean and team variability. Interestingly, and in some contrast with other research in the "non-project" literature, none of these composition variables, when considered separately, was meaningfully related to team performance.

Tasa, Sears, and Schat (2011) investigated personality in project teams made up of business students performing a management simulation. In this study, group (mean) Agreeableness was associated with interpersonal teamwork behavior, which in turn was correlated with team performance. Conscientiousness and Core Self-Evaluation (i.e., evaluations that individuals have of themselves that involve self-esteem, self-efficacy, and so on) were both related to performance management behavior, which in turn was also related to team performance.

In our own research, we have conducted several investigations linking personal characteristics to performance in student project design teams. For example, O'Neill and Allen (2011) focused on student engineering design teams and, specifically, examined the Big Five factors of personality plus four facets of Conscientiousness: Achievement, Cognitive Structure, Organization, and Endurance. We reasoned that because Conscientiousness has been found to

be critical for task-oriented team performance contributions (see LePine et al., 2011), it would be valuable to uncover the specific facets of Conscientiousness, if any, that may be most important. Indeed, the findings did reveal that mean team Conscientiousness was positively related to team performance, and each facet had a similarly important effect. Thus, all facets of Conscientiousness seem helpful for strong team performance. We also found that diversity on Conscientiousness, and its facets, tended to relate to team performance in the negative direction, although the relations did not reach conventional levels of significance.

In a subsequent study, we investigated a personality-related variable referred to as "team meeting attitudes" (O'Neill & Allen, 2012). These attitudes are dispositional in nature; that is, they reflect an individual's feelings about the value of team meetings in general, not meetings in a particular team. Among student engineering design teams, we found that team meeting attitudes were indirectly, and positively, related to team performance (in this case, instructor ratings of 100-page team project reports). Specifically, team meeting attitudes were positively related to team potency (the team's beliefs in its ability to perform well; see Guzzo, Yost, Campbell, & Shea, 1993, for an overview) which, in turn, was positively related to team performance.

Other Characteristics

Miller (2001) investigated the overall Teamwork-KSA Test and its five scales in student project teams. Neither mean levels of overall Teamwork-KSA Test scores nor mean levels of its separate scales correlated significantly with team performance (i.e., instructor ratings of student projects that focused on offering solutions to an organizational problem). Neither did Miller find any effects involving overall KSA diversity. Interestingly, the diversity of Conflict Resolution scores was positively related to team satisfaction, suggesting that having some team members with stronger, and some with weaker, Conflict Resolution skills may lead to greater satisfaction. We wonder, however, if this could be a chance finding; although Miller (2001) did not report the reliability of the Conflict Resolution measure used in her study, subsequent research (O'Neill et al., 2012) using the measure reports its reliability to be .00.

Finally, Taggar and Neubert (2004) used an innovative design—and took a somewhat jigsaw puzzle approach—to investigate the combined effects of general mental ability (GMA) and Conscientiousness in a sample of business student teams working on a semester-long project. They found that team performance, indexed as prosocial (or helpful) behavior, was lowest in those teams who had a poorly functioning member who was both high on GMA *and* low on Conscientiousness. In other words, these results suggest that if team members

feel that they have a low-performing teammate and that person has high GMA but is not very motivated (low Conscientiousness), then helpfulness in the team will suffer. In contrast, in teams with a low-performing member who has low GMA, but is very motivated, helpfulness in the team will flourish. Thus, there appears to be interplay between GMA and Conscientiousness: low-performing team members will impact teams much differently depending on their combination of GMA and motivation.

Research from the Project-Management Literature

We searched in four project management journals, over a 16-year period (1997–2012), for work that examined *team-level* empirical relations between characteristics of project team members (team composition) and team performance. Journals included the *Project Management Journal, International Journal of Project Management, International Journal of Managing Projects in Business,* and *International Journal of Project Organisation and Management*. We also examined numerous other empirical papers, cited by the authors in the aforementioned journals and elsewhere, in which the performance of project teams was discussed with reference to team composition variables. In the end, although much thought-provoking *conceptual* work was evident (e.g., Madter, Bower, & Aritua, 2012), our search yielded very few relevant *empirical* studies. These are summarized below. As with the student project team literature described above, most researchers take the individual characteristics approach to the issue; very few examine team composition using the jigsaw puzzle approach.

Odusami, Iyagba, and Omirin (2003) examined team composition with respect to the source of design input. Specifically, they were interested in whether teams performed better if members were in-house consultants, external consultants, or a consortium (presumably a mixture of the two). They described their results as showing that project teams performed better when composed of in-house consultants. Further, they attributed this to the "easy flow of project information" (p. 526) that team member proximity can facilitate and to the pre-existing familiarity that team members had with each other.

Research by Liang and colleagues (Liang, Lui, Lin, & Lin, 2007; Liang, Wu, Jiang, & Klein, 2012) focused on several forms of diversity within project teams. Liang et al. (2007) examined diversity regarding knowledge, social (demographic) categories, and values, and they predicted that diversity would influence team performance via effects on task and relationship conflict. All relevant data were collected on surveys completed by individual team members from 16 software project teams. Liang et al. (2007) described their results as suggesting

that knowledge diversity is positively related, and value diversity is negatively related, to team performance and that these relations are mediated by task and relationship conflict. The authors acknowledge the relatively small sample size (n = 16); thus, their subsequentlarger-scale study (Liang et al., 2012) is a welcome addition to the literature.

In this study of information systems development (ISD) project teams, Liang et al. (2012) focused on value diversity and its relations to team conflict and performance. Drawing survey data from PMI members, the researchers collected information about each of the key variables from two members (project manager and one other member) of 62 ISD teams. Based on their results, Liang et al. (2012) offer the advice that project managers should compose teams from members with *diverse* values, as this appears to enhance team performance. It is not entirely clear whether the contrasting value diversity result found in this, and the researchers' earlier study, described above, is due to differences in the types of project teams studied, sample size, the measurement of key variables, or something else. Nor is it clear exactly what values form the basis of the measures these researchers use. Nonetheless, taken together, this research suggests the intriguing possibility that value diversity may play some role in enhancing performance in project teams.

Li, Yang, Klein, and Chen (2011) focused on problem-solving competencies, relevant to ISD projects, and their potential links with team performance. They based their theorizing on conceptual work that suggested that, to the extent an ISD team possessed a high degree of these competencies, projects would be conducted successfully. Respondents were 119 individuals, each representing a separate team, who rated their team's product (project) quality. These individuals also rated the problem-solving competencies of their team *as a whole.* Thus, although results generally supported the researchers' prediction, they noted as a limitation the fact that they did not use "aggregated responses from multiple team members" (p. 921) when assessing either team composition or team performance but, instead, relied on the reports from one member per team. Also somewhat concerning is that both sets of measures were taken using the same measurement technique (surveys), a strategy that can inflate observed relations.

Sommerville and Dalziel (1998) suggested that project teams within the construction industry might be more innovative if teams were composed based on Belbin's team role theory (discussed above). To better understand the distribution of Belbin roles in a student sample and the correlates of these roles with brain dominance, gender, extroversion, and course choice, they administered the Belbin measure to 92 students in business, engineering (including "building" [construction-related] students), and occupational therapy. Although they did not directly test the validity of team role theory, the authors concluded that

the variation within these student samples was such that using a multiple role approach to team composition was possible. Moreover, they noted, optimistically perhaps, that this "affords the project manager the opportunity of composing a team with the desired characteristics which will ensure continuous project success" (p. 171).

Finally, in their test of Belbin's team role theory, Blenkinsop and Maddison (2007) examined seven project teams tasked with procurement in the UK Ministry of Defence. As outlined above, the key issue in assessing team role theory rests on whether teams that are composed of members who represent a "balanced" set of roles outperform teams that are composed of members who represent an "unbalanced" set of roles. Blenkinsop and Maddison note several complexities associated with faithfully testing the theory. For example, team balance can be identified using various strategies/measures. In their study, four such measures were used to predict team performance and the authors note that "results give little support for any of these [four] measures" (p. 678). Somewhat puzzlingly, however, they also argue that "given the small sample size, sufficient evidence has been established to suggest relationships between some measures and team performance" (p. 678). Overall, although they appear to lean cautiously in support of Belbin's theory, they acknowledge that their data set may not provide an adequate opportunity to test it.

Some Thoughts

As researchers who study teams using quantitative methods, we are well aware of the numerous challenges associated with doing this type of research. Moreover, as psychologists steeped in the theory and practice of measurement (of both "people" and "performance"), we naturally took special note of these features of the research. Thus, we viewed the small body of research from the project management literature, summarized above, through these lenses. Overall, our sense is that the empirical project management literature that focuses on team composition would benefit considerably by paying greater attention to the construct validity of measures used to assess individual (personal) characteristics. In some of the research we examined, it was quite difficult to determine how measures were developed, what *specific* constructs they were designed or intended to assess, and whether they had been subjected to the kind of psychometric scrutiny recommended for measures of this sort (e.g., Hinkin, 1995). In studies where a single individual responded on behalf of the team (typically, so as to assess the team's diversity on a given variable), little information regarding the legitimacy of doing so was provided. The concern here, of course, is whether the individual being asked to make this assessment has the necessary information with which

to do so. Relatedly, in cases where *more than one* team member made observations regarding a team construct (e.g., performance), it was not always clear whether there existed conceptual and statistical justification to aggregate multiple observations to the team level. In essence, unless we know that multiple team members have relatively similar views about some characteristic of their team, it may not be legitimate to treat that characteristic as "true" of the team; instead, it might mainly represent the disparate views of individuals. This and related "levels of analysis" issues (e.g., Klein & Kozlowski, 2000) are pesky but critically important, and they require close attention in research of this sort.

Practical Implications for Project Managers

Recently, Ballesteros-Perez, Gonzalez-Cruz, and Fernandez-Diego (2012) commented that project team research has increased but that its incorporation into practice lags, especially in project-oriented companies. As implied above, we are not yet convinced that all of the project management research examining team composition has been developed to the point where specific findings should be adopted into practice. In some cases, results require replication; in others, replication efforts have been made, but have not produced clear patterns of findings. Nonetheless, taken together, the research reviewed in this chapter does provide some practical guidance to project managers interested in assembling high-functioning teams.

First, it seems that the most promising team composition variable associated with desirable project team performance outcomes may be GMA. GMA, also referred to as "cognitive ability" or "intelligence," measures an individual's ability to learn and process new information (Schmidt & Hunter, 2004). Specifically, GMA is theorized to be helpful because it speeds up the acquisition of job knowledge (Schmidt & Hunter, 1998) and helps individuals make connections that may not be evident to those lower on GMA. As many scholars have noted, project work often involves adapting rapidly to uncertainty—that is, learning quickly (e.g., Perminova, Gustafsson, & Wikström, 2008). Thus, assuming that team members have the necessary knowledge base and technical skills, there seems little doubt that project teams composed primarily of "high GMA" members will outperform those with other GMA configurations.

Second, the evidence is fairly strong in the general literature on teams, as well as in project teams, that team members' personalities should be considered. Conscientiousness has been found to be valuable across team types as well as within project teams (O'Neill & Allen, 2011); therefore, including team members who are achievement-oriented, planful, organized, and effortful will likely be advantageous. Other traits, such as Agreeableness, appear to be more relevant

for outcomes involving interpersonal behavior, such as building a cohesive and friendly atmosphere and reducing conflict (e.g., Mount, Barrick, & Stewart, 1998; Tasa et al., 2011). Importantly, these interpersonal outcomes themselves have been linked to team performance (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008).

Fortunately, the scientific assessment of psychological characteristics is based on a strong and extensive research base (Cronbach, 1949; Jackson & Messick, 1978; Lord & Novick, 1968; Nunnally, 1978). As such, there are numerous well-developed assessment instruments available that can evaluate GMA (e.g., the Wonderlic Personnel Test: Wonderlic & Associates, 2002). Similarly, valid and reliable measures of the personality traits reviewed above are widely available (e.g., NEO PI-R: Costa & McCrae, 1992; Jackson Personality Inventory: Jackson, 1994; HEXACO-60: Ashton & Lee, 2009). Particularly for large organizations that assemble numerous project teams, incorporating such assessments into the organization's human resource information systems (HRIS) would be of considerable practical value. We are certainly not suggesting that such characteristics be used as the only bases of team composition decisions; clearly, numerous others (e.g., skills sets, experiences, competencies, availability) also must come into play. Nor is the application of this information as simple as "always pick the highest X-scorer." Rather, as Humphrey, Hollenbeck, Meyer, and Ilgen (2007) describe in their "seeding" approach, the psychological characteristics of potential team members can be considered along with those of existing team members in conjunction with research-based knowledge regarding the "optimal composition" of the characteristic in question. The goal here is to ensure that *each* relevant team is seeded with an individual whose characteristics in some way enhance that particular team's composition. For example, if the characteristic in question is known to combine *additively* (such that increasing the team mean on that characteristic is helpful for performance), then individuals should be placed in teams in a manner that ensures that *each team* has the highest mean level of the characteristic possible. Unless teams have quite different priority levels, this should be done such that no team is treated advantageously (or disadvantageously) in this regard. A similar strategy is used when seeding a set of teams on the basis of a relation between team variability on a particular characteristic and team performance. That is, if *variability* (high or low) on the characteristic is known to be most important, then individuals should be placed on teams such that each team will enjoy some increase (or decrease) in variability (Humphrey et al., 2007).

Finally, as we outline below, we believe that researchers should work toward, and will be able to reach, a point at which much more specific and fine-grained advice about project team composition can be offered.

Directions for Future Research: Challenges and Opportunities

Numerous claims have been made about the differences that exist between project teams and those that are not "projectified" and that these differences have important consequences. To our mind, at least when it comes to issues regarding team selection/composition, such differences have yet to be established empirically. This *does not* mean such differences do not exist but, merely, that the relevant comparative work has yet to be undertaken.

The project versus non-project issue aside, we see tremendous value in studying the team composition issue within project teams. Project teams do important work. Some succeed spectacularly, others less so. Although we acknowledge that any project team's performance is due to numerous factors, we are persuaded by discussions within the project management literature (e.g., Madter et al., 2012; Maurer, 2010; Raiden, Dainty, & Neale, 2004) and by existing empirical work within organizational psychology, reviewed above, that "people factors" play an important role in predicting team success. For all these reasons, we are convinced that well-designed programmatic research, aimed at better understanding team composition/team performance relations could greatly enhance any organization's ability to put together a "made-for-success" project team. Some early-stage work has been done in this regard, but much more work is needed. For this reason, we argue that the primary value of the present chapter is a "stage-setting" one. We have summarized a wide body of knowledge that could be recruited to assist in the project team assembly process and have outlined the implications of this work. To fully understand how best to assemble high-functioning project teams, however, we believe that there is a need for project team research to go further and to do so in a programmatic manner.

In an ideal world, what would such research look like? First, we believe that it should be done so as to draw from the expertise of *both* project management experts and behavioral scientists. Project managers and project team members have a wealth of knowledge about the project team context and the planning, development, execution, and measurement of project objectives. Behavioral scientists understand the scientific method: how to choose and measure relevant psychological and team constructs, evaluate sample size needs, and conduct appropriate statistical analyses and report their results. To tackle this issue, there is a clear need for these two disciplines to combine research efforts. Second, such research would require the involvement of enough organizations so as to amass a large sample of commensurate projects/teams and, thus, to allow for adequate statistical evaluations of team composition/performance relations. Third, at each participating organization, it would be critically important to have an internal "research champion." We are referring here to someone who is

genuinely interested in the research, can navigate quasi-political and logistical research challenges within the organization, and can provide the research team with a nuanced understanding of the organization, and the project contexts, that only an insider will have. Finally, in considering this, we envision a consortium approach—perhaps linked to a set of related organizations, or organizations within a particular industry, in which project work predominates. Research capability would be drawn from academia (in the fields of both project management and organizational behavior) and from participating organizations. Although we well recognize the numerous challenges that all this would entail, we are enthused about its possibilities for both the science and the practice of project team design.

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13 FUNCTIONAL DIVERSITY IN PROJECT TEAMS

WORKING ACROSS BOUNDARIES

Sujin K. Horwitz

Introduction

As elucidated by Hobbs, Chiocchio, and Kelloway in Chapter 1 of this volume, there has been a stream of multidisciplinary research to investigate various elements of project teams (Brown & Eisenhardt, 1995; Chiocchio, Grenier, O'Neill, Savaria, & Willims, 2012). This chapter reviews literatures from management and organizational psychology to assess the impact of diversity on project team performance. Specifically, among numerous diversity attributes discussed in the team literature, functional diversity and its effects on project team performance are closely examined in this chapter, as project teams typically consist of members from different functional expertise and backgrounds to accomplish complex, novel, and non-routine tasks (Denison, Hart, & Kahn, 1996; Edmondson & Nembhard, 2009; McDonough, 2000). In doing so, two broad dimensions of functional diversity, inter- and intrapersonal functional diversity, are delineated, and their effects on project team process and outcomes are discussed by reviewing extant team research from both organizational psychology and management. This chapter also examines the potential moderation of intrapersonal functional diversity on the relationship between overall functional diversity and project team performance, followed by directions for further research and implications for practice.

Classifications of Diversity in Extant Literature

Chiocchio (Chapter 3 of this volume) defines the term "project teams" as the following:

> A project team unites people with varied knowledge, expertise and experience who, within the life span of the project but over long work cycles, must acquire and pool vast amounts of information in order to define or clarify their purpose, adapt or create the means to progressively elaborate an incrementally or radically new concept, service, product, activity, or more generally, to generate change.

From the above definition, one significant element of project teams is the relevance of functional diversity, the extent to which team member attributes reflect knowledge, experience, and perspectives pertinent to accomplishing tasks. Additionally, it can be inferred that the impact of functional diversity on project team performance is likely to be affected by members' abilities to combine their unique expertise to contribute to project success. Note that numerous other diversity attributes can influence project teams in other ways than those comprising functional diversity examined in this chapter. For example, Harrison, Price, and Bell (1998) examined the impact of surface-level and deep-level diversity on team integration. The researchers defined surface-level diversity as member differences in visible biological characteristics (e.g., age, gender, and race/ethnicity) and deep-level diversity as differences in attitudes, beliefs, and values that are learned through member interactions. In their cross-sectional study of teamwork, Harrison, Price, Gavin, and Florey (2002) found that over time, the effects of surface-level diversity were less important, whereas the effects of deep-level diversity were more prominent in predicting group outcomes. Milliken and Martins (1996) similarly categorized diversity into two broad types, "observable individual differences" and "underlying attributes," while Pelled (1996) dichotomized diversity based on "visibility" and "job-relatedness" dimensions. In Pelled's taxonomy of diversity, job relatedness was operationally defined as the extent to which the attribute reflects experience, skills, or perspectives pertinent to accomplishing tasks. In a similar vein, Joshi and Roh (2009) distinguished between relations-oriented (e.g., gender, ethnicity, and age) and task-oriented diversity (e.g., education, seniority, and functional expertise) to meta-analyze the effects of the two diversity categories on team performance. The researchers identified that functional diversity had a significant and positive effect on team performance as compared to other forms of task-oriented diversity. A meta-analysis by Horwitz and Horwitz (2007) also reported a positive impact of task-related

diversity on team performance, whereas bio-demographic diversity was not significantly related to team performance. A more recent meta-analysis by Bell et al. (2011) focused on the effects of specific demographic variables (e.g., functional background, education level, and organizational tenure) on team performance, rather than those of broad diversity categories (e.g., highly job-related, less visible), as typically studied in other meta-analyses. The researchers reported that a variety in functional backgrounds had a small yet positive relationship with general team performance as well as more specific dimensions of team performance, such as team creativity and innovation. Finally, a meta-analysis by Gerwin and Barrowman (2002) was particularly noteworthy, as they evaluated the relationships between project-salient integrative product development (IPD) characteristics and project performance. Gerwin and Barrowman identified that cross-functional teaming (i.e., creating a team consisting of functionally diverse members), one of IPD's main characteristics, significantly reduced a product development time in their meta-analysis.

Research endeavors to ascertain the effects of team diversity on teamwork have garnered prolific outcomes on the topic, and many studies have highlighted a positive relationship between task-related diversity and team performance, as discussed in the preceding section. Particularly, functional diversity has been suggested to benefit teams that perform novel and complex tasks across a variety of team contexts, as demonstrated in several meta-analyses (Devine & Philips, 2001; Bell et al., 2011; Gerwin & Barrowman; 2002). Because project teams are generally formed to undertake unique and complex tasks and their membership tends to be more functionally heterogeneous than that of other types of teams, functional diversity is assumed to hold the most significant impact on the complex dynamics of project team performance and thus is especially important to understand (Cohen & Bailey, 1997; Edmonson & Nembhard, 2009; Gemser & Leenders, 2011). However, the majority of team studies and especially meta-analyses tend to mix types of teams in their analyses; thus it is impossible to determine whether and to what extent the "generic" relationship seen for all types of teams is also applicable to project teams (Chiocchio & Essiembre, 2009). The ensuing section examines the multifaceted dimensions of functional diversity in the project team context.

Dimensions of Functional Diversity in Project Teams

Most of existing work on the diversity literature conceptualizes functional diversity as the distributional differences among individuals on a team with respect to varying functional areas and amounts of job-related expertise (Bunderson & Sutcliffe, 2002). Functional diversity has thus become generally operationalized

as a multidimensional construct embracing a variety of differences in individual functional expertise, experience, and knowledge (Bunderson & Sutcliffe, 2002). Functionally diverse teams are often equated with teams consisting of members who possess in-depth knowledge in their respective functional areas; however, functional diversity can also be examined on an individual basis by measuring the breadth of functional experience that an individual possesses. This within-individual functional diversity is assessed by measuring whether an individual on a team is a narrow functional specialist with experience in a limited range of functions, or a broad generalist whose work experience spans a range of functional areas (Bunderson & Sutcliffe, 2002). Less work has investigated how the varying dimensions of functional diversity affect project team performance, despite the prolific research on teams in both organizational psychology and project management. The following section reviews the team literature to refine the current conceptualization of functional diversity.

Existing Frameworks Through a New Lens: Dichotomy of Functional Diversity

Clearly delineating functional diversity and its dimensions is critical to a discussion of how different dimensions of functional diversity affect project team performance. The current literature in organizational psychology reveals several existing frameworks to explain multiple facets of functional diversity. First, Bunderson and Sutcliffe (2002) classified functional diversity in four categories: (1) dominant function diversity, described as different functional areas within which team members have spent most of their careers; (2) functional background diversity, defined as differences in the complete functional backgrounds of team members; (3) functional assignment diversity, conceptualized as differences in functional assignments of team member; and (4) intrapersonal diversity, denoted as differences in functional backgrounds of individual team members (pp. 878–880). In contrast, Harrison and Klein (2007) offered three components of diversity in analyzing their effects on team outcomes: (1) separation, denoted as compositional differences among individuals in their lateral position with respect to values, beliefs, and attitudes; (2) variety, referred to as compositional differences among individuals with respect to some relevant categories that contribute to team diversity; and (3) disparity, conceptualized as vertical differences in proportion of valued assets or desirable resources, hence creating inequality or relative concentration within a team. Finally, Dawson (2011) expanded Harrison and Klein's typology by refining the construct of variety into two sub-dimensions: (1) range in variety, defined as the range of levels of a variable

is represented within a group (p. 88); and (2) spread in variety, defined as the degree to which all possible levels of a variable are equally or evenly represented within a group (for further discussion of these concepts in relation to selecting project team members, see Allen & O'Neill, Chapter 12 of this volume).

In this chapter, functional diversity is dichotomized into the following parsimonious dimensions: interpersonal functional diversity and intrapersonal functional diversity. Interpersonal functional diversity is defined as between-member differences in functional domains across team members, thereby including varying functional backgrounds, expertise, and knowledge at the group level. Intrapersonal functional diversity is conceptualized as within-person differences in functional domains in order to reflect the breath of functional diversity that individual team members posses. Intrapersonal functional diversity, while frequently used as a group-level measure, also affects team performance, given the extent to which members' prior experiences are individually heterogeneous or homogeneous. Intrapersonal functional diversity thus embraces the notion of *spread* in functional varieties in teams by capturing both the range of functional experience within the individual, as well as the common representation of functional experiences among team members at the group level. For example, finding a high level of intrapersonal functional diversity in a team indicates that individual team members have broad functional experience that overlaps with each other's experience, thereby indicating a commonality in functional experience among the members at the group level. In contrast, a high level of interpersonal functional diversity in a team suggests that the team has a diverse knowledge base and expertise, with a large number of functional domains represented across team members. Although these two types of diversity fall under the same rubric of functional diversity, they tap into fundamentally different facets of functional bases, as interpersonal functional diversity pertains to the breadth of functional diversity at the group level, whereas intrapersonal functional diversity examines the breadth of functional diversity at the individual team member level. The concept of intrapersonal functional diversity may thus allow for a more specific analysis, hence elucidating the complex impact of functional diversity on project team dynamics. The next section reviews the extant literature on these two dimensions of functional diversity and assesses their effects on project team process and performance. For project team process, task conflict, external communication, and boundary spanning due to increased functional diversity are highlighted with a summary of relevant research findings, while the overall impact of functional diversity on project performance is examined with a particular emphasis on the effectiveness and efficiency of novel projects.

Literature Review on the Two Types of Functional Diversity in Project Teams

Relevant articles on the two categories of functional diversity in project teams published since 1990 were identified by computerized searches of academic databases and journals. The major keywords used for the searches were "project teams," "new product development teams," "project team diversity," and "functional diversity/heterogeneity," in order to narrow the vast amount of research done on teamwork in both organizational psychology and project management. Keyword combinations and truncation were also used to capture relevant studies on the effects of functional diversity on team outcomes in the project team context. Finally, the searches were limited to empirical studies on project teams performing real-life tasks in natural settings (i.e., real organizations), while excluding project teams performing simulated tasks in laboratory settings (i.e., educational institutions and training centers). A total of 22 empirical studies that examined the two functional diversity categories in the project team context were identified (see Table 13.1 for the summary of the identified studies). Of these studies, 18 studies examined the relationship between interpersonal functional diversity and project team outcomes, while four studies focused on the effects of intrapersonal functional diversity on project team performance. Additionally, four meta-analyses that assessed the cumulative effects of functional diversity on project performance were identified and included in this review.

Interpersonal Functional Diversity in Project-Team Processes

Interpersonal functional diversity, the extent to which team members differ in their dominant functions, backgrounds, and assignments, was by far the most studied dimension of functional diversity in project teams. A review of interpersonal functional diversity in project teams reveals two critical processes in facilitating project team performance: a high level of interpersonal functional diversity is associated with increased task conflict and expanding communication and boundaries in project teams.

Effects of Interpersonal Functional Diversity on Task Conflict

The current literature posits that a moderate level of task-based conflict can produce positive effects by generating ideas, evaluating alternatives, and encouraging constructive criticism, all of which can improve the quality of team performance (De Dreu & Weingart, 2003; Jehn, 1995; Klein & Harrison, 2007). In particular, when tasks are of a non-routine nature and are complex, as in project

Table 13.1 Effects of Interpersonal and Intrapersonal Functional Diversity on Project Team Performance

Authors	Journal	Sample	Main Results
Ancona & Caldwell (1992)	*Organization Science*	45 NPD teams	Positive effect of functional assignment diversity on external communication, which led to higher team and manger ratings of effectiveness
Eisenhardt & Tabrizi (1995)	*Administrative Science Quarterly*	72 multifunctional project teams	Interpersonal functional diversity was related to shorter product development time
Pelled et al. (1999)	*Administrative Science Quarterly*	45 NPD and process improvement teams	High levels of dominant functional diversity experienced greater task-related conflict but were not related to performance
Sethi (2000)	*Journal of Marketing*	141 cross-functional teams	No effect of functional diversity on the quality of NPD
Keller (2001)	*Academy of Management Journal*	93 R&D teams	Positive indirect effect of functional diversity on quality, efficiency, and budget, while negative indirect effect on cohesiveness through external communication
Lovelace et al. (2001)	*Academy of Management Journal*	43 NPD teams	No direct effect but significant moderating effects of interpersonal functional diversity on innovation
Sethi et al. (2001)	*Journal of Marketing Research*	141 cross-functional teams	No effect of functional diversity on the innovativeness of NPD
Cummings (2004)	*Management Science*	182 problem-solving teams	Functional assignment diversity was positively related to external knowledge sharing

(continued)

Table 13.1 (Continued)

Authors	Journal	Sample	Main Results
Joshi & Sharma (2004)	*Journal of Marketing*	165 NPD projects	Creating cross-functional teams was positively related to customer knowledge development
Bstieler (2005)	*Journal of Product Innovation Management*	182 development projects	Significant effect of functional representation on time efficiency was found
Randel & Jaussi (2003)	*Academy of Management Journal*	37 cross-functional teams	Identification with other members on functional background is positively related to an individual member performance
Van Der Vegt & Bunderson (2005)	*Academy of Management Journal*	57 R&D teams	Significant moderating effects of functional assignment diversity on team learning and performance
Yeh & Chou (2005)	*Social Behavior and Personality*	88 cross-functional teams	Support for main effects but no support for the moderating effect of functional background diversity
Carbonell & Rodriguez (2006)	*Journal of Business Research*	83 projects	Functional diversity positively influenced innovation speed and the effect was stronger for complex projects than simple projects
Liang et al. (2007)	*Industrial Management & Data Systems*	16 project teams	Functional diversity indirectly increased team performance through increased task conflict
Akgun et al. (2008)	*Innovation & Management*	207 NPD projects	Functional diversity was positively related to a team's ability to manage and integrate knowledge
Dayan & Di Benedetto (2009)	*European Journal of Innovation Management*	93 NPD teams	Functional diversity was quadratically (a ∩ shape) related to team communication, coordination, and cohesion

Haon et al. (2009)	*Marketing Letters*	142 NPD teams	Functional diversity had a positive effect on NPD performance mediated by the degree of instrumental use of information
Park et al. (2009)	*Journal of Product Innovation Management*	62 NPD teams	Multi-knowledge as intrapersonal functional diversity positively influenced NPD performance
Huckman & Staats (2011)	*Production and Operations Management*	409 software development teams	Intrapersonal diversity positively affected team performance when a coordination of a team task was required due to change
Zoogah et al. (2011)	*International Journal of HRM*	44 strategic alliance teams	Negative effects of functional diversity on both performance satisfaction and goal achievement in the strategic alliance teams
Richter et al. (2012)	*Journal of Applied Psychology*	34 R&D teams	Functional diversity positively moderated the link between creative self-efficacy and creativity

teams, conflict regarding team task can enhance the depth of problem evaluation and assessment of options (Amason & Mooney, 1999; Jehn & Mannix, 2001). This finding was consistent with several studies examining new product development (NPD) and innovation in project teams, demonstrating that task conflict positively affects the relationship between functional diversity and project team outcomes. When task conflict is properly managed, task conflict stimulates creativity and innovation through encouraging divergent viewpoints and thus represents an advantage that functionally diverse teams have relative to homogenous teams (Jehn & Bendersky, 2003; Liang et al., 2007; Pelled et al., 1999). Findings from research suggest that task conflict is related to team performance in a curvilinear fashion in that performance is highest when task conflict is moderate, while extreme levels of task conflict are associated with a decrease in performance (De Dreu, 2007; Van de Vliert & De Dreu, 1994) (for more on conflict in the project context, see de Wit, Chapter 9 of this volume).

Pelled, Eisenhardt, and Xin (1999) studied the impact of team diversity on task conflict and performance by surveying 45 new product and process improvement teams in electronic divisions at three companies. Although dominant functional diversity was not significantly related to team performance in their sample, Pelled et al. (1999) reported that teams with high dominant functional diversity experienced greater task-related conflict, with the relationship being moderated by team longevity and task routineness. Their findings suggest that task conflict has a positive relationship with cognitive task performance because such conflict fosters a deeper understanding of task issues and exchange of information, which ultimately facilitates problem-solving and idea generation. There is also a moderating effect of team longevity on task conflict in that when team tenure is less, the relationship between dominant functional diversity and task conflict tends to be weakened (Pelled et al., 1999). Similarly, Liang et al. (2007) investigated the effects of functional assignment background (i.e., team member diversity in departmental and unit affiliations in an organization) among 16 software project teams and reported that such diversity indirectly increased team performance through increased task conflict. Finally, by examining 43 cross-functional NPD teams in a global high tech industry, Lovelace et al. (2001) found that functional assignment diversity in teams positively influenced the effectiveness and efficiency of innovation through the mediating effect of team communication. Specifically, the researchers noted that a greater level of functional diversity increases levels of task disagreement, but the effect of task disagreement on teams' outcomes depends on how such disagreement is communicated, how free team members feel to express task-related issues, and the ability of the teams to attain creative solutions to their problems in the process of resolving such conflict.

Effects of Interpersonal Functional Diversity on Crossing Boundaries and Expanding Communication

The current project management research postulates that functional diversity in projects teams enhances members' ability to connect and communicate with multiple sources that are internal and external to teams, thereby integrating relevant resources to benefit team performance (Argote, Ingram, Levine, & Moreland, 2000; Edmonson & Nembhard, 2009; Marrone, Tesluk, & Carson, 2007). In particular, external communication allows a project team to import relevant information into the team and coordinate internal activities as needed (Edmondson, 1999). The team literature from both organizational psychology and project management highlights that heterogeneous team members in terms of functional backgrounds, affiliations, and organizational positions are efficient at crossing boundaries and expanding networks, as such functionally diverse members can act as boundary spanners to facilitate information transfer and intersect inter- and intra-organizational boundaries (Cummings, 2004; Richter, West, Van Dick, & Dawson, 2006). Such effective boundary spanning and networking activities are crucial for project teams, as their tasks are largely interdependent of the rest of the organization, thereby necessitating the coordination of resources and cooperation from multiple stakeholders.

Surveying 182 teams engaged in problem-solving projects, Cummings (2004) reported that an interaction of external knowledge sharing and functional assignment diversity was positively related to team performance in that greater external information sharing was more strongly associated with team performance when teams were more functionally diverse. Observing 45 product development teams, Ancona and Caldwell (1992) also found that successful product development teams took part in a variety of boundary-spanning and political activities, including coordinating tasks, seeking support and feedback, and promoting the team's image. Communication strategy was also found to be germane to team performance in that the most successful product development teams used a variety of external communication strategies and task-coordination behaviors, which helped these teams obtain task-related information, secure resources, and enhance project success. In contrast, less successful product development teams used fewer types of external communication activities and prolonged information-seeking. This study demonstrated the importance of task-oriented external communication and coordination behaviors, hence suggesting that product development teams benefit not only from greater frequency of external communication, but also from the quality of such interactions (Ancona & Caldwell, 1992). Keller (2001) likewise argued that cross-functional team composition offers a unique advantage to teams by providing multiple sources of communication and network, both inside and outside an organization.

In his study of 93 R & D teams at four companies, Keller identified that functional assignment diversity had a positive and indirect effect on team outcomes through external communication. That is, although functional diversity itself had an insignificant (even a negative effect) on team outcomes, cross-functional teams delivered better technical quality, faster schedule performance, and significantly more cost savings when mediated through enhanced external communication with stakeholders. Keller's study stressed that cross-functional teams can enhance project outcomes through increased external communication because the benefits are due to having members with diverse backgrounds and skills, coupled with contacts with important external networks of information. Similarly, Akgun et al. (2008) found that the number of functional areas represented in a project team is positively related to the team's ability to acquire, process, and utilize knowledge from various sources, and that doing so increases the team's flexibility and responsiveness to changes and customer demands.

Impact of Interpersonal Functional Diversity on Project Performance

In the current literature, project performance criteria include a variety of performance measures (Atkinson, 1999; Shenhar, Tishler, Dvir, Lipovetsky, & Lechler, 2002; Turner, 2009). Although schedule, cost, and quality, commonly referred to the "iron triangle," have been frequently used to measure project team performance (Oisen, 1971), divergent viewpoints exist to embrace varying dimensions of project team performance given the multidisciplinary nature of projects. Among various performance dimensions discussed in the project management literature, effectiveness and efficiency of novel projects are examined in this chapter, as functionally diverse project teams are generally well equipped to develop innovative solutions when problems and tasks are complex, ill-defined, and novel (Mohrman, Cohen, & Mohrman, 1995; Simons, Pelled, & Smith, 1999; West, 2002).

Interpersonal Functional Diversity and Effectiveness/Efficiency of Novel Projects

Numerous researchers have argued that cognitive diversity, as reflected in the breadth and depth of functional diversity, provides a particularly rich source for creativity and innovation in teams (McDonough, 2000; Milliken & Martins, 1996; Pelled, Eisenhardt, & Xin, 1999; Zhou & Shalley, 2010). For example, proponents of the cognitive resource hypothesis argue that cognitive diversity

enhances a team's collective ability to solve complex problems and achieve novel projects (Hambrick, Cho, & Chen, 1996; Miller, Burke, & Glick 1998). Similarly, the value-in-diversity paradigm stresses that diversity in organizations brings net-added value to organizational processes and outcomes (Cox & Blake, 1991). As reflected in these perspectives, researchers maintain that teams composed of members with varying skills, knowledge, and expertise will be more innovative than teams composed of homogeneous members because a variety of functionality in teams generates unique yet complementary perspectives and experience on issues and problems (Miller, Burke, & Glick, 1998). Indeed, a large body of research suggests that functional characteristics positively influence product development and innovation in project teams (Edmonson & Nembhard, 2009; Gerwin & Barrowman, 2002). Additionally, some further contend that if relevant departments (e.g., engineering, marketing, and production) are involved from the beginning of a project, the activities in these departments can concurrently be coordinated to allow an efficient transfer of information to facilitate project coordination (Griffin, 2002).

Several studies have focused on the effects of interpersonal functional diversity on NPD and innovation process in the cross-cultural context by examining project teams sampled from different countries. For example, Bstieler (2005) studied team characteristics and contextual factors affecting project timeliness with 182 development projects in Australia and Canada and demonstrated that one of the key factors for project timeliness was the number of functions represented in a project team, coupled with the members' dedication and integration into the project. Joshi and Sharma (2004) surveyed 165 Canadian marketing managers as key informants for cross-functional NPD projects to test antecedents, moderators, and outcomes of customer knowledge development process. The researchers uncovered that cross-functional NPD teams fostered an understanding of customer preference, which was essential to the success of NPD, hence underscoring the importance of functional diversity in the NPD process. Finally, a study by Eisenhardt and Tabrizi (1995) examined 72 multifunctional product teams in 36 computer firms located in Japan, Europe, and the United States and discovered that cross-functional teams created a wider range of ideas and expedited the product development process because downstream problems in the various functional areas were more likely to be identified and corrected during early stages in the production process due to the involvement of multiple units. Another noteworthy finding of the study was that an experiential and improvisational strategy through frequent iterations, increased testing, establishing milestones, and utilizing powerful leadership expedited the product development process, particularly in uncertain and complex product innovation environments. Their findings mirror the current thought of project

management, agile project delivery, which employs incremental delivery and iterative process of working products for project modification and enhancement, as discussed by Hobbs (Chapter 2 of this volume). Although a life cycle of a given project should be adapted to characteristics and contexts unique to each project, an agile approach seems to be well-suited for experimental, innovative, and novel projects in a dynamic, changing environment because the approach incorporates incremental changes and progressive elaborations throughout the product development cycle (Eisenhardt & Tabrizi, 1995).

Haon, Gotteland, and Fornerino (2009) embraced the notion of competence diversity, a more inclusive measure of functional diversity, by adding education, experience, and expertise to functional diversity and examining its effects on NPD performance. Haon and colleagues reported that competence diversity had a positive effect on NPD performance mediated by the degree of instrumental use of information. Carbonell and Rodriguez (2006) operationalized functional diversity as the number of functional areas and external stakeholders represented on a team (e.g., top management, marketing, engineering, manufacturing, sales, etc.) and measured its effect on the speed of product development in various industries. The authors classified the sample into two categories based on the technical complexity of a project (simple or complex), and performed a separate analysis for each sub-sample. Their results indicated that functional diversity had a curvilinear relationship with innovation speed for both technologically complex and simple projects. As functional diversity increased, so did the speed of product development; however, when functional diversity became too high, there was then a reduction in innovation speed. Additionally, there was a varying degree of acceleration in innovation speed between the two types of project in that the more complex and challenging the project was, the greater functional interdependence was needed to expedite its execution, whereas functional diversity was less beneficial for simple projects requiring clear solutions (Carbonell & Rodriguez, 2006). Similarly, Van Der Vegt and Bunderson (2005) investigated how forming collective identification moderated the effects of functional assignment diversity on team learning and outcomes (for more on identity in project teams, see Tremblay et al., Chapter 8 of this volume). The researchers identified that at the extreme ends of the continuum, either too little or too much, of functional assignment diversity among team members inhibited team learning and decreased team performance. Van Der Vegt and Bunderson highlighted that moderate levels of functional assignment diversity in teams made them more conducive to team learning and performance. Finally, Dayan and Di Benedetto (2009) surveyed 93 NPD team mangers in Turkey to examine the effects of functional diversity, along with several other antecedents on the quality of team interactions (teamwork quality). The researchers reported that

high teamwork quality was achieved when functional diversity increased from a low to a moderate level. As suggested by the aforementioned studies, the impact of member diversity on team performance is likely to be affected by the complexity and structural aspects of the task (Van de Ven & Ferry, 1980; Dumont, Gibson Jr., & Fish, 1997). For example, in accomplishing a highly complex and ill-defined task, it is necessary for team members to pull together their diverse expertise to formulate strategies to deal with the task under complex conditions, whereas member diversity may be unnecessary or even counterproductive in dealing with a simple, routine task (Horwitz, 2005). There should be an optimal match between team diversity and the scope and complexity of a project to ensure project team success (Dumont, Gibson Jr., & Fish, 1997).

Empirical studies have also reported either negative or null effects of interpersonal functional diversity on project team performance. For example, Sethi, Smith, and Park (2001) surveyed 141 cross-functional team managers regarding how new product quality was affected by project team characteristics, such as functional background diversity and information integration among team members. From their results, Sethi et al. proposed that diverse functional inputs would facilitate the development of a new product and further hypothesized that the quality of a new product would be highest when functional background diversity in a cross-functional team is moderate. Contrary to their expectations, functional background diversity in itself had no effect on the quality of a new product. Yeh and Chou (2005) examined the effects of functional diversity on the performance of 88 cross-functional teams implementing a sophisticated, system-wide software program at a high-tech firm. The researchers expected that functional diversity would be positively associated with team performance, while team conflict would mediate the effect of functional diversity on performance. However, like Sethi et al.'s study, neither a main effect of functional diversity nor a mediating effect of task conflict was found for their cross-functional team sample with respect to having a significant impact on team performance. In other words, a high degree of functional diversity was found to be neither the main source of task conflict nor a contributing factor for project effectiveness. There were also several meta-analyses summarizing the impact of functional diversity specifically on project team outcomes, and their findings were similarly inconsistent regarding the benefits of functional diversity. For example, a meta-analytic review by Henard and Szymanski (2001) found that NPD was not significantly correlated with cross-functional integration, thereby suggesting that an integration of multiple functional areas into the new product initiative may not necessarily improve the success of new products. Likewise, Chen, Damanpour, and Reilly (2010) meta-analyzed the relationships between NPD speed and 17 antecedents of NPD, including functional diversity, and

did not establish a significant relationship between functional diversity and NPD speed. More recently, Sivasubramaniam et al. (2012) reported an insignificant relationship between functional diversity and NPD success in terms of efficiency (marketing budgets and schedules), effectiveness (market success), and speed to market in their meta-analysis. Another noteworthy study on the impact of functional diversity on project teamwork was conducted by Zoogah, Vora, Richard, and Peng (2011) by surveying 44 strategic alliance teams drawn from both US and non-US companies. Contrary to their expectations, Zoogah et al. found negative effects of functional assignment diversity on both performance satisfaction and goal achievement and speculated that this result may have been caused by the lack of distinction between interpersonal and intrapersonal functional diversity in their analysis. The research team reasoned that intrapersonal functional diversity as reflected in the functional specialists in team composition may have engendered a negative effect on team outcomes in their sample.

Summary of Empirical Studies on the Overall Impact of Interpersonal Functional Diversity on Project Teams

The underlying logic of the benefits of interpersonal functional diversity in project teams is twofold. First, from the intra-group process perspective, interpersonal functional diversity has a positive impact on project team performance because of unique yet complementary functional expertise and experience that members bring to the team, which leads to synergetic team outcomes (Hambrick, Cho, & Chen, 1996; Horwitz & Horwitz, 2007). Second, from the intergroup process perspective, having diverse team members regarding functional backgrounds, assignments, and affiliations in organizations enables a project team to span boundaries and gain access to key resources from both inside and outside the team in order to pool and assimilate such resources to augment their project (Ancona & Caldwell, 1992; Caldwell & O'Reilly, 1982). However, the totality of empirical research on the benefits of interpersonal functional diversity for project performance has presented a complex picture and inconsistent findings. On one hand, from both theoretical perspectives (notably from the cognitive resource and value-in-diversity perspectives) and empirical bases, by broadening the range of human capital among team members, such varieties in interpersonal functional diversity can promote the effectiveness of project team performance. Indeed, this review has found a number of empirical studies supporting the perspective that functionally heterogeneous project teams are more innovative in developing products and respond more quickly to market demands than homogenous ones. However, not all studies concur, and the results are inconclusive.

In some cases, negative effects have actually been found between functional diversity and project team performance, as discussed in the preceding section.

Although the impact of functional diversity is paradoxical to some extent within the project team context, some of the equivocal findings on the effects of functional diversity may be due to the fact that extreme levels of such diversity produce negative consequences, whereas moderate levels lead to optimal performance, as consistent with the curvilinear effects found in the team literature. That is, it is possible that project outcomes may be compromised when each member is far more knowledgeable in one area relative to other members, as shown for high levels of interpersonal functional diversity suggested by several studies (Bunderson & Sutcliffe, 2002; Zoogah et al., 2011). Conversely, having team members with broad functional experience that overlaps with each other (high intrapersonal functional diversity) may be instrumental in stimulating the exchange and integration of information and reducing interpersonal conflict, as the members are more likely to have a shared understanding and relate to each others' experience due to their broad exposure to various functions in the organization (Bunderson, 2003; Byul, Boone, Hendriks, & Matthyssens, 2011; Maznevski, 1994). This chapter proposes that project team outcomes can be more accurately understood by including intrapersonal functional diversity as a potential moderator in the relationship between interpersonal functional diversity and project team outcomes.

As shown in Figure 13.1, task conflict, external communication, boundary spanning, and information sharing (project team process) are theorized as team mechanisms through which interpersonal functional diversity facilitates distal outcomes of project teams. The effects of interpersonal functional diversity on

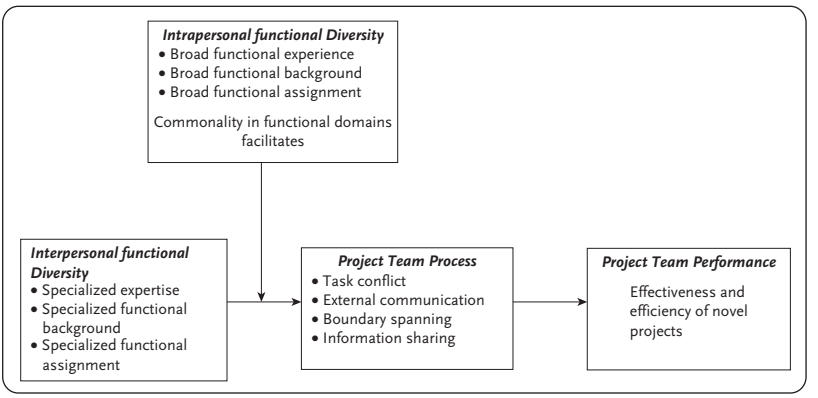

FIGURE 13.1 The moderation of intrapersonal functional diversity in the mediated relationship between interpersonal functional diversity and project team performance

project team outcomes are thus mediated by the project team process, as depicted in the figure. Additionally, the meditated relationship between interpersonal functional diversity and project team outcomes varies across levels of intrapersonal functional diversity, as suggested in the moderated mediation in the figure. This proposition, therefore, predicts that project team process mediates the relationship between interpersonal functional diversity and project performance at different levels of the moderator, intrapersonal functional diversity. On the basis of this proposition, it is thus argued that a high level of intrapersonal functional diversity improves team process as compared with a low level of intrapersonal functional diversity, and the improved team process positively mediates the relationship between interpersonal functional diversity and project team outcomes. Because intrapersonal functional diversity represents another crucial dimension of functional diversity in assessing its impact on project team dynamics and has been largely ignored in the current literature, a more comprehensive assessment of the benefits and limitations of functional diversity in project teams is needed, whereby intrapersonal functional diversity is tested as a moderator in understanding the complex relationship between functional diversity and project team outcomes.

Intrapersonal Functional Diversity and Its Moderating Impact on Project-Team Dynamics

The majority of empirical studies on project team diversity have used a one-dimensional approach in conceptualizing functional diversity, as opposed to taking a multidimensional approach that accounts for both interpersonal and intrapersonal functional differences (Bunderson & Sutcliffe, 2002). By failing to isolate the potential effects of intrapersonal functional diversity from the broader operationalization of functional diversity, the lesser influence of such results can be directly tied to project team performance. Additionally, there is an inherent assumption that individuals are capable of integrating others' information with little misunderstanding, which seems erroneous, given the potential for relationship conflict ensuing from such misunderstandings (Cronin & Weingart, 2007; Jehn, Chatwick, & Thatcher, 1997; Jehn, Northcraft, & Neale, 1999). A tendency also exists to overlook the political nature of project team cooperation, which can hinder the development of team cohesion. As illustrated in the preceding chapters, project teams often involve cross-functional members with different values, interests, and objectives (Hoever, Knippenberg, Ginkel, & Barkema, 2012: Nabukenya, Van Bommel, Proper, & De Vreede, 2011). For example, in developing and launching a new product in an organization, individual members on a NPD team can have conflicting objectives due to their

departmental affiliation. It is important for a sales team member to push for an aggressive product launch date and competitive pricing to boost sales, whereas a production unit member is more concerned with estimating prudent costs so that production can meet scheduling and quality goals. Such various perspectives and conflicting interests can create problems and can hinder cross-functional collaboration in project teams (Ancona & Caldwell, 1992). Furthermore, negative effects of functional diversity on project team collaboration are more likely the result of parochialistic views and member emphasis on hasty categorizations of individual differences rather than project-relevant information (Byrne, Clore, & Worchel, 1966; Tajfel, & Turner, 1986; Tziner, 1985; Williams & O'Reilly, 1998). A team's ability to integrate project-relevant information and knowledge is largely influenced by both commonalities and differences in the individually held occupation and contextual knowledge (Dougherty, 1992). Individuals trained in a particular discipline, profession, or occupation have substantial conceptual and practical knowledge in common with others from the same discipline or occupation, while sharing common language, mental models, and practices (Cronin & Weingart, 2007; Parker, Atkins, & Axtell, 2008). Conversely, unfamiliar language, different mental schema, and idiosyncratic practices of heterogeneous team members can lead to difficulty in communication, synthesis, and agreement on individual members' informational contributions to benefit project team outcomes (Dougherty & Hardy, 1996; Parker & Axtell, 2001; Wiersema & Bantel, 1992).

Finally, to aggravate the negative effects of categorizations and parochialism, there is an additional factor affecting project team performance: the temporal dimensions of project teams in terms of membership, duration, and process, as discussed by Chiocchio (Chapter 3 of this volume). Project teams generally have relatively limited project duration, coupled with fluid membership, as they are assembled for performing specific tasks within a finite time frame signaled by explicit deadlines and time constraints. Such temporariness reduces potential opportunities for team members to gain member familiarity and shared understanding, which is more prevalent in long-standing work teams (Edmonson & Nembhard, 2009; Haon et al., 2009). In addition, project teams tend to lack sufficient team temporal duration, the length and frequency of member interactions, which has been found to mitigate negative effects of team diversity on collaboration (Harrison et al., 2002; Mohammed, Hamilton, & Lim, 2009). Finally, member attrition and turnover at varying temporal points impact project teams in a substantially negative manner. As illustrated by Chiocchio (Chapter 3 of this volume), although turnover across project phases is problematic regardless of project team types, the damaging effects of unforeseen turnover are much more pronounced in integrated *do-it-all* teams than component project teams

since such member attrition impacts the complex role that integrated *do-it-all* project teams assume in managing and executing projects during multiple work cycles. Therefore, capitalizing on diverse functional resources in project teams is critically dependent upon each member's ability to understand, communicate, and integrate the ideas of other team members to accomplish a unified task in a relatively short project timeline. Research has consistently found that multidisciplinary, cross-functional knowledge integration requires higher levels of team members' involvement in information sharing; however, the more functionally diverse the team members are, the less common knowledge and shared understanding among their functional differences are likely to be (Caldwell & O'Reilly, 2003; Mesmer-Magnus & DeChurch, 2012). This review, therefore, flowing from the extensive yet somewhat conflicting literature, has found that considering these obstacles that potentially inhibit effective team functioning, teams consisting of functional generalists (i.e., members with broad functional backgrounds) will be able to facilitate team process and performance more effectively than teams largely composed of functional specialists with narrowly defined functional expertise (Kessler & Chakrabarti, 1999; van Knippenberg, De Dreu, & Homan, 2004). The ensuing section elucidates the potential benefits of intrapersonal functional diversity on project teams by highlighting key empirical findings from both organizational psychology and project management.

Effects of Intrapersonal Functional Diversity on Project Teams

An empirical study by Park, Lim, and Birnbaum-More (2009) described intrapersonal functional diversity by using the concept called "multi-knowledge," in which members understand multiple functional areas as distinguished from mono-knowledge, a depth of expertise in one's own functional domain in the absence of knowledge of others' functional areas in a team. Using the tenets of expectancy theory (Vroom, 1964), Park et al. (2009) asserted that teams largely composed of multi-knowledge individuals are more likely to understand the capabilities and expertise of other team members, particularly in team-based projects. In such cases, individuals have greater ability to share knowledge with others, which in aggregate should lead to an overall high level of information sharing and understanding within the team. Using 62 cross-functional NPD teams drawn from multiple firms in South Korea, the researchers confirmed that the proportion of multi-knowledge individuals on cross-functional NPD teams had a positive effect on product innovativeness through the information-sharing process, thereby confirming the benefits of intrapersonal functional diversity in project team performance. Similarly, Richter et al. (2012) proposed shared understanding of others' expertise, "knowledge of who knows what (KWKW)"

in capturing the socially shared "meta-knowledge" (p. 1283) of individual members' expertise within teams, which is similar to the notion of transactive memory in team mental models (Austin, 2003; Wegner, 1986). The researchers suggest that a team's awareness of an individual's unique knowledge and its source, as reflected in KWKW, can benefit team performance through combining the knowledge possessed by each team member. Surveying 34 multidisciplinary pharmaceutical R&D teams, Richter and colleagues investigated how functionally diverse teams could facilitate their member creativity by serving as an information reservoir. The researchers found that as team members had more divergent expertise and knowledge, shared KWKW became more crucial in improving an individual member's creativity by facilitating the individual's use of diverse expertise and knowledge of other members. Conversely, for teams with low functional diversity, where unique and dispersed expertise within the team was limited, shared KWKW did not benefit individuals in their creative endeavors as strongly as teams with high functional diversity. Extending on this line of research, Randel and Jaussi (2003) investigated 37 cross-functional teams and discovered that an individual's perceived identity related to functional background, deemed "functional social identity," explained more variance of an individual's performance as a cross-functional team member than relational demography that simply considers an actual degree of dissimilarity in functional background as a factor to explain such variance. Specifically, the individual's identification with other members from the same functional background is positively related to his or her self-esteem and subsequent performance as a cross-functional team member, and the individual is thus more likely to engage in cooperative behaviors to enhance the attractiveness of that functional background.

Finally, in a study of 409 software development projects at a software services firm in India, Huckman and Staats (2011) dichotomized diversity into two broad categories with respect to team members' customer experience: intrapersonal experience diversity, defined as individual team members' breath of experience in interacting with customers, and interpersonal experience diversity, conceptualized as team members' depth of experience in interacting with customers in completing projects. The researchers reported that a team's intrapersonal diversity in customer experience positively affected team performance, particularly when a coordination of a team task was required to change task requirements over the course of a project. Conversely, increasing the interpersonal difference in customer experience across team members negatively impacted team performance under conditions of task change and subsequent coordination. Based on their findings, Huckman and Staats (2011) contend that intrapersonal diversity is more beneficial for project team performance in volatile and uncertain project environments than stable environments, as such team composition of members

with a breadth of functional experience enhances a project team's ability to adapt and respond efficiently to changes that require the coordination and integration demands on team members.

Summary of Empirical Studies on the Effects of Intrapersonal Functional Diversity on Project Team Outcomes

Despite the scarcity of studies examining the effects of intrapersonal functional diversity in the project team context, the preceding review nonetheless suggests that intrapersonal functional diversity provides an important common ground for team members to communicate, coordinate, and integrate their unique and diverse expertise in project teams, in which wide functional differences can acutely heighten interpersonal differences between team members. The study by Huckman and Staats (2011) is noteworthy in this regard, as they found that teams composed of individuals with a vastly different experience (i.e., high interpersonal diversity) were challenged with coordination issues and thus delayed team processes to complete projects. Alternatively, teams with high intrapersonal diversity delivered projects more efficiently when tasks changed rapidly, thereby supporting that intrapersonal diversity facilitates efficacious coordination and integration of tasks for functionally heterogeneous teams. Although interpersonal aspects of functional diversity can have negative implications for team functioning, this review has observed the opposite for intrapersonal functional diversity by pointing to a significant and positive impact of such diversity on functionally diverse project teams through facilitating team processes. Additionally, it should be noted that the construct of intrapersonal diversity has been increasingly addressed in studies of project teams, although the construct has been operationalized somewhat differently, such as multi-knowledge (Park et al., 2009), intrapersonal experience diversity (Huckman & Staats, 2011), and KWKW (Richter et al., 2012). In summary, the current research seems to favor positive effects of intrapersonal functional diversity on project team performance by suggesting that team members with a broad experience and understanding of the relationships among different functions on a project are uniquely positioned to utilize member expertise to improve team processes for synergistic outcomes.

Directions for Future Research

There has been a growing interest in investigating various factors affecting the efficacy of project teams in multiple fields; functional diversity is one of such factors studied in an interdisciplinary fashion, as demonstrated by the extensive

scope of research in both organizational science and project management. As reflected in the subject areas of the studies included in this review, research on project teams is inherently a multidisciplinary endeavor, encompassing production and operations management to organizational psychology and marketing (see Table 13.1 for the list of journals). Therefore, research opportunities to advance the current understanding of project team diversity are multidisciplinary and abundant. In particular, this review observed three key areas that future research should address.

First, as a significantly sparse amount of research on the effects of intrapersonal diversity on project teams has been conducted and the ramifications are important, this is an area in need of further examinations. Although the construct of intrapersonal diversity has been increasingly addressed in team research, the current literature still severely lacks empirical studies investigating the moderating role of intrapersonal functional diversity on project team interactions and outcomes. For example, several articles examining this important issue were identified; however, the majority of them are either conceptual pieces on intrapersonal functional diversity or empirical studies examining the effect of top management teams' intrapersonal diversity on firm performance, which differs considerably from project teams discussed in this chapter (Bunderson 2003; Cannella, Park, & Lee, 2008; Davis, Bell, Payne, & Kreiser, 2010). Therefore, the significance of intrapersonal functional diversity for project team outcomes is largely understudied in the current literature, hence calling for greater stream of research on this area.

A second important line of research lies in further exploration of how the duration of project team membership can change the dynamics of functional diversity. A number of studies postulated non-monotonic, curvilinear models to explain the effects of functional diversity on team outcomes when moderated by team longevity. Team temporal duration, for example, is a mechanism to help teams develop member familiarity, as team members have the opportunity to engage in meaningful interactions over time (Harrison, Price, & Bell, 1998; Mohammed, Hamilton, Lim, 2009). However, there remains a paucity of studies investigating the temporal relationship between intrapersonal functional diversity and project team outcomes. Intrapersonal functional diversity in the context of project team longevity is a particularly crucial area to be examined because project teams' fluid membership, coupled with relatively short team tenure, implies that member familiarity and understanding derived from team longevity are generally absent. In the absence of team longevity, intrapersonal functional diversity may help team members recognize and integrate their diverse knowledge for efficient task completion. Only a handful of studies investigated the moderating role of intrapersonal

functional diversity on team processes, and none looked at the effects of intrapersonal functional diversity on team dynamics with a longitudinal lens. There is thus an important need for research examining the dynamic moderation played by intrapersonal functional diversity in temporary and time-bound project team performance.

Finally, more research is needed to identify and test other potential moderators affecting the relationship between team diversity and project outcomes. Although this review largely focused on the moderating role of intrapersonal functional diversity, other important moderating variables exist in project team diversity. In particular, several researchers called for more examination on contextual moderators and other intervening variables, such as environmental uncertainly (low vs. high), organization types (manufacturing vs. service), and innovation types (incremental vs. radical innovation), that potentially affect the efficacy of project work in functionally diverse teams (Chen, Damanpour, & Reilly, 2010; Miles, 2005). Another fruitful research area is to examine the moderating impact of task interdependence on the relationship between functional diversity and project performance, as functional diversity may not impact teams with low levels of task interdependence (e.g., pooled or sequential task interdependence) as strongly as teams working on highly interdependent and reciprocally integrated projects (Thompson, 1967). The current literature, however, lacks studies investigating the moderating role of task interdependence in the functional diversity–project team performance relationship (Chiocchio & Essiembre, 2009). At the same time, it is evident that there is ample room for more studies on the effects of functional diversity in project team settings. In spite of the prolific research done on the topic, when studies were categorized under each dimension of functional diversity, there were only a few examining intrapersonal functional diversity.

It should be acknowledged that this chapter was limited to the examination of functional diversity and its effects on the effectiveness and efficiency of novel projects. There are, however, other diversity attributes that impact various dimensions of project performance, as noted previously. While the focus on functional diversity in project teams allowed for a more comprehensive assessment of the complex relationship between such diversity and project performance, it also limits considerations of the impact and implications of other important diversity dimensions in the project team context. Therefore, future research should seek to uncover other specific elements of team diversity and their effects on project teams.

Implications for Project Management

Unlike innate and immutable bio-demographic diversity at the individual level, functional diversity is more malleable at both the individual and team levels in

team composition. For example, employees can transfer from one functional unit to another to broaden their functional experience, and in practice, an increasing number of companies utilize cross-training to obtain organizational flexibility, broaden employee skills, and thus increase the value of their employees' human capital (Marks, Sabella, Burke, & Zacaro, 2002; Volpe, Cannon-Bowers, Salas, & Spector, 1996). Similar to cross-training, another managerial strategy that counteracts the potential negative impact of functional diversity on project team collaboration is cross-cut role assignments, in which individuals are simultaneously members of more than one task group or team for a fixed duration of time (Bettencourt & Dorr, 1998). For example, Anthro, an Oregon-based furniture manufacturer, has been successfully utilizing a cross-cut role assignment program called "Shadow Program," to improve internal relations and cooperation among teams and departments. In Anthro's Shadow Program, employees shadow other employees to understand different functional roles and develop interdepartmental relationships to improve their teamwork (Layne, 2000). As the primary goal of cross-training and cross-cut role assignments is to enhance knowledge of interpersonal activities by introducing team members to the roles and responsibilities of their teammates, such training can improve team interaction, communication, and coordination among diverse team members and thus help organizations capitalize on the cross-functionality of project teams (Blickensderfer, Cannon-Bower, & Salas, 1998).

Additionally, organizations can build shared knowledge by making information on individual skills and expertise easily available and accessible to employees. For example, an organization can promote knowledge sharing by cataloging information on employee expertise and making such information available across the origination (Spreitzer, 2006). An employee can then access the database of employee expertise to search and consult others with relevant expertise when needed. Indeed, with the expansion of information technology, organizations are increasingly utilizing HR information databases to identify, store, and retrieve knowledge, skills, and abilities of employees. Such employee skills databases greatly enhance the organization's capability to track and integrate employee talent for creating project teams with optimal complementary skills.

Finally, caution should be exercised when promoting member diversity in project teams. Simply increasing the amount of functional diversity in teams is not sufficient to improve project team performance. Instead, the characteristics of the specific project must be taken explicitly into account to maximize the benefits of functional diversity. In doing so, a right combination of interpersonal and intrapersonal functional diversity makes it more likely that members will utilize their different perspectives with their teams to optimize their project performance.

Final Thought

This chapter challenges project team researchers as well as practitioners to rethink how functional diversity can impact project team performance by refining the existing concept into interpersonal and intrapersonal functional diversity and contrasting key findings of the empirical research on the two dimensions. The refinement of the construct in particular was captured by the notion of intrapersonal functional diversity, defined as variation in functional domains within individual members, which is different from the traditional construct of functional diversity discussed in the project team literature. Drawing on team research from organizational psychology and project management, this work also proposed a conceptual model in which intrapersonal functional diversity moderates the relationship between functional diversity and project performance and thus presented both opportunities and challenges of managing functional diversity in project teams. The inclusion of intrapersonal functional diversity as a moderator in the functional diversity–team process–team outcomes relationship allows for a more consistent analysis and accurate identification of the impact of functional diversity on project team outcomes.

For those who support that functionally diverse members benefit project performance, a myopic, single-lens approach to understanding the complex nature of such diversity may miss the mark, as this review suggests that the effects of functional diversity are not uniformly positive, while engendering some contradictory findings. It is no doubt that as functional diversity increases in a project team, so does the breadth of knowledge, expertise, and experience that the team can collectively utilize to enhance the quality and quantity of projects. However, it has been also found that functional diversity, combined with complex tasks and temporal structures in project teams, reduces member familiarity and shared understanding, leading to the potential for communication difficulties, coordination challenges, and suboptimal knowledge integration. This review contends that teams with high levels of intrapersonal functional diversity have a broader repertoire of experience to draw upon, share a larger proportion of their functional background, and thus have a better understanding of different functions and how they are related to accomplish team goals.

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14 MULTICULTURAL DIVERSITY AND COMMUNICATION IN THE PROJECT CONTEXT

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The use of multinational project teams is becoming increasingly more frequent in today's era of fast-paced knowledge-sharing and globalization (Barkema, Baum, & Mannix, 2002). With the greater use of such teams comes a relatively higher risk of miscommunication between members compared to traditional work teams, as differences in national culture among multinational project team members bring differences in preferred communication practices and assumptions (Gibson & Gibbs, 2006; Hogg & Terry, 2000; Hymes, 1974; Kirkman et al., 2013). It is perhaps of no surprise that managing cultural difference has been identified as the most prominent problem of international projects (Turner, 2009). That said, do "differences" always create challenges for project teams, especially those composed of members with different cultural backgrounds? Many high-performing international companies would say no, arguing that bringing together diverse members of an organization sparks creativity and innovation and comprises a competitive advantage for exploring product development in new markets (Finkelstein & Hambrick, 1996; Hoffman & Maier, 1961). The academic literature is much more uncertain in its stance on the effect of diversity on team performance, with many theorists predicting that differences on the basis of national culture will provoke conflict, division, and difficulty reaching decisions (Chatman, 1991; Tajfel & Turner, 1979). The base of culture research in the project management literature, specifically, is small and still in development (Henrie & Sousa-Poza, 2005).

Therefore, as multinational project teams present heightened potential for miscommunication and negative outcomes, the purpose of this chapter is to integrate scholarly findings related to national

culture diversity, communication practices, and the performance of teams, and extend them to project management.

We begin by operationalizing global concepts (culture, diversity, and communication) by scholars in the project management and organizational psychology literature, drawing on the similarities and distinctions between the two communities. We follow this with an outline of research on national culture diversity and communication in project teams, and how team performance is consequentially affected. In doing so, we continue to draw from the project management community, filling gaps in the literature with conjectures based on organizational psychology theory. Our findings point to two key sources of communication challenges faced by multinational projects, which we explain in the context of teams characterized by "high" diversity in national culture. Finally, we use Hofstede's (1980) cultural dimensions to frame our propositions regarding the impact of diversity on communication at each stage of the project life cycle. This leads to a summary of the benefits of and challenges faced by multinational project teams, as well as implications of diversity (as categorized by Harrison and Klein's [2007] framework), for project managers wishing to optimize the cultural composition of their team.

Conceptualizing Key Concepts

Culture

The modern concept of culture in the social sciences is derived from social anthropology, which gave us a definition of culture as being a complex *whole* made up of knowledge, beliefs, art, morals, law, custom, and other capabilities and habits acquired by members of society that cannot be attributed to genetic inheritance (Tylor, 1871). Many aspects of human expression form the culture in which individuals participate, contributing to identities that are affected by language, values, social conventions, roles, behaviors, and social structure.

Organizational Culture

For organizations and work-related groups, organizational culture refers to collective behaviors and assumptions shared by members of the organization. These shared assumptions are believed to guide interpretations and actions within the organization, as members learn to expect certain behaviors in certain situations (Ravasi & Schultz, 2006). In the organizational psychology literature, the study of culture in the workplace has been a dominant theme for scholars for over 30 years, and many frameworks exist for conceptualization. This area of research has evolved to incorporate the role of leaders (e.g., Gordon & DiTomaso, 1992; Hunt & Dodge, 2000; Schein, 1986–2010), organizational values

(e.g., Cameron & Quinn, 1999; Hofstede, Hofstede, & Minkov, 2010), "levels" or organizational structure (e.g., Cole, 1997; Schein, 2004), and existing traits and artifacts believed to be linked with organizational performance (e.g., Bettinger, 1989; Denison, 2000; Schein, 2004).

Interestingly, the project management perspective of organizational culture is focused on instrumentality and shared cultural values (Anderssen, 2003; Henrie & Sousa-Poza, 2005; Wang, 2001). Some research on project culture conceptualizes "organizational culture" as referring to the culture of the work group, such that the culture that is formed among members of the project team transcends the culture of the employing organization (e.g., Anderssen, 2003; Adenfelt & Lagerström, 2006; Marrewijk, 2007). Others hold an integrative perception of project culture, believing it to consist of multiple subcultures (Kendra & Taplin, 2004). Researchers have also examined the problems that arise when there is a mismatch between the project team and larger organization cultures or between subcultures within the same project, noting such conflicting cultures are likely to spur change and cultural transformation (e.g., Marrewijk, 2007; Patanakul & Milosevic, 2009; Kendra & Taplin, 2004).

National Culture and Implications for Organizations

For decades, psychologists have shown that national culture greatly influences the personal values and attitudes of individuals (Doney, Cannon, & Mullen, 1998; Smith, Dugan, & Trompenaars, 1996). Countries can be distinguished from each other on the basis of societal values that are promoted and reinforced by social policy and government (Harrison & Huntington, 2000; Hofstede, 2001).

Some of the most comprehensive research on the influence of national values on employees in the workplace was conducted by Dr. Geert Hofstede over a 40-year span using data from employee value scores from a multinational company and the World Value Survey (Hofstede, 1980; Hofstede et al., 2010). Through the statistical analysis of this data, Hofstede (1980) extracted cultural dimensions that distinguish countries from each other and describe how groups and societies behave at each level of the dimension. From this research and other studies on national culture, scholars have learned that the national culture in which one is raised has significant influence on shaping one's expectations in social interactions and preferences for person-to-person communication (Gibson & Vermeulen, 2003; Hofstede, 2010; Nakata & Sivakumar, 1996; Salk & Brannen, 2000).

This point is especially important for multinational companies in which employee members of varying nationality are brought together to form project teams, as effective peer-to-peer communication becomes a necessity for the success of the project. When considering that communication practices involve any

type of messaging in any situation (i.e., talking and listening, reading, writing, or performing), it becomes easy to imagine that individuals who come from a variety of backgrounds and perspectives may have their own preferences of ways to communicate with others that are most meaningful to them (Hymes, 1974). As such, communication practices may be one area where cultural differences are most noticeable, and where diversity in national culture may have one of its strongest effects on communication.

Communication

A curious finding is observed when contrasting research from the project management literature to organizational psychology. In fact, the two communities differ in their most basic operationalization of communication. The organizational psychology literature traditionally imposes a multilevel view of communication as a key behavioral process in teams (Kozlowski & Ilgen, 2006). Specifically, the role of communication in teams is to sustain other team processes, such as cooperation and coordination (Kozlowski & Bell, 2003). In addition, communication acts as a support for the general task work and teamwork competencies required for successful team performance (Morgan, Salas, & Glickman, 1993). The project management literature has a different view of communication and conceptualizes the construct at the project level. For instance, project management scholars refer to communication as "the provision of an appropriate network and necessary data to all key actors in the project implementation" (Pinto & Prescott, 1988, p. 7). It is clear from this definition that, in contrast with organizational psychology, the project management community emphasizes the technical aspects of communication that affect the project context. For instance, individual team members involved in the project tend to communicate information through routine documentation and reports (e.g., monthly progress reports and charts depicting the status of the project). This approach assumes that for the project to be successful, project team members must be aware of who needs the information, and in what form, as well as where, when, why, and how the information will be exchanged among stakeholders or primary members of the team (Project Management Institute, 2008). Whereas the organizational psychology domain views communication as a *general* support function for enabling other team processes (Kozlowski & Bell, 2003), the project management community tends to conceptualize communication as a *specific* support function of team projects (e.g., Project Management Institute, 2008).

An early attempt to combine concepts from project management and organizational psychology can be seen in the research of Smith-Jentsch, Johnston, and Payne

(1998), who define communication through a microscopic approach of "using proper terminology; providing complete internal and external reports; avoiding excess chatter; ensuring communications are audible and ungarbled" (Smith-Jentsch et al., 1998). This individual-level view of communication is also the basis of the definition of communication in Campbell, McCloy, Oppler, and Sager's (1993) theory of performance. Specifically, communication task proficiency (both written and oral) is conceptualized as "the degree to which an individual can write or speak, independent of the correctness of the subject matter" (Campbell et al., 1993).

Additional scholars have addressed this gap between the two communities by proposing that communication can be viewed through both macroscopic and microscopic lenses (Chiocchio, Grenier, O'Neill, Savaria, & Willms, 2012). In a study demonstrating how microscopic and macroscopic aspects of communication interact to affect communication, McChesney and Gallagher (2004) combined technical aspects of project management (i.e., shared, standard communication practices) and tenets of organizational psychology (i.e., collaboration and coordination) in an effort to improve communication within the project team. The authors explored the use of socially recognized manners of exchanging project information (such as memos and meetings), finding that miscommunication was reduced in conditions where (a) collaboration and coordination were facilitated, and (b) communication practices were socially recognized. This demonstrates that the clarification of communication preferences and psychological trust in a project team can enhance communication.

Hirst and Leon Mann (2004) combine aspects of project management and organizational psychology in a similar fashion by developing and testing a model of team communication that encompasses five factors, some rooted in organizational psychology, and others rooted in project management: (a) leadership role performance—organizational psychology; (b) team boundary spanning—project management; (c) communication psychological safety—organizational psychology; (d) team reflexivity—organizational psychology; and (e) task communication—organizational psychology. In this study, communication safety and task communication were significantly related to project team performance. In addition, communication safety predicted customer ratings of project performance, while task communication predicted stakeholder ratings of project performance.

These findings demonstrate both technical and psychosocial characteristics of communication and their effect on project team performance, and suggest that contextual variables can enhance communication and affect team performance. However, it is interesting to note that minimal research to date has examined the interaction of concepts related to project management and others related to organizational psychology.

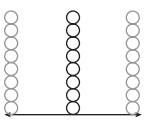
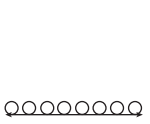
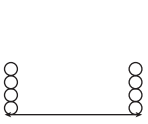
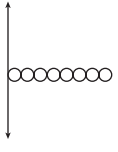
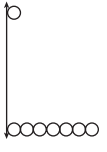
Diversity

For individuals, being different from one another can be a productive advantage or a problematic challenge; sometimes it can be both, sometimes even simultaneously. The fickle nature of differences has posed challenges to organizations who strive to manage them, and to academic researchers who endeavor to study them, because of what scholars describe as "the conceptualization problem" of diversity: in short, the expansive literature on diversity is confusing and difficult to synthesize because researchers tend to avoid substantiating the nature of diversity in their studies (Harrison, Price, & Bell, 1998; Pitcher & Smith, 2001; Harrison & Klein, 2007). By way of example, let us think of a characteristic on which team members in an international project team typically vary: consider a hypothetical case in which the members of a project team are local residents based in Canada (Montreal and Toronto), China (Shanghai), and India (Mumbai). Although diversity in national culture is obvious in this case, it is difficult to conceptualize *how* it should be represented to best capture the differences. Indeed, authors examining diversity on a particular attribute go so far as to tie diversity to differences, but fail to go beyond the basic premise of differences to specify the shape of the collective distribution of differences within groups, such that it is difficult to conjecture what it is to have "more diversity" or "less diversity" in any particular sample (Harrison & Klein, 2007).

Several frameworks for explaining diversity exist in the organizational literature. Harrison and Klein (2007) present one such framework, offering guidelines for conceptualizing and measuring differences among team members. This typology of diversity aims to (a) substantiate the nature of differences by defining the meanings and properties of three types of diversity, and (b) describe what the differences *look* like by specifying their collective distribution, allowing researchers to gain perspective on *how diverse* their organizational sample is and what that means (Harrison & Klein, 2007).

Having the purpose of describing a team as a whole rather than describing how individuals in a unit differ from each other, Harrison and Klein define diversity as "the distribution of differences among the members of a [team] with respect to a common attribute" (2007, p. 1200) and identify three types of diversity. Specifically, the three types are *separation, disparity,* and *variety*. *Separation* on an attribute refers to differences in position or opinion among team members relative to values, beliefs, or attitudes. *Disparity* refers to hierarchical differences in socially valued assets (i.e., status), while within-unit differences in category or source of experience or knowledge, including unique or distinctive information, are referred to as *variety*. Table 14.1 presents a depiction of each type of diversity according to the Harrison and Klein (2007) typology, including attribute

Table 14.1 Diversity Typology According to Harrison and Klein (2007)

Diversity Type	Definition	Attribute Examples	Illustrative Example of Amount of Diversity		
			Minimum	Moderate	Maximum
Separation	Composition of differences in (lateral) position or opinion among unit members, primarily of value, belief, or attitude; disagreement or opposition	Opinions, beliefs, values, and attitudes, especially regarding team goals and processes			
Variety	Composition of differences in kind, source, or category of relevant knowledge or experience among unit members; unique or distinctive information	Content expertise, functional background, nonredundant network ties, industry experience			
Disparity	Composition of (vertical) differences in proportion of socially valued assets or resources held among unit members; inequality or relative concentration	Pay, income, prestige, status, decision-making authority, social power			

Adapted from Harrison & Klein (2007).

examples and illustrative representations of minimum, moderate, and maximum diversity within each type.

According to Harrison and Klein (2007), this typology is most useful in cases where attributes being studied are generally not demographical in nature. National culture is one such attribute. Continuing with our example of teams composed of members with different national backgrounds, you may have noticed that "national culture" could be categorized in more than one of the three above-identified types. In the diversity literature, attributes that are not demographical in nature are called *deep-level* differences, as they are not easily noticeable or measurable, reflecting psychological characteristics in attitudes, values, beliefs, and personality (Harrison, Price, & Bell, 1998; Riordan, 2000). Conversely, *surface-level* diversity refers to more highly visible differences that are demographic in nature, including national culture (Jackson, May, & Whitney, 1995; Pelled, 1996).

The following sections of this chapter outline research examining the effect of national culture diversity in project teams on communication and team performance. The advantages of applying the Harrison and Klein (2007) typology to research in project teams are significant, as this typology allows for precise specification of the attributes being studied, which aid in differentiating conceptual models and determining the appropriate empirical tests to use. In project teams especially, use of the Harrison and Klein (2007) typology can allow for the statistical disentangling of team-level diversity from organizational-level diversity, which represents an interesting avenue for future research.

The Effect of National Culture Diversity in Project Teams on Communication and Performance

In a multinational company, effective communication is often a necessary requirement for project team success. However, having project teams that comprise members from a variety of national backgrounds increases the risk for the increased diversity to cause communication challenges, which lead to negative performance outcomes (Gibson & Gibbs, 2006; Hogg & Terry, 2000; Kirkman et al., 2013). Conversations with colleagues are one way that project team members can learn and share knowledge with each other (Adenfelt & Lagerström, 2006; Hymes, 1974). Although conversations can be a valuable medium for communicating information to other group members, communication challenges often arise due to cultural differences. In multicultural teams, the absence of shared cultural assumptions and the presence of different communication

expectations increases the possibility of miscommunication (Kim & Sharkey, 1995). As a result, cultural preferences are sometimes an indirect source of conflict (see deWit, Chapter 9 of this volume, for more on conflict).

Challenges Arising from Differences in Shared Cultural Preferences

Conflict presumably arises when differences that stem from cultural perspectives at odds with each other are verbalized. When mismanaged, this often results in more disagreement and debate (Elron, 1997; Eisenhardt & Bourgeois, 1988). In turn, culture-based conflict can hinder the performance outcomes of teams (Ely & Thomas, 2001; Mäkilouko, 2004).

One example of this effect can be found in research on decision-making teams that comprise various individuals, including executives and CEOs. Although such teams are not always project teams, as their existence may be sustained for longer than the time it takes to make a decision on an item, the relationship between conflict and team performance outcomes is likely to be similar because the composition of the group includes members other than executives. For example, Eisenhardt and Bourgeois (1988) studied the decision-making process of teams from various companies in the microcomputer industry. They found that conflicts during decision-making sessions in the form of disagreement, arguments, heated debate, and insults were associated with an inability of the team to reach consensus on a decision, but only when teams were highly centralized and headed by an authoritarian leader (Eisenhardt & Bourgeois, 1988). As authoritarianism varies from national culture to culture, it is plausible that multinational project teams headed by authoritarian leaders would experience increased conflict. In this study, the basis for conflict was that team members felt the need to form coalitions within their group or to use tactics such as withholding information to gain power over others.

In an examination of conflict experienced by Finnish leaders and key personnel of multicultural projects, Mäkilouko (2004) found that differences in cultural perspectives and communication patterns sparked conflict between members of different national cultures. In this particular study, for example, Finnish team leaders would describe their American team members as "know-it-all bullies," while the Americans would describe their team leaders as being highly technical but insensitive to human relations. However, this conflict only resulted in negative team outcomes when it was managed through distancing (i.e., one group withdrawing from the other, or one group reinforcing lines delineating positions of power), as opposed to improving personal relationships among team members to avoid cultural blindness.

Ely and Thomas (2001) devised a study to investigate a model in which diversity in ethnic and cultural identities affect work group functioning. This study focused on "work groups," with no other specification regarding whether they were project teams. Qualitative data revealed interesting sources of conflict stemming from the work group's diversity in composition with respect to national culture. The authors found that differences in cultural perspectives manifested themselves as conflict in three forms: (a) conflict resulting from different points of view, (b) conflict resulting from differential power and status, and (c) conflict resulting from entrenched, race-related attitudes. Each form of conflict had different effects on the work group's communication and performance outcomes. For example, when cultural differences leading to conflict were not addressed openly and respectfully, work groups would suffer low morale, lack of cross-cultural learning, and wasted potential of employee skills from those who felt uncomfortable speaking up. By contrast, conflict managed through open discussions brought fruitful cross-cultural exposure and learning, and the development of processes designed to facilitate the exploration of diverse views (Ely & Thomas, 2001). Despite being a study that was not conducted on project teams, specifically, the authors' findings are likely to be similar in project teams because the theories applied in explanation of each form of conflict (i.e., integration-and-learning, access-and-legitimacy, and discrimination-and-fairness theories) are also likely to be applicable to project teams.

Challenges Arising From Stereotyping

The second source of communication challenges in project teams that we have identified is stereotyping and social categorization. Social categorization theory would indeed suggest that national culture is one demographic on which individuals sort one another into categories, perceiving those from their own category as superior (Hogg & Terry, 2000; Tajfel, 1981; Turner, 1987). According to this theory, motivation to categorize others is rooted in a need to identify with similar entities while disparaging others who are dissimilar (Tajfel, 1981) (see also Tremblay, Lee, Chiocchio, & Meyer, Chapter 8 of this volume, for more on identity and identification). Simply put, the odds of such an event to occur increases with the extent to which teams are diverse (Kirkman et al., 2013). Research shows that in multicultural teams, the absence of shared communication preferences within cultures has led to stereotyping (Gibson & Gibbs, 2006), which can be manifested as attitudes, social organization, thought patterns, roles, nonverbal behavior or language (Loosemore & Lee, 2002).

In multinational project teams, stereotyping can negatively impact performance outcomes other than (but related to) communication. For example, a

study by Sackmann and Friesel (2007) demonstrates that cultural stereotyping leads to decreased knowledge sharing among project team members. Although knowledge sharing has been examined in multiple project management studies (e.g., Adenfelt & Lagerström, 2006; Grillitsch, Muller-Stingl, & Neumann, 2007; Han & Hovav, 2013), Sackmann and Friesel (2007) were among the first to test how cultural dynamics impact this particular performance outcome. The researchers found that culturally complex project teams were more likely to engage in stereotyping. As a result, this "us" versus "them" attitude caused a decrease in knowledge sharing among project team members who differed in national culture. The authors explain that knowledge-sharing behavior is thought to initiate from group identity, but the individual identity of project team members can enhance stereotyping.

In light of these findings, it is important that project teams become aware of the implications of stereotyping so that they become less susceptible to stereotyping behaviors. Ruben (1975) provides suggestions for combating stereotyping by identifying seven dimensions fundamental to the success of multicultural work groups. Although the teams examined in this research were not specifically project teams, we would expect findings from this study to be applicable to project teams as they have been found to be applicable to a wide range of culturally diverse teams. Of the seven listed dimensions, the capacity to communicate respect was identified as the most vital.

Ruben's (1975) early finding provided a foundation for scrutinizing communication frameworks when managing international groups, which grew into a body of research that now suggests that developing sensitivity to cultural diversity is imperative for facing challenges associated with intercultural communication, such as stereotyping. In the project management literature, more recent research demonstrates that members of an international construction project were able to overcome their cultural differences by adapting their cultural attributes to better fit the various cultures of their business counterparts (Loosemore & Al Muslmani, 1999). In this study, cultural awareness helped foster a complimentary fit among various cultural attributes so that conflicting attitudes and beliefs underlying stereotypes did not hinder intercultural communication processes. Loosemore and Al Muslami's (1999) study is one of the few examining stereotyping and communication, as the project management literature contains a dearth of research in this area.

Ochieng and Price (2010) present techniques for overcoming stereotypes by examining how culture affects communication and, in turn, multicultural project team performance. By conducting semi-structured interviews with 20 senior project managers from Kenya and the United Kingdom, the researchers uncovered information on developing an infrastructure to facilitate communication

among construction engineers. Their findings suggest that cross-cultural communication is most effective when project managers express empathy in their leadership—that is, by fostering an environment in which the cultural diversity among all project stakeholders is acknowledged and appreciated. In this study, project managers and team members were encouraged to learn about their cultural counterparts firsthand before having the opportunity to form long-standing stereotypes. As a result, project managers were able to manage the expectations and misunderstandings of their multicultural project teams by applying effective communication strategies.

Overcoming Communication Challenges in Project Teams by Fostering Psychological Safety

We have established that multinational project teams risk experiencing communication challenges due to differences in cultural communication preferences and stereotyping. At this point, it would appear that diversity in national culture is likely to have negative impacts on team performance and outcomes. However, research from both the organizational psychology and project management communities has shown that fostering the appropriate conditions for psychological safety can mitigate these negative effects, leading to increased innovation and improved collaboration through better conflict resolution (e.g., Ely & Thomas, 2001; Gibson & Gibbs, 2006; Ochieng & Price, 2010; Ruben, 1975; Sackmann & Friesel, 2007, Vaaland, 2004).

By way of example, the innovation and new product development literature suggests that when diversity in cultural perspectives can be combined in a way that improves integrated information flow, project teams become more innovative (Dougherty, 1990, 1992; Dougherty & Corse, 1995). In an effort to uncover the mechanisms by which several types of diversity (including national culture) affect innovation through communication, Gibson and Gibbs (2006) conducted two studies exploring psychologically safe communication climates in teams, some of which can be categorized as project teams, while others cannot. They found that when multinational teams foster support, openness, trust, respect, and risk-taking among their members, cooperative behaviors such as asking questions, admitting to not understanding, and voicing constructive opinions become more common. Members also become more open to conflict resolution in productive and positive manners.

Adenfelt and Lagerström (2006) showed that implementing a collaborative culture of knowledge-sharing among members of a multinational project team encourages them to create and share information deemed important for the organization among each other. In this study, the enabling culture was described

as valuing collaboration, trust, and learning. Adenfelt and Lagerström conclude that this type of culture can be created by communicating to team members how knowledge can drive innovation, and what types of knowledge are important for constructive collaboration. In a similar fashion, Han and Hovav (2013) focus on the importance of social bonding as an enabler of knowledge-sharing in information system project teams, showing that knowledge-sharing between members of different cultures can be facilitated by fostering bonding among members.

A laboratory study by Early and Mosakowski (2000) further supports the notion of the mitigating effects of psychological safety on the relationship between national diversity and team performance. In this study, a curvilinear U-shaped relationship between national diversity and team performance was confirmed, with high-performing teams showing that they would allow productive exchanges on the basis of national diversity, and were therefore able to create a common identity for the team (Early & Mosakowski, 2000). These findings were replicated in the field by Kirkman et al. (2013) with global organizational communities of practice in the mining industry, who extended the literature by finding moderating effects of psychological safety, or the degree to which individuals perceived the team as being safe for interpersonal risk-taking (Edmondson, 1999).

From the organizational psychology literature, a similar study examining cultural diversity in the top management teams of multinational corporations showed beneficial effects of national culture diversity on team performance (Elron, 1997). Although teams that were more diverse led members to perceive conflict more frequently than teams who were more homogeneous, they also experienced better team performance. To explain this relationship, it was proposed that the executives who perceived team member differences in values and attitudes as complementary, rather than conflicting, were able to make better decisions for the company (Very, Lubatkin, & Calori, 1993), which resulted in improved team performance (Elron, 1997). That said, it is important to note that top management teams do not constitute project teams (see Chiocchio, Chapter 3 of this volume). Although this limits the application of the findings of this study to project teams, the project management literature contains only a limited number of studies that focus on fostering psychological safety as a means of moderating the outcomes of race-based conflict in multinational teams.

This research suggests that national culture diversity is beneficial for team performance when a climate of psychological safety exists. Teams who view disagreements about strategic issues as opportunities for enriching the available information can reap the benefits of diversity in national culture through increased innovation (Schneider & DeMeyer, 1991). Conversely, when disagreement arises in climates lacking psychological safety, the potential exists for team

members to use nationality as the basis for making in-group/out-group distinctions, or forming two separate cliques (Gibson & Vermeulen, 2003; Whitener, Brodt, Korsgaard, & Werner, 1998). The moderating effect of psychological safety on the relationship between national culture diversity and team performance can be explained through social categorization theory, which describes how social categorization produces prototype-based depersonalization (Hogg & Terry, 2000). Perhaps when in a psychologically safe climate, one's subconscious need to sort team members into subgroups based on nationality is reduced (Kirkman et al., 2013). In any case, it is increasingly clear that communication processes in project teams are deserving of more scientific scrutiny in order to uncover the pathways through which they link surface-level diversity and team-related outcomes.

Applying Hofstede's Cultural Dimensions to Project Team Communication and Challenges

One way to examine the challenges encountered by project teams who engage in intercultural communication is by using Hofstede's (1980) cultural dimensions as a framework for contextualizing project teams. Hofstede's (1980) model includes four cultural dimensions that affect work-related values: (a) power distance, (b) uncertainty avoidance, (c) individualism/collectivism, and (d) masculinity/femininity. Understanding how these dimensions impact project teams is of particular importance, as reaching a consensus on standard communication practices is especially difficult in situations where cultural dimensions vary greatly for teams who must work together (Bantz, 1993). Given that Hofstede's (1980) cultural dimensions influence team norms, dynamics of leadership, roles, and prevalence of conflict, Bantz (1993) suggests that team members must become accustomed to changing contexts, situations, issues, and the needs of culturally diverse teams in order to produce successful performance outcomes.

Hofstede defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede et al., 2010, p. 6). This framework for categorizing diversity predicts general trends among teams. Of most notable use to our discussion, Hofstede's cultural dimensions can be particularly useful in predicting communication patterns among international project teams, depending on where each project team member falls on each continuum of the dimensions. Among the cultural dimensions, power distance and uncertainty avoidance create the largest number of obstacles for achieving successful team performance (Van Hook, 2000).

Jessen (1992) takes a different approach to examining Hofstede's (1980) cultural dimensions and applies them to the project context. Instead of conceptualizing project teams as being either high or low on each of cultural dimensions, Jessen (1992) uses the project life cycle to identify optimal levels of each dimension (i.e., power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity) throughout the project life cycle. Table 14.2 provides a summary of Jessen's (1992) conceptualization of optimal levels of Hofstede's cultural dimensions at each stage of the project life cycle.

Power Distance in Project Teams

Power distance refers to the extent to which individuals expect power to be distributed equally or unequally among members (Hofstede, 1980). Organizations in national cultures that endorse high power distance are more effective with autocratic team structures, while cultures that support low power distance favor democratic team structures. The implications for teams is that members of cultures characterized by *high* power distance acknowledge the individuals with the most authority based on hierarchical distributions of power. Power distances of this nature generally occur in cultures with larger populations (Hofstede, 1980). In contrast, cooperation and consultation, regardless of rank, are encouraged among team members existing in cultures of *low* power distance.

Evidently, power distance is one dimension in which project team members may hold different expectations for communication practices, depending on their own national culture. Paulus, Bichelmeyer, Malopinsky, and Rastogi

Table 14.2 Optimal Levels of Hofstede's Cultural Dimensions Throughout the Project Life Cycle

	Project Life Cycle Stage		
Cultural Dimension	Initiation	Planning and Execution	Evaluation
Power Distance	High	Low	High
Uncertainty Avoidance	Low	Medium	High
Individualism	High	Medium	Low
Masculinity/Femininity	Medium	Medium	Medium

Adapted from Jessen (1992).

(2005) address this phenomenon by examining the impact of power distance on communication in project teams. Surveys, interviews, and participant observations reveal that project teams that maintain *high* power distance among members frequently experience conflicts caused by miscommunication, while project teams with *low* power distance seem to be better able to overcome communication challenges (Paulus et al., 2005). One explanation for this finding is that low power distance fosters trust among team members, which helps project teams conquer communication challenges. On the other hand, achieving effective communication is a greater challenge for larger project teams, such that these teams are likely to benefit from formalized communication structures.

When analyzing power distance from the project life cycle perspective, Jessen (1992) would recommend increasing power distance at the initiation stage of the project, as this is when project managers are responsible for outlining project requirements. The implications of this recommendation for communication are significant because the project manager's ability to manage communication is positively related to project performance (Kerzner, 2003). During the next phases (i.e., planning and execution), *low* power distance is preferred, as facilitating communication is no longer the sole responsibility of the project manager, and all project team members are expected to work together on an equal basis. At this point, all team members are accountable for ensuring that the project is properly completed, and should communicate and collaborate accordingly. Finally, during the evaluation of the project, Jessen (1992) indicates that *high* power distance is preferred to ensure that project managers can objectively assess the work produced by the project team. This way, the project manager can use his or her authority to communicate meaningful results of the evaluation to the rest of the project team.

Uncertainty Avoidance in Project Teams

Uncertainty avoidance is conceptualized as the degree to which individuals experience anxiety in unpredictable situations and try to avoid such circumstances by implementing strict behavioral codes (Hofstede, 1980). Individuals in cultures with high uncertainty avoidance view ambiguity as threatening to their work. Such individuals prefer structure and clearly outlined expectations when working as part of a project team. Conversely, individuals in cultures with low uncertainty avoidance are not as concerned about complying with structured guidelines.

Jessen (1992) claims that, in general, a multicultural team characterized by *high* uncertainty avoidance is more favorable than one characterized by *low* uncertainty avoidance, reasoning that project team members who are better able

to predict the behaviors of other team members and external stakeholders will perform more effectively. As for the project manager, uncertainty avoidance has been shown to affect the resolution of miscommunication. Indeed, Mohammed, White, and Prabhakar (2008) found that project managers with *high* uncertainty avoidance are more likely to avoid conflict and confrontations, resulting in further team conflict, while project managers who are *low* in uncertainty avoidance are more likely to confront and resolve potential challenges for team communication.

Jessen (1992) also identifies optimal levels of uncertainty avoidance for culturally diverse project teams at each stage of the project life cycle. During project initiation, *low* uncertainty avoidance is beneficial, as it allows project team members to overcome their fears of ambiguity and become open to new ways of approaching the project. One way to create such circumstances is by facilitating the understanding of each member's national culture. In other words, learning the cultural values of others will equip project team members with the necessary resources for treating team members from other national cultures with respect and, consequently, potential conflicts can be avoided.

Medium uncertainty avoidance is proposed to be advantageous during planning and execution projects, as team members remain focused on achieving the set project goals while being encouraged to ask for clarification when needed (Jessen, 1992). In the evaluation stage of a project, *high* uncertainty avoidance is often created by project team members who are feeling unsure about what their next project will be (Jessen, 1992). In cases such as these, it becomes the role of the project manager to quell anxiety by communicating feedback on project team member performance and setting clear expectations for future project work.

Individualism/Collectivism in Project Teams

The dimension of individualism/collectivism also affects the communication patterns and practices of project teams. This dimension represents the degree to which a culture values the needs of the individuals or the group (Hofstede, 1980). While individualistic cultures prioritize individual goals, collectivist cultures emphasize group values. Developing team roles and norms is particularly challenging for project teams with members who differ in individualistic and collectivist views, as certain members may feel obliged to achieve organizational objectives, while others may focus on individual aims (Bantz, 1993). Collectivism is seen as more desirable for project teams since the goals of the team should be prioritized over individual motives (Mohammed, White, & Prabhakar, 2008).

With regard to communication, Kim and Sharkey's (1995) examination of cultural patterns and communication practices found that members of

individualistic cultures place greater value on verbal clarity than members of collectivist cultures. That said, regardless of the project team's individualistic or collectivistic orientation, project team members must agree on their responsibilities, both individually and collectively (Turner, 2009). When disagreements do occur, individualistic project managers are more likely to adopt a competitive style of conflict management (Eisenhardt & Bourgeois, 1988; Mohammed, White, & Prabhakar, 2008). Therefore, collectivist project teams may find it more difficult to overcome challenges caused by miscommunication.

Although collectivism is seen as preferable to individualism in project teams, Jessen (1992) suggests that the prevalence of individualism and collectivism differs throughout most of the project life cycle. *High individualism* is vital at project initiation, as this encourages project team members to bring forth unique, innovative ideas (Jessen, 1992). Further, high individualism will prevent the project team from being subject to groupthink, which sometimes occurs when collectivism is high, as individualistic team members feel more comfortable communicating their opinions, even if they differ from those of the group. *Balanced* individualism and collectivism are recommended for the planning and execution phase of the project to facilitate the communication of multiple perspectives of the processes involved in the project (Jessen, 1992). During the evaluation stage, however, individualism should be *low*, in order to allow for the results of the project to be viewed holistically and communicated via a collective lens (Jessen, 1992).

Masculinity/Femininity in Project Teams

Masculinity/femininity refers to the extent to which cultures differentiate between gender roles (Hofstede, 1980). Team members from cultures emphasizing masculinity are more apt to make a distinction of gender roles (Hofstede, 1980). For instance, they may view men as assertive and women as nurturing. Moreover, Triandis (1995) suggests that males have more egotistical goals (e.g., furthering their careers), while the goals of females are more relationship oriented (Mohammed, White, & Prabhakar, 2008). Gender roles are viewed as more fluid in cultures that reflect femininity, such that men and women are perceived as having overlapping traits (Hofstede, 1980).

Given that the distinction between male and female roles is more prominent in masculine cultures, it is essential for team members in feminine cultures to communicate effectively in order to gain a good understanding of their own role in the project, as well as the roles of others. Otherwise, role confusion is bound to occur. Project managers in feminine cultures also find themselves having to

use conflict management styles that will be perceived to be as effective as those exhibited in competitive masculine cultures, in order to establish credibility for themselves.

Unlike the other three of Hofstede's (1980) cultural dimensions, it is recommended that *medium* levels of masculinity/femininity be maintained throughout the project life cycle in order to optimize conditions for success at each stage (Jessen, 1992). To achieve this goal, members in both masculine and feminine roles should be encouraged to participate actively, in order to facilitate contributions from both perspectives equally.

Supplementary Dimensions

Since its conceptualization, two additional cultural dimensions have been added to Hofstede's (1980) framework, including (a) indulgence/restraint (Hofstede, Hofstede, & Minkov, 2010), and (b) long-term/short-term orientation (Bond, 1987). Long-term orientation cultures are oriented toward achieving rewards in the future (Hofstede, 2001). Thus, cultures with long-term orientation persevere toward their goals. In contrast, short-term orientation cultures are oriented toward past and present occurrences. For example, cultures with short-term orientation have respect for tradition and fulfilling social obligations (Hofstede, 2001). The latter dimension delineates the severity with which cultures regulate and/or suppress gratification. While restrained cultures suppress the gratification of basic needs and use strict social norms for regulation, indulgent cultures allow the gratification of human needs. To date, there has been minimal research on these two dimensions, and no project team–specific studies were found.

Although the work of Hofstede (1980) and Jessen (1992) may appear outdated, their research contributions have had a profound impact over the past 30 years and are still relevant today. In fact, Ochieng and Price (2009) suggest that 80% of the differences in work attitudes and behaviors as outlined by Hofstede's (1980) dimensions continue to be influenced by national culture. Not only are these cultural dimensions referenced in recent research studies, they also have practical implications and can be used to aid project managers in understanding the behaviors of their project team members.

Ochieng and Price's (2009) study of the multidimensional factors that facilitate or hinder the effectiveness of multicultural project teams demonstrates how understanding these cultural dimensions is particularly pertinent for the project manager. Using a sample of managers involved in construction engineering projects, the researchers identified eight key dimensions to consider when managing multicultural project teams. Of these dimensions, two in particular relate to Hofstede's (1980) cultural dimensions: cross-cultural collectivism

and cross-cultural uncertainty. In addition, cross-cultural communication was acknowledged as a vital factor since project managers are expected to be both cross-culturally and communicatively competent. These dimensions demonstrate how project managers can influence effective project team performance by being attentive to the cultural diversity of their team members. Table 14.3 outlines the cross-cultural team performance variables associated with the three dimensions.

Ochieng and Price (2009) recommend that project managers achieve cross-cultural collectivism via multicultural analysis. They also suggest multicultural training and data collection as means to reduce cross-cultural uncertainty. Interestingly, the researchers provided a solution to every dimension, with the exception of cross-cultural communication, implying that there is no straightforward resolution to achieving the project team performance variables underlying cross-cultural communication.

Table 14.3 Cross-Cultural Project Team Performance Variables

Dimension	Variables
Cross-cultural Collectivism	Good team organization Institute participatory leadership Establishment of commitment from all team members Open decision-making
Cross-cultural Uncertainty	Articulation of project goals and objectives Establishment of clear project roles Managers need to be cross-cultural communicators Effective interpersonal skills Adopt project procedures that would apply to everyone
Cross-cultural Communication	Establish clear lines of responsibility Cultural empathy Establish team effectiveness Implement value management techniques Establish trust Implement honesty Encourage respect for others

Adapted from Ochieng and Price (2009).

With respect to communication, cultural dimensions create challenges for project managers in particular (Ochieng & Price, 2009). Project team leaders must balance the complex demands of their home organization, their client's organization and culture, as well as the culture of their team members (Turner, 2009). In addition to knowing the cultural characteristics of their team members, project managers should be aware of their own cultural attributes and how these affect the project team's performance and communication. In order to communicate most effectively, project team managers and members of multicultural teams must learn to overcome any ethnocentric attitudes (Gudykunst & Kim, 1998). That is, they must realize that their respective national culture is not necessarily superior to that of others, and must come to understand and accept the communication norms of foreign cultures. Given that work within and among culturally diverse project teams is a "two-way street" such that contributions must be made by all stakeholders involved (Turner, 2009), the conflicting values of both cultures must be considered in order to achieve effective communication and successful project outcomes.

Conclusion

In project teams, especially international ones, there is an increased risk for the cultural diversity in team members to cause communication challenges that lead to negative team performance outcomes. Some of these challenges are unfortunately related to stereotyping and social categorization, whereby team members make in-group/out-group distinctions among their colleagues to form cliques. At other times, communication challenges are the result of miscommunications due to differences in shared cultural assumptions, as well as personal expectations for how team members should interact with each other. Finally, while it is possible that diversity on some attributes can lead to counterproductive work behaviors that are more passive in nature (e.g. information-withholding behaviors or silence during brainstorming activities), the potential for conflict to emerge as a direct result of cultural diversity in a team is greater.

That said, this chapter has outlined the many ways in which increased diversity in a team has been associated with superior team performance. Organizations that believe in the innovative potential of teams composed of members from a variety of backgrounds (including differences in national culture) are not wrong, as the sharing of knowledge among members who have different individual perspectives can indeed be a powerful catalyst for innovation (see Horwitz, Chapter 13 of this volume). However, one important caveat exists, as these beneficial effects of diversity in national culture on team performance are more

prevalent with the presence of certain contextual variables. Fostering a climate in which team members feel psychologically safe to take personal risks, for example, has been linked with increased innovation and creativity in new product development (Dougherty, 1990, 1992; Dougherty and Corse, 1995), while collaboration among members from different nationalities can improve decision-making (Ely & Thomas, 2001; Gibson & Gibbs, 2006; Ochieng & Price, 2010).

Implications for Management: The Pros and Cons of Diversity in Project Teams

We have established that diversity in project teams, especially when related to national culture, can have beneficial effects on team performance when the conditions are right. Therefore, in the interest of optimizing the composition of team members, some important considerations should be taken in creating multinational project teams and deciding on the range of diversity that should exist within each team. Using the Harrison and Klein (2007) typology to describe teams with minimum, moderate, and maximum diversity, the following implications for management are offered in a general and non-context-specific sense.

Diversity in team members' opinions or positions on a subject matter (*separation* in the Harrison & Klein typology) reflect disagreement. Where minimal differences in opinions within a group are likely to be psychologically comforting to team members, who may perceive "sameness" with each other and develop perceptions of group cohesiveness (Elron, 1997), members are also less likely to challenge assumptions and more likely to develop groupthink (Harrison & Klein, 2007). While group members of such teams show increased satisfaction with one another and with the team itself, it may ultimately lead to poor decision-making.

Maximum diversity on *separation*, that is, on attributes that reflect diverging opinions, leads to disagreement and potential conflict. As previously detailed, disagreement and conflict can have many negative implications for the team's performance, as they can detract from cooperation and lead to infighting, politicking, or power struggles (Eisenhardt & Bourgeois, 1988). Project managers of teams that are maximally diverse on such an attribute would benefit from interventions for fostering collaboration in their group. Indeed, increased collaboration can help members create a common identity for themselves and their role in the project team (Early & Mosakowski, 2000). Further, this is a useful tactic for avoiding the development of "cliques" or "factions" that reside within the main group and are based on national culture (Harrison & Klein, 2007; Gibson & Vermeulen, 2003; Whitener, Brodt, Korsgaard, & Werner, 1998).

Evidently, one could argue that having *high* discord among team members who have opposing opinions is preferable to a group of complacent members who all think alike, as it is possible to manage conflict in order to boost team performance. Indeed, effective conflict resolution is associated with increased innovation, as members of teams who are more open to productive conflict resolution are more likely to contribute their knowledge and ideas (Gibson & Gibbs, 2006). Psychologically safe environments such as these allow for the collaboration of team members despite their differences because of the presence of support, openness, trust, and respect among team members. These constructs are likely to cultivate cooperative behaviors from members, such as asking questions, admitting to not understanding, and voicing constructive opinions (Gibson & Gibbs, 2006).

Project managers would certainly do well to foster a psychologically safe environment in teams that are maximally diverse on attributes related to the kinds of information, knowledge, or expertise that team members bring to the table (*variety* in the Harrison & Klein typology). In psychologically safe conditions, maximum diversity on a *variety* attribute can lead to the sharing of information from different sources or the generation of more ideas because members feel safe enough to take risks and voice their thoughts (McLeod & Lobel, 1992; Watson, Kumar, & Michaelsen, 1993; Burt, 2002; Reagans & Zuckerman, 2001). In turn, these productive behaviors are likely to improve the quality and effectiveness of the team's decision-making, as well as the creativity involved in new product innovations.

By contrast, project teams with maximal *disparity,* or large differences among team members in status, pay, power, or other prestigious attributes, are likely to have increased competition and differentiation among team members. According to Harrison and Klein (2007), one example of maximal diversity in *disparity* is when one member of the team holds the majority of the power, such as when a CEO's authority far exceeds that of other members. Those who perceive such marked disparities may experience resentful deviance, which often leads to conformity, silence, dampened creativity, and withdrawal from the team (Homans, 1961; Pfeffer & Langton, 1993; Siegel & Hambrick, 2005). Differentiation on disparity-related attributes tends to distract team members from their tasks and interrupt information flow due to a higher preponderance of information-withholding behaviors by team members who feel jilted (Harrison & Klein, 2007). Therefore, it may be beneficial for project managers in teams having high diversity as *disparity* to address perceived inequalities in valued resources or consider a different composition of the group (for more on project team composition, see Chiocchio, Chapter 3, and Allen & O'Neill, Chapter 12 of this volume).

Directions for Future Research

As outlined in this chapter, continuing the proposed interdisciplinary approach to studying communication in project teams would provide a fruitful opportunity for theory development. Using the macroscopic definition of communication generally promoted by organizational psychologists in conjunction with the more technical elements of the field studied by the project management community would be a productive start to expanding the literature. Further, by applying the Harrison and Klein (2007) typology to the diversity variables under study—a task that can be done if the researcher considers carefully the *meaning* of the diversity attribute in the context of the project team's task, goal, demographic makeup, structure, and nature—it is possible to enhance the rigor with which studies can be conducted. Indeed, use of the Harrison and Klein (2007) typology helps with identifying the statistical properties of diversity attribute distributions, therefore helping with the appropriate choice of statistical test to use. Finally, studying surface-level diversity through the Harrison and Klein (2007) typology provides researchers with the opportunity to study the interactive relationships of different types of diversity.

Similarly, the use of Hofstede's cultural dimensions to examine the context in which communicative processes take place can be beneficial to further our study of cultural diversity and its impact on team outcomes. For instance, it is important to consider that cultural dimensions have varying effects on each phase of the project (Jessen, 1992). Thus, practitioners and researchers alike should be aware of a project team's current level on each cultural dimension, as well as the optimal level desired for effective team performance throughout the project life cycle. When considering the cultural dimensions of the team as a whole, there are certain attributes of the project team members (i.e., low power distance, high uncertainty avoidance, individualism) and the project team managers (i.e., high power distance, low uncertainty avoidance, individualism) that foster effective communication. Accordingly, these cultural dimensions should be considered when examining potential challenges and incidents of miscommunication among project team members.

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15 VIRTUAL PROJECT TEAMS

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Introduction

In order to pull together the human resources of geographically dispersed members on a project, electronic communications has increasingly supplanted face-to-face interaction on teams, giving rise to computer-mediated-communication (CMC) or virtual teams that can span the globe. Dispersed CMC radically changes the work environment for those team members and so may require different approaches to organization and management in order to achieve efficiency and effectiveness of outputs (Hambley, O'Neil, & Kline, 2007). The research on the differences is relatively recent.

A virtual project team (VPT) consists of geographically and/or organizationally dispersed coworkers who work toward accomplishing a shared goal and who collaborate using a combination of different technologies (Ale Ebrahim, Ahmed, & Taha, 2009; Townsend, DeMarie, & Hendrickson 1998; Powell, Piccoli, & Ives, 2004). Other geographically dispersed arrangements may be used to provide support for projects that do not include key characteristics of teams, such as communities of practice (Wenger, McDermott, & Snyder, 2002), project networks (Cummings & Pletcher, 2012), and X-Teams designed to grow networks (Ancona, Backman, & Bresman, 2008).

Virtual teams may involve more risk of project failure than co-located teams (Cataldo & Nambiar, 2009; Reed & Knight, 2010), and they depend on electronic communication in place of face-to-face meetings, so outcomes may fall short of expectations (e.g., Cummings & Kiesler, 2007; Lee, Brownstein, Mills, & Kohane, 2010). The increasing prevalence of VPTs makes a scientific understanding of underlying processes indispensable. A 2010 survey by Ashridge University (Schofield, Dent, & Holton, 2010) reported

83% of respondents were required to manage cross-functional and virtual teams, 50% of respondents reported operating in "different cultures" (Holton, Dent, & Rabbetts, 2008, p. 17), and 23% communicated across different time zones. However, less than one half of the managers felt that their organization provided sufficient support for virtual teamwork. Excellence appears to be rare in teamwork. Mediocrity is common because of communication barriers and lack of organizational investment in skill building and team building (Majchrzak, Rice, King, Malhotra, & Ba, 2000). Moreover, virtual teamwork may not be conducive for innovative solutions to complex problems. Hackman (2011, p. 30) wrote, "those… require real-time coordination among diverse experts to generate an integrated solution." New outcomes require new designs (Hambley, O'Neil, & Kline, 2007). Complex and creative team projects depend on teamwork processes (Crawford & LePine, 2013) that may be difficult to develop without significant face-to-face contact.

In this chapter we present psychological, structural, and process elements that enable effective virtual project teamwork. The chapter is organized around two common frameworks: the Input-Mediator-Output-Input (IMOI) framework, used for organizing team processes (Ilgen, Hollenbeck, Johnson, & Jundt, 2005); and the Project Management Body of Knowledge (PMBOK) (Project Management Institute, 2008). We stress the key themes that are crucial for performance in VPTs. The chapter also compares and contrasts the team processes between the traditional (face-to-face) project teams and the VPTs.

New Approaches to Organizing and Working Together: Virtual Project Teams

Many multinational organizations leverage their global reach in order to optimize their workforce, workloads, and performance (Rich & Lukens, 2009). Virtual teams consist of experts located at different worksites who must pool their skills, knowledge, and insight to achieve project goals. Effective teaming (Edmondson, 2012) is never easy, and geographical dispersion of members adds significant additional challenge. Virtual teams can be used when (a) local talent is inadequate, (b) moving the dispersed talent (even temporarily) to a local site is costly, (c) input from people with expertise in local cultures is desired on a global project, and (d) organizing across time zones is desired so that work can be done on the project 24 hours per day in order to speed the work.

The principles of virtual collaboration are scalable. Virtual communities can be known by a range of names, such as collaboratories, community of interest, project team, distributed work groups, joint venture, virtual teams,

online communities, and science gateways (Hackman, 2011; Workman, 2005). Common characteristics across different types and classes of virtual organization include the following:

- Geographically distributed across the globe, with participants spanning localities and institutions;
- Spanning time zones, but allowing synchronous as well asynchronous interactions;
- Adaptable structures and processes throughout their life cycle;
- Computationally enabled, with such tools as e-mail, teleconferencing, telepresence, awareness, social computing, and group information management tools; and
- Computationally enhanced, with extensions of the group's capabilities as simulations, databases for group memory, instrumentation, analytic tools, and services that facilitate interaction.

The following five features suggest a flexibility of team design and operation when working virtually.

Virtuality as a Continuum

Since most modern teams do rely on some degree of ICT (information and communication technologies), it is beneficial to view teams as being on a continuum of virtuality (Fiol & O'Connor, 2005; Martins, Gilson, & Maynard, 2004). The increasing reliance on ICT contributes to increased challenge in developing effective team processes. The level of complexity can be further enhanced by cultural (Connaughton & Daly, 2004) and organizational differences (Nemiro, Bradley, Beyerlein, & Beyerlein, 2008) that accompany virtual teams. VPT projects can range from simple and quick to highly complex and long term, where a particular team has responsibility for only a small part of the work flow (Chiocchio, Chapter 3 of this volume; Mankin & Cohen, 2004).

IMOI Model

The vast expanse of literature on teams spreads across various academic streams. However, we focus on themes that are pertinent to virtual teamwork in project teams. Within this area, we specifically focus on processes not addressed in the mainstream project management literature (Project Management Institute, 2008). We adopt the IMOI (Input-Mediator-Output-Input) approach (Ilgen et al., 2005) to organize the areas covered in the following sections. The IMOI

model captures the complexity involved in team working by identifying the key stages in team development, namely, forming, functioning, and finishing. The forming stage consists of the antecedents that may influence team interactions at individual, team, or organizational levels. The functioning stage represents team processes directed toward outcomes and other emergent team behaviors. The finishing stage includes team outcomes and feedback that can be used as future team input (Ilgen et al., 2005; Mathieu, Maynard, Rapp, & Gilson, 2008). These stages from the IMOI framework relate to the processes from the Project Management Body of Knowledge (PMBOK) (Project Management Institute, 2008). For example, the PMBOK initiating process recognizes that a project or phase should begin, and the planning processes are used to devise and maintain a workable scheme to accomplish the project. Both of these processes overlap with the forming stage of the IMOI model in aspects of team interaction development, as discussed further in the next section.

VPT Forming and Virtual Project Initiation and Planning

The forming stage in the IMOI model discusses three main components: trusting, planning, and structuring within the team for effectiveness (Ilgen et al., 2005; Mathieu, Maynard, Rapp, & Gilson, 2008). The PMBOK, on the other hand, discusses the organization commitment during the initiation process, as well as scope, activity, schedule, cost, and resources planning during the planning process in order for a project to be successful (Project Management Institute, 2008). Thus, it is important to discuss the importance organization support, VPT design and structure, and trust development as related to effective teaming and achieving project success.

Organizational Support

Organizational readiness is critical for the success of virtual project teams. Successfully introducing a new way of working and interacting with coworkers is a major transformation in organization. Thus focusing on both people and technology factors is critical—the sociotechnical context of work (Cataldo et al., 2009; Leonardi & Barley, 2008; Rystsareva et al., 2012). Bal and Foster (2000) suggest that getting management support, changing management regarding team members' behaviors, selecting the right type of team members (see also Allen and O'Neill, Chapter 12 of this volume), training team members to use the technology, setting ground rules on meeting behavior, and putting in place a

reward structure are very important for the success of virtual teams. Establishing an environment of support and preparation increases the odds of team success.

Virtual Project Team Design and Structure

The structure or design of a VPT is a factor to be considered in the forming stage of a team. PMBOK identifies this factor of organizational planning and staff acquisition as two important processes during the planning process. Recent literature on virtual teams has identified team configuration (relative number of members at each location) as a feature with potentially long-term implications (Cummings 2004). Two features that can potentially impact team functioning are the balance of membership and the number of isolated members, that is, the sites with lone individuals (O'Leary & Cummings 2007). A balanced membership refers to a roughly equal distribution of members across major locations. For instance, a 6-5-2 configuration refers to a virtual team that has three locations, with 6, 5, and 2 members at each location, respectively. There is a tendency among virtual team members to form in-groups with other co-located members. Team members at other locations are then viewed as out-groups (Cramton & Hinds 2005). A balanced membership further compounds this in-group/out-group problem. With numerical equality, these co-located "fault lines" become deeper as the propensity for gridlock increases (Polzer, Crisp, Jarvenpaa, & Kim 2006). The fault lines signify the latent cracks in a virtual team. These cracks can be reinforced by distinct national and cultural identities. Such local coalitions could in turn lead to misalignment of goals, negative politics, alienation from team identity, and generally poorer team performance (Prasad, DeRosa, & Beyerlein 2012). To the extent that a balanced membership represents a debilitating potential for stalemate, a majority influence may sound like a lesser evil. Team configurations where certain locations have the majority of members can run the risk of being non-representative. However, majority membership often provides certainty, cohesion, and clarity (Menon & Phillips 2011).

A final consideration of virtual team design concerns isolated members. This occurs when a member is the sole representative from a location. The obvious problem with this situation is a lack of synergy and involvement. In isolation, there can be a risk of social loafing, wherein the isolated member does not feel obliged to commit or contribute to overall goals. Additionally, majority members could choose to ignore minority voices. Generally, the feeling of estrangement of isolated members can be detrimental for overall team performance (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002).

Trust

Teamwork is defined by interdependence. Team members must trust and rely on one another to accomplish their work. Trust is recognized as critical for all team performance (e.g., Jarvenpaa, Knoll, & Leidner, 1998; Kirkman, Rosen, Tesluck, & Gibson, 2006). Trust rests on perceptions of the other person's reliability, expertise, and intention and also involves a willingness to be vulnerable to the actions of others (Mayer, Davis, & Schoorman 1995). Thus, it is an integral part of the IMOI model's forming phase. The PMBOK does not elaborate on trust in its framework for a successful project. Distrust can undermine the project with communication problems, limited knowledge sharing, and uncooperative behavior, sabotage, and loss of team members that results in failure (Casey, 2010; Felps, Mitchell, & Byington, 2006).

Intra-team trust predicates the commitment of team members to these facets, and also to their propensity to rely on each other for the benefit of the project. Working in unconventional settings, with little physical contact between members, the situation necessitates that members trust that their teammates will deliver (Germain, 2011). In a longer frame of time, trust influences team processes, including participation, cycle times, quality of the products, members' turnover, attitudes about forming new teams (Bandow, 2001; Salas, Sims, & Burke, 2005), and conflict within the team (Polzer, et al., 2006). Empirical literature on trust has largely measured trust in teams through questionnaires, though in some interesting exceptions, relevant to project teams, Chen, Chen, and Chu (2008) presented a model to evaluate trust between VPT members as they share resources in an R&D team.

With the premium associated with such interactions in terms of body language, feedback, and richness of communication, virtual teams appear to be at a disadvantage in developing trust among members. This process takes longer than building trust face-to-face (Wilson, Strauss and McEvily 2006) and longer with teams speaking a variety of native languages, even when their work is executed in a common language (Henderson, 2005).

The nature of project teams complicates trust building. Project teams often work on short-term or one-time projects, with no expectations of long-term obligations or interactions between members. There are few shared social and work contexts—which might otherwise lead to the development of relationship and trust between members. The sheer impersonal and business-like attributes of virtual project work can hamper the development of trust. Individuals placed within the challenging environment of virtual teamwork can develop *swift trust* (Meyerson, Weick, & Kramer, 1996). In absence of any prior interpersonal cues or relationships, short-term virtual team members can trust based on their

previous experience working within virtual environments. In *swift trust*, individuals employ categorizations about other team members to attribute reliability and competence to members they do not get to meet (Germain, 2011). The fact that the project team is assembled with the objective of achieving a goal, using the best talent, provides a thrust to individuals for developing swift trust. Subsequent communication and the nature of experience can either strengthen or erode this trust.

VPT Functioning and Virtual Project Executing and Controlling

The IMOI Model discusses bonding, adapting, and learning as the important aspects of the functioning phase for effective team development (Ilgen et al., 2005; Mathieu, Maynard, Rapp, & Gilson, 2008). The PMBOK, on the other hand, includes project plan execution, team development, and information distribution as some of the executing processes and includes scope, cost, schedule change control, as well as performance reporting as some of the controlling processes (Project Management Institute, 2008). Thus for functioning, executing, and controlling a VPT, communication as a required facilitating process is very critical and is performed intermittently between different processes (Project Management Institute, 2008).

The IMOI model further discusses the importance of managing diversity of membership and managing conflict among team members—emphasizing the team's ability to adapt and learn. Thus, the next few sections will discuss the importance of managing culture, communication, and communication channels.

Culture and Communication

Culturally diverse and geographically distributed project teams collaborating across boundaries face the challenge of confronting, exploring, and resolving intercultural differences to optimize performance. What are the sources of cultural differences, and how might they be circumvented? A better understanding of culture can help ameliorate such difficulties.

The term "culture" seems enigmatic and ambiguous to many people. However, early researchers have pointed out several important aspects of culture. Hofstede (1980) referred to culture as software of the mind. Culture is a shared sense-making process, which produces common understanding, expectations, and behaviors. Schein (1992) stated that the culture will naturally produce

integration and adaptation, creating shared identity while adapting to a changing world. This normative process of sense-making is emergent. Norms will quickly form in any group, even if team members are not intentionally mindful or directive of this formation. Schein also provided a perspective of culture as a multilevel construct, with multiple levels of influence within the organization. Teams and individuals operate within multiple cultural contexts. Current virtual team culture research builds on these key points.

An overview of current empirical culture research is found in Hinds, Liu, and Lyon (2011), who reviewed every article involving organizational culture in the 15 leading psychology and business journals from 2000 to 2010. During this period, they found only 38 published articles that addressed transnational culture. Of these, there were only 11 empirical studies of global teams examining the role of multinational culture. Half of these studies focused on IT and technology projects. The 11 articles all reported significant findings for the role of culture on global work. These authors note a lack of data at the individual, team, project, network, and firm level.

This handful of studies over the last half century illustrates ongoing misunderstandings concerning the nature of culture and the devaluation of the role of culture on work. Several recent reviews of virtual teams de-emphasized culture. For example, Martins, Gibson, and Maynard (2004) treated culture as simply one aspect of diversity.

Most researchers retained traditional views of culture. This perspective widely assumes culture to be static, based on shared, persistent belief and value schemas (Leung, Bhagat, Buchan, Erez, & Gibson, 2005). This is known as an entity, attitudinal, or taxonomic view. This point of view fails to explain much of what is important about intercultural collaboration—how culture dynamically influences the actual behaviors observed in global work (Gelfard, Erez, & Aycan, 2007; Kirkman, Lowe, & Gibson, 2006).

In contrast, dynamic perceptions of culture stem from the interaction of complex contexts, which regulate the behaviors of workers. In a dynamic view, culture is a multilevel construct that consists of various contexts nested within one another, from the most macro level or global culture, down to national cultures, organizational cultures, group cultures, and individual-level values, expectations, and assumptions (Leung, Bhagat, Buchan, Erez, & Gibson, 2005). A cultural context is a system composed of institutional and cultural logic that informs structures and practices available to workers (Chao & Moon, 2005).

Rather than displaying static persistence, these dynamic drivers are reciprocal, forming a feedback loop of information and adaptation. Higher-order

contexts shape—and are shaped by—day-to-day work practices and norms (Hinds, Liu, & Lyon, 2011).

Macro-influences impact embedded social networks, which in turn influence and are influenced by small-group and individual differences (Leung et al., 2005). This reciprocal dynamic affects both top-down and bottom-up processes.

Although values and beliefs play a role in influencing behavior, they are an insufficient explanation for work behavior. Concentrating on beliefs and values is also inadequate to prescribe changes in daily work practices (Hinds, Liu, & Lyon, 2011).

An embedded systems view enables us to look beyond other factors, such as the economic situation, regulatory system, career advancement patterns, technology infrastructure, traffic, and so forth, that influence people's behavior at work (Hinds, Liu, & Lyon, 2011).

Perlow, Gittell, and Katz (2004) used structuration theory as a theoretical lens to understand the nested structure of the relationship between cultural context and work practices. They found that unique helping behaviors and reward systems within each team, and the larger institutional context of the organization and the country, were mutually reinforcing, and produced behaviors that would be unpredictable with a static values view of culture.

The diversity of team composition plays a role. Teams with low or high levels of national diversity performed better than teams with moderate diversity (Early & Mosakowski, 2000). Gibson and Gibbs's (2006) study of 56 global teams concluded that national diversity decreased innovation, particularly in the absence of a psychologically safe environment. They also reported that national differences related to less stable team structures. Dynamic drivers and modifiers of cultural diversity consist of organizational- and team-level differences in democracy, tolerance for diversity, respect of individuals and freedom of choice, empowerment, and openness to change (Gupta & Govindarajan, 2000).

While influenced by higher order contexts, work practices are shaped by local contexts. In Kitayama's systems view of culture (2002), higher-order cultures are intertwined with local context in which actors are embedded. Culture is composed of public meanings and practices, which influence outside conscious awareness. Culture is best understood by examining the interrelation between local institutions, local practices, cognitive processes, and individual responses (Kitayama, Markus, & Kurokawa, 2000; Kitayama, Mesquita, & Kurasawa, 2006). Spencer-Oatey (2000) also emphasizes the collective meaning-making role of culture in her concept of a fuzzy set of norms and assumptions shared by

a group, which influence members' behavior and the meaning ascribed to that behavior.

Convergence

The intentional process of creating shared meaning and systematic practices is called convergence. Some researchers contend that team practices should converge to produce collaborative effectiveness (Hinds, Liu, & Lyon, 2011). Others believe that convergence is time-consuming, impractical, and an impediment to coordination and innovation. An empirical study by Zellmer-Bruhn and Gibson (2006) found that organizations allowing local improvisations are more effective at adapting, learning, and improving processes. Their analyses of convergence strategies concluded that convergence at the institutional level was less effective than freedom to evolve practices at the team level (Leung et al., 2005). However, studies are too few to conclusively support practical team-level convergence.

An alternative to the convergence of practices is the creation of a hybrid culture unique to each team. This is based on the notion that workers can create and hold multiple meaning systems that can be situationally adaptive (Benet-Martinez, Leu, Lee, & Morris, 2002). Essentially, team members can intentionally create a unique, shared team culture. This approach creates a primarily cognitive construct or schema that guides behavior. Work practices become cultural products themselves. Since team composition is unique, each team may be considered a unique adaptive organism.

A hybrid team culture can be based on practices that members currently share or can be uniquely created in response to changing situations. A virtual hybrid culture is characterized by a common, group-specific identity that emerges over time. In a study of five teams within a multinational clothing firm, teams that formed a hybrid culture had the highest performance level (Earley & Mosakowski, 2000). Elements from each culture were borrowed, creating a unique or shared team culture. This process was accomplished through agreed-upon rules for interaction, high expectations for team performance, effective communication, conflict management, the development of shared identity, and cross-cultural empathy.

While team-based hybrid convergence may be a compelling concept, a handful of recent studies provide little empirical support. Molinsky (2007) suggests that expansively redefining complex norms can be psychologically tedious. In addition, team members may have different definitions and understandings of proposed practices and outcomes. The more profound the cultural divides, the more time an effective hybrid team culture will take to emerge (Hinds, Liu, & Lyon, 2011). For example, teams working together in different countries had

difficulty creating meaning of the work and a shared language of experience. They also had difficulty perceiving that others' goals were aligned with their own (Baba, Gluesing, Ratner, & Wagner, 2004). Levina and Vaast (2008) noted that cultural responses to status differences, such as not challenging a more senior member, proved to be a hindrance to collaboration. It is unclear if failures of this approach stem from structural flaws or weaknesses in interpersonal dynamics.

Culture-based Conflicts

As workers are distributed across multiple collaborative cultural contexts, challenges to working together effectively become much more complex. Inherent conflicts and incompatibilities emerge, and must be uniquely recognized and managed by the team.

Conflicts also arise from ignorance of cross-cultural differences. In order to adapt to such emerging conflicts, Orr and Scott (2008) found that important attributes included documenting the resolution process, experience in virtual teams, open-mindedness, and ineffective sense-making process. In addition, team members' levels of argumentativeness and cognitive abilities affect their ability to create and fit into a unique team culture (Infante & Rancer, 1996).

Cross-cultural conflict can emerge because of differences in ideas and norms about the work, deadlines, conflict management, and power relations (Walsham, 2002). Differences in cultural norms can increase transaction costs (Dibbern, Winkler, & Heinzl, 2008) and impede project success (Rai, Maruping, & Venkatesh, 2009).

Challenges often emerge concerning coordination and convergence across contexts. Resentment and disengagement can emerge from perceived inequity of the distribution and ownership of knowledge, expertise, meaning, and "truth" (Maurice, Sorge, & Warner, 1980).

Despite the challenges of working across boundaries and contexts, team members will naturally employ socialization. Socialization is the process of fitting in and adapting to group work and team member relations (Riddle, Anderson, & Martin, 2000). Team members will continuously modify the societal fabric in which they operate (Maurice, Sorge, & Warner, 1980). They will figure out how to get work done in spite of the inherent misunderstandings within the virtual environment (Olson & Olson, 2000).

Multinational teams can utilize intentionality to adopt unique shared rules and procedures in order to create a common language and meaning, thus creating alignment and a unique common identity (Kostova & Roth, 2003). Intentionally created shared identity provides a common language and a context for global project work (Orlikowski, 2002). The shared meanings of a common

cultural context create shared identity, illustrating the reciprocal nature of context and meaning (Leung et al., 2005).

A key function of team communication is providing feedback to enable adaptation (Schultz, 1999). Intentional communication also enables team members to learn, create, and re-create a unique culture and group structure, engage in relevant processes and activities, and pursue individual and collective goals (Riddle, Anderson, & Martin, 2000). Leveraging a resource that competitors cannot duplicate, such as a unique culture, provides a sustained competitive advantage (Hult, Ketchen, & Nichols, 2002). Taken together, the empirical studies of virtual culture suggest that teams with shared identity, aligned interests, and congruent practices might have more fruitful cross-national collaboration and fewer coordination costs (Hinds, Liu, & Lyon, 2011).

While many of the concepts reflected in this research summary are intriguing, there are few practical, empirical studies to support them. The handful of studies published over the last decade and the sparse conceptual evolution of the concept of culture within the last half century provide a clear call for future research in the nature, role, and importance of culture on virtual project outcomes.

Virtual Team Use of Communication Channels and Technology

A combination of modern technology and human innovation enables organizations to tap into scattered talent and bring them together as a team. While ICT media like video-conferencing have the ability to simulate the environment of face-to-face interactions, teams rarely use them (Shachaf 2008). The most popular tool used by virtual teams is e-mail (an asynchronous medium) and audio conferencing (a synchronous medium) (Lurey and Raisinghani 2001). The low-tech habit is not surprising, considering the enormous popularity and convenience of these two technologies. In fact, there is value in steering away from assessing ICT by its ability to replicate conditions of face-to-face interaction, instead judging it by how well teams can use it to accomplish their goals (Kimball 1997; Prasad, DeRosa, & Beyerlein 2012). Teams can employ a mix of various technologies, depending on their time, convenience, nature of work, compatible technology platforms, and technology expertise, as well as the team budget. A team familiar with the technology options available can make informed choices about when and how to use each tool to address the balance needed by locations in different time zones.

Global VPTs are also challenged by accelerated and compressed time frames and round-the-clock availability. How do members most effectively participate asynchronously? Here are a few practices, which enable more effective asynchronous participation (Schmidt, Montoya-Weiss, & Massey, 2001):

- Record the meetings: audio or video recordings provide the context of a concept's development.
- Compile inputs before deciding or acting: provide a period of time for members to submit their thoughts and views. This often increases participation among disenfranchised international members.
- Develop a WIKI with subject nodes: nodes can be a discrete subject or a meeting. They can be text based or audio/video. Nodes can be created in real time by a recorder or by the group on their laptops. Nodes are useful to capture the context of an issue. Nodes can be connected together as concepts or decisions emerge and can be used by all members of the team as an ongoing discussion medium.

While technology promises emerging solutions, these will be slow in adoption. Challenges within global teams are largely related to social process, communication, and conflict management. These challenges are solvable through awareness, understanding, respect, appreciation, and a group commitment to creating systematic, intentional solutions as problems surface. Though technology continues to evolve toward avatars, holograms, 3D graphics, and other such simulations of natural social exchange, it is pertinent to remember that at a basic level the key ingredient of all interpersonal communication is discerning another person's response, mood, and understanding. Whichever tool facilitates this process can be deemed successful.

VPT Finishing and Virtual Project Closing

The OI stage of the IMOI model deals with the aspect of a team that is producing output as well as using that feedback as input to function as a team. Within this context, a team's readiness for creativity and innovation is crucial, since the emphasis is on a feedback-loop.

Developing a Virtual Team Culture of Innovation and Creativity

Virtual project teams are creative problem-solving systems. Members at the scattered locations bring a variety of expertise to the problem situation. That expertise has to be shared in an effective manner, so the team as a whole can process the relevant information and jointly craft a solution. Their problem is likely to be complex, so a number of subproblems have to be solved along the way to an overall integrated solution.

The environment in which the team must be designed to stimulate creativity. Nemiro (2004) interviewed members of nine virtual teams involved in creative

work to generate the a list of characteristics that describe a culture that supports creativity, including clear goals; clear procedures and norms for regular and consistent communication; personal bond (vs. superficial or lack of personal bond); high level of trust (honest, respectful, and open sharing builds trust); high level of challenge; sufficient resources; and supportive management. This list describes a work environment where the sharing of information and ideas is optimal. That level of sharing is prerequisite for the team to reach the highest levels of creativity. Creativity plays a central role in all non-routine work in organizations, including problem-solving and continuous improvement. Our focus on creativity involves two specific contexts: achieving project goals and improving project processes.

Innovation is typically defined as the application of ideas and tools that emerge from a creative phase (O'Connor, 1998). However, creativity characterizes all the stages of innovation, beginning with the generation of new ideas, approaches, and tools. It may end with the generation of new ways to package or market the output, including identifying new market niches. Creativity represents a way of thinking at each stage in the development process.

According to the investment theory (Sternberg, 2006), creativity requires a confluence of six distinct but interrelated resources playing a role in virtual teams: intellectual abilities (diverse expertise that needs to be connected and leveraged); knowledge (that needs to be openly shared); styles of thinking (that must be harmonized); personality (that may be culture specific); motivation (that demands more attention at a distance); and environment (with local and global enablers and hurdles). A geographically dispersed team may have greater difficulty in achieving high levels of creativity. This is an issue that requires research. That difficulty suggests that a careful assessment of the need for creativity should be made before switching from a co-located team to a VPT. Many companies have focused their growth on lower levels of innovation where investment is minimal and return is quick. They leave high levels of innovation to government labs and universities, where long-term investment can wait for payback.

The balance of routine with non-routine is crucial (McDermott & Kendrick, 2000). Over-routinization will stifle creativity, whereas under-routinization will waste resources. Application of rigid methods like Stage-Gate models where go/no-go decisions are made by managers or committees may be inappropriately structured where the team is expected to be highly creative (Lenfle & Loch, 2010; Sethi & Iqbal, 2008; Sitkin & Sutcliffe, 1994). One solution is to separate the fuzzy front end of divergent thinking from the rest of the project and save Stage-Gate methods and tools for the latter (Koen et al., 2002). Sawyer refers to the creative stage as "problem-finding" (2007, p. 44) and the second convergent part as "problem-solving" (p. 44). How can the team leader know when the balance of routine and non-routine activities is off? Ask the team. Do they feel

hampered by having to solve problems (like inventing administrative procedures or making policy decisions) that do not advance their work on the product, or do they feel stifled by too many routines, such as having to write reports too frequently to document minuscule details of the product development process? Then adjust to regain the balance point. A number of process and software tools have been developed for handling the routine of the team innovation process. PMBOK provides many of these to identify, capture, create, represent, distribute, use, and update information and insights about products, processes, and designs, such as the comprehensive software packages Clarizen, Genius Project, or Huddle, and human resource processes such as how team members are chosen and informed about the project (Kendrick, 2010). Some tools have also been developed to stimulate the creative work (but outside the PMBOK framework), which facilitate brainstorming types of activity, stimulate development of trust, or enrich flow of feedback during communications, such as software and Internet tools including Google Drive, which allows simultaneous collaborative editing, CMAP Tools, which allows online visualization of mind-mapping to show a network of new ideas, and wikis for collecting informal notes and processes such as developing a group identity and providing opportunities for members to interact informally (Robert, Dennis, & Hung, 2009) and using interdependent tasks as an opportunity for developing relationships that can then enable more sharing of informal knowledge (Zhang, Venkatesh, & Brown, 2011). Nemiro (2008) describes ways to adapt traditional team creativity procedures in eight categories for virtual team use, including idea checklist, attribute listing, drawing, and force field analysis. The tools for managing the effectiveness and control of routine and the tools for managing creativity continue to evolve. Finding the right balance will enhance team performance. Team chartering may be useful for both the routine and the creative, clarifying norms that emphasize creativity and innovation but also clarifying roles so that communication and handoffs are smooth.

Drucker (1992) notes that knowledge applied to tasks that are new and different is innovation. Most definitions of innovation contain the same key elements that Drucker mentions: knowledge, application, and new. Amabile's (1993) definition of creativity is similar, with an emphasis on application and new. Roberts (2002) states this as an equation: invention + exploitation = innovation, and emphasizes the difference between having ideas and exploiting ideas. For example, do not expect plans to be clear or timely or in sync with each other. Anticipate ambiguity and conflict for the team coming from other parts of the company, and take steps to form a nimble team that can respond adaptively when confused planning engulfs the team.

Challenges experienced by a virtual team that could impact effectiveness include "friction due to cultural differences, fatigue and stress due to time

differences, productivity loss due to technology challenges, discomfort with technology, equipment malfunction, task technology mismatch, frustration due to communication challenges and lack of meeting skills" (Nemiro, 2008, pp. 464–465). The collective experiences of project team transform them over time from a loose group of experts into a fully functioning creative team. In this process, both intellectual and social resources are integrated. A network of trust is formed, which enables effective knowledge sharing and innovation.

Should your company make the considerable investments in time, money, and resources to make your teams more innovative, creative, and effective? If the project can be executed efficiently and effectively without developing a full team, then do not make that investment. The pattern of a team's workflow depends on the necessary level of task interdependence. Four levels of interdependence have been identified, with each representing different patterns of information exchange between people at each stage of the work flow (Tesluk, Mathieu, Zaccaro, & Marks, 1997; Thompson, 1967). The levels range from "pooled" work that requires no communication between group members to "intensive" work where all members must collaborate. Beal, Cohen, Burke, and McLendon (2003) used meta-analysis to show that cohesion among group members becomes more essential to performance as work flow becomes intensive. Using the wrong workflow design can result in errors and waste. For example, using sequential handoffs of the work, akin to the old "throw it over the wall" model of product development, has tended to produce more errors than collaborative approaches. New ways of organizing the work were invented to correct the problems that the "throw it over the wall" approach created.

Practical Implications

We approach the practical implications for project teams working in virtual environments from a leadership perspective (for a discussion of leadership in the project team context, see also Byrne & Barling, Chapter 6 of this volume). The benefit of this approach is that it enables a holistic analysis of the complexity involved with VPT. Additionally, the leaders of such teams have a ready reference of the key challenges that they are likely to face as they lead VPTs.

Leading Virtual Project Teams

Virtual teams can face some daunting psychological factors. "Building the boat while going down river" is a description of the work of new product development

teams (Purser & Pasmore, 1992). The teams are inventing the processes at the same time that they are developing the new product. One engineer working on the design of the Joint Strike Fighter, perhaps the largest scale virtual project in new product development (Olson, 2008), said, "It feels like being in a whirlpool. It feels like being in a set of rapids where there's so many pop up emergencies. People are saying, 'Oh, I forgot this.' or 'Oh, my gosh, if we Do not have this.'… 'I need it tomorrow.'… 'It's urgent.' You just wonder, 'How could that be?' How could we have so much 'churn' in the system?" Within this complex situation, while the team is also inventing itself, it is also discovering the processes to get the work done, as well as to work together. Smart companies invest in all three creative acts: product development, process development, and team development. However, companies often omit the team part of this development triangle and leave that responsibility to the team—to develop by accident. This is less likely to occur with any success when the "team" is virtual. As a consequence, the team is handicapped in its ability to share, collaborate, coordinate, create, and learn from experience. The team leader may be compelled to spend resources for team development when the members do not have the expertise, motivation, or time for development work. Challenges identified by virtual team leaders include infrequent face-to-face contact, lack of resources, difficulties in building a collaborative atmosphere virtually, lack of time to focus on leading the team, shifting team and organizational priorities, and difficulties in managing poor performers (Lepsinger & DeRosa, 2010). The many areas with practical implications for leaders include:

1. *Workflow*. The leader not only attends to the work done inside the team but also the incoming and outgoing flow that links the team to the rest of the organization. Work flow issues include having the wrong people on the team or missing required expertise, changes in the pace of work including altered deadlines or bottlenecks, and clumsy handoffs to customers (the next team down the line). Handoffs require more attention when the work is virtual, because the opportunity for adequate feedback needed for smoothing the process is less convenient.
2. *Team development*. Change management is "the process of continually renewing an organization's direction, structure, and capabilities to serve the ever-changing needs of external and internal customers" (Moran & Brightman, 2001, p. 111). Team development represents the leader's responsibility for facilitating change in the team's structure and process so that goals can be achieved effectively, including exchanges with the team's suppliers and customers. Team development (LaFasto & Larson, 2001) requires attention to membership, relationships within the team, relationships with suppliers

and customers of the team, problem-solving and decision-making processes, and the support from the environment.

3. *Communication*. Information and decisions must flow smoothly. Flow depends on open channels and those depend on planned pathways and trust. Virtual team leaders must communicate often and in more detail than face-to-face team leaders (Yoo & Alavi, 2004). One example of a planned pathway is the escalation plan—when a decision gets pushed upstairs and by whom to whom (Garton & Wegryn, 2006). When planned out, difficult or controversial decisions are handled more quickly. With co-located teams, the hierarchy that guides the escalation of decisions is typically clear, so the next steps in a controversial situation are automatic. For virtual teams, there may be a dominant hierarchy, with the team leader reporting to a program manager, who reports to an executive sponsor for the project, but there will also be local hierarchies for each team member, where they report to the manager of their functional area. Escalation of decisions, such as how much time a specific member can dedicate to the project, may require communication across the local and project hierarchies. One engineer working on the design of the Joint Strike Fighter (Olson, 2006) described a communication problem as follows: "Although the Catia (Computer-Aided-Design system) workspace allows engineers to see one another's design virtually, it did not allow them to change one another's design in real time. This was in part due to relying on telephone and network lines that were very slow. Engineers would have to go apart from the meeting, create some new designs, shelve those back in the workspace, and then get back together in the collaborative meeting which, in real terms could be the next day. Time delays would be created as well as a limited number of designs from which to choose. A simple design exercise might degenerate into a three or four day exercise. Often it was considered faster just to send somebody on an airplane to the site." Technology is evolving rapidly, so reliance on travel to sites for face-to-face meetings may become more optional, but better technology will not be sufficient for solving the team process problems.
4. *Changing technology and information security*. The virtual project team leader not only selects and provides training on the appropriate technology for collaboration among the team members, but also assures that the sharing of information is easy yet secure (Bal & Foster, 2000). Easy collaboration and document management is a concern, especially when multiple organization systems are involved. For example, on the F-35 Joint Strike Fighter mega-project, specialists from eight countries worked on international teams to design various components of the plane. They typically worked at their desks using e-communication tools to share ideas and diagrams. However,

the US policy limited sharing. ITAR (International Traffic in Arms Regulations—regulations for defense trade controls; US Department of State, 2011) meant that it was illegal to share some information coming from companies in the United States to their partners in other parts of the world such as the United Kingdom and Italy. Olson (2006) wrote, "The guidelines themselves were so changing and complex, that engineers seemed to err on the side of caution in not releasing information that might have been releasable. It seems that the startup time period was the most difficult in that people were unaccustomed to these routines and found them overwhelming." The regulations stifled risk-taking and so innovation.

5. *Stress.* Stress can stifle creativity and collaboration. A team is subject to a number of sources of stress (Horsman & Kelloway, Chapter 11 of this volume). The first source to consider is leadership style. Leaders who demand instead of support, bully instead of support (Loughlin & Bryson, Chapter 10 of this volume), withhold information, and so on, create stress. The work load and pace and a shortage of resources can also generate stress that affects the team's work and morale. Stress accompanies any project that must be done with limited resources and limited time. Working virtually results in additional stressors. For example, each member of the team reports to his or her remote team leader, but also to the manager of the local functional specialties, which creates opportunity for conflicting demands from the two supervisors (Klein & Barrett, 2001).
6. *Turnover.* As a project develops, team members build up a storehouse of knowledge about the project and about each other—a shared knowledge reservoir. When the project team loses a member, a hole appears in the reservoir and results in slowed progress (Stuart, 2011; Mathieu, D'Innocenzo, & Kukenberger, Chapter 5 of this volume). Turnover results from excessive stress, leader-member conflict, budget cuts, new assignments, better looking opportunities, or manager whim. When turnover occurs, steps should be taken to fill the opening as quickly as possible. In virtual teams, the team leader may have little control over who is added to the team and when. Socialization of the new member becomes a priority, to accelerate the process of optimizing the fit of the person with the team, so that collaboration can begin.
7. *Unknown Metrics.* "You get what you measure." This is an old platitude that holds some truth. What gets measured is what gets attended to, valued, and rewarded (Spitzer, 2009). There are two problems with that: the activities that are easy to measure are often trivial, and the measurement systems either outside or inside the team may be inadequately designed or implemented or aligned. Effective measurement of valuable activities in the project provides

the foundation for planning subsequent actions and is important when using milestones to mark project progress or using stage gates to control project movement to subsequent phases. However, the value of effective measurement as feedback for the team is also important. In virtual projects, measurement and feedback require more conscious effort—a disciplined process for communicating results on how the team is doing.

The virtual workspace is a sociotechnical system, with interacting dimensions representing the social nature of the team members, their intellectual resources, and the array of technologies they rely on for task work and teamwork. Reliance on the social or the technical facets of the environment to achieve coordination and collaboration among members seems to vary with the degree to which the members share the same organizational environment (Rystsareva, Le, Conner, Kalyanaraman, & Panchal, 2012). In a virtual environment, the effective leader builds trust, appreciates diversity of thought and culture, and motivates team members to be innovative and creative, but also strives to align technical resources to minimize gaps in infrastructure and create a consistent process for congruence of the social and technical (Cataldo, Herbsleb, & Carley, 2009).

Directions

Motivating Twenty-first-Century Knowledge Workers and Innovators

Along with the changing nature of work, our understanding of motivating this new workforce has also changed. Most motivators, incentives, and rewards embedded in business are vestigial and obsolete, producing suboptimal results. Many of our motivators are counterproductive. It is now understood that the organization can either experience breathtaking levels of performance and retention, or it can perpetuate traditional and counterproductive beliefs, practices, and cultures of control, which guarantee suboptimal outcomes. Simply stated, we can have high performance or control, but we cannot have both (Purser & Cabana, 1998). Research in business and psychology has converged and has illuminated three factors that motivate the knowledge worker and innovation workforce: autonomy, mastery, and purpose, that is, becoming better and better at something that matters, and connecting this drive with a higher purpose (Gibson & Cohen, 2003; Hertell, Geister & Konradt, 2005; Pink, 2009). These findings also find support in self-determination theory (Gagné & Deci, 2005), which stresses intrinsic motivation as a key driver of individual growth. Testing this theory within the context of a VPT should provide interesting

insights for motivation in a hitherto less researched area, which is motivation in distributed teams.

Relationship Between Project Complexity and Choice of ICT

The degree of complexity of a traditional project is assessed on the basis of its level of differentiation and the extent of interdependence (Baccarini, 1996). When transposed in a virtual context, geographical distance adds another dimension to this complexity. Similarly, reliance on ICT for communication renders integration (of differentiation via interdependence) a challenge. What choice of media is best suited for VPTs of varying complexities? Drawing from the media-richness (Daft & Lengel, 1986) and social presence theories (Short, Williams & Christie, 1976), one may ask, is a "rich" medium like video-conferencing, which is equipped to re-create an individual's social presence at remote locations, better for virtual project teamwork? Conversely, considering the ubiquitousness of computer-mediated communication, one can examine its potential in facilitating task-related communication and better self-presentation of team members (Walther, 1996).

Cross-cultural Collaboration

Dispersion of team members on virtual project teams typically results in inclusion of multiple organizational, disciplinary, and national cultures in the social process. Some researchers are questioning the value of established frameworks such as the Hofstede model (Hofstede, 1998) for understanding and managing the cross-cultural challenge (Erez, 1994). No research seems available that addresses this issue within the arena of VPTs, so empirical study is essential, beginning with relating virtuality, cultural diversity, and VPT effectiveness.

Limits to Creativity for VPTs

Little research seems to be available on highly creative teams—what sets them apart? None of that research seems to address virtual teams or VPTs. There is a need for research matching the level of creativity with level of virtuality, since the highest levels of creativity may be unattainable with the team development that can occur from face-to-face interaction.

Conclusion

Solving complex problems depends on bringing together the people with the required expertise and creating an environment where they can work well

together to craft innovative solutions. Those people are often located at distant places, so reliance on an array of electronic communication tools becomes a necessity. This means the leadership of the project team has additional challenges. Leaders of virtual project teams must attend to both the technical and the social environments that the team is embedded in while working on the project. The first problem for the leader is ensuring that those technical and social factors are designed to support open communication, useful reflection, and co-creation of new ways to see the problem and new solutions. In spite of the challenges, virtual project teams are increasingly used in organizations that span geographic boundaries, because they provide a means of rapidly responding to environmental changes, reduce the cost of relocating people, provide local expertise for tailoring products to local cultures, and avoid the risk and cost of travel by team members. When leadership at the team and organizational level provide a supportive environment, the virtual project teams can innovate well.

Understanding of virtual team work in organizations in general and of VPR in particular is a work in progress. This augurs well for the scientific development of this field where there is motivation to question what can be "established." For instance, contrary to the earlier predilection of emphasizing the contrasts between co-located and virtual teams, recent literature prefers to place them on a continuum, depending on the degree of ICT use by the team (Fiol & O'Connor, 2005). Such integration of knowledge is fundamental for any thoughtful development of theory and science—a tone aptly set by Hobbs, Chiocchio, and Kelloway in the introductory chapter of this book. In conclusion, though there may be challenges involved with virtual project teamwork, one must recognize the fact that it is neither a handicap nor an anomaly. In essence, use of VPTs mirrors the times in which we live, where enterprise, innovation, and talent trump. This chapter does not claim to cover the extant work on virtual teamwork. It, however, offers insight into some of the issues that are current as well as pertinent for an interested student of project teamwork in a virtual environment.

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16 THE DEVELOPMENT OF PROJECT TEAMS

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Over the last two decades, team-based work structures have become a common foundation of organizational design (Devine, Clayton, Philips, Dunford, & Melner, 1999; Garvey, 2002). Work teams are considered "critical building blocks" (Rapp & Mathieu, 2007, p. 532) of organizations because of their many advantages, including access to diverse expertise, flexibility, and proximity to problems and solutions. Work teams can be defined as "(a) two or more individuals who (b) socially interact (face-to-face or, increasingly, virtually); (c) possess one or more common goals; (d) are brought together to perform organizationally relevant tasks; (e) exhibit interdependencies with respect to workflow, goals, and outcomes; (f) have different roles and responsibilities; and (g) are together embedded in an encompassing organizational system, with boundaries and linkages to the broader system context and task environment" (Kozlowski & Ilgen, 2006, p. 79).

As compared with work carried out by individuals, a number of benefits can result when multiple employees strive collaboratively toward a common goal. Teams of employees working collectively have access to more diverse sets of expertise, information, and experience than those employees would have when working alone (Kozlowski & Bell, 2013). These benefits have relevance for organizational success; positive team states and processes are related to both individual and team performance (Hollenbeck, Beersma, & Schouten, 2012). Teams also provide additional boosts to the individuals that compose them, for instance through increased well-being, satisfaction, and adaptability.

Notably, however, because many of these benefits emerge only after teams have worked together for some time, it is critical to explicate and understand the nature of their developmental processes.

The value associated with team development lies in the potential to understand how a set of initially distinct *individuals* becomes a *team* with unique characteristics while working together toward a shared goal (Kozlowski, Gully, Nason, & Smith, 1999). Specifically, team processes emerge during development that unify members and contribute to building key capabilities underlying effectiveness and adaptability. These include team members connecting with one another and their task (cohesion), monitoring one another's performance and detecting errors when appropriate (backup behavior), and organizing each person's efforts alongside others while striving for collective success (coordination) (Marks, Mathieu, & Zaccaro, 2001).

Although many types of teams have been identified and studied (e.g., Sundstrom et al., 1990; Cohen & Bailey, 1997)—types that are usually distinguished based on characteristics like the nature of teams' tasks, the organizational context within which they exist, and their size and tenure—the current chapter focuses on the development of project teams in particular. Several characteristics distinguish project teams from other common workplace teams, such as production, service, and management teams. Project teams are created to complete a specific, predetermined task within a certain period of time; their existences begin and end alongside the start and finish of the project task; and their members are collectively responsible for the team's products and must collaborate interdependently to succeed (Gersick, 1988). In addition, project teams are often cross-functional[1] in that each member holds distinctive expertise and unique task-relevant skills (Sundstrom, McIntyre, Halfhill, & Richards, 2000). In line with their cross-functional nature, project teams have members who switch in and out over time, depending on which particular sets of expertise are needed at each stage of project completion (Eskerod & Blichfeldt, 2005). Thus, most definitions of project teams delineate their key characteristics as *being driven by a temporal context* (i.e., project time frame), *cross-functionality* (i.e., including members with diverse expertise to meet project goals), and *dynamic composition, with membership changing depending on task requirements* (Chiocchio & Essiembre, 2009; Edmondson & Nembhard, 2009; Hollenbeck, Beersma, & Schouten, 2012; Project Management Institute, 2008; Turner, 2009; Turner & Müller, 2003). For a full discussion on project team definitions, see Chiocchio (Chapter 3 of this volume).

1. The cross-functionality of project teams, as we describe it throughout this chapter, has been referred to as "interdisciplinarity" or "multidisciplinarity" in other texts. All three terms encompass the same idea: the variability in project team members' expertise or functional background.

Project teams are one of the most common structures used for teamwork in organizations and are included in most team typologies as a key category (c.f., Cohen & Bailey 1997; Devine, Clayton, Philips, Dunford, & Melner, 1999; Sundstrom, DeMeuse, & Futrell, 1990). Because work is often structured around project teams in organizations, science explicating how they develop—and how one might influence the favorability of their development—is a necessary step toward enhancing their effectiveness. However, extant research focusing on project teams has tended to be descriptive and pragmatic in nature, as well as disconnected from broader streams of research on team effectiveness that may be informative. On the whole, substantive theory regarding the psychological and social processes underlying project team development is currently lacking. Theoretical models can be drawn from other literatures in order to inform project team development research. However, the unique structure or context of project teams (versus other types of teams) also has implications for the ways in which these models are applied.

Reflecting this, the objectives of this chapter are to highlight particularly unique and influential characteristics of project teams and to identify how they can be integrated with current models of team development to advance research in the realm of project team development. To do so, we first discuss the present status of project team development research. We then contrast this perspective with more general models of team development from the broader organizational science literature, identifying ways in which other models might inform project team research, and how the distinguishing characteristics of project teams may advance theories of team development. In particular, we describe three distinctive characteristics—temporal context, cross-functionality of members, and member churn—that are especially relevant to project teams, and discuss ways in which these features may impact team development. Finally, based on our review, we discuss a set of recommendations designed to advance theory and research on project team development.

Project-Team Life Cycles

Much of the writing and research regarding project teams is practical and application-oriented, highlighting its foundation in the project management and engineering literatures. Unlike team effectiveness research from the domain of organizational science, which defines a team's life cycle by the characteristics associated with—and the dynamics of—the process of team development and the interactions among team *members* (e.g., the strength of team mental models, the level of implicit coordination within the team), the basis of a team's life cycle from the project teams literature stresses the importance

of *task* progression. In this way, project teams are typically "managed as technical systems instead of behavioral systems" (Belout & Gauvreau, 2004, p. 2). Related to this perspective, the primary focus of research on project teams tends to lie in assessing and enhancing the favorability of three outcomes known as the "golden" or "iron" triangle: quality, budget, and deadlines (Atkinson, 1999; Bryde & Wright, 2007).

Reflecting this pragmatic, task-based perspective, project team scholars typically break a project team's "life cycle" into a sequence of stages representing the cumulative progression toward task completion. Project team development models tend to include "three to five distinct stages... [representing] the life of the project, usually along the pattern of initiation, execution or development, and project termination" (Pinto & Prescott, 1988, p. 7). One benefit of using a staged developmental model is the ability to identify when certain member actions and methods should be implemented: earlier, toward the middle, or near the end of a project (c.f., Ericksen & Dyer, 2004).

According to Pinto and Prescott (1988), one of the most popular project team development models was described by Adams and Barndt (1983) and King and Cleland (1983). It comprises four stages: conceptualization, planning, execution, and termination. *Conceptualization* involves the team's recognition of task needs and goals and the setting of preliminary action steps for moving forward. The next stage, *planning*, entails gaining support from supervisors (e.g., top management) in the form of assessing available resources such as funding and personnel. This step also involves formalizing action steps and strategies for task completion. *Execution*, the third stage of project team development, encompasses performing required task work, gathering and using resources, and preparing and presenting results. Finally, because project teams are by nature temporary entities that form as a project begins and end at project completion, the last stage of the model, *termination*, involves releasing leftover resources and disbanding members. At this point, depending on how the organization is structured, the employees who were involved in the project team may enter new project teams to work on different tasks, or they may return to individual-based endeavors.

There are a number of other project team development models in the literature, many of which involve very similar stages as those described above (see Hobbs, Chapter 2 of this volume). The Project Management Institute (2008) recognizes initiation, planning, execution, control, and closing as project teams' five sequential task stages. Many scholars have used this framework, although Thiry (2004) provides a particularly thorough description. The first stage in this framework, *initiation*, occurs when a project manager first receives or creates

task objectives. *Planning* is the integrative process applied to organize the project (e.g., selecting team members, strategizing for task completion). *Execution* involves carrying out the established plan and completing the work. The *control* phase entails assessing task progress to date and adjusting as appropriate given the predetermined schedule (i.e., deadlines). Although these phases are conceptualized as sequential—that is, occurring one-and-then-the-other—it would perhaps be more accurate to view these "middle" stages of execution and control as reciprocally linked, such that they occur simultaneously while the team works toward its end goal (and adjusts in real time to ensure that the goal is met). Finally, *closing* represents the administrative and legal tasks that must be carried out to formally conclude the project (e.g., ending contracts and re-allocating resources).

As illustrated by this emphasis on stages related to task completion, team members and their development as a unit are not a primary focus or key concern. The majority of this literature has focused on the "technical aspects, while too little attention is being paid to team building processes" (Zwikael & Bar-Yoseph, 2004, p. 137). Notably, team processes may occur most frequently and may be particularly critical in one stage of the project team life cycle: the execution stage, during which team members are actively working collaboratively toward task completion. However, this stage is not currently described with regard to the nuanced developmental changes that occur within it. Thus, understanding the developmental processes of project teams may require a particular focus on the execution stage. Of course, team development may also impact other task stages (e.g., coordination during preliminary strategy formulation, viability during termination). Rather than describing changes in member characteristics and behaviors over time *across* multiple task stages, project team researchers have typically focused on behaviors occurring in each stage discretely. Although some research has assessed the emergence of team characteristics over time, these studies tend to ignore links between *team* issues and events (e.g., confidence building and maintenance) and *task* issues and events (e.g., extent of task completion).

More research in this area is needed to determine the overall patterns of members' behaviors and characteristics over time (within and across task stages) that lead to team success. In examining the connection between *task life cycles* and *team member characteristics and behaviors*, the two may be strongly connected. For example, certain team member behaviors may be more important than others at each stage of task completion. To address these questions, new integrative perspectives that combine stages of team development as well as task completion are necessary.

Classic Models of Team Development

Models of team development that exist outside the literature specific to project teams can help inform project team research. There are a number of theoretical models available that may provide insight into project team development, especially when researchers are interested in understanding the interaction of task- and team-related issues over time. These classic team development models generally take one of two forms: stage models structured around the different (internal) interpersonal and task-related processes that occur at different time points or in different phases, and models structured around external issues such as deadlines that dictate how and when team members must interact and complete task work.

Table 16.1 outlines the sources and stages associated with several classic models of team development. Common among them is a focus on the types of interactions occurring among members during each stage of team development—and on how those interactions allow shared team characteristics to emerge (e.g., cohesion, transactive memory). For example, Tuckman's classic stage model involves four (1965) or five (1977) steps: forming, storming, norming, performing, and adjourning. *Forming* takes place when team members first come together to work as a collective. During this stage, team members tend focus on meeting and learning about one another, as well as making preliminary plans and strategies for collaborating. The *storming* stage comes next and involves team members discussing their differing ideas and opinions regarding how they will work together and how they will approach their task (e.g., who will take a leadership role). *Norming* occurs once team members agree about these issues and begin (e.g., through practice) to create protocols and habits for working together. *Performing*, the next stage in the model, represents the time during which team members exert primary effort toward completing their objectives. Finally, *adjourning* takes place after the team's task is complete and members disband or enter a transition period before working together again. Tuckman's model has been applied almost exclusively when describing project team development.

However, there are reasons to believe that Tuckman's model does not offer the most accurate portrayal of project team development. As noted by Kozlowski and colleagues (1999), linear, sequential stage models like Tuckman's are largely based on work using "simple teams" whose tasks are static, whose members' roles are unspecified, and whose members have little prior experience working with one another or on similar types of tasks (i.e., therapy and T-groups; not work teams). These "simple teams" do not capture the common—yet variable—characteristics of project teams. Additionally, they tend to emphasize interactions as they occur socially, not within the context of the team's task or work environment. Another

Table 16.1 Sources and Stages Associated with Several Classic Models of Team Development

	Developmental Stages				
Source	Early Formation		Development		Disbandment
Bion (1961)	Dependency	Fight/Flight	Pairing	Work	
Caple (1978)	Orientation	Conflict	Integration	Achievement	Order
Francis & Young (1979)	Testing	Infighting	Getting Organized	Mature Closeness	
Gibb (1964)	Acceptance	Data Flow	Goals and Norms	Control	
Hill & Grunner (1973)	Orientation		Exploration	Production	
Kormanski & Mozenter (1987)	Awareness	Conflict	Cooperation	Productivity	Separation
Modlin & Faris (1956)	Structuralism	Unrest	Change	Integration	
Tuckman (1965)	Forming	Storming	Norming	Performing	

(continued)

Table 16.1 (Continued)

	Developmental Stages				
Source	Early Formation		Development		Disbandment
Tuckman & Jensen (1977)	Forming	Storming	Norming	Performing	Adjourning
Whittaker (1970)	(Pre-affiliation)	Power and Control	Intimacy	Differentiation	
Yalom (1970)	Orientation	Conflict	Intimacy		Termination

Source: Originally published in Kozlowski et al. (1999).

Notes: There are some variations in the basic developmental framework across the models. Whittaker (1970) considers a pre-affiliation stage. Other models incorporate a stage to represent decomposition (Kormanski & Mozenter, 1987; Tuckman & Jensen, 1977; Yalom, 1970), or later aspects of the life cycle (Caple, 1978).

Three models of work group development (not shown in the table) represent more significant departures. Gersick's (1988) two-stage "punctuated equilibrium" model posits: (1) an immediate pattern of activity that persists to the halfway point, and (2) a transition that significantly alters the pattern of group activity as it focuses on task completion. Note that the constraints of a single project objective and limited time may limit the applicability of the punctuated equilibrium model to ad hoc or temporary teams. Morgan, Salas, and Glickman (1993) use a nine-stage model that integrates Tuckman and Gersick, essentially repeating Tuckman's four stages both before and after the punctuated equilibrium, and then adding a disbanding stage. Kozlowski, Gully, Nason, and Smith (1999) posit a four-phase model—team formation, task compilation, role compilation, and team compilation—that is focused on the development of team adaptive capabilities and views the process of development as compiling across levels—individual, dyadic, to team network.

In spite of these variations, most models of group development are remarkably parallel with respect to the descriptive stages. In addition, there is a stream of research that is not of direct interest here which takes a more micro focus on the developmental stages relevant to group problem-solving (e.g., Bales & Strodtbeck, 1951) and other group functions (e.g., production, wellbeing, and support; McGrath, 1990).

particularly problematic aspect of Tuckman's model for explaining project teams is its linear, sequential nature; one step (e.g., "storming") must be complete before another step (e.g., "norming") begins. In reality, teams' developmental stages do not plainly unroll one at a time; rather, there is often overlap such that multiple stages occur simultaneously and/or the same stage occurs multiple times (e.g., when a problem emerges; when a new member joins). Simultaneous—rather than sequential—development may be an especially important consideration for project teams, in which team members churn in and out of the team over time. Although Tuckman's model is useful as a basic framework for team development, alternative models should be considered as ways to more accurately portray the development of project teams in the context of work.[2]

One alternative model is Gersick's (1988, 1989) *punctuated equilibrium model*. In contrast to Tuckman's model, this model considers team development not as occurring across a set of predetermined linear, sequential stages over the course of some malleable time period, but rather as being primarily influenced by externally imposed temporal issues like schedules and deadlines. Named after systems that involve "long periods of inertia, punctuated by concentrated revolutionary periods of quantum change" (p. 16), Gersick's framework describes team members' behaviors during the course of task completion. It places heavy emphasis on the influence of the organizational environment, with regard to how team members communicate with external entities, gain and allocate their resources, and adjust their pacing and strategies to meet deadlines. Thus, this framework was created for temporary project teams with known deadlines—but does not specifically take into account other issues important for project teams, such as member churn. Gersick's model describes an initial period of inertia (i.e., continuous work) until midpoint transition approaches, at which time dramatic changes are made when team members interact with environmental entities to assess their progress to date. Note that, as opposed to emphasizing the extent of *task* work that has been completed at a given point in time, Gersick argues that team members' behaviors are more influenced by *temporal* issues such as pacing and deadlines.

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2. The theoretical and practical problems inherent when applying Tuckman's framework to the development of work teams have been discussed elsewhere. For one thorough description, the reader is directed to the chapter by Kozlowski, Gully, Nason, and Smith (1999). The team development model suggested by these authors is described in the pages that follow; these authors' model was built specifically to address the commonly acknowledged shortcomings of Tuckman's model for the work context (i.e., its origins in therapy and T-groups; its simplicity; its emphasis on social structure rather than the task and work environment; and its linear, sequential nature).

Kozlowski, Gully, Nason, and Smith (1999) later introduced a "phased" model of team development that integrated earlier stage-based frameworks, incorporated task and workflow (rather than social) emphases, and applied a multilevel, dynamic lens. As teams develop across a series of phases, the locus of development evolves from individuals to dyads to an adaptive team network. In the first of four phases, *team formation*, team members acquire social knowledge: they seek out information about one another and begin to develop norms and shared perceptions. The second phase, *task compilation*, involves team members acquiring task knowledge: learning skills, practicing, helping teammates, and regulating their goals and efficacy perceptions. The third phase, *role compilation*, involves a shift to the dyadic level as members negotiate role exchange expectations to guide coordination and task interaction. The fourth phase, *team compilation*, shifts to the team level and involves continuously improving one's own and teammates' effectiveness and developing a repertoire of strategies to enable team adaptation.

More recently, Chang, Bordia, and Duck (2003) integrated Gersick's (1988) punctuated equilibrium model with one of the most popular stage models of team development: Wheelan's (1994) *integrative model*—a framework very similar to Tuckman's framework. Using data collected from project teams in a sample designed to be similar to those involved in Gersick's work, Chang and colleagues concluded that team development may be best described by simultaneously using both models; whereas Gersick's punctuated equilibrium model can explain a team's awareness, pacing, and members' allocation of effort toward task work over time, Wheelan's integrative model can describe how a team's structural properties and the nature of members' interactions change from one developmental stage to the next. Chang and colleagues argue that, taken together, the two models serve complementary roles in describing team development.

Applying Classic Models of Team Development to the Project-Teams Literature

The classic models discussed above represent examples of conceptual work describing how teams may develop over time. We suggest that these models, with their emphases on (1) team member characteristics and behaviors, and (2) influences originating in the team's external environment, can inform the more task-execution perspective of project team research. Indeed, in the cases where project team scholars have applied these and similar stage- and deadline-driven models to understanding development issues, the results have been promising. For example, Rickards and Moger (2000) reviewed and updated Tuckman's

stage model of team development (described earlier) for implementation in project team settings in which creative leadership can be leveraged toward team effectiveness. In doing so, they identified certain barriers to successful team development (e.g., conflict due to role ambiguity, occurring during Tuckman's "storming" stage) and described ways in which these barriers can be ameliorated by applying principles of creative leadership (e.g., facilitating discussions by providing team members with clear responsibilities).

Other researchers have also proposed updates to classic team development models for application to the project team context. For instance, Ford and Sullivan (2004) have proposed a conceptual framework based on Gersick's punctuated equilibrium model—for understanding how the influences of team members' contributions change, based on when in the team's life cycle the contributions occur. Later research by Farh, Lee, and Farh (2010) used Ford and Sullivan's framework to study similar ideas empirically. These authors investigated the relationship between task conflict and team creativity, and how that relationship might change based on task phase. Farh and colleagues' findings evidenced a curvilinear relationship between task conflict and team creativity, which was moderated by team phase such that the relationship was strongest in the initial project stage but nonexistent in later stages.

These studies are highly informative and represent exceptional steps toward applying a team development lens to a project team's lifecycle. Notably, however, there has been little empirical work in this arena—and only a small portion of the extant work has used a longitudinal approach, which is important for developmental research (Kozlowski & Bell, 2013). Given that there is much interest in understanding the development of project teams—both in academic and applied realms—the state of this research domain led us to ask how extant models of team development and task life cycles might be updated, further specified, and integrated to account for issues that are uniquely and particularly relevant for project team development. Addressing this issue will be our focus in the remaining sections of this chapter. Rather than choosing one team development model upon which to base our discussion, we will discuss team development as a broad domain incorporating multiple perspectives, leaving it to readers and future researchers to choose particular models on which to focus their attention.

Key Characteristics of Project Teams Impacting Their Development

In order to understand and compare the research conducted in the realm of project team development, we first performed an extensive literature review.

We aimed to assess how project team development is typically discussed and studied, what characteristics and variables seem to be particularly relevant for successful project team development, and what implications the project team context has for member behaviors and characteristics as well as task completion. We first identified certain key words to be used when seeking work in this domain (i.e., the term "project team" paired with the terms "development," "life cycle," "formation," "learning," "progress," "change," "phase," "time," and "cycle-time"). We used those key words to collect articles from general topic journals as well as those that specialize in publishing works from the fields of management, education, and engineering. We ultimately identified over 120 articles that either theorized about project team development or measured and analyzed data associated with project team development in some way.

Based on knowledge gained from our assessment, we drew a number of conclusions regarding how classic models of team development could inform the project team literature and vice versa. In particular, project teams were sometimes discussed in very similar ways to the more generalized teams that organizational scientists often study; in other cases, project teams embodied specialized and unique characteristics. Typical teams studied in organizational science are composed of a set of members from the beginning to the end of the team's existence. In these teams, member composition is relatively stable, changes slowly, and—when it does change—it is due to unexpected turnover rather than pre-planned member churn. In addition, these teams tend to exist continuously; the team's membership is not based on a single project cycle with a deadline for disbandment. Employees working as members of non-project teams also tend to complete most if not all of their work as team members rather than individuals. Finally, the generalized teams that organizational scientists study exhibit a range of task structures, from pooled or additive, in which all team members share the same function, to intensive structures that embody distributed expertise or cross-functional skills (Van de Ven, Delbecq, & Koenig, 1976).

In contrast, typical project teams tend to embody very different characteristics that may cause certain challenges when studying their development. Specifically, project teams tend to be *bound by a temporal context*, to be *cross-functional*, and to involve *member churn*. That is, in most cases and relative to other types of teams, project teams tend to be more temporary (i.e., their "lives" are constrained by project deadlines), to be more clearly cross-functional with regard to formal roles, and to have relatively more frequent pre-planned member churn. Although the literature tends to treat project teams as a "type" such that all project teams are assumed to be characterized by these defining characteristics, we suggest that these characteristics vary, even within the "type" or category of project teams. As discussed by Chiocchio (Chapter 3 of this volume), though most project teams

are short-lived, some project teams may exist for a day while others last a year. Most project teams are cross-functional, but some project teams may consist of members with clearly differentiated formal roles, whereas others consist of members with similar formal roles but whose expertise or preferences make them distinct. Finally, although most project teams involve some degree of member churn such that team composition changes as the project progresses, the extent of this churn can vary greatly. For example, some project teams maintain a stable core (i.e., members who continue to belong to the team throughout the project) as non-core members switch in and out, while other project teams involve all members leaving at some point during project progression.

In the sections that follow, we consider what the embodiment of these three key characteristics mean for the development of (project) teams. These considerations are summarized in Table 16.2. In most cases, project teams exist in a short-term context, with a short-term leader and short-term peers and colleagues, in a situation where the quality of one's work is not associated with his or her primary position but rather a secondary or supplementary project-based assignment. In these cases, there is little if any further contact once a team member is churned out and his or her replacement joins the team; as projects evolve and membership composition changes, a unique environment for team development emerges and shapes the team's progress. As a result, additional consideration is necessary to understand the functioning of teams with these characteristics. Specifically, in addition to exploring how to prevent disengagement and poor performance in these teams (for more on team member selection and motivation in project teams, see Allen & O'Neill, Chapter 12 of this volume; and Sue-Chan, Rassouli, & Latham, Chapter 7 of this volume), it is critical to investigate and explain their development over time. In the sections that follow, we attempt to address this question by discussing the development-relevant implications specific to project teams, which must be taken into consideration when investigating them in research and practice.

Project Teams Are Driven by Their Temporal Context

A project team's life is linked with a particular task and, therefore, a task's schedule and deadline. While other work teams exist over an indefinite amount of time within an organization, project teams have predetermined expiration dates. That is, the project team's "life" begins when its task is chosen and ends when its task is complete. As such, one of the most important issues to consider when researching project team development is temporal context—specifically, that project team members continuously progress toward a predetermined, impending deadline. The set timetable of a project team should also be considered relative

Table 16.2 Key Project Team Characteristics, Definitions, and Examples of Effects on Team Development

Key Project Team Characteristic	Definition	Examples of How Project Team Development May Be Affected
Temporal context	Project teams have predetermined expiration dates (i.e., when the taskwork associated with the project is complete).	• Project teams may develop at a faster pace, may spend different amounts of time in certain developmental phases versus others, or may develop in ways that are more efficient than other types of teams. • Team characteristics like cohesion and identity may emerge more quickly than in other types of teams. • Because project team members often maintain a primary role within the organization in addition to their project team role, they must balance their responsibilities effectively.
Cross-functionality	Project teams consist of members with unique areas of (formal or informal) expertise.	• Project team members rely on one another's ability to contribute based on particular areas of expertise—and their collective success depends on whether and how those contributions are made. • Project teams may be less effective when members neglect to contribute based on their unique areas of expertise.
Member churn	Members of project teams flow in and out, depending on the stage of project progress or what new task needs emerge.	• Member composition changes allow the team to match its members with task requirements at each stage of the project. • Rather than one long cycle of development occurring within the project team, repeated unique sub-cycles of development may occur whenever members leave or join. • Socialization interventions can be used to prepare pre-existing team members for membership changes and to familiarize new team members with existing norms and work structures.

to the amount or complexity of work necessary to complete with that time span. For example, a two-week deadline for a project that involves straightforward, simple work is not equivalent to a two-week deadline for a highly complex or time-consuming project.

Given the temporary life span of these teams, might they develop in similar ways as other types of teams, but rather at a faster pace? Or, might they spend different amounts of time in certain phases versus others? For example, perhaps project teams must spend relatively greater amounts of time in transition phases because their work tends to be more complex and less routine than work done in other types of teams (Chiocchio, Chapter 3 of this volume). Or, alternatively, do they develop in entirely unique ways that prove more efficient? If one considers Tuckman's (1965, 1977) classic stage model of development, perhaps project team members avoid spending time in certain stages that are not as relevant or important in short-term contexts. The norming stage, for instance, involves team members mutually creating shared habits or standards for interpersonal and task-related behavior. Building norms for effective teamwork early allows teams to perform more favorably across tasks in the long run (Mathieu & Rapp, 2009). However, because project teams exist for only a short period of time and usually to complete one specific task, project teams may not be able to, or may not need to, develop norms. Instead, project teams may require other structural (e.g., more formalized) guides to shape members' expectations and interactions, which may be different from evolving team norms.

In a related vein, the temporal context of project teams may also affect the emergence of team states that have direct implications for effectiveness outcomes (e.g., cohesion, identity, shared mental models). Kozlowski and Klein (2000) have described the various ways in which team characteristics emerge—that is, the ways in which *individuals'* own characteristics, ideas, and habits evolve as they work together such that *team*-level characteristics, (shared) ideas, and (common) habits are created and maintained. Although models of emergence have now become salient in organizational science, the *amount of time* it takes for team states to fully emerge remains unclear. Members of new teams do not automatically hold strong levels of shared identity or cohesion, or clear mental models regarding how to approach one another and their task. Rather, it takes some time (and many opportunities for interaction) for members to develop these and other important team states. Additionally, the development of these team states could be further impacted by the extent to which team members have worked with one another in the past on *other* project teams. Some project teams may be composed of members who have never worked together before, while others may be composed of members who have worked together extensively. Depending on the extent of familiarity among members within a project team, team states

like cohesion may have already been weakened (in cases where members did not work well together in the past) or strengthened (in cases where members have successfully collaborated in the past). Because the precise amounts of time are flexible, the implications for short-term (versus more long-term) project teams are unclear. It may be that project teams with shorter life cycles provide less opportunities for members to build team states that aid their effectiveness; or, that members of these teams have less need to build team states in the first place and therefore develop alternative means or substitutes instead. Longitudinal, empirical work is needed in this area to sort out the amount of time required for critical team states to build within these teams, as well as potential contingencies or substitutes for these states in especially temporary teams.

Because project teams are typically composed of members on a temporary basis, those members' involvements are often not their primary roles within the organization. That is, project team members often hold other "main," or official, jobs in addition to working within the project team itself. This may affect how members view the importance of their project team affiliation. Because project team members who hold additional roles in the organization must balance the responsibilities and identities associated with holding multiple roles within the organization, they may hold weaker psychological commitment to their project teams and—as a result—the many advantages associated with teamwork may not be fully realized (for more on identity and commitment in project teams, see Tremblay et al., Chapter 8 of this volume). Further, this issue of part-time membership or partial inclusion can cause problems when members hold dissimilar ideas about how to complete their work, as well as how to engage in their work (Drazin, Glynn, & Kazanjian, 1999). Thus, it may be especially important that project team members learn to effectively self-regulate (i.e., manage responsibilities and schedules) and prioritize to meet the goals associated with each of their multiple roles.

Project Teams Are Cross-Functional

Each member of a project team is usually selected because of his or her ability to contribute unique expertise. This means that members may be pulled onto project teams from different departments or functions in order to create a diverse set of knowledge, skills, and abilities that will help the team to achieve its goal. The inclusion of members with distinct backgrounds and sets of expertise may have implications for team development in a variety of ways.

The involvement of members with different formal functions and expertise will also likely affect the ways in which they collectively collaborate toward task completion. Project teams may be especially interdependent in that their

outcomes are contingent on members' ability to coordinate their unique skills toward task success. For example, some project teams may be interdependent in that all members work alongside one another to achieve a collective goal (e.g., an emergency medical team addressing a patient's deteriorating status). Other project teams may be interdependent in that each member must complete a unique part of the task and the collective goal can only be achieved if all members do so effectively (e.g., a marketing expert cannot create an advertising campaign until the production expert completes the design, who cannot do so until the finance expert evaluates budget availabilities and limitations). Whatever way in which project team members rely on one another to achieve their collective goal of task completion, they each contribute distinctive and necessary assets—and their success depends on their ability to combine these assets.

Aside from the benefits of including diverse skills in a team (e.g., better team performance; Bell, 2007), certain aspects of teamwork are known to suffer when members have distinct formal roles and knowledge. As one example, teams whose members are more diverse in terms of expertise may be especially likely to develop strong fault lines—or psychologically based divisions that exist in teams when members hold different characteristics (e.g., female versus male; older versus younger; engineer versus accountant). Although diversity is valuable in teams, at least to the extent that members are able to capitalize on one another's differences to develop products or solutions that just one of them could not create alone, diverse teams also sometimes endure problems that inhibit their effectiveness (e.g., greater conflict because members hold different/competing characteristics, preferences, values, etc.; Lau & Murnighan, 1998; see Horwitz, Chapter 13 of this volume, for a discussion of functional diversity, and Horsman & Kelloway, Chapter 11 of this volume, for a review of cultural diversity). Thus, when training these teams, facilitators might focus on avoiding team conflict by enhancing members' ability to share information or problem-solve with people who are different (and hold different values, skills, preferences, and goals) from themselves. By preventing problems (e.g., conflict) that are likely to occur when dissimilar people work together, project teams can capitalize on the benefits of their unique qualities, rather than be thwarted by them.

Project Teams Involve Member Churn

In many project teams, especially those existing for longer periods of time and those working on tasks requiring different sets of competencies, members continually flow in and out, depending on the stage of project progress or new task

needs that have emerged. Member composition changes are beneficial in that they allow matching between the expertise and experience of team members and the task requirements associated with each project stage.

The issue of member churn necessitates several important considerations when studying and understanding project team development. For example, because member composition in project teams tends to be dynamic (i.e., some degree of churn occurs), multiple sub-cycles of development may occur as new members acclimate to the team's environment and old members adjust to working with replacements. How smoothly these sub-cycles connect to one another depends on how member replacements are prepared and on-boarded. Given that project team members tend to switch in and out during project progression, outgoing members may be able to create and leave behind certain artifacts that will help newcomers acclimate to the task or to their teammates. Instead, or in addition, continuing members and leaders may need to be trained for properly orienting, teaching, or socializing newcomers; various scholars have demonstrated the critical influence of continuing members and leaders on new team members—namely, as sources of unknown information (Ostroff & Kozlowski, 1992; Weiss, 1977) and as sources of expectations and norms (Chen & Klimoski, 2003; Eskerod & Blichfeldt, 2005). If member replacements are familiar to continuing members (e.g., because the candidate pool of project team members is stable), then relatively less effort might be required for on-boarding because—to some extent—newcomers and continuing members are already comfortable with working (or at least aware of what it will be like to work) with one another. However, if newcomers are mostly or entirely unknown to continuing members, then socialization processes that are quick and effective will be valuable to the team and its stakeholders.

Member churn may also have additional implications for project team development due to the virtual nature of many of these teams. For example, the ability of new members in a high-churn team to acclimate quickly may be hindered when members have little or no in-person contact. Similarly, leadership in virtual teams may require different practices and may be too difficult for just one person, so teammates may need to "share" the leadership or enact leadership substitutes (Bell & Kozlowski, 2002). Although there is a growing body of research on virtual teams, the influence of the virtual context on project team development has yet to be thoroughly investigated (Kirkman, Gibson, & Kim, 2012). We return to discuss this issue later in this chapter, with a call for future empirical research that looks to the currently separate streams of research regarding *virtual teams*, on the one hand, and *project teams*, on the other, and draws from both whenever possible in order to build one comprehensive knowledge base regarding virtual project team development.

Discussion: Recommendations for Progress

In this chapter, we have reviewed the present status of project team research and have highlighted its emphasis on project "life cycles." We have discussed how project team life cycles tend to focus on stages associated with the task itself, rather than the ways in which work structures and social norms are developed interpersonally among project team members. Next, we highlighted popular team development models from outside the traditional project team literature in order to provide a potential route for understanding the development of project teams in particular, thereby filling the gap currently caused by life cycle–centered research. We described a few studies taking these models into account in the project team context, and called for additional longitudinal and empirical research in this important domain. Finally, we used knowledge gained from a review of extant project team literature to identify three key characteristics associated with project teams that differentiate them from other types of work teams. These characteristics have critical implications for project team development—namely, their temporal context, the cross-functionality of their members, and the member churn that occurs throughout the course of the project lifecycle.

Based on the themes we have identified in the project teams literature, and on key characteristics of many project teams, we now propose three recommendations for researchers interested in studying project team development. First, project team research tends to exist wholly apart from the extensive literature regarding team development and effectiveness. Conceptual and empirical research focusing on project team development—either as its main focus or tangentially—is largely descriptive, with little emphasis on theory to enhance an understanding of underlying processes. For example, the project team literature primarily consists of descriptions of a project's life cycle, making practical suggestions for when certain tools or methods might be most useful for effectively completing a task. Although the ability to inform practice is important, this body of knowledge could be greatly expanded by drawing upon theory from the team development, team processes, and virtual team literatures.

Thus, *we recommend that project team scholars integrate theory and empirical research from the broader team effectiveness literature when studying the development of project teams.* We recommend six substantive areas in which extant theory and research from other domains can provide a richer conceptual foundation, as well as a stronger research base, to inform future work on project team development. These include the following:

1. Team composition and faultlines
2. Socialization

3. Team development (in teams that are not specifically classified as project teams)
4. Emergent states and processes
5. Team leadership
6. Virtual teamwork.

Scholars from organizational science have studied team composition—or the ways in which team members' personal attributes combine to produce higher-level (team-level) patterns of attributes—and have discovered important relationships with effectiveness outcomes (see Bell, 2007, for a recent meta-analysis of this literature). Researchers have argued that including *diversity* in teams—for example, with regard to functional background or area of expertise—enhances the likelihood of team success because members have access to a larger pool of information and assistance than they would if each person were working alone (with access only to his or her personal pool of information). However, as noted by Homan and colleagues (2007), functional diversity often "comes hand in hand with differences on other dimensions, such as demographic characteristics and deeply held values and beliefs... when different dimensions of diversity converge (e.g., when all team members with technical expertise are male and those with knowledge about marketing and sales are female), so-called diversity faultlines emerge that may disrupt group processes…" (p. 1189). When team members are diverse with regard to multiple types of characteristics, fault lines may emerge that separate teams into sub-teams or cliques because of differences in terms of gender, age, personality, value, skill set, and so on (Lau & Murninghan, 1998). Thus, although functional diversity can be valuable in teams because members have access to additional information and expertise, teams whose diversity causes fault lines tend to suffer problems like conflict, low morale, and poor performance (Thatcher, Jehn, & Zanutto, 2003). For project teams, whose members tend to be cross-functional, understanding when and how serious fault lines emerge, as well as what interventions might ameliorate their negative effects, seems highly critical to aiding team development as well as teams' ultimate success.

Another area of the literature that may be integrated with project team research focuses on employee socialization in team contexts. In a longitudinal study of newcomer socialization in teams, Chen and Klimoski (2003) discovered that newcomers' performance was influenced by their teammates' expectations, the quality of social exchanges between newcomers and their teammates, and how empowered newcomers felt while working with their teammates. Chen (2005) extended these findings, revealing that newcomers who initially performed better also tended to feel more empowered and had weaker intentions to quit later. Because project teams often include members who switch in and out

over time (i.e., as project needs change), issues of newcomer/replacement socialization are a clear target for future research. For example, given Chen's results, can members of project teams be trained to communicate their (high) expectations to newcomers, to provide support to them and empower them to complete their work, and to maintain effective social exchanges with newcomers? And, after receiving training, do project team newcomers (and their teammates) benefit via enhanced team performance?

A third area of the literature that may aid project team researchers is in the domain of team development, as described earlier in this chapter. Although most of the team development literature is theoretical in nature, project team scholars with access to field samples and longitudinal research opportunities may provide not only important results for the science of project teams but also for the broader science of team effectiveness. Project teams, whose tasks generally follow certain sequences of phases or steps (life cycles), may be particularly suited to development-focused research because such sequences can be used as foundations for more continuous and dynamic models of teamwork.

When studying team development within or across task phases, we encourage researchers to use longitudinal designs that allow for the study of emergent states and team processes. *Emergent states* are team characteristics like identity and cohesion, which build as members become familiar with and collaborate with one another; *team processes* are interactions taking place among members that allow for the collective completion of taskwork (Kozlowski & Bell, 2013; Kozlowski & Ilgen, 2006; Mathieu, Maynard, Rapp, & Gilson, 2008). While information about emergent states is often collected via (perception-based) questionnaires (c.f. empowerment; Mathieu, Gilson, & Ruddy, 2006), team processes manifest via members' interactions and are therefore more appropriately measured via behavioral observation (c.f., strategizing, monitoring, coordinating; Fernandez, Pearce, Grand, Rench, Jones, Chao, & Kozlowski, 2013). Certain emergent states and processes are highly valuable for teams (and very predictive of team performance)—and understanding the ways these states and processes are created and maintained in project teams may be critical to managing them effectively. In an article reviewing the team effectiveness literature, Kozlowski and Ilgen (2006) argue that emergent states and team processes "are a way to capture coordination of team member effort and factors relevant to it, as well as the alignment of team processes with task demands." (p. 80). By aligning emergent states and processes with project task phases during which they may play especially critical roles, researchers may be able to further leverage their benefits. For example, early task phases of the project team's life cycle (e.g., planning) may require emphasis on the successful building of emergent states, while later phases of the project team's life cycle

(e.g., execution) may require emphasis on action processes (Marks, Mathieu, & Zaccaro, 2001) such as teammate assistance or resource monitoring. Thus, we suggest that researchers employ longitudinal designs and analyses in order to examine emergent states and processes that fluctuate during project team development (Kozlowski, in press). As one example, time-series analysis can be used to examine differences between high-performing and low-performing project teams at various points throughout their development (as in Chiocchio, 2007). Assuming that data are collected at multiple time-points for every team in a given sample, repeated-measures analyses of variance (and repeated-measures multiple analyses of variance), multilevel modeling, random coefficient modeling, latent growth modeling, dynamic social network analysis, and latent vector autoregression provide additional analytic methods.

A fifth area where research from the broader team effectiveness literature may be valuably integrated with project team research is in the domain of team leadership (see also Byrne & Barling, Chapter 6 of this volume, for a discussion of leadership in project contexts). Team leadership is a popular topic in organizational science, with most scholars taking the perspective that leaders should continuously monitor their teams in order to identify what needs to be done and, once a need is identified, either carry out the task themselves or delegate the work to team members (i.e., *team functional leadership*). In a recent review, Day (2012) notes that much empirical evidence is now available to support the importance of team functional leadership, including a meta-analysis of over two hundred studies showing that teams whose leaders enact certain team functional leadership behaviors tend to be more effective and productive than those whose leaders do not (see Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006).

Notably, the importance of team functional leadership behaviors likely depends on the particular phase or stage of team development (Morgeson, DeRue, & Karam, 2010). Work by Kozlowski and colleagues (1996, 1999, 2009) provides prescriptive guidance regarding how leaders may be able to take an active role in shaping the process of team development over time. As one example, consider the following three-phase framework from Kozlowski, Watola, Jensen, Kim, and Botero (2009):

> During *preparation*, team leaders should set *developmental goals* designed to build *task* and *social* capabilities appropriate for the team's current developmental phase that will direct member resources as they engage the task. Leaders should also brief the team with strategies commensurate with their current capabilities to aid goal accomplishment. These developmental goals will shape team learning as members work toward goal accomplishment. As the team transitions to *action*, the load on member

> resources increases as they fully engage the task. The leader *monitors* and actively *develops* targeted *attitudes, behaviors*, and *cognitions*. Because team tasks can place loads on member resources that exceed their current capabilities—particularly early in team development—leaders are also prepared to directly *intervene* as necessary by *prompting coordination, adjusting strategy, updating situation assessments*, and *maintaining performance*. As the task engagement cycle concludes, the load on member resources is reduced, and the team transitions to *reflection*. Leaders should then facilitate process feedback, helping team members to *diagnose deficiencies* and to identify capabilities that need further development in subsequent engagements. (p. 117)

We believe that prescriptive frameworks such as this one, when integrated within the project team context, may have much to offer in terms of understanding the leader's role in project team development.

In particular, the extant team functional leadership literature may be used to guide future research by considering the project team leader's role as the primary shaper and prompter of desirable developmental processes. For instance, project team leaders should explicitly set clear foundations early on for teamwork and performance so that team members spend less time discussing norms and protocols and more time practicing, becoming familiar with one another, and working toward task completion. In line with this perspective, some project team scholars have suggested the importance of effective leadership during early team development (for example see Ng & Walker, 2008) examined how different styles of leadership affected teamwork over the course of four project stages. They discovered that leadership style impacted members' trust and commitment, and argued that leader credibility and power should be asserted during early stages to develop a "leadership foundation" (p. 423) that would translate into successful leader interactions during later project stages. Thus, a team's extent or stage of development may have important implications for team processes—and the leader likely plays a critical role in enabling these processes.

These functional leadership findings are in line with the common practice of holding "kick-off" meetings for project teams, during which new members' roles and responsibilities are established, client needs are reviewed, and initial strategies and goals are put into place (Hamburger, 1992). Although these meetings are widely acknowledged as influential by real-world managers of project teams (Besner & Hobbs, 2008, 2013), there is yet little empirical research establishing their effectiveness. Therefore, in addition to an enhanced focus on the use of functional leadership in project teams, we suggest that scholars examine the overlap between functional leadership strategies and common kick-off procedures to

see *whether* such meetings are important for project team effectiveness, as well as *which* strategies are most critical.

As a sixth and last recommended substantive area, we encourage greater integration of research conducted with project teams and virtual teams. On the one hand, many project teams are also virtual teams in that members rarely, if ever, work together face to face. On the other hand, a substantial literature exists focusing specifically on virtual teams—most of which could also be categorized as "project teams" given the traditional classification schemes (e.g., temporary nature, differing expertise of members, member churn). Thus, given that the foci (and samples) of studies from both streams of research seem to overlap, we encourage researchers from either stream to be aware of the other as an additional source of information. That is, rather than project team research and virtual team research evolving as entirely separate research areas, it would be worthwhile to integrate perspectives whenever possible in order to build one common and comprehensive knowledge base (for example, see Beyerlein, Prasad, Cordas & Shah, Chapter 15 of this volume, for a discussion of virtual project teams).

As described in a recent review of virtual team research by Kirkman, Gibson, and Kim (2012), this literature has not yet incorporated team development models in a systematic way that allows for an understanding of teams' complexities and dynamics—a problem shared with the project team literature (as we have noted). Kirkman and colleagues (2012) base the current confusion concerning virtual team development on the fact that some scholars have suggested similarities between the ways in which virtual teams develop and the ways in which face-to-face teams develop, and therefore apply classic team development models to the study of virtual teams; other scholars believe that virtual team development is inherently different from face-to-face team development because, for example, the quality of virtual team members' communication depends greatly on their media and technology. Overall, it is not yet clear how development unfolds in virtual teams, just as it is not yet clear how development unfolds in project teams. As researchers continue to empirically investigate development in virtual teams that happen to be project teams, or in project teams that happen to complete their work virtually, we suggest that efforts should be combined whenever possible, and sources of information from both streams of research should be utilized, so that a common body of research can be built and used from now forward.

Additionally, team development research in these broader areas tends to utilize large sample sizes, multiple contexts, and rigorous theory-based endeavors, which could provide value to the project team development literature. In contrast, project team development research tends to be pragmatic, case-based, and/or qualitative. While these kinds of research are certainly informative, the science

would benefit from more systematic, large-sample, theory-based endeavors that further the *science*, before the *practice*, of project team development. By engaging in these types of research, scholars would be in a better position to build upon theoretical foundations and draw conclusions regarding project team development across studies. As such, *we recommend that project team scholars interested in development issues conduct systematic, methodologically rigorous research.*

Specifically, we recommend three changes in this research domain. First, we recommend using large samples rather than descriptive case studies. This allows for greater generalizability, as well as greater statistical power for detecting relationships among variables of interest (Shadish, Cook, & Campbell, 2002). Second, we recommend targeting specific development phases (e.g., execution or control phases) in addition to life cycle stages for examination through longitudinal research. By examining team development longitudinally, researchers will be able to identify the processes occurring during development, as well as how this development may differ during different stages. Finally, we recommend utilizing specific and consistent effectiveness criteria. Mathieu and Gilson (2012) recently provided a framework for such criteria by dividing team outcomes into the following commonly studied categories: tangible outcomes (i.e., productivity, efficiency, quality) and intangible outcomes (i.e., members' attitudes, reactions, behaviors, personal development). Project team studies tend to examine highly unique or distinct criteria, limiting the ability to draw general conclusions across studies. By using consistent criteria (whether behavioral or surveyed), findings will be more clearly comparable—and, thus, more appropriate to consider in aggregate when making practical recommendations.

Our final recommendation addresses the fact that project team scholars tend to treat project teams as entirely distinct from other types of work teams and as an invariant type. This "one size fits all" approach treats teams as *either* being project teams or not. Reflecting this norm in the literature, and for clarity, we also have defined project teams and have discussed them as a "type" of team that can be unique in certain ways from other types. However, we also have noted, and stress again, that project teams may vary along each of the key characteristics or dimensions that we have highlighted (cf. Bell & Kozlowski, 2002). For example, some project teams may be more temporally constrained than others; some may include more formally cross-functional members than others; and some may involve greater or different member churn than others. This is illustrated in Figure 16.1. In other words, each characteristic is a contingency, and together, they collectively distinguish one project team from another, rather than serving as an invariant defining quality.

Reflecting this, rather than treating project teams as an entirely unique type of team, wherein all project teams are simply "project teams" (i.e., suggesting that they

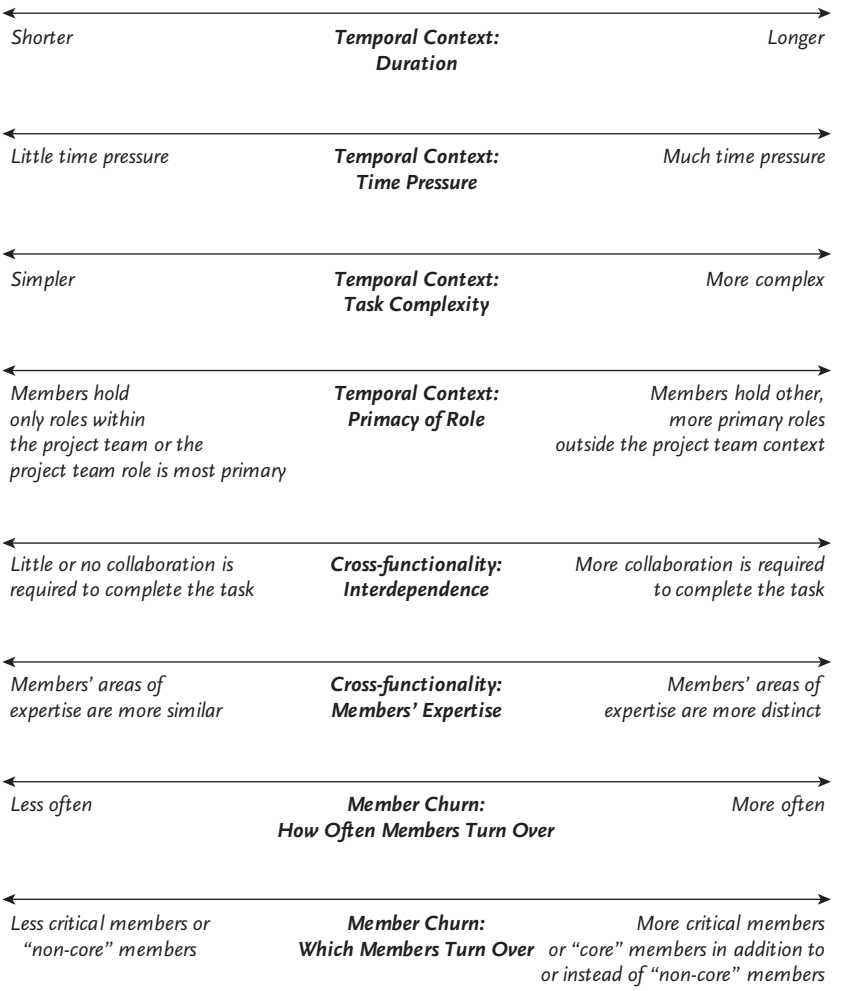

FIGURE 16.1 Project team contingency characteristics

are all, for example, short-term, cross-functional, and dynamically composed), we suggest treating each project team as potentially fulfilling these characteristic to different extents. This is related to the perspective presented by Chiocchio (Chapter 3 of this volume), in that both acknowledge the variation in these defining characteristics. This "continua" perspective, which has recently gained popularity in organizational science (cf. Bell & Kozlowski, 2002; Hollenbeck, Beersma, & Schouten, 2012), moves away from labeling a team as a certain type (e.g., "project team" versus "advisory team"). We believe that these endeavors to examine the potential variations in the characteristics that make teams "project teams"—and what those potential variables indicate for key team phenomena (e.g., development) are critical.

Reflecting this belief, we suggest that future research should target, and should clearly describe, their project team samples. By specifically using and documenting samples that vary along the continuum of each characteristic, researchers can begin to compile a comparative literature base for extracting conclusions regarding these differences and their implications. This will enable researchers to treat project teams' fulfillment of key characteristics as contingencies that influence or shape their development. In other words, contingencies are potential and likely moderators. For example, when using socialization interventions to ameliorate the potentially negative effects of member churn, the content may differ depending on whether churn occurs for core versus non-core members, and whether churn occurs frequently versus rarely.

This perspective has been offered before by project team scholars—most notably by Shenhar (2001), who described technological uncertainty and system complexity as two key characteristics that vary across project teams.[3] However, the vast majority of researchers and practitioners still tend to treat project teams as entirely distinct from other types of teams. Rather than categorizing teams as "project teams" or "not project teams," we suggest focusing solely on features embodied (or not) by any given team, so that research can be more easily and appropriately integrated across literatures. After all, whether or not a team is a "project team" does not influence how its members interact or the output they produce; it's the underlying characteristics of the team (the extent to which it is temporally bound, its members are cross-functional, and member churn occurs) that are crucial to the team's functioning and performance.

In summary, as an alternative to the traditional treatment of project teams as one homogenous "type" of work team, *we recommend that project team scholars conceptualize and assess key characteristics associated with project teams as continua, such that some project teams may fulfill each characteristic to a greater or lesser extent than other project teams.*

Discussion

Project teams are clearly a valuable and meaningful subject of study, given their prevalence in the workplace. Because of this, clarity in the understanding of how they develop over time, as well as of the factors that are most impactful on their development, is essential. By acting on the recommendations made here, we believe that great strides can be made toward understanding and developing

3. Shenhar's ideas regarding technological uncertainty and system complexity are similar to, and support the inclusion of, the time pressure and task complexity features presented in our Figure 16.1.

project teams research and practice. Through accessing and building upon other informative literatures, and through the use of systematic and rigorous methodological designs, research regarding—and thus, the ability to positively impact—project team development can be greatly enhanced.

Future Research Directions

Earlier in this chapter, we discussed our recommendations for future research regarding project team development. Namely, we suggested greater integration of knowledge from the broader literature outside project team context; more systematic, methodologically rigorous research designs and analyses; and a change of emphasis from considering project teams as belonging to one homogenous category of teams to considering project teams with regard to the extent to which they embody particular characteristics common due to their tasks and contexts (i.e., temporal context, cross-functionality, and member churn). By following these recommendations, we believe that knowledge regarding project team development will not only be strengthened but also more easily incorporated into and informative for other team-focused research in the psychological and management sciences (and vice versa).

Practical Implications

The perspectives discussed in this chapter highlight a number of important considerations for practitioners, organizational leaders, project managers, and project team members alike. For instance, an understanding that project teams may vary along at least three criteria that impact team development (temporal context, cross-functionality, member churn) will help those involved with project teams to better prepare for and lead these teams. As one example, a team with high member churn may benefit from consistent leadership that re-establishes and reinforces norms, expectations, and plans, as these may be filtered out and lost over time as members leave. Similarly, this perspective can help project team managers to allocate time and resources. For example, a team with little time pressure may build team cohesion and shared mental models more slowly, whereas a team with a very tight timeline may need to use quicker, less thorough methods to these essential team states.

Conclusion

Throughout this chapter, we have highlighted the critical characteristics of project teams that, though varied within and between teams, may impact their

development over time. By paying greater attention to these characteristics, as well as the alternative team development models presented, we believe that a deeper, more thorough and systematic understanding of project team development can be explored.

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17 LEARNING IN PROJECT TEAMS

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Introduction

With the increasing focus in education and organizations in utilizing project teams, it is all the more important to understand the unique dynamics of a project team. Researchers in the fields of project management and organizational psychology investigate project teams and the characteristics that set them apart from other types of teams. However, neither field utilizes the information gathered by the other. The goal of this chapter is to synthesize the information gathered across the project management literature and the organizational psychology literature in order to create a more complete picture of project teams, specifically learning in project teams. The term "project team," as defined by Chiocchio (Chapter 3 of this volume), describes these specialized teams as having individuals with a variety of knowledge, skills, and abilities who work together for the project's life span and perform a variety of tasks to achieve the team's goals. Typically, the tasks that project teams work on are characterized by defining or clarifying some purpose, combining information into something meaningful, and/or elaborating on a new concept, service, product, or activity, to create change. Furthermore, there is also a temporariness of membership within these teams, the duration the team is together, and the processes the teams use to accomplish their task(s). For the remainder of this chapter, we will be using the aforementioned conceptualization of project teams to formulate propositions regarding how these teams learn.

Learning in teams, at its core, stems from the team communicating and actively working together toward a shared goal. Therefore, team processes have been shown to have a significant impact on teams themselves, affecting their performance, how they work

together over time, whether they need an intervention to increase effectiveness, and many more elements beyond the scope of this chapter. As explicated by Marks, Mathieu, and Zaccaro (2001), team processes are broken into two different phases that the team experiences: action (when the team is engaged in task work) and transition (when the team plans activities to reach their goals). Team processes within the action phase include monitoring progress toward goals, systems monitoring, team monitoring and backup behavior, and coordination; processes in the transition phase include mission analysis formulation and planning, goal specification, and strategy formulation. Finally, the authors propose that there are three interpersonal processes as well: conflict management, motivation and confidence building, and affect management.

However, when dealing with a project team, the requirements for the team's success are different. As such, team processes such as strategy formulation, while still important, are not as integral as other processes, such as communication. It is not uncommon for project teams to be distributed across disciplines, offices, companies, or geography, and as such it is incredibly important that teams not only communicate but do so effectively. Effective communication within a project team, especially one that is distributed, allows for verification that the individuals who compose the team are completing their individual tasks, as well as preventing duplication of work, not to mention the significant impact that communication has on other team processes. A lack of effective communication in project teams would pose a serious handicap to their success, if the team were to succeed at all.

However, merely going through the actions of communication and engaging in team processes does not necessarily mean that learning will automatically occur. As Hinsz, Tindale, and Vollrath (1997) rather succinctly stated, working in groups does not mean the group members are learning anything or contributing to the team's learning. Ultimately, this chapter hopes to clarify how learning occurs in project teams, as well as how a project team alters the learning processes involved within the team. We also aim to clarify different stimuli that impact project team learning, covering both those that facilitate learning and those that inhibit it. Learning outcomes are discussed next, emphasizing the relationships between learning within project teams and performance, adaptive behaviors, and shared mental models. Finally, the chapter concludes with practical implications and directions for future research.

Overview of Team Learning

Throughout a number of different disciplines, there has been a plethora of research concerning team learning and measurement, which has grown out of

the concept of organizational learning in management literature (Garvin, 2000). Team learning has been described in a number of different ways, including being an aggregate of individual learning (Ellis, Porter, Hollenbeck, Ilgen, West & Moon, 2003), an outcome (Zellmer-Bruhn & Gibson, 2006), a team process (Edmondson, Bohmer & Pisano, 2001), or an emergent state that stems from team processes (Wilson, Goodman, & Cronin, 2007). Regardless of the point of view taken, team learning ultimately results in a change in the status quo, causing the team to share knowledge and skills, or to change behaviors. This, in turn, has the ability to make the team more productive and efficient (Edmondson, Dillon, & Roloff, 2007).

Additionally, research points to two specific types of team learning activities: internal and external. Internal learning is the most common type of learning that appears in research and includes all manners by which the team learns based on the experiences of its members (Edmondson, 1999). Furthermore, previous research has shown that internal learning is positively related to performance via the ability to recognize and correct errors or better understand the task at hand (Gibson & Vermeulen, 2003). External learning, much like the name suggests, occurs when members of a team gain knowledge from any source other than their teammates. Unlike internal learning, external learning's focus on gaining information from outside the team has been found to generate new ideas and to produce innovativeness (March, 1991). Similar to internal learning, research by Haas and Hansen (2005) found that external learning is positively related to team performance and that this relationship is moderated by task situation. For instance, the authors showed that in circumstances where highly experienced teams utilized external knowledge, they were more likely to have lower performance than teams with less experience who gained the same knowledge.

The question then arises as to what actions a team might need to take in order to increase learning and effectiveness. Much research has been done in management literature surrounding this issue, and it has been found that there are three specific learning behaviors which lead to an increase in team performance: feedback seeking, experimentation, and discussing errors made (Schon, 1983; Henderson & Clark, 1990; Leonard-Barton, 1995). Each of these learning behaviors is considered important because each facilitates team understanding that there is a problem that requires attention and change. For instance, if the team seeks feedback and is told that it could improve in a specific area, this will potentially result in change and increased effectiveness (Sitkin, 1992). There is, however, no assurance that effectiveness will increase in teams. Therefore, learning behaviors might serve no purpose other than wasting the time of teams unless the teams are regularly experiencing change and adaptation (Edmondson, 1999).

The following section will elaborate on the aforementioned conceptualizations and will explain how they specifically apply to project teams.

Learning in Project Teams

As previously stated, one of the essential underlying characteristics of project teams is that they are very dynamic and often involve work that is not standard for those within the team (Turner, 2006). This rapidly changing nature of project teams forces individuals within them to adapt to the challenges and environment they are faced with and to share information (Savelsbergh, Gevers, van der Heijden, & Poell, 2012). However, there is previous research which shows that teams tend toward the opposite and prefer to discuss information that is accessible to all members (Stasser & Titus, 1987). Therefore, in an effort to maintain a constant, changing awareness of both the team's task and its members, project teams have been prescribed to constantly make inter-inquiries. Edmondson and Smith (2006) further elaborated on this idea and labeled it as "inquiry orientation." Such actions, as shown by other researchers, are integral to project team learning and ultimately performance (Lant & Hurley, 1999; Yeo & Marquardt, 2010). Therefore, learning in project teams is an essential component that should be examined in detail by researchers.

At its core, team learning has been defined in a number of different ways by multiple researchers, across various fields. For the purposes of this chapter, we will adopt the definition of team learning proposed by Arrow and Cook (2008) and Tannenbaum (1997), which suggests that learning encompasses all activities through which individuals obtain, share, and combine knowledge with one another. Additionally, these authors show that learning is not a process that ends; it constantly changes based upon the team's environment and task. Adopting this view of team learning, Sessa, London, Pingor, Gullu, and Patel (2011) proposed a team learning model that can be seen in Figure 17.1. This model consists of four different constructs: learning stimuli, readiness to learn, learning processes, and learning outcomes. Essentially, stimuli are presented to the team, which, in turn, inform its members that learning is necessary. These stimuli are then acted upon, based on how prepared the team is to engage in learning behaviors. Finally, how well the team carries out these learning behaviors will influence the team's performance on the given task. Of specific interest to researchers in this model are the learning processes, which consist of the following: single loop learning (adaptive learning), double loop learning (generative learning), and triple loop learning (transformative learning).

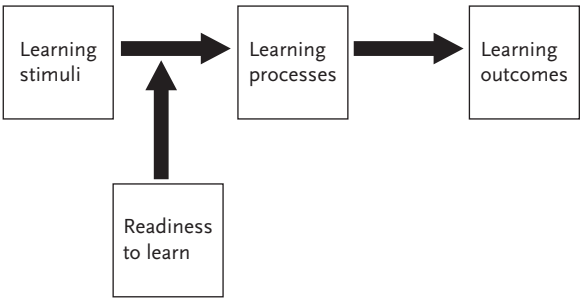

FIGURE 17.1 Model of team learning

Reprinted from Sessa, V. I., London, M., Pingor, C., Gullu, B., & Patel, J. (2011). Adaptive, generative, and transformative learning in project teams. *Team Performance Management, 17*(3). With permission from Emerald Group Publishing.

Single loop learning was first described by Argyris and Schön (1974) as involving the detection of error in a team. Upon its discovery, with single loop learning, individuals in the team search for an alternate strategy that can be used to address the error without changing the team's approach to the task or their objectives. The authors explain that this type of learning is like a thermostat in that it "learns when it is too hot or too cold and turns the heat on or off" (p. 2). This type of learning is also called adaptive learning because it occurs on a fairly regular basis, as teams must respond to small errors and changes in the team environment in an effort to maintain the status quo (Pulakos, Arad, Donovan, & Plamondon, 2000). Furthermore, due to the frequent nature of these types of scenarios, single loop learning has the ability to occur with minimal cognitive processing. However, by its very nature, this type of learning has the main limitation that it does not allow for creativity and creation (Peschl, 2006).

Double loop learning, on the other hand, takes this concept one step further and attempts to improve upon the team's status quo. Essentially, in these situations, when a team recognizes a need for learning, they analyze their current situation and investigate alternative approaches or perspectives to the task that will negate the error faced by the team (Sessa, London, Pingor, Gullu, & Patel, 2011). Therefore, the main difference between this type of learning and the previous is that in double loop learning, the team's assumptions are challenged and actively improved upon, based upon the environment the team encounters (Argyris, 1982). Double loop learning is also called generative learning because the team examines a problem and generates new, innovative ideas in an effort to solve the problem and improve functioning.

Finally, triple loop learning not only tries to improve upon the status quo of a team, but also serves to completely change all aspects of the team. In these

circumstances, a team will realize that there are problems inherent to their purpose, goals, structure, or processes, and completely alter the team's underlying components (Sessa, London, Pingor, Gullu, & Patel, 2011). In this sense, whereas the focus of generative learning is on using cognitive processes to alter the existing team dynamics on the same level, triple loop learning is aimed toward a complete change of team dynamics so that they are entirely different from the previous system used by the team. For this reason, triple loop learning is also known as transformative learning.

Furthermore, it is important to note that each of the aforementioned types of learning can occur at different times within the same team and can aid in the process of collective project learning (Fong, 2003). Both the practitioner and scholarly project management literature refer to this as "lessons learned" (Kotnour, 2000). The process of collective project learning occurs when individuals with multidisciplinary backgrounds are placed in a team and gain insight from their teammates concerning disciplines in which they had no prior specialization (Fong, 2005). Moreover, learning can also occur across different project teams. These processes are called concurrent and sequential transfer of knowledge. Concurrent transfer takes place when different project teams provide information to one another at some point during the course of their tasking (Fong, 2008). Sequential transfer, on the other hand, occurs when one project team finishes its task and then passes on knowledge to another team (Nobeoka & Cusumano, 1995). Ultimately, the process of collective project learning, both in and between project teams, serves to increase knowledge integration, generation, and sharing (Fong, 2003).

In project teams, much like other team types, research has found the relationship between learning and knowledge integration to be reciprocal (Okhuysen & Eisenhardt, 2002). Knowledge integration, in this sense, is conceptualized as "the synthesis of individuals' specialized knowledge into situation-specific systemic knowledge" (Alavi & Tiwana, 2002, p. 1030). In other words, each individual member of a multidisciplinary team starts with specific, individual expertise and knowledge. Each member's knowledge is then pooled over the course of the team tenure, and knowledge is recombined to formulate a team-level knowledge structure (De Boer, Van den Bosch, & Volberda, 2002). If this process is effectively carried out, each team member will gain some insight into the specializations of others and, in turn, will be capable of picking up on stimuli that emerge outside his or her own area of expertise (Hargadon & Sutton, 1997). Ultimately, in project teams, knowledge integration is one of the processes through which the team internally learns from its members. At this point, now that learning in project teams has been conceptualized, the following sections will delve into the stimuli that facilitate learning in project teams and the various outcomes of learning.

Stimuli That Facilitate Learning in Project Teams

There are multiple methods for increasing the effectiveness of learning in project teams. One way is to ensure that the leader is able to communicate in an emotionally intelligent way, a major feature of facilitative leadership (Amy, 2008). Because project teams do not often consist of the same individuals, having training available to increase emotional intelligence would be hugely beneficial for those who are consistently involved in or are leaders of project teams, and this could have a major impact on how effectively the team learns. Understanding the effects of subgroups is also important for improving the learning potential of a team. Having moderately strong demographic subgroups facilitates learning in teams. For example, having a variety in age or race, where at least two members of the team are similar to one another, encourages team members to share their viewpoints and to support those within their same subgroup (Gibson & Vermeulen, 2003). Additionally, the presence of subgroups reduces the fear of embarrassment, which allows for the expression and discussion of new ideas that are required for team learning. This is particularly relevant to project teams, as each team's work cycle exists only for the amount of time it takes to complete its given task(s), meaning that the team needs to be efficient in its use of time in order to facilitate team learning as quickly as possible. With teams that are very homogenous or very heterogeneous, they are also more likely to engage in learning behaviors with subgroup strength as a moderator when compared to teams that are only moderately homogenous or heterogeneous (Gibson & Vermeulen, 2003).

Similarly, a paired structure for learning within teams is more effective than a team structure based on functionality or department (Ellis et al., 2003). The authors define a paired structure as "matched dyads to control the amount of access each team member has to various pieces of information" (p. 824). This has a positive relationship with the collective information processing of a team, as shown by Hinsz, Tindale, and Vollrath (1997). Similarly, an evenly distributed workload and team members who are high in cognitive ability allow teams to learn more (Ellis et al., 2003). This is particularly useful to keep in mind when assembling project teams to ensure that the team learns as much as possible during the time the members work together. It would also be beneficial to incorporate into the organizational culture a positive emphasis on paired structures to encourage their development within project teams and to increase learning.

Another impact on learning within project teams is how the teams learn and adapt when faced with changes. When new routines develop within organizations and pre-existing routines are reinforced by their current technology, those teams that successfully alter their routines follow the same strategy; this involves

(1) enrollment in the program of change, (2) preparation for the change in routine, (3) trials on the new routine, and (4) reflection and debriefing after the trials had been completed (Edmondson, Bohmer, & Pisano, 2001). Utilizing this strategy in project teams would increase the team's learning potential, especially if a significant change were to occur during the life span of the team, or if the team's purpose is to implement the change itself.

To clarify, in a consulting office that typically works to resolve issues that a client presents, changing the manner in which a team works, such as how individuals are selected for a team, who becomes the leader of the team, what procedures the team follows for the duration of the project, and so on, can lead to drastic negative changes in the team's performance. However, should the team be willing to participate in a beta stage of the new procedures (step 1), have preparation through notifications and education about the changes from their company or department (step 2), experience a few trials using the new procedures to learn what they entail and how the changes will affect them (step 3), and participate in a debriefing of what is changing, how significant it is, who and what it effects, and so on (step 4), there will be a significant increase in the teams that successfully adapt to the new changes. Additionally, research consistently shows that having choices in decisions, such as whether to participate in trials for a new routine, increases intrinsic motivation, effort, and task performance (Patall, Cooper, & Robinson, 2008). This is one area where organizations and teams can focus their efforts to increase the effectiveness of their teams, especially when faced with organizational change.

There is also evidence that demonstrates how to increase the effectiveness of team learning and how well the team can transfer knowledge from one frame of reference to another. For one, the importance of effective team learning within product development teams through questionnaires and interviews has been noted (Meyers & Wilemon, 1989). To improve a team's learning potential, it is integral to allocate time specifically to allow for learning, to ensure that there is substantial organizational commitment to team learning, and to monitor and record what was learned. There are also ways in which to increase learning within project teams at the organizational level. For example, Zellmer-Bruhn and Gibson (2006) have found that organizational contexts emphasizing responsiveness and knowledge management increase team learning, which then positively influences performance and interpersonal relations. Additionally, learning boundaries surrounding project teams help emphasize where the information learned within a project team cannot be generalized to the overall organization and thus are an important constraint that prevents the distortion of the learned information (Scarbrough, Swan, Laurent, Bresnen, Edelman, & Newell, 2004).

While it is integral to determine the limitations of what is learned, other research looks at how learning can be generalized from a specific space to be

incorporated into the work environment itself. A specific dialogical space dedicated to teaching communicative behaviors—"sharing," "co-construction," and "constructive conflict"—is required for effective team learning (Decuyper, Dochy, & Van den Bossche, 2010). However, questions such as "who," "for what," and "about what" the teams are communicating are integral aspects of communication, helping to increase the effectiveness of team learning and positively affecting team performance. The concepts of co-construction (collaborative construction) and constructive conflict (arguing and clarifying to deal with differences in interpretation) are important team learning behaviors that facilitate the development of shared mental models (Van den Bossche, Gijselaers, Segers, Woltjer, & Kirschner, 2011). As seen later in this chapter, this will also impact team performance, as the similarity of team members' mental models is indicative of higher team performance (Mohammed, Ferzandi, & Hamilton, 2010).

Another important factor of team learning is in relation to efficacy and psychological safety. Efficacy refers to an individual or team's belief in their own capabilities. For example, an individual with low self-efficacy would likely see a novel and challenging task as daunting and would view him- or herself as unlikely to succeed. However, an individual with sufficient self-efficacy would be prone to view the task as feasible, even though it would be difficult. Psychological safety refers to the belief that an individual or team is safe to take interpersonal risks. For example, when a team is high on psychological safety, team members feel comfortable voicing their opinions, without fear of negative interpersonal repercussions. If a team is low on psychological safety, individuals will not feel safe speaking up within the group (Edmondson, 1999).

While self-efficacies will affect collective or team efficacies, it is the self-efficacies that support individual performance (Law & Chuah, 2010). Similarly, Edmondson (1999) does not find that efficacies at the team level are correlated to learning behaviors but does find that psychological safety is associated with learning behaviors. This is supported by findings from Van den Bossche, Gijselaers, Segers, and Kirschner (2006), which indicate that psychological safety, interdependence, task cohesion, and group potency are integral to the team engaging in team learning behaviors. The authors also emphasize that those components lead to mutually shared cognition and to perceived team effectiveness. This suggests that an increase in the individual self-efficacies of those who compose the team, such as perceived increases in performance, would increase the likelihood of the individuals' participation in team learning behaviors. Similarly, encouraging a standard process of thoroughly reviewing project information, having stable project goals, and following a rigorous testing process are factors that contribute to a project team's ability to learn more effectively (Lynn, Skov, & Abel, 1999).

Of course, complex teams, such as diverse teams, result in some interesting correlations. For example, within multidisciplinary teams, if team identification is high, the relationships to learning and team performance are positive (Van Der Vegt & Bunderson, 2005). However, the relationships between diversity, team learning, and performance are nonlinear, with team learning moderating the relationship between diversity and performance. Looking at project teams that are distributed, however, brings another dimension to an already complex situation. There are benefits to having a distributed team, however, in that the individual team members have locale-specific knowledge and practices, which benefits solving problems within that locale but also increases the knowledge of the team in general (Sole & Edmondson, 2002). (For more on diversity, see Horsman & Kelloway, Chapter 11 of this volume and Horwitz, Chapter 13 of this volume. On the topic of distributed teams, see Beyerlein, Prasad, Cordas, and Shah, Chapter 15 of this volume. Additionally, Tremblay, Lee, Chiocchio, and Meyer, Chapter 8 of this volume discusses identification in project teams in detail.)

Stimuli That Inhibit Learning in Project Teams

There are also ways to limit a team's capacity to learn within project teams. For example, while Sole and Edmondson (2002) find benefits to having locale-specific knowledge to assist with locale-specific problems, they also find that when the problem was in a specific locale and the knowledge needed to solve the problem was elsewhere, the team members first had to adjust what they learned to accommodate locale-specific practices before it could even be used. Specifically, if you have a distributed team, with half the team situated in Washington, D.C., and the other in London, the two areas have different knowledge sets and cultural norms, which can have the benefit of different viewpoints when overcoming a problem, but which can also lead to issues. Should the two sets of knowledge or the different cultures conflict, it is incredibly important that the differences between the cultures and/or knowledge be understood and subsequently that the information is adjusted to fit the information and culture of the other members.

Similarly, when identification with the team is high, it has positive relationships with learning and team performance, while expertise diversity is negatively related to learning and performance when collective identification is low (Van Der Vegt & Bunderson, 2005). This suggests not just a lack of cohesion within the team but a competitive, rather than a cooperative, environment, contrary to the findings of Chiocchio and Essiembre (2009) that project teams tend to have a stronger relationship between team cohesion and their

subsequent performance. Teams composed of those high in cognitive ability and who have an evenly distributed workload may learn more as a team than the average, but when the team members are high on agreeableness, it has a negative impact on learning within that team (Ellis et al., 2003). When selecting members to be part of a project team, looking at cognitive ability as well as personality characteristics would help to avoid situations where a team is composed of individuals who are all high on agreeableness or who are consistently low on cognitive ability, thus reducing the capability of the team to learn and reducing their usefulness for the organization. (For more information, see Allen and O'Neill, Chapter 12 of this volume, which discusses project team member selection.)

There are also certain organizational characteristics that can discourage learning within project teams. High time pressures, centralization, and deferral tend to describe organizations that emphasize project teams, but it is these characteristics that impede the members of project teams in learning from and through the projects they work on (Keegan & Turner, 2001). Based on their data, Keegan and Turner (2001) suggest that it would be beneficial for an organization to reduce the time constraints placed on project teams and to allow the teams to be more self-sufficient and self-managed, thus increasing the teams' learning potential and thus increasing the knowledge base of the organization. Similarly, while responsiveness and knowledge management increase team learning, global integration actually reduces learning within the teams they study (Zellmer-Bruhn & Gibson, 2006). However, it is unrealistic to create more relaxed timelines for projects, at least because deadlines are often a part of the work agreement. As such, it is recommended that project team leaders and management incorporate time specifically for learning into their timeline, just as for any other project-related task, for total project completion. Because of this, it is recommended that those in charge of project teams may want to encourage team development by emphasizing responsiveness and knowledge management, rather than forcing global integration into the organization. This would increase team learning and would be more beneficial for the overall organization, as it increases the knowledge base of the organization as a result of a knowledge increase of the individuals who compose the project teams.

Increasing the amount of control that an individual feels he or she has over his or her environment has a positive impact on facilitating learning, as does the ability of a workshop's framework to impede or facilitate the exploration processes (Sense, 2005). A lesson learned from studying workshop processes is that to increase learning in workshops, the workshop must have the capacity to isolate from the contextual conditions of the organization, as well as the ability

to incorporate what is learned into the company. Without these factors in play, learning is significantly stunted and creates discontinuity between the planning phases of the workshops and the actual activities within the workshops themselves, making them ineffective at best.

Team tenure is also a complex but important consideration for project teams. There are significant differences in the possibilities for short-term versus long-term teams. For example, as described by Chiocchio in Chapter 3 of this volume, having individuals on the core or integrated project team, compared to the component project team, indicates that the team will remain intact for the length of the project, rather than just the length of time required to complete a component of the project. This impacts learning; Keegan and Turner (2002) conclude that one way in which to increase project team learning is to ensure that there is more than one specialist on each team, so that specialists can teach one another and can share tacit knowledge—something that is realistic primarily when the individuals on the team are actively involved with the project (i.e., component and integrated project teams; see Chiocchio, Chapter 3 of this volume). In short, to maximize the benefits of team learning within project teams with a shorter life span, the team should be an integrated project team. For those teams with a longer life span, more team learning will occur in the core project team or if the team can be integrated.

Outcomes of Learning

Previous research within this realm has used goal orientation to positively link learning in teams to performance (Dweck, 1986). This research explains that teams which have a learning goal orientation and that emphasize sharing knowledge and developing skill among team members will lead to teams that are more adaptive and capable of performing in any type of situation or under high levels of uncertainty (Dweck & Leggett, 1988). However, recent research has shown that, despite the positive connotation that comes with learning, it does not always mean that the more learning which occurs in teams, the better the team will perform. Specifically, this can be seen in the work of Bunderson and Sutcliffe (2003), which explains that while learning promotes adaptive behaviors and better performance, for those teams that have little problem with their performance to begin with, an emphasis on learning can actually hurt the team. The following sections will delve into the details of these outcomes and others that result from learning in project teams.

Learning and Performance

When will learning lead to increases in performance and when will it hurt a team? Current research points to the fact that the answer to this question is dependent upon the type of learning that the team is engaged in. For instance, in a field study by Wong (2004), it was found that both internal and external learning activities independently led to increases in group efficiency and effectiveness. However, when both internal and external learning are taking place at the same time, the two conflicting styles of learning cause tension, and group efficiency is reduced. Therefore, based on the task type and goals of the team in question, it is proposed that the team's context should be taken into consideration before promoting either internal or external learning within project teams.

Furthermore, based on the previously stated fact that internal learning tends to promote procedural knowledge concerning the task at hand, while external learning highlights creativity and novel ideas within the team, one should take into consideration where the project team exists in its life cycle when determining whether the team should focus on one specific type of learning. Following the team cycle proposed by Gersick (1989), it can be extrapolated that project teams undergo two specific phases throughout their tenure. The first phase consists of the team meeting and generating an approach to the task at hand. This method adopted by the team would then last until the halfway point of the team's tenure. At this time, the team undergoes an insurgence of new ideas and activity, which, in turn, lead to phase two. The second phase consists of the team adapting to the new, generated ideas and then using them to move forward and complete the task. Therefore, during phase one, it can be beneficial for the project team to focus on external learning, which will provide them with new, innovative ideas, and then, in the second phase, to shift over to internal learning so that the task is completed and there is no frustration or decrease in performance that emerges from novel ideas brought up before team deadlines (Ford & Sullivan, 2004). Similar prescriptions can be made when examining other conceptualizations of a team's life cycle. For instance, the stages of initiation, planning, execution, control, and closeout, proposed by the Project Management Institute (2008), will likely need different types of learning based upon the stage that the project team is currently experiencing. (For further detail, Pearce, Powers, and Kozlowski, Chapter 16 of this volume, also discuss project team development.)

Additionally, there are a number of other instances in which the project team's context comes into play and ultimately influences performance. For instance, in a study by Druskat and Kayes (2000), it is shown that the needs of a short-term and long-term project team can be entirely different, specifically when referring

to the necessary team processes that increase performance. Namely, as previously stated, if team identification is high, there is increased learning within the team. Therefore, in short-term project teams, it is understandably more difficult to foster this identification, considering just how short the tenure of the team actually is. In long-term teams, this is significantly easier due to the fact that the team will spend time working together, will feel comfortable communicating, and will develop a shared mental model concerning the capabilities and specialties of each member (Druskat, 1996).

Learning and Adaptive Behaviors

One of the critical obstacles that a project team must overcome lies in the fact that the team is inherently different from the standard, run of the mill team. Be it due to having dispersed team members, having members with a variety of different specializations, or simply having an impromptu formation causing a short tenure, all project teams must overcome and adapt to the factors that stand in their way. One method for achieving the desired outcome is by promoting a learning orientation within the team (Bunderson & Sutcliffe, 2003), so that the team develops an adaptive response pattern. As explicated by Bell and Kozlowski (2002), this is conceptualized by "persistence in the face of failure, the use of more complex learning strategies, and the pursuit of difficult and challenging material and tasks" (p. 500). Once the team has adopted the adaptive response pattern, it can lead to a shift in how effort and ability are viewed. For instance, in an adaptive team, the members will not view effort as a negative indicator of performance brought about by a team that does not have the ability to finish the task at hand. Instead, the team members will view effort as a method for the team to reach its goals and develop necessary skills (Dweck, Hong & Chiu, 1993). Therefore, it is proposed that, for teams that are operating within a dynamic environment (as is the case for most project teams), a learning orientation should be promoted so that the team develops an adaptive response pattern.

Much like the previous discussion of learning and performance, there is a caveat to consider here as well. It is not always the case that learning in teams will result in the emergence of adaptive behaviors (LePine, 2003). This is due to the fact that the behavioral processes necessary for the emergence of adaptation typically lie dormant within a team. Chiocchio, Chapter 3 of this volume, has explained that there is a continuum between routine processes and non-routine processes in project teams. When the team is carrying out a routine process, it is likely that the emergence of adaptive behaviors is not necessary. However, in non-routine processes, the team is faced with situational uncertainty to which the team must adapt (Perminova, Gustafsson & Wikstrom, 2008).

Therefore, team learning, albeit a necessary condition to catalyze the emergence of adaptive processes, is not sufficient in all cases (Burke, Stagl, Salas, Pierce, & Kendall, 2006). Take, for instance, a medical team that is performing a surgery on a patient. Suddenly the patient's vital signs drop, and there is a significant change in the task environment. If the members of the team do not draw from their pooled resources or communicate the proper information to one another concerning the new status of the patient, the team will not be able to properly adapt to the change in status quo. Instead, the team will either become more confused by the environmental change or will improperly adapt to the situation at hand.

Learning and Shared Mental Models

As previously stated, project teams must adapt to the fact that team members are likely to be composed of an interdisciplinary sample. This is typically the case because organizations assign the team a task that would not be possible to complete by focusing on any one specific area of expertise. It typically requires a number of individuals, each with varying, unique knowledge, working together to accurately complete the task. Therefore, it is crucial for everyone on the team to have a shared understanding regarding who specializes in what areas and what unique knowledge they might possess (i.e., a shared mental model). In this sense, shared mental models refer to a mental, shared understanding held by the team members regarding a number of environmental factors, including resources, tasks, and interpersonal relationships (Mohammed & Dumville, 2001). In order for a team to be effective, previous research has shown that it is necessary for the team members to share the same mental models as others on their team, specifically regarding the task at hand (Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005). The question then arises, how can it be ensured that shared mental models will develop via learning?

Recent research has shown that in teams where learning takes place, team members are considerate of the ideas of others, and everyone on the team feels comfortable speaking freely (VanKnippenberg, DeDreu, & Homan, 2004). This, in turn, may lead to the development of new and innovative ideas. However, it may also lead to conflict within the team (Weingart & Jehn, 2000). If this conflict is directed toward the task rather than the relationships of those on the team, it has been shown that project teams will benefit and will develop more accurate shared mental models (Van den Bossche, Gijselaers, Segers, Woltjer, & Kirschner, 2011). Similar findings regarding task conflict have been found throughout teams literature as well. For instance, it has shown that teams experiencing task conflicts might exhibit positive benefits, such as better

decision-making (Wit, Greer, & Jehn, 2012; Janssen, Van de Vliert, & Veenstra, 1999; Simmons & Peterson, 2000). This is argued to be due to the fact that if there is discord in a team surrounding some aspect of the task, this discord forces the team to discuss the situation, producing a better understanding of the available knowledge in the team and the possible resources necessary to complete tasks effectively. On the other hand, the inability to compromise and resolve task conflict can hinder a team's ability to work together and effectively perform their collective task (De Dreu, 2006). Therefore, we propose that organizations should promote a reasonable amount of task conflict within project teams. If the teams are trained properly with regard to handling conflict, it is likely that the end result will be a team with a better shared understanding regarding their internal and external environments. This will specifically be the case for project teams whose performance is measured in terms of financial gain or decision quality (Wit, Greer, & Jehn, 2012).

Practical Implications

Pulling from a multidisciplinary literature base, this chapter has presented research regarding learning in project teams, its antecedents, and outcomes. Additionally, specific recommendations have been provided in the previous sections regarding how to ensure that learning not only happens in project teams, but ultimately results in effective outcomes. For a complete list of these best practices, see Table 17.1. Ultimately, it is important that organizations which employ the use of project teams take this research into account. Learning is a crucial step in the progression of a project team, and without a system of ensuring that learning will take place, it is likely that the team will have decreased performance or may even fail to complete its task properly. Therefore, using these propositions that are grounded in past research, an organization might be able to create a training program based on theory to promote a learning environment within project teams.

If, however, training is not an option and an impromptu project team needs to be assembled quickly, this research should still provide insight for organizations regarding how teams interact in a project team. Therefore, if the organization keeps track of the team's status quo, it would likely be able to step in and change a problem before it emerges. For instance, if a significant amount of relationship conflict is observed within a project team, it would likely be beneficial for the organization to intercept before the team fails to work together effectively and learn from one another. Or, as previously explained, this research could aid an organization in choosing individuals for the impromptu team who have personality characteristics that are conducive to learning.

Table 17.1 Best Practices for Consideration in Project Teams

1. Incorporate a positive emphasis on paired structures into the organizational culture
2. Set a pre-existing routine for the project team to follow when adapting to unexpected changes
3. Create specific learning boundaries for the project team
4. Develop a standardized process surrounding reviewing project information, goals, and testing
5. Incorporate time for learning into the project's timeline for completion
6. Promote team identification
7. Promote a learning orientation so that the team develops an adaptive response pattern
8. Train teams properly with regard to handling conflict

Future Directions

Theoretical understanding concerning the interplay between learning and project teams is still a very under-researched topic. Nevertheless, the topic is important for both academics and practitioners alike. Therefore, we suggest that future academic research in this realm begins to focus on environmental factors and details surrounding the process of learning. For instance, is it possible that a project team's composition will act as an antecedent for learning? This is especially important for project teams due to the fact that the individuals that comprise them typically come from a diverse background. Furthermore, another external variable that would be of interest to future research is time. How differently do teams project learn when they are under immense time pressure? Moreover, which, if any, of the typical antecedents would predict learning in these situations? With the aforementioned knowledge, it would not only further project teams literature, it would also provide organizations with the ability to properly compose their teams based on the types of tasks that they are likely to encounter in the workplace. This, in turn, could ultimately result in saved money, time, and resources. Therefore, it is important that future research breaks out of the theoretical realm and incorporates "real-world" studies within organizations.

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18 THE FUTURE OF PROJECT TEAMS

AN INTEGRATED FUNCTIONAL MODAL AND RESEARCH AGENDA

François Chiocchio, E. Kevin Kelloway, and Brian Hobbs

Introduction

For many years, scholars have observed that teams play a growing role in organizations. In 1997, Cohen and Bailey's seminal study on team types reviewed trends going back many years, stating that "[t]he management and academic press increasingly emphasizes the importance of teams for organizational success in the modem economy." (p. 239). In 2006, Kozlowski and Ilgen's review made a similar argument to underscore that "teams are central and vital to everything we do in modern life." (p. 78). Recently, Tost, Gino, and Larrick have noted the "increasing prevalence of teams in modern organizations" (2013, p. 1465).

In parallel, others have argued that projects are vehicles that private and public organizations use to achieve higher levels of process efficiency and outcome efficacy (Ives, 2005). Organizing work into projects is not new, of course, but it is spreading beyond "traditional" fields such as architecture, construction, engineering, military, new product development, and information technologies. Now, it is not uncommon to find project work being carried out in healthcare (Chiocchio et al., 2012), human resource management (Klimoski, Dugan, Messikomer, & Chiocchio, 2014), and education (Chiocchio & Lafrenière, 2009). Projects are seen as the means by which change is brought forth in organizations (Project Management Institute, 2013). Simply put, project work is ubiquitous (Dane & George, 2013) and has become a "standard operating procedure" (Söderlund, Chapter 4 of this volume).

The rise of both teams and projects is very relevant to this book. In fact, we worked to create this volume because we were convinced

that a fair proportion of the emergence of teams is due to the rise of projects and thus, of project teams (Chiocchio & Hausdorf, 2014). In sum, if teams in general are said to "promote organizational adaptability" (Hollenbeck, Beersma, & Schouten, 2012, p. 82) and if project, project management, and project-based organizations address change and adapt to context-specific problems (Johnson, 2013; Lindkvist, 2008) it follows that project teams are of strategic importance for any organization to survive and thrive. Surprisingly, we are unaware of a strong and specific research stream on project teams. This book is aimed at correcting this gap.

Each chapter in this book has tackled a specific issue and has provided a wealth of conceptually or empirically derived research propositions that will prove useful to test and learn from. We will therefore not thoroughly summarize each chapter. But because we were fortunate enough to have read all chapters before this point, we are in a good position to underscore what we believe stands out in each chapter, as well as suggesting additional avenues for further research. After doing so, we will conclude by pulling back even further and outlinining overarching issues that we feel are fundamental to any research program focused on project teams.

Multiple Research Streams on Project Teams

Top-Down Impacts on Project Teams

Söderlund (Chapter 4 of this volume) emphasizes the impact of external forces on organizations as well as factors at play inside organizations. He addresses the need for knowledge integration as a key determinant of successful projects. Söderlund insists that the usual arguments in favor of a project-based structure (i.e., fast rate of knowledge change and high need for subsystem interdependencies) must be considered in a new light. Specifically, he suggests that project-based organizations should consider the complexity in coordinating between many knowledge areas simultaneously with the complexity of subunit coordination. As such, P-form organizations can be sensitive to differentiated and dynamic market conditions, which in turn require project teams to benefit from temporarily decentralized decision-making. Söderlund's key argument is that the P-form organization is the context in which teams and technologies can be combined and recombined to deliver strategic projects, despite the heterogeneous, infrequent, and ambiguous nature of the task. This in turn implies that while the P-form organization is designed for flexibility in order to address changing conditions, it must be backed by a solid human resource (HR) management function. That HR function has to ensure that complexity arising from, on

the one hand, the need to coordinate projects across knowledge bases and, on the other hand, the need to maximize cooperation between units is well managed. Unsurprisingly, the nature and impact of project management capabilities on project team members and project teams are important elements of Söderlund's proposed research. We find that additional elements can be derived from Söderlund's insights. For example, using Söderlund's presentation of Whitley's (2006) singularity-separation matrix, one can classify four types of P-form organizations: organizational, precarious, craft, and hollow. This provides a structure within which we can conduct organizational-level comparative studies in order to determine how each of these P- form organizations can best support project teams and project team members faced with coordination and cooperation complexity.

Mathieu, D'Innocenzo, and Kukenberger (Chapter 5 of this volume) adopt a multilevel perspective. They focus on how organizational-, team-, and individual-level phenomena interact with each other throughout the project life cycle. As such, they make many worthy contributions toward a specific research stream on project teams. One addresses planned team member churn and how it affects the project as it unfolds in time. Team processes delineated by Marks, Mathieu, and Zaccaro (2001) are a lens through which planned churn can be viewed. An research question that arises from Mathieu et al.'s chapter is "who needs to perform what task during transition and action phases and how does their planned presence/absence on the team affect project team performance and project performance?" In addition, what selection and "de-selection" criteria can be used to make good decisions about planned churn, and how can they be measured in a fast-paced project environment? An additional research endeavor that this suggests is that, from a human resource perspective, member churn interacts with the larger project system. In a single team system, planned member churn means ensuring that the best team members are on board at key moments in the project life cycle, after which they are assigned to other tasks. In multi-team systems, these members may likely be assigned to other projects. Planned churn at a higher level also means that the best *teams* are brought in and out of the project as it unfolds. Both member and team churn can co-occur. That is, the efficacy with which team member churn within teams and team churn within large multi-team projects is managed is likely to affect project performance as well as organizational performance. To our knowledge, there is no research on team churn within multi-team projects.

Byrne and Barling (Chapter 6 of this volume) also adopt a multilevel perspective when they describe leaders' impact on project teams. They show many opportunities for the examination of how leaders impact project teams and project performance. For example, they point to the importance of understanding

industry characteristics, project characteristics, and project ambiguity in order to study leaders' impact on team and project performance. Byrne and Barling's review of the literature emphasizes that a leader's impact should vary as the project unfolds. Most interesting, they expand on how different leadership theories might explain different outcomes, depending on how the leadership behaviors are manifested. Although some work has been done on this issue using single theories, the field is ripe for comparing the effectiveness of different theories at different stages of the project life cycle from ideation, to execution, to closing. Echoing work done by project management scholars comparing the leadership of project managers and functional managers, Byrne and Barling underscore that the project context differs from the non-project context when it comes to the role and impact of leadership. As such, their suggestion of the moderating role of team type is in line with previous calls to that effect (Cohen & Bailey, 1997). A deeper look at team type as a moderating factor might also be useful. For example, comparative studies on leaders' behaviors across types of project teams have not been conducted (at least to our knowledge). Using Chiocchio's (Chapter 3 of this volume) hierarchical typology, one can suspect that leadership's impact might differ as a function of whether the target of the leader's behaviors is an integrated, a core, or a component project team, and whether projects are deployed over months or last many years. In other words, Byrne and Barling's insight that different leadership theories might explain the impact of a leader's behavior as the project unfolds should also be considered from a project team type perspective. For example, leader-member exchange or transformational/transactional leadership in a short versus a longer project might impact members of an integrated project team differently than members of a core project team. These considerations operationalize the overarching suggestions that Byrne and Barling make regarding the importance of studying more complex two- and three-way interactions.

Bottom-Up Impacts on Project Teams

Leadership and motivation go hand in hand. Sue-Chan, Rassouli, and Latham (Chapter 7 of this volume) explore how goal orientation and the motivational influence of context impact the link between motivation's form, direction, intensity, and duration on goal attainment. When applying goal-setting theory to the context of a project team, Sue-Chan et al. emphasize how setting performance or learning goals and providing individual and team feedback are key, particularly in an uncertain and non-routine context. Specifically, by combining evidence from studies on goal orientation with Turner and Cochrane's (1993) goal-and-method matrix, Sue-Chan et al. provide project team scholars with a

strong conceptual basis to determine the extent to which project type moderates the goal orientation–performance relationship. Specifically, they underscore that how the project manager coaches team members and the entire team, as well as how the project manager leverages team members' goal orientation, depends on the type of project, as defined by Turner and Cochrane. Studying the impact on performance of a coach's behavior (i.e., guiding versus facilitating; Hui, Sue-Chan, & Wood, 2013) and approach to framing goals (i.e., promotion versus prevention; Sue-Chan, Wood, & Latham, 2012) in a project team context seems a particularly fruitful opportunity for the advancement of knowledge in this area. In line with these ideas, other fruitful research avenues come to mind. For example, how does the success or failure of milestone impact project managers' coaching behaviors and approach to framing in the next phase of the project? If a project manager initiates the project with facilitation and promotion, does he or she change to guiding and prevention after a less than successful milestone? If so, how does this impact the goal orientation–goal attainment relationship?

Because project team members migrate between activities cast as functional/ongoing and project/temporary, move from one project to another, and even belong to multiple projects at once, it is logical to ask whether this affects the nature and level of their commitment. It is also logical to ask how their identity is shaped or transformed, and how one's self-concept is integrated. This is what Tremblay, Lee, Chiocchio, and Meyer (Chapter 8 of this volume) examine. Specifically, they scrutinize the role that project characteristics such as complexity, uncertainty, and temporariness have on team members' commitment and identification. They discuss how multiple foci—profession, team, project, organization—affect one's commitment and identification, but also how commitment and identification in turn affect how project team members interact. Among the many theoretically derived positions that Tremblay et al. adopt, we note that they suggest that the time-bound nature of project work affects what team members commit to. Based on a recent meta-analysis on cohesion and performance, Tremblay et al. suggest that the social aspect of committing to the project team might be more important to project performance than the task-specific focus of committing to the project. This is an exciting angle to future research. Goal ambiguity is a component of project complexity. Tremblay et al. make a point of underscoring that goal ambiguity can directly affect one's commitment. We also note Tremblay et al.'s contention that one's perception of project complexity might be buffered by a strong identification to one's profession, team, or project. Additional questions not directly addressed by Tremblay et al. are, which specific focus acts as a stronger buffer, and what is the role of commitment in this process? Furthermore, these questions can also be deployed longitudinally over project phases. Specifically, how do these complex processes

involving multiple foci and commitment and identification change over the life cycle of the project?

Important Processes

De Wit (Chapter 9 of this volume) tackles the issue of conflicts in the project context. Although he relates recent findings illustrating the impact of task, process, and relational conflict on team interactions and performance, de Wit focuses his attention on the equivocal roles that task conflict plays in performance. While important meta-analyses found that task conflict is negatively related to performance in teams in general (De Dreu & Weingart, 2003) and in project teams in particular (O'Neill, Allen, & Hastings, 2013), de Wit suggests examining the relationship using a contingency approach. He suggests that task conflict in project teams positively impacts performance when there is a high level of psychological safety, when task conflict and relationship conflict are low in intensity, and when task conflict occurs in early stages of the project. This puts emphasis on the project manager to harness these phenomena to the benefit of the project, including fostering an active task conflict management approach in the team that is conducive to information sharing, and a passive avoidance conflict management approach when it comes to relational conflicts. A key feature of de Wit's analysis echoes Mathieu et al.'s (Chapter 5 of this volume) emphasis on churn. De Wit suggests that more research should focus on whether team members who expect to work together again favor collaborative conflict management. He further suggests that past positive experience may carry over to current project work and may foster collaborative conflict management later. These are very worthy future research endeavors. Additional questions include testing for these hypotheses but in concurrent project teams. Specifically, when some team members work on two projects concurrently, does the presumed association between positive experiences and collaborative conflict management style within one project team carry over into the other project team? Similarly, is the presumed association between negative experiences and a competitive conflict management approach reproduced in the other project team? Which of the two is more likely to be reproduced? How many members in both project teams must there be for the effect to take place? Even more complex, is the effect more likely when the two projects are in roughly the same state of advancement, or is it more likely to take place when one is nearing the end and the other is starting?

Escalation of conflict may lead to incidents of bullying. Loughlin and Bryson (Chapter 10 of this volume) point out the high cost of bullying. Citing high stress and turnover as some of the consequences of bullying, they add that project teams may suffer more from the consequences of bullying. For bullies, having

been bullied, being prone to anger and anxiety, being in a position of power (e.g., being an autocratic "leader"), including not receiving feedback from "subordinates," are among the predictors of bullying at work. For victims, predictors include the lack of perceived control over one's environment. Interestingly, Loughlin and Bryson report that when work is poorly organized and stressful, bullying increases. They underscore the importance of assessing the extent to which project team members can interact with each other in stressful contexts *in addition to* ensuring that technical skills and knowledge are well distributed. Extending Loughlin and Bryson's emphasis on the need for longitudinal, context-rich studies, it would seem worthwhile to study bullying determinants in terms of how perceptions of goal clarity (i.e., "the extent to which the outcome goals and objectives of the job are clearly stated and well defined"; Sawyer, 1992, p. 134), method clarity (e.g., some measure similar to goal clarity but focused on how means and processes are defined and stated clearly), role clarity (i.e., clarity regarding what to do in a given situation; Eys & Carron, 2001), and role conflict (i.e., when multiple people are assign incompatible tasks; Rizzo, House, & Lirtzman, 1970) co-vary in time across the project life cycle. Such individual-level perceptions could also be compared across projects using a project-level classification such as the goal-and-method matrix (Turner & Cochrane, 1993). As implied by Loughlin and Bryson, it would prove informative to examine if project phases interact with known phase-models of bullying.

Loughlin and Bryson present bullying in the context of a model of job stress, a topic discussed in detail by Horsman and Kelloway (Chapter 11 of this volume). Horsman and Kelloway note that project work is usually thought of as stressful, but they also underscore that the topic is usually not addressed from occupational health's evidence-based models. Particularly interesting in the context of project work is the distinction between chronic stressors (e.g., sustained high workload) and acute stressors (e.g., an accident). Horsman and Kelloway discuss workload and its interaction with time pressure. When seen as challenge stressors (that is, as stressful demands valued as an opportunity to learn and develop; Colquitt, Lepine, Wesson, & Gellatly, 2011), high workload nearing project milestones may have a positive impact on well-being. Horsman and Kelloway also point out the importance of implementing a wellness function in project management offices. Because of evidence in non-project contexts that assigning a conflict mediator decreases the strain caused by intra-team conflict, it is logical to extend this role to a project management office. More generally, while project management offices typically support technical aspects of projects, they do not seem to focus on preventing stressors or building project team's conflict and/or stress-management capabilities. Testing the impact of this added function to a project management office is a worthy research goal. Other

research avenues suggested by Horsman and Kelloway include shifting attention from the stress–performance relationship to studying the determinants of health problems, on the one hand, and well-being, on the other. They also suggest examining the impact of abusive and passive leaders on the health of their followers—something not yet done in the project context. Horsman and Kelloway's chapter also addresses the issue of the impact for individuals of working on multiple projects at the same time. It is logical that projects in dire straits bring in more people to compensate for too high a workload or to meet a key deadline. But what is a temporary situation from the perspective of the project can be a chronic situation from the individual's perspective if he or she migrates from project to project only when these projects experience a human or time deficit, and then is allocated to another "problem" project when the situation has been resolved. As Horsman and Kelloway indicate, knowing individuals' Project Involvement Index (Chiocchio et al., 2010) is one way in which project management offices can monitor project team members' well-being. Even if Horsman and Kelloway is replete with new and exciting research questions, others come to mind. For example, studies on the potential accumulative impact of workload spikes over multiple milestones are needed to examine the impact of repetitive cycles of "ups" and "downs." For example, does the initial positive impact of a challenge stressor become negative with repetition? Or does it build up over time and increase its positive effect? In addition, there is a need to know how much time is necessary for one person to recover from a particularly harrowing project phase. Furthermore, does "downtime" consist of being assigned to another project, or being assigned to functional/ongoing tasks? Finally, is "downtime" the only form of recovery, or are there other more effective strategies?

Project Team Composition

Allen and O'Neill (Chpater 12 of this volume) tackle the key issue of how to assemble the "perfect" project team. They contrast approaches based on individual characteristics to that of a complementary fit between individuals. They set the stage by explaining how summarizing information regarding a team using its members' mean value on some characteristic is different from using a measure of its variance. This leads them to discuss team composition from an additive perspective—that is, forming project teams based on as many "good" characteristics as possible. However, they argue convincingly for a so-called jigsaw approach in which means and variances on multiple key characteristics (i.e., complementary fit) are used as predictors of team performance. Noting the lack of empirical studies on this topic, they nevertheless provide a review of how key variables often studied in "general" team research and student project teams

could be pertinent as a predictor of project team performance. For example, an additive stance regarding Big Five measures of personality seem to be positively related to team performance (e.g., Bell, 2007). The scarcity of jigsaw/complementary fit research in general and thus for project teams opens the door to worthy speculation deserving of future research. For example, Allen and O'Neill suggest that the high need for team adaptation in the face of uncertainty provides team members ample opportunities to inject their unique characteristics into the project. Specifically, Allen and O'Neill suggest that high General Mental Ability project teams and a mix of members high on Conscientiousness or Agreeableness should produce higher project team performance. Following Cohen and Bailey (1997), Allen and O'Neill argue for comparative studies between project and non-project teams. Such studies imply that similar means and/or variances of key personal characteristics should produce different levels of team performance across project and non-project teams. As Allen and O'Neill note, their perspective is rooted in paradigms of multilevel research (Kozlowski & Klein, 2000) and strong footing regarding measurement and method. Because project management scholars can contribute a wealth of knowledge on project contingency, project types, and project context, Allen and O'Neill call for richer collaborations between organizational behaviorists and project management scholars. We argue that such collaborations should go beyond project and non-project team comparative studies. Teams performing temporary work (i.e., project teams) should be compared to teams performing ongoing work (e.g., service teams, production teams) in order to capture in finer detail the similarities and differences that lead to team performance. Comparisons can go even further by comparing groupings of core versus peripheral team members (Humphrey, Morgeson, & Mannor, 2009) or, as argued by Chiocchio (Chapter 3 of this volume), by comparing integrated, core, and component project teams. Such comparative studies would provide project managers with models of "ideal" project team composition, depending on the role team members play in single- or multi-team systems.

Horwitz (Chapter 13 of this volume) tackles project team homogeneity, or heterogeneity from the perspective of functional diversity. Functional diversity is an important feature of project teams. In fact, functional diversity is so important that it is often confused with the concept of project team itself—something referred to as the "flying-fish problem" (Chiocchio, Chapter 3 of this volume). Horwitz convincingly avoids this problem by drawing on recent important writings on diversity (Bunderson & Sutcliffe, 2002; Dawson, 2012; Harrison & Klein, 2007) to examine the importance of intrapersonal and interpersonal functional diversity on project team processes and outcomes. She defines interpersonal functional diversity as the variety of functional background and expertise across project team members. She further defines intrapersonal

functional diversity representing the breadth and depth of each team member's functional background and expertise. Interestingly, one of the main conclusion of Horwitz's review of the project team literature tends to confirm Allen and O'Neill's (Chapter 12 of this volume) contention that a jigsaw/complementary fit approach to functional diversity is related to project performance. However, inconsistencies persist in the literature, and Horwitz presents a testable moderated mediation model to clarify these inconsistencies. Specifically, she convincingly argues that the positive relationship between interpersonal functional diversity and project team processes depends on intrapersonal functional diversity, before project team processes can exert their positive impact on project performance. Horwitz's model will inform project team scholars on the type and nature of functional diversity required in project teams. Interesting additional research questions include testing her model in different sectors of industry. Are the ideal proportions of inter- and intrapersonal functional diversity found in "mature" sectors, such as construction and engineering, different from sectors of industry in which projects are only emerging? This is important because functional diversity includes the extent to which project management expertise and knowledge is found in project teams. Hence, taking footing on Hortitz's work, we argue that larger proportions of shared project management expertise (i.e., in terms of intrapersonal functional diversity) as found in more "mature" sectors, should have a larger impact on the relationship between interpersonal functional diversity and project team processes, compared to lower levels of shared project management expertise typically found in less mature sectors.

In addition to issues of functional diversity, project management scholars and practitioners wrestle with the challenges with multicultural diversity. Pitfield, MacLellan, and Kelloway (Chapter 14 of this volume) examine multicultural diversity (i.e., a compositional factor) in conjunction with intra-team communication (i.e., a team process). For example, inspired by Jessen's (1992) work on optimal levels of Hofstede's (1980) cultural dimensions at each stage of the project life cycle, Pitfield, MacLellan, and Kelloway examine recent studies to unearth how communication can benefit project teams (e.g., Ochieng & Price, 2009). Their review suggests many research avenues, one of which focuses on the potential negative impact of national diversity on team performance, which can be explained by stereotyping and social categorization (i.e., "us" versus "them" thinking). Such negative effect will be dampened if communication occurs in a psychologically safe environment. Psychological safety is the extent to which team members share the belief that they can take risks by expressing themselves (Edmondson, 1999). Echoing Tremblay et al. (Chapter 8 of this volume) Pitfield, MacLellan, and Kelloway argue that social categorization plays a role in psychological safety. Indeed, if team members' identification process focuses on

"oneness," irrespective of national culture, psychological safety is likely to exert its positive influence on communication and team performance—a moderated mediation hypothesis worthy of scientific scrutiny. Furthermore, how this complex relationship (i.e., moderated mediation; Hayes, 2013) evolves across project phases remains an unanswered research question.

In discussing virtual project teams, Beyerlein, Prasad, Cordas, and Shah (Chapter 15 of this volume) adopt a multilevel perspective of nested top-down contextual factors interacting with bottom-up phenomena developing over time. Interestingly, they insist that a virtual project team can become its own unique adaptive system, regulating behavior within it (i.e., convergence). And the key element allowing teams to adapt is communication, which, these authors explain, in the context of a virtual team is hindered by cultural frictions, time zone fatigue, technological glitches, and general comfort with using the technology. Adopting Ilgen, Hollenbeck, Johnson, and Jundt's (2005) Input-Mediator-Output-Input (IMOI) functional model, Beyerlein et al. describe which aspects of forming, functioning, and finishing team stages are impacted by the extent to which teams are virtual. They also suggest that the creative process and its intended innovative outcome are more difficult to achieve as "virtuality" increases. We conclude from Beyerlein et al.'s analysis that team stage and "virtuality" are moderators that interact to impact the relationship between creativity and innovation. To our knowledge, this issue has not received attention in project teams.

Development and Learning

Noting important shortfalls of simple stage-like models of team development—such as Tuckman and Jensen's (1977) popular five-stage model—Pearce, Powers, and Kozlowski (Chapter 16 of this volume) set out to analyze team development and project life-cycle models. Indeed, they note that project management scholars tend to frame project life cycle in terms of the progression of a "task," while organizational psychologists tend to view team development in terms of social norms and interactions. As Pearce, Powers, and Kozlowski analyze project teams in terms of temporal context, cross-functionality, and planned member churn, they propose two important general approaches to future research. One is to better integrate team effectiveness models into systematic and rigorous project team research. Another is to never forget that team research draws on key characteristics that predict outcomes, and that these characteristics vary. For example, project teams are not necessarily short-term: their duration varies. So it is important to describe accurately how long they last (Hollenbeck et al., 2012). Keeping these two general approaches, they suggest focusing future research on a number of issues, one of

which is fault lines. Fault lines in a team emerge as team members' distinguishing characteristics (concrete or perceived) cumulate to form subgroups (Lau & Murnighan, 1998). Fault lines can hinder effectiveness by causing conflict (Jehn, Bezrukova, & Thatcher, 2008). Pearce, Powers, and Kozlowski argue that since various levels of cross-functionality are one feature of many project teams and are therefore a potentially divisive criterion, understanding how functional fault lines emerge in project teams is important. We agree. An additional step we suggest that researchers take is to test Jehn, Bezrukova, and Thatcher's propositions that relate fault lines with types of conflict. Specifically, they suggest that informational fault lines (i.e., akin to cross-functionality) are associated with high task conflict, low process conflict, and low relational conflict. Taking this even further (and also following Pearce, Powers, and Kozlowski's emphasis on longitudinal designs and project execution), we suggest that scholars scrutinize what aspects of team functioning in early conceptualization stages of the project trigger the emergence of these associations in later execution phases.

Kramer, Savage, and Salas (Chapter 17 of this volume) discuss learning in project teams. For example, they discuss single-, double-, and even triple-loop learning processes—that is, ongoing adaptation to situational demands, proactively generating new skills to improve performance, or radically changing the team's goals and purpose. One of their conclusions is that researchers should consider the project team's context before promoting acquiring information from the outside or generating it from within. They dig deeper in such considerations by taking footing on Sessa, London, Pingor, Gullu, and Patel's (2011) model of team learning. Their model explains that learning processes are the mechanism linking learning stimuli (e.g., internal, external sources of information) to outcomes of learning such as team performance and project success. More specifically, the model explains that the relationship between learning stimuli and processes depend on levels of learning readiness. Learning readiness is the extent to which the team knows it needs to learn and acts to learn (Sessa et al., 2011). Kramer, Savage, and Salas add that behaviors such as feedback seeking, experimentation, and discussing errors made are key to team learning in general, and to project teams in particular. How feedback is sought (and by extention how it is provided by leaders; see Sue-Chan et al., Chapter 7 of this volume), and how errors are discussed in a psychologically safe way are key factors, especially when goals or the means to achieve them are unclear, which is often the case in project work (Turner & Cochrane, 1993). One specific research endeavor implied by Kramer, Savage, and Salas's perspective on project team context that would strengthen a project team–specific research agenda would be to compare project team learning at different levels of project uncertainty. We add that there are at least three ways to do so. One is to rely on the concept of progressive elaboration

and to postulate that the project and its process decrease in uncertainty as the project progresses toward its completion (Hobbs, Chapter 2 of this volume). As such, team learning processes and learning readiness should differ as time progresses. Another way would be to compare projects that vary in terms of innovativeness. Some projects require the use of known methods to produce innovative outputs, while other projects must also create the method (Shenhar & Dvir, 2007). A third way would be to do both in a single design and test main effects and the interaction between the two. Kramer, Savage, and Salas also propose examining learning as a function of project time pressure, echoing Horsman & Kelloway's views on challenge stressors (Chapter 11 of this volume). We agree. This inspires us to suggest addressing this issue even more specifically. Since time pressure is highest near the end of phases (i.e., immediately before milestones), what teams do (or don't do) at these times and what predicts these behaviors when phases start are important to understand. Furthermore, learning outcomes in one phase might have interesting consequences as learning inputs in the next phase. For example, if a team was apt at a generative learning process that successfully impacted the quality of a prototype, it is fair to ask how this would impact the next phase's learning inputs and learning processes. Cross-over effects of outputs of one phase onto inputs of the next phase are largely unstudied and represent an area rich with research potential.

Overarching Themes for a Research Agenda on Project Teams

The Need for Structure

There are a number of themes that emerge from the chapters of this book. Three intertwined principles stand out for us and should help structure research on project teams:

1. Project team phenomena must be conceptualized from a multilevel perspective, including time, individual, team, project, and organizational levels;
2. Long work cycles characteristic of project work allow for predictions within and across phases;
3. The tasks that a project requires differ markedly over its phases and emphasize different valued outcomes.

Since project teams and other project stakeholders are embedded in a project context, it is important that the structure of cause and effect relationships of project variables and project team variables are conceptualized in a multilevel

way. One of the key issues of multilevel theory and research is that it is crucial to articulate at what level phenomena occur, and to conceptualize and measure them accordingly (Kozlowski & Klein, 2000). Then proper within-level or cross-level hypotheses are possible. Interestingly, time is a level (Raudenbush, 2001; Raudenbush & Bryk, 2002) and is an issue often neglected in research (Mohammed, Hamilton, & Lim, 2009).

The fact that projects are time bounded and progress through different and relatively long discrete phases provides a wealth of opportunities to map project team phenomena over time. There are two overarching questions that require a multilevel framework that encompasses time: *How much of what is needed at what point, within and across project phases, for a project to succeed?* and *What is the impact of phase and project duration?*

Both project and team domains have a long tradition in defining and studying how enablers/predictors impact (or should impact) results/performance. But borrowing the best of what both fields have to offer in terms of conceptual and empirical developments requires an integrated view of performance and its predictors. For example, both project management and organizational behavior scholars have debated or continue to debate what constitutes "performance" and how to measure it reliably and accurately. On the one hand, project scholars wrestled with these notions as project time, cost, and quality criteria were judged important but not sufficient, adding the factors of organizations' improved efficiency and effectiveness, the meeting of strategic objectives, the satisfaction of stakeholders, and the creation of long-term value (Atkinson, 1999). Nowadays, more elaborate models exist that relate enablers such as project management leadership, project workers, project management policy and strategy, partnerships, and project life cycle management to results such as client/customer perception, meeting specified project objectives, responsiveness to change, cost effectiveness, and personal growth (Bryde, 2003). Such models make it possible to relate project management to project success (Mir & Pinnington, 2014). However, these models do not always help in distinguishing what individual, team, or organizational antecedents contribute to project success.

On the other hand, organizational scholars have evolved in terms of what is dubbed "the criterion problem." The term is used to explain how performance measures need to be better conceptualized and more accurate (Austin & Crespin, 2006; Austin & Villanova, 1992), something that Mathieu and Gilson (2012) recently have emphasized strongly. Most academics familiar with team research elaborate and test their hypotheses using a functional model of team effectiveness where "inputs" are transformed into "outputs" and where the object is to predict what inputs and transformation mechanisms predict outputs. A large number of important conceptual writings and empirical results have been published on this

issue (Ilgen et al., 2005; Kozlowski & Ilgen, 2006; Marks et al., 2001; Mathieu & Gilson, 2012; Mathieu, Maynard, Rapp, & Gilson, 2008; Wittenbaum et al., 2004). In the most recent of these contributions, Mathieu and Gilson frame the functional model in terms of multiple levels and offer insights on tangible and less tangible outcomes that are valued by organizations and scholars alike. However, it is meant to be general and does not explicitly model how team phenomena relate to project outcomes. For example, Mathieu and Gilson define productivity as the number of units produced in a relatively short time frame, which is relevant to production teams (e.g., number of cars produced) or service teams (e.g., number of patients treated). However, projects produce *one* unit at the end of *many* long work cycles. So we feel strongly that integrating a team functional model with project-specific results is a necessary foundation on which a strong research program on project teams must be erected.

A Multilevel Functional Framework for Project Team Research

Figure 18.1 shows one stage of that integration and Figure 18.2 shows the second stage. In Figure 18.1, the front end of the model should be familiar to team scholars. Top-down (e.g., project management capabilities) and bottom-up (e.g., team member competencies) influences are taken into consideration. Inputs (e.g., team size, team cultural and/or functional diversity), transformation mechanisms such as emergent states (e.g., cohesion) or processes (e.g., communication),

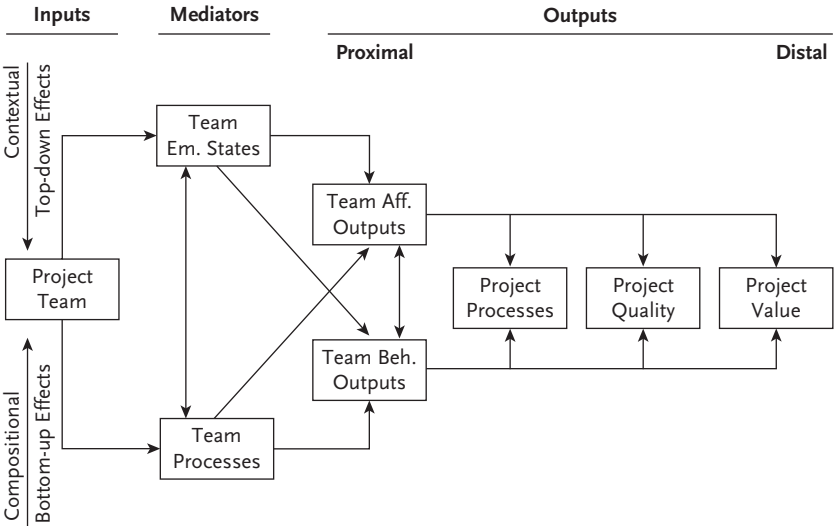

FIGURE 18.1 Project team functional input-mediator-output model

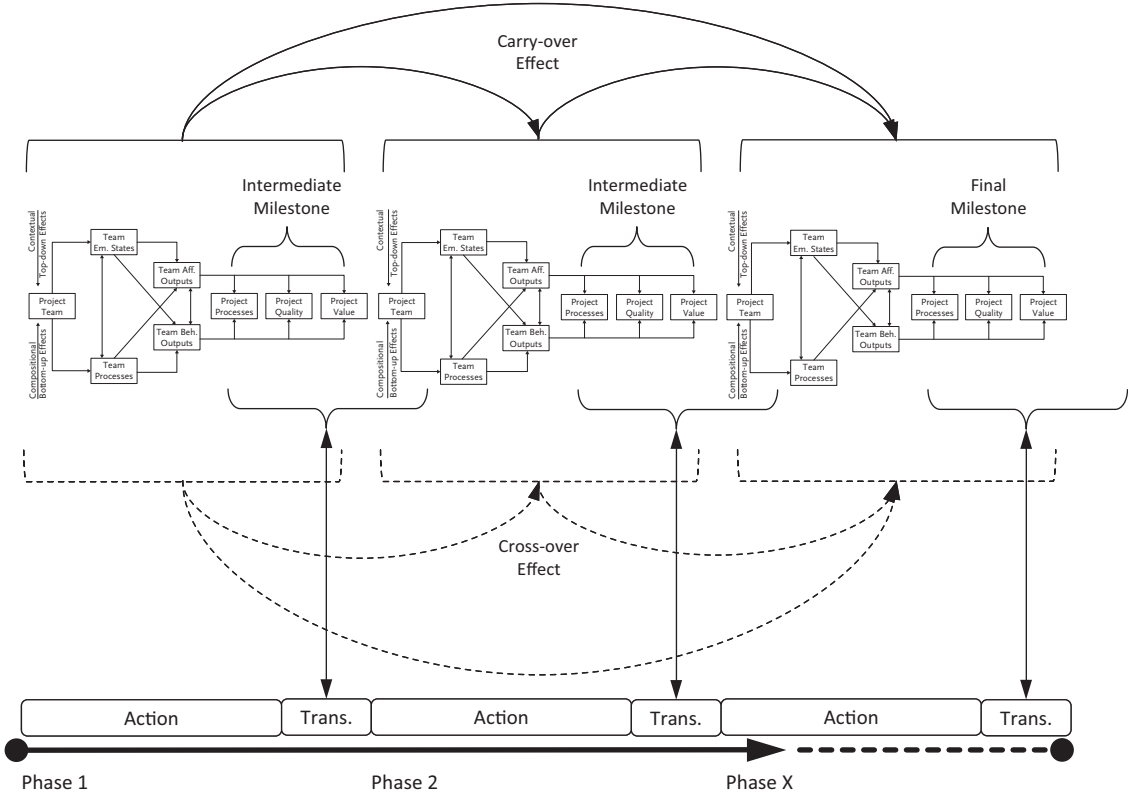

FIGURE 18.2 A multi-level functional framework to project team research

and the outputs they predict must be clearly delineated and aligned with the project reality. Outputs vary in terms of the extent to which they are proximal or distal. Proximal outcomes include team affective outputs. Team affective outputs such as trust are valued in many settings in and of themselves, including in project contexts (Khalfan, McDermott, & Swan, 2007). Team behavioral outputs, such as the extent to which individuals and the team display task-specific behaviors, adaptive behaviors, and proactive behaviors are good examples of outcomes that should be valued (Griffin, Neal, & Parker, 2007) and are predicted from emergent stages such as psychological safety (Burke, Stagl, Salas, Pierce, & Kendall, 2006) or processes such as coordination (Chiocchio, Forgues, Paradis, & Iordanova, 2011). Whether variables are considered mediators or proximal outputs is debated (Mathieu & Gilson, 2012). Our view is that this is largely an issue specific to the focus of a given study and its research design. Our main objectives in including proximal outputs is that because they are more closely related contextually to their antecedents, correlations should be stronger than for more distal outputs.

The back end of the model in Figure 18.1 should be familiar to project scholars. It follows distinctions outlined by Turner (2009). Indeed, keeping in mind that a project is a temporary organization designed to bring beneficial change and that project management is the process by which that change is delivered and its benefits achieved (Turner, 2007), Turner (2009) distinguishes between the process of the project, the output of the project, and the outcome of the project. The process of the project relates to project management and thus represents *how* (e.g., methods and techniques) the change is delivered. Its performance indicators are often schedule and budget performance—being on time and within budget. The output is the deliverable, the *what* of the project. It can be tangible, such as a new software, or it can be less tangible, such as a new organizational culture. Its performance indicators are quality with respect to some standard, or a strategic target met, such as lower employee turnover. The outcome is the value the output creates for the organization (i.e., "business benefits"), such as savings due to the implementation of a new software system or increased productivity from a culture of more engaged employees. The value can take a long time after the project is completed before becoming tangible (e.g., increased market share after the introduction of a new product). Because the words "output" and "outcome" are often used as synonyms, we use the term "output" to represent all forms of performance indicators, and we use "project process," "project quality," and "project value" to denote Turner's three-pronged terminology. Figure 18.1 shows that both team and project elements are connected in terms of proximal or distal outcomes. Proximal and distal can refer to time, but more important, proximal and distal outputs imply that relationships will be weaker when predicting distal

outcomes compared to when predicting proximal outcomes. The main reason for this is that project processes, quality, and outcome belong at the project level and as such are impacted by many factors outside the control of the project team. In a single-team project system, market conditions can pressure organizations to increase the pace of the project. These outside contingencies (i.e., organizational top-down influence) are likely to affect the integrated project team's processes, emergent states, and project processes. In multi-team project systems, core and component teams contribute to impact project processes, quality, and value. In other words, each team in a multi-team system has its own inputs, mediators, and proximal outputs, but all teams "connect" to project outputs. This is in line with program and project portfolio management. This is also in line with multi-team scholars who say that teams are in a multi-team system when they "share at least one common distal goal; and in so doing exhibit input, process, and outcome interdependence with at least one other team in the system" (Mathieu, Marks, & Zaccaro, 2001, p. 290).

Figure 18.2 deploys our functional model for a single team over time. The bottom line depicts that the project is bound in time, and dashed portions mean that projects vary in duration. Consistent with work by previous scholars (i.e., Marks et al., 2001) our model also encompasses both an episodic and a developmental approach to project teams as they move forward in time across project phases. Each project phase depicts a project-level performance episode consisting of action and transition (i.e., Mathieu & Gilson, 2012), separated by a project milestone. A performance episode is a discrete period of time after which feedback is available to assess the work. The project-level feedback is a consequence of project milestones, which we define as either a team-imposed or an environmentally imposed period in time where measures regarding the process, quality (to date), and value (to date) are available. The decision process leading to another phase is a transition where the team looks back to assess its work and/or looks ahead to plan future phases. Action is the time in the episode when the team is doing the things that contribute to project objectives. While phases/episodes have to do with the "task" of a project, our model also maps the mechanics of team development. Teams develop in time according to carry-over or cross-over effects. Carry-over effects are when components of the functional model in early/previous phases predict similar components in later phases. For example, one can assess whether cohesion (an emergent state) or coordination (a team process) in early phases accumulates, develops, or carries over to impact cohesion or coordination in later phases. Cross-over effects are when different components are used in predictive relationships across time. The most obvious is early outputs predicting subsequent inputs (Ilgen et al., 2005) or when, say, coordination early in the project is used to predict whether cohesion emerged in

later phases. Relationships in carry-over effects should be stronger (solid lines) than relationships in cross-over effects (dashed-lines). This is because same-to-same correlations are likely to be stronger than same-to-different correlations. In addition, relationships in carry-over and cross-over effects should decrease in size as phase and/or project duration increase. In both carry-over and cross-over effects, mediators and moderators can be at play. Many examples of these complex relationships can be drawn from each chapter and our analysis in the first part of this chapter.

For example, inspired by Sue-Chan et al. (Chapter 7 of this volume), we asked earlier whether milestone success or failure would lead a project manager to change his or her coaching behaviors. This implies considering a milestone as a moderator of a project manager's behavior. Furthermore, examining the impact of the project manager on the team's goal orientation–goal commitment before and after the milestone implies a multilevel top-down interaction (i.e., the project manager has a contextual impact on the team, which is at a "lower" level). Furthermore, if the object of the study is to understand if goal orientation (or goal commitment) if affected by the milestone and the change of project management behavior, then the interactions include a carry-over effect. If the object is to predict goal commitment in later phases with goal orientation from past phases, then the moderations are applied on a cross-over effect.

The issue of conflict has inspired many contributors to this book. For example, it would be revealing to find out if task conflict positively impacts performance when there is a high level of psychological safety within a phase (de Wit, Chapter 9 of this volume). But using time (such as number of weeks) as a mediator and milestone success as a moderator, one could understand the impact of longer team member interactions and level of success at milestones to capture what happens to psychological safety. Would a low level of milestone success hinder psychological safety and change the relationship between task conflict and performance? Is the potentially negative impact of a low success milestone more pronounced when team members did not spend much time working together? Or does longer spanning interactions buffer the negative impact?

Recall Pearce et al.'s (Chapter 16 of this volume) suggestion regarding the emergence of functional fault lines and Jehn, Bezrukova, and Thatcher's hypothesis that informational fault lines are associated with high task conflict, low process conflict, and low relational conflict. It would be interesting to see beyond what levels of informational fault lines are high task conflict, low process conflict, and low relational conflict triggered. The link between informational faultiness and these forms of conflicts is likely to be moderated depending on the project phase. Indeed, the beginning of the projects (i.e., conceptualization phase) differs markedly from later phases when the project is well under way (i.e., execution

phase). For example, the effect of process conflict cannot impact project process similarly between conceptualization and execution, in part because process challenges are typically more numerous during execution.

Project Features to Test or to Report

Johns defines context as "situational opportunities and constraints that affect the occurrence and meaning of organizational behavior" (2006, p. 386). He explains that context bundles stimuli and shapes meaning downward across levels such as economic sector, organization, team, and individual. He further explains that research—and by extension, practice—blind to context's effects runs the risk of generating knowledge heavily affected by range restriction and low base rates (i.e., not detecting an effect because the sample is homogeneous or too small). Furthermore, context can impact causal direction or even "be diagnostic of opposing signs between key organizational behavior variables" (p. 387). Hence, integrating—or at least adequately reporting—project features into research on project teams is necessary. An appropriate multilevel research design that accounts for individual-level X team-level interactions in relation to time (carry- or cross-over effects) is key. However, since no study can control for every factor involved, reporting specific project features is also important. Table 18.1 shows project/contextual features that are important to report in project team studies.

Obviously, "large" or "small" projects offer different challenges and opportunities to members of core, component, or integrated project teams. Similarly, it is important to describe the actual deliverable. Some scholars argue that the abstractness of a project's output impacts the team (Hausdorf, Risavy, & Hunter, 2014). Similarly, not all projects are alike. They can be classified in many ways (Besner & Hobbs, 2012; Crawford et al., 2005). These classifications can serve as an independent variable useful to compare project teams. Söderlund's (Chapter 4 of this volume) observations on whether organizational, precarious, craft, and hollow P-form organizations can impact coordination and cooperation in and of project team is an example (Whitley, 2006). In addition, projects can be distinguished in terms of "classic" and "dynamic" (Collyer & Warren, 2009). Classic projects have high levels of unknowns at the start, but these are resolved early. Dynamic projects have unknowns throughout the project cycle. People working on dynamic projects must constantly explore solutions. They run the risk of implementing solutions at a slower rate than the emergence of environmental change, requiring additional solutions. These types of projects entail markedly different levels of complexity, which in turn affect team members' tasks and interactions. Unsurprisingly, research is emerging that shows that project type

Table 18.1 Key Project Features to Report

Feature	Examples
Project scope	• Size of the project in $, €, £, ¥, etc. • Number of teams and individual stakeholders involved • Size of team(s)
Project output/ deliverable	• A bridge, a software, an event?
Project types	• Attributes (Crawford, Hobbs, & Turner, 2005) • Level of uncertainty (Shenhar, Levy, Dvir, & Maltz, 2001) • Singularity-separation matrix (Whitley, 2006) • Classic versus dynamic projects (Collyer & Warren, 2009) • Internal or external (Archibald, 2003)
Project team type	• Core or non-core (Graham & Englund, 1997) • Core, component, integrated (Chiocchio, Chapter 3 of this volume)
Project stage or phase	Generic • Initiating, Planning, Executing, Controlling, Closing (Project Management Institute, 2008). • Formulation, Plan, Implement, Manage transition, Sustain change (Project Management Institute, 2013). Industry-specific • Software development (Xie, Zhang, & Lai, 2006) • Manufacturing projects (Labuschagne & Brent, 2005) • Construction projects (Abdul-Kadir & Price, 1995) • Test development (Downing, 2006)
Phase and total project duration	• Number of weeks, months, or years • Duration of delays encountered
Project management capability	• CMMI (Software Engineering Institute, 2006) • Berkeley (Ibbs, Reginato, & Hoon Kwak, 2007) • Five levels of maturity (Kerzner, 2003) • OPM3 (Project Management Institute, 2003)
Project complexity	• Structural uncertainty (Williams, 1999) • Goals and methods uncertainty (Turner & Cochrane, 1993; Williams, 1999)
Project management approach	• Waterfall (Davis, Bersoff, & Comer, 1988) • Fountain (Lindkvist, Soderlund, & Tell, 1998) • Traditional, Agile, Extreme (Wysocki, 2009)

moderates the relationship between teamwork and project performance (Yang, Huang, & Wu, 2011).

Projects involve intertwined processes and feedback loops over the course of their implementation. Life cycles can be generic, focusing on initiating, planning, executing, controlling, and closing (Project Management Institute, 2008). Alternatively, life cycles can be industry-specific, such as in construction (e.g., conceptualization, engineering, procurement, construction, startup; Abdul-Kadir & Price, 1995), software development (e.g., analysis, design, implementation; Xie et al., 2006), and manufacturing (e.g., idea generation, pre-feasibility, feasibility, development and execution, commissioning, launch, post-implementation review; Labuschagne & Brent, 2005). Some life cycles are not regulated by industry but are the object of some consensus and can still serve as an overarching structure. Organizational psychology practitioners can relate to steps outlined by Downing (2006) for test development projects: overall plan, content definition, test specification, item development, test design and assembly, test production, test administration, scoring test response, passing scores, reporting test results, item banking, and technical report.

Phase progression justifies membership changes (Eskerod & Blichfeldt, 2005; Mathieu et al., Chapter 5 of this volume). Project phases are sufficiently different to moderate computer-mediated communication patterns and topics across phases (Chiocchio, 2007). Team member turnover seems to occur most frequently at the point of the project life cycle where motivation drops (i.e., during project execution), which implies that new joiners have missed the conceptualization phase (Parker & Skitmore, 2005). If the only research design possible is a cross-sectional one, it is fundamental that the project stage at which the measurements were taken be described. Project teams in early project phases are more likely to be dealing with conceptual design issues. Toward the end of projects, the work is more technical and concrete. Studying conflict, identification, motivation, and the like without the knowledge of such contextual elements is detrimental to the advancement of knowledge.

Duration is a key concept in project management and team literatures. Projects can be short or long, and the life span of the team within this time frame can be shorter than the duration of the project (Chiocchio, Chapter 3 of this volume). Hence, closely related to issues raised regarding project phases is the issue of the duration of each phase and of the entire project. Many short project phases over long projects provide with many transition points in which the team can assess the past and plan the future. Hence, such projects offer many opportunities to reflect on team processes and project processes. In contrast, short projects with few phases do not. Research on team reflexivity suggests that teams that

discuss their processes predict valued outcomes such as innovation (Schippers, West, & Dawson, 2012).

Project management capability refers to an organization's sophistication and capability in managing projects (Ibbs et al., 2007). Some organizations' processes are well-defined, documented, and assessed regularly, while other organizations manage projects without guidance or consistency. As with the previous contextual elements, several conceptualizations of maturity exist. The Software Engineering Institute's maturity model has five stages (i.e., initial, repeatable, defined, managed, and optimized; Software Engineering Institute, 2005, 2006) and its success has spawned other more sophisticated maturity models suited for various industries and sectors (Gareis & Huemann, 2007). Some maturity models are more generic, such as the Berkeley Project Management Process Maturity Model (i.e., ad hoc, planned, managed at the project level, managed at the corporate level, learning; Ibbs et al., 2007) and Kerzner's five-level model (i.e., common language, common processes, singular methodology, benchmarking, and continuous improvement; 2003). Other models more specifically map organizational maturity in terms of standardization, measurement, control, and continuous improvement across multiple organizational levels such as project management, program (groups of projects), and portfolio (groups of projects and programs) (Project Management Institute, 2003).

Project management capability/maturity is an important moderator in project teams because it is grounded in attitudes, knowledge, and actions (Andersen & Jessen, 2003). Although attempts to validate this empirically have proven difficult (Thomas & Mullaly, 2008), other studies have shown that project management capabilities are positively related to project success (Ghapanchi & Aurum, 2012; Jugdev, Mathur, & Fung, 2007). Interestingly, compared to more mature industries, multiple project assignments in less mature industries may explain lower levels of psychological well-being and higher levels of distress (Chiocchio et al., 2010).

Hobbs (Chapter 2 of this volume) discussed traditional and waterfall projects, as well as other forms of project management. Some forms of project management are designed to allow for more flexibility, while others make it more difficult and costly to make important changes during the course of the project. This is obviously constraining to project team members.

Conclusion

We have provided a bird's eye view of chapters while adding some of the insights their authors brought us. We then proceeded with integrating project

management and organizational psychology literatures in terms of inputs, mediators, and outputs. Next, we overlaid this functional model over project phases and the team- or organization-imposed milestones that punctuate them. Our hope is that the framework will provide any researcher interested in project teams with a structure to determine and test hypotheses. Finally, we described a number of contextual factors to use, understand, or describe when it comes to research on project teams.

We undertook this book project for researchers and their graduate students with a clear goal of developing an integrated stream of research on project teams. As organizations increasingly rely on project teams to accomplish their goals, we believe that this integrated view has great potential to advance our understanding of work in project teams—and hence, organizational behavior.

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