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Cohesion and Performance

A Meta-Analytic Review of Disparities Between Project Teams, Production Teams, and Service Teams

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The management of project teams is evolving from managing technical processes to focusing on psychosocial determinants of performance. This trend puts a strain on project management theory and practice. Past meta-analyses on the cohesion–performance relationship show a positive correlation. However, they integrate effect sizes across different types of teams and settings. To clarify this issue for project teams, this meta-analysis differentiates 33 cohesion–performance correlations depending on whether teams are project, production, or service teams in organizational or academic settings. Results show that types of teams and settings are moderators. Project teams in organizational and academic settings show large effect sizes and differ from other teams. Theoretical considerations point to five interrelated modifiers: task uncertainty, task versus outcome performance, student samples' mental representation of the project outcome, and group heterogeneity.

Keywords: *cohesion; performance; project teams; production teams; service teams*

In an era of rising competitiveness and globalization, organizations are facing dynamic environments where survival calls for draconian measures and flexible structures (Belout, 1997). Project teams are seen as an

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asset in responding to such challenges (Hoegl & Parboteeah, 2006). Project management calls for pooling and leveling human resources across time, space, and organizational boundaries, which reduces idle time and promotes expertise sharing and knowledge transfer (Zika-Viktorsson, Sundström, & Engwall, 2006). Project teams are used in many industries—construction, information systems, research and development, manufacturing, and telecommunication (Kloppenborg & Opfer, 2002). In addition to delivering industry-defined outcomes to external customers, such as a building in the case of construction projects, project teams also serve to manage change within organizations (Kloppenborg & Opfer, 2002; Sense, 2003) creating value for an array of internal customers (Winter, Andersen, Elvin, & Levene, 2006). Project teams are used in education settings as well (Kloppenborg & Opfer, 2002; McPherson & Nunes, 2008), where projects frame problem-based learning (Markham, Larmer, & Ravitz, 2003), and help students acquire and share knowledge, often through the use of information technology (Chiocchio & Lafrenière, in press; Duch, Groh, & Allen, 2001; Selwyn, 2007). In dealing with various complexities pertaining to project teams, individual and team competency development (Edum-Fotwe & McCaffer, 2000) as well as psychosocial aspects (Zika-Viktorsson, Hovmark, & Nordqvist, 2003) are now being increasingly recognized as key factors in promoting project success. According to this new perspective, project efficacy depends on solidarity and synergy between contributors (Gareis, 2002; Midler, 2002) and superior project teams must display cohesion (Hoffman, Kinlaw, & Kinlaw, 2002). The broadening use of project teams beyond traditional applications into different fields and settings has put a strain on project management theory and practice, given projects are still mostly managed as technical systems rather than behavioral systems (Belout, 1997). It is therefore critical to investigate research on the relationship between cohesion and performance through the specific perspective of project teams. Unfortunately, although much research has been conducted on the cohesion–performance relationship, scarce conclusions can be drawn for project teams distinctively.

One way to bridge such gap is to distinguish and compare between different types of teams. Indeed, studies comparing types of teams better emphasize theoretical underpinnings of team dynamics (Sundstrom, McIntyre, Halfhill, & Richards, 2000). However, such studies are relatively scarce, although researchers are aware of important differences affecting key processes pertaining to team types (Webber & Klimoski, 2004). Comparing studies using meta-analytical methods promotes new learning by casting new light on variations in the phenomenon under study and on theoretical issues of explanation and construct validity (Hall, Tickle-Degnen, Rosenthal, & Mosteller, 1994). Consequently, the aim of this meta-analysis is to decipher the cohesion–performance relationship as a function of forms of cohesion (task and social), performance (behavioral and performance), team type (project, production, and service teams), and team setting (organizational and academic). Past meta-analyses have not achieved such goal for numerous reasons underlined in the following section.

Problems of Past Reviews on the Relationship Between Cohesion and Performance

Many meta-analyses have been published on the cohesion–performance relationship (Beal, Cohen, Burke, & McLendon, 2003; Carron, Colman, Wheeler, & Stevens, 2002; Evans & Jarvis, 1980; Gully, Devine, & Whitney, 1995; Mullen & Copper, 1994; Oliver, Harman, Hoover, Hayes, & Pandhi, 1999). The general conclusion stemming from these quantitative integrations is that the correlation is moderate, positive, and highly dependent on intragroup processes. However, it is difficult to apply such conclusion to any specific type of team given four related problems: inconsistent classifications of types of teams, moderators of team processes unknowingly related to certain types of teams, inconsistent inclusions of student teams, and inconsistent handling of the passage of time in teams.

First, even for some meta-analyses that limit their scope to sports (Carron et al., 2002) or military settings (Oliver et al., 1999), all have indistinctively encompassed many varieties of teams that make it difficult to apply results to specific types of teams, including project teams. For example, past meta-analyses mix student teams, project teams, management teams, and production teams (Beal et al., 2003; Evans & Dion, 1991; Gully et al., 1995; Mullen & Copper, 1994). Specifically, Gully et al. (1995) and Beal et al. (2003) indistinctly incorporate sports teams, military teams, production teams, service teams, and teams of students working on class assignments as well as those involved in business simulation games and short laboratory tasks. Although Evans and Dion (1991) exclude production teams, the teams they include are of different types. In Caron et al.'s (2002) sports team meta-analysis, laboratory sports teams are included with high school, intercollegiate, club, and professional teams. Probably because of the rather limited number of studies or unequal reporting of critical information, Oliver et al.'s (1999) military meta-analysis makes no distinctions on team types, and mixes both student and non-student military teams. Moreover, none of the work team taxonomies help in determining common grounds between military and sports, and project teams (Devine, 2002).

The second problem relates to underlying constructs used to describe team process mechanisms. Three meta-analyses test the extent to which team processes moderate the cohesion–performance relationship and code primary studies according to various levels of team functioning. Mullen and Copper (1994) use interaction requirements, Gully et al. (1995) use task interdependence and Beal et al. (2003) use workflow. However, two issues emerge from such procedures. The first issue is rather technical and applies to Beal et al.'s (2003)' meta-analysis. These authors use Tesluk, Mathieu, Zaccaro, and Marks's (1997) categories of how work flows between team members—additive, sequential, reciprocal, intensive—as a continuous moderator. Although we agree that these categories are rank ordered, we believe they are not equidistant or if so, they are in the context from which they were originally conceptualized (i.e., hospital workers) and may not apply to other types of teams. Ironically, after describing the first two categories, Beal et al. (2003) add that "The final two patterns of team workflow involve *considerably more* [italics added] workflow between team members" (p. 992). The second issue, applying to all of the three above-mentioned meta-analyses, is more important and involves distinctions between what integrative research scholars call low versus high inference coding (Hall et al., 1994). Low inference coding relies on factual information in the description of the study whereas high inference coding uses an additional construct to classify studies. On closer examination of the description of the study participants or tasks, we found that teams coding high on interaction, interdependence, or workflow are in fact overrepresented by project teams. For example, approximately half the teams classified by Beal et al. (2003) as representing intensive workflow are project teams. Furthermore, no project teams are classified as pooled, sequential, or reciprocal, whereas all teams in those categories are nonproject teams such as production or service teams.

The third problem affecting past meta-analyses deals with student teams. There is an ongoing debate regarding the pertinence of using student samples in research (Locke, 1986; Wintre, North, & Sugar, 2001). Including student teams in research on cohesion and performance is pertinent. Teams of undergraduate or graduate students are as real as any other type of teams (Chiocchio, 2007; Hackman, 1990; Mullen & Copper, 1994). However, in trying to resolve classification issues related to cohesion, performance, and project teams, it is important to distinguish between three very different kinds of student teams. On the one hand, some student teams are involved in unique, short performance episodes in laboratory-controlled settings. Laboratory tasks take only a few minutes and include listing uses for a wire coat hanger (Stajkovic, Locke, & Blair, 2006), folding papers into tent shapes (Zaccaro & Lowe, 1986), or completing jigsaw puzzles (Friedkin, 2004; Sheikh & Koch, 1977). On the other hand, some student teams are involved in more intense and long-term efforts such as longitudinal management simulations where members make decisions over many weeks of real-time regarding market changes occurring over months or years of simulated time (Jaffe & Nebenzahl, 1990). These teams mimic management teams found in organizational settings. Finally, some student teams are involved in academic projects ranging from a few weeks to several months. Examples include the elaboration and validation of questionnaires (Chiocchio, 2007) or the construction of a water pump (Lent, Schmidt, & Schmidt, 2006).

We believe that when it comes to cohesion and performance studies using project teams of students are interesting in their own right, especially in light of the expansion of project management from traditional fields to other fields such as education (Kloppenborg & Opfer, 2002). Unfortunately, attempts at classifying student teams in past meta-analyses are inconsistent. For example, Mullen and Copper (1994) classify teams of students involved in projects (i.e., Terborg, Castore, and DeNinno, 1976) as artificial teams, but include one study comprising student teams working on a 1-month project (i.e., Darley, Gross, & Martin, 1952) in the nonmilitary and non-sport category, together with sales teams (i.e., George & Bettenhausen, 1990) and project teams in nonacademic settings (i.e., Keller, 1986).

The last problem of past meta-analyses pertains to their treatment of the time dimension. Task duration and the nature of interactions are salient features in cohesion—cohesion does take time to build (Terborg et al., 1976). This is apparent in procedures and decisions to maintain independence within samples in past meta-analyses. Mullen and Copper (1994) collapse all multiple cohesion–performance correlations to come up with independent measures of effect-size per sample. Criticizing this approach, Beal et al. (2003) argue that the last cohesion–performance correlation available in the life-span of a team is the best indicator of the relationship. Although they disagree on how to account for the passage of time, both argue that some time is required after team inception before cohesion measures are relevant. Interestingly, both include experimental studies involving short single session laboratory tasks in their meta-analyses, thus omitting criteria related to minimum required time-span of teamwork interaction.

At least two narrative reviews discuss intrateam processes such as cohesion (Rasmussen & Jeppesen, 2006; Sundstrom et al., 2000). Interestingly, both argue for differentiating between types of teams. Generally, they conclude that intrateam-related attitudes are important to understand teamwork outcome (Rasmussen & Jeppesen, 2006) and specifically, that there is a positive relationship between cohesion and performance, but point out that project teams and service teams differ (Sundstrom et al., 2000). However, these reviews involve many of the previously outlined problems. For example, Sundstrum et al. (2000) conclude that cohesion predicts team performance in project teams but not in service teams. Yet, they base this conclusion on studies that combine project and production teams (Greene, 1989), use unclear measures of cohesion or performance (Gillespie & Birmbaum, 1980; Labianca, Brass, & Gray, 1998) or use self-assessment measures of performance (Vinokur-Kaplan, 1995) as opposed to more reliable measures of performance (Pulakos, 2007). Rasmussen and Jeppesen's (2006) review of teamwork and many types of psychological variables distinguishes between project, production, and service teams but, surprisingly, does not locate studies involving project teams measured in terms of cohesion. They also conclude that team type distinctions are important but that no consistent differences emerge.

We conclude that these problems raise two fundamental interrogations pertinent to meta-analyses (Hall et al., 1994). First, with how much confidence can we assert that findings of past meta-analyses are applicable to project teams? Second, how can past meta-analyses advance the theoretical understanding of the cohesion–performance relationship in project teams? Our answer to the first question is obvious from our description of problems of past quantitative and qualitative reviews. We cannot clearly apply knowledge gained from past reviews to project teams because project teams are either unclassified or misclassified. When project teams are misclassified, they end up with other types of teams, or under different team process constructs. Briefly, there is no clear way to extract pertinent conclusions on project teams.

As suggested by synthesist scholars, to provide sound new knowledge and fill the theoretical void preventing a clear understanding of project team processes, we will formulate a problem that clarifies what evidence to include in the review, provide definitions that distinguish relevant studies from the others, including clarity in boundary conditions around potential moderators, and finally, provide sufficient conceptual and operational details to enable generalization (Cooper, 1982). We now turn to definitions of cohesion, performance, projects, project teams, and other types of teams, and team setting.

Fundamental Definitions

Cohesion. There has been numerous debates surrounding the definition of cohesion (Friedkin, 2004; Mudrack, 1989). In fact, examining the history of research on cohesiveness, one finds confusion, inconsistencies, even sloppiness, regarding the definition of such a construct (Mudrack, 1989). Early group cohesion researchers presented a unidimensional perspective of cohesion. Its classic definition referring to a field of forces making group members stay together (Festinger, 1950) has been considered too general and vague, thus difficult to convert into concrete measures and concepts (Craig & Kelly, 1999).

Since then, a multidimensional view of cohesion has emerged, describing how multiple factors induce groups to stick together and remain united (Carron & Brawley, 2000). In their meta-analysis, Mullen and Copper (1994) use a tridimensional categorization of cohesion: social cohesion (i.e., interpersonal attraction), task cohesion (i.e., task commitment), and group pride. However, the latter dimension has received little attention in literature and studies focusing on it seem mostly limited to sports teams. Social cohesion refers to a shared liking or attraction to the group (Evans & Jarvis, 1980), emotional bonds of friendship, caring and closeness among group members, enjoyment of other's company or social time together (MacCoun, 1996). Cohesion from a task perspective 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). The important distinction between task and social cohesion stemming from numerous researchers and approaches constitutes a milestone in the cohesion field of study (Dion & Evans, 1992). Most contemporary researchers support such distinctions. For instance, some view cohesion as interpersonal attraction and commitment to tasks (Zaccaro, 1991; Zaccaro & Lowe, 1986). Cohesion can also be defined as a group's resistance to forces that are disruptive (Friedkin, 2004). For the purpose of this study, we view cohesion from the bidimensional perspective (i.e., social cohesion and task cohesion), given its increased recognition and stronger theoretical basis.

Three more issues pertaining to measurement also require attention. First, because cohesion is a subjective phenomenon involving perceptions and affects, self-assessments of cohesion best tap into the construct as opposed to assessments made by external observers such as managers or teachers. Second, cohesion is a group phenomenon and individual-level studies should be avoided (Beal et al., 2003; Careless & De Paola, 2000; Klein, Dansereau, & Hall, 1994). Third, cohesion takes time before team members become acquainted and develop some kind of attraction. As stressed by Carron and Brawley (2000), various dimensions of cohesion are not always present or equally salient throughout the life of a group. Based on what can be minimally accepted in student teams (Treadwell, Laverture, Kumar, & Veerarghavan, 2001), we reason that a minimum of four weeks of team interactions constitute a reasonable amount of time for teams in academic as well as organizational settings to reach a certain degree of acquaintance and culminate group experiences underlying cohesion factors.

Performance. Performance taxonomy distinguishes outcome performances (Bernardin, Hagan, Kane, & Villanova, 1998) from more behavioral types of performances, such as task and contextual performances (Borman & Motowidlo, 1993; Borman & Motowidlo, 1997; Motowidlo, 2003). Outcome performance relates to the end results or products of tasks or work consequent to behaviors or critical job functions (Bernardin et al., 1998), and includes, while not limited to, measures such as profits, sales, ranks, grades (Motowidlo, 2003), as well as schedule and cost variance (Fleming & Koppelman, 2000). Behavioral performance includes two types of performances: task and contextual (Motowidlo, 2003). Task performance involves activities usually described in formal job descriptions and is specific to jobs (Borman & Motowidlo, 1997). Contextual performance relates to behaviors promoting organizational effectiveness by acting on the psychological, social, and organizational features of work. These behaviors are not job specific and include conduct such as help, cooperation, and persistence in efforts, initiative taking, and compliance with organizational rules and procedures (Borman & Motowidlo, 1997). As for team performance, it includes team behavior as an integrated and interdependent unit, centered on achieving measurable team objectives (Reilly & McGourty, 1998).

One can quantify performance through self-assessments or using an external source. Both have pros and cons, but many recognize that self-report measures of performance are often distorted (Russel & Peterseon, 2007), while assessments made by superiors more reliably take the context into consideration (Pulakos, 2007).

Teams. Hackman (1987, 1990) defines a work group as an intact social system consisting of interdependent members with differentiated roles. Cohen and Bailey (1997) say

> A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries. (p. 241)

Others summarize the minimal defining qualities as a group of employees that are formally established, assigned some autonomy, and interdependent (Rasmussen & Jeppesen, 2006; Sundstrom, 1999). These overlapping definitions allow for many work groups such as

> [E]xecutives charged with deciding where to locate a new plant, a team of rank-and-file workers assembling a product, a group of students writing a case assigned by their instructor, a health-care team tending to the needs of a group of patients, and a group of economists analyzing the budgetary implications of a proposed new public policy." (Hackman, 1987, p. 322)

Projects and project teams. Pragmatically, one could assert that a project team is a team (as defined above) working on a project, and proceed with specifically defining a project. Although we will follow that path, the progression from a general conceptual definition of a team to operational distinctions between types of teams is not that simple. One difficulty is that many taxonomic endeavors are practitioner driven (Devine, 2002). Such taxonomies yield team types that are often not mutually exclusive, which is precisely what we aim to avoid in the present meta-analysis. Although we want to provide conceptual and theoretical knowledge on the cohesion–performance relationship, we also aim at yielding clear practical knowledge relevant to teams. Hence, after defining projects independently from practitioner-driven team descriptions, we will put things into perspective by also referring to relevant taxonomies. Thus, what is a project?

The most comprehensive attempt at a definition cutting across many fields of practice and research and the most widely used body of knowledge on project management (Stretton, 2006) is that of the Project Management Institute (PMI). The PMI developed a validated ANSI Standard defining projects and project management (Project Management Institute, 2004) encompassing many industries and settings. According to this standard, "A project is a temporary endeavor undertaken to create a unique product, service, or result" (Project Management Institute, 2004, p. 5) and as such, bears three defining features: (a) a project is a temporary process, (b) the process' objective is to create something unique; (c) the process, its object, or both, are progressively elaborated. Temporariness implies that there is a known start date and an anticipated end date, and that a project ends when its objectives are met or when it is intentionally terminated. Uniqueness refers to the outcome of the project, either as a new product or new service. Progressive elaboration is the combination of temporariness and uniqueness. It means that at the beginning of the project, there is only a broad understanding of the end result and the process used to achieve it. Work is planned as properly as possible at this stage, but as knowledge grows and the project progresses, both become more explicit and detailed.

Nuances regarding four additional elements are also required. First, projects are composed of interdependent activities (Webster & Knutson, 2006). For instance, in a construction project, foundations must be set before walls are erected. Second, it is implied that projects consume human, financial, or material resources assigned to these activities (Kerzner, 2003), on which decisions must be made regularly. Third, in line with the concept of progressive elaboration, it follows that the cost of making changes (e.g., financial resources, time, intellectual and physical effort) is rather trivial at the beginning of the project, but increases prohibitively towards its termination. In parallel, at the beginning of a project, uncertainty regarding the process and the risk that the end result will not be completed are great but diminish as the project progresses and things become increasingly clearer (Kerzner, 1998; Lambert, 2006). Hence, projects are riddled with uncertainty (Lambert, 2006) and require frequent high-stakes decision-making. Together, these features account for high stress levels within project teams (Aitken & Crawford, 2007) and make intrateam processes, such as cohesion, important phenomena to harness. The fourth aspect is dependent on the setting in which the projects takes place. Most projects in organizational settings are rather complex and require a rich pool of knowledge, skills, and abilities. This translates into the need for cross-functional expertise and multidisciplinary collaboration (Kerzner, 2003). In academic settings, even if projects concur with PMI's definition, team members share the same level of project relevant knowledge (usually quite low) and approach the task from their own discipline (i.e., course related).

According to Sundstrom et al. (2000), whose team taxonomy is retained in this meta-analysis for purposes detailed in the following section, project teams refer to groups that perform a defined, specialized task within a definite time period, and whose members are generally cross-functional and disband after project termination. Examples include developing a new product, writing a computer program, building a prototype, or designing a component (Sundstrom, 1999). The definition and examples are consistent with PMI's definition of a project.

Other types of teams. Sundstrom et al.'s (2000) taxonomy has other advantages in addition to providing a definition of project teams compatible with a definition of projects cutting across domains. It is the most concise and pertinent, providing the smallest number of the most common types of teams found in work settings described in research: production, service, project, management, action and performing, and advisory teams. According to Sundstrom et al. (2000), production teams consist of frontline employees repeatedly producing tangible outputs, and involved in long periods of relatively frequent short cycles of routinized tasks (Cohen & Bailey, 1997). Service teams are similar except for the fact that they conduct repeated transactions with customers. Project teams, production teams, and service teams share an important characteristic relevant to conducting a meta-analysis: Studies on these teams are more frequent (Sundstrom et al., 2000). Furthermore, similarities between production and service teams set them apart from project teams in a theoretically important way. The ongoing, arguably simple, and repetitive tasks of production and service teams are in sharp contrast with project teams' uncertainty and progressive elaboration of time bounded tasks. As such, comparing project teams to production and service teams provides an interesting perspective on the cohesion–performance relationship.

Team setting. Along with team type, work group experts suggest that the context in which teams function is paramount to a better understanding of team effectiveness—yet context is understudied (Sundstrom et al., 2000). Interestingly, many descriptions of teams confound the setting or industry in which the work is performed with other features such as member composition or tasks. This is the main problem of grouping student teams working on 20-minute laboratory tasks with project teams. If project teams are the focus of attention and if there is an overarching definition of a project—such as in the case of this meta-analysis—then it is necessary to distinguish the setting in which project teams operate. In fact, team setting distinction is an effective operational device that controls for problems of classification of teams comprised of students.

Summary

So far, we have outlined important problems of past meta-analyses that impede us from concluding with confidence that past results apply to project teams. To help clarify these issues, we have defined cohesion (as task or social cohesion), performance (as behaviors or outcomes), projects (as temporary, unique, and progressively elaborated endeavors), project teams (as formalized interdependent members performing specific time bounded tasks), production and service teams (as formalized interdependent members performing short routine tasks), and team settings (as either academic or organizational). To enable theory development pertinent to project teams and develop clear testable hypotheses, we view these elements similar to a factorial design: cohesion × performance × team type × team setting. As shown in the following section, this perspective enables the use of results from past meta-analyses but casts them in testable cohesion–performance hypotheses aimed at shedding light on different aspects of project teams.

Hypotheses

On the one hand, Mullen and Copper's (1994) meta-analysis shows the primacy of task cohesion over social cohesion (i.e., task cohesion–performance correlations are stronger than social cohesion–performance correlations). These authors conclude that team processes such as interdependency explain why teams display higher task cohesion–performance correlations. On the other hand, Beal et al. (2003) found that cohesion–behavioral performance relationship is stronger than cohesion–outcome performance relationship. In addition, they disconfirmed the primacy of task cohesion based on the workflow construct—in their meta-analysis, social and task cohesion are of similar magnitude and as team workflow increases, so does the cohesion–performance relationship. Because high interdependent and high workflow coding was inconsistent in terms of types of teams and setting, it remains unclear which of task or social cohesion takes precedence in project teams compared with other types of teams. An interesting hypothesis lies within explanations of mixed results when interventions aimed at increasing group processes believed to play a role in cohesion are tested, such as coordination in production teams (Molleman & Slomp, 2006). These authors suggest that because tasks in production and service teams are routinized and already streamlined, additional interventions do not yield much benefit. This sheds light onto project work. Contrary to much of production or service work, project work requires identifying and sequencing activities, as well as estimating their duration (Project Management Institute, 2004); in other words, planning. Later phases involve reestimating the initial planning and making corrections to keep the project under control (Dinsmore & Cabanis-Brewin, 2006). In fact, planning is difficult and projects tend to fail when it is not done properly (Buehler, Griffin, & Ross, 1994). Consequently, commitment to tasks in project teams must be strong and constant, and overall, much more salient than in production or service teams. Hence, we will test the following hypothesis.

Hypothesis 1: Project teams will show larger positive task cohesion–performance correlations than production or service teams.

Beal et al.'s (2003) disconfirmation of Mullen and Copper's (1994) primacy of task cohesion effect was partly based on issues related to performance. Beal et al. (2003) argue that because much of outcome performance is not directly under one's control, any correlation with outcome performance is dampened compared to behavioral performance. Their results support this hypothesis. However, we believe this conclusion does not apply to all teams in all settings. Outcome performance is a very salient feature in projects. Indeed, a project is planned, managed, and carried out almost entirely from the perspective of its outcome. Almost all decisions pertain to avoiding or removing obstacles in delivering the highest quality outcome under rigorous schedule and cost pressures—the triple constraint in project management jargon (Kerzner, 2003). Project teams constantly interact to monitor, rearrange, and redo tasks in order to maximize the outcome. Hence, in project teams, outcome performance is more important than behavioral performance and task cohesion is more important than social cohesion. This suggests a rank ordering of correlations and differences between types of teams. Consequently, we will test the following hypotheses:

Hypothesis 2: Project teams will show larger positive task cohesion–outcome performance correlations, followed by social cohesion–outcome performance, task cohesion–behavioral performance, and finally social cohesion–behavioral performance correlations.

Hypothesis 3: Project teams will show larger positive cohesion–outcome performance correlations than production or service teams.

Distinctions between project teams in organizational settings and academic settings can shed light on boundary conditions pertaining to the definition of a project, the construct of cohesion, and its relationship with performance. Cohen and Bailey (1997) make cross-functionality a defining feature of project teams. Sundstrum et al. (2000) state that project work is generally, hence not necessarily, cross-functional. According to PMI's definition, cross-functionality is not a defining feature of a project (Project Management Institute, 2004).

The heterogeneity implied by cross-functionality is interesting in terms of cohesion in project teams. A recent meta-analysis on team design and team performance concludes to a small positive association between heterogeneity and project team performance ($\rho = .04$; Stewart, 2006). Another meta-analysis (using short laboratory tasks) does not show that specific attributes such as personality, ability, and sex are useful in creating homogenous or heterogeneous teams, but suggests that heterogeneous teams perform better when tasks are complex (Bowers, Pharmer, & Salas, 2000). Because such results do not settle the issue, the question remains as to whether cross-functionality does moderate the cohesion–performance relationship.

One way to test the effect of cross-functionality on cohesion and performance in nonlaboratory settings is to compare project teams used in organizational and academic settings. In academic settings, there is usually no cross-functionality: Class project team members share the same level of ability and project-relevant experience—both usually quite low—and approach the task from the perspective of one course-related discipline. Hence, environmental constraints related to the learning environment force student project teams to be homogeneous. For organizations, environmental constrains related to increased competition is an incentive for cross-functionality.

Past attempts to clarify the relationship between team ability, cohesion, and performance are inconclusive (Terborg et al., 1976). Because of range restriction in team performance and potentially low group drive toward the task, it is not possible to support Terborg et al.'s (1976) hypothesis that teams with homogenously low ability and high cohesion predict high team performance. More recently, similarity theory and equity theory offer useful—yet competing—predictions (Bowers et al., 2000; Tziner, 1985). Similarity theory predicts that similarity between team members positively affects performance because of interpersonal attraction, and that tensions between dissimilar members will negatively affect performance. Consequently, similarity theory implies that the social cohesion–performance correlation will be stronger in academic project teams compared with organizational project teams. Conversely, referring to equity theory, others suggest that tensions between dissimilar members enhances team performance (Bowers et al., 2000), a phenomenon akin to initial disagreements and subsequent efficacious problem solving related to choice of the best tasks to perform (i.e., task conflicts; Jehn, 1995). If this were true, organizational project teams would have higher cohesion–performance correlations than academic project teams. Hence, we will test the following competing hypotheses:

Hypothesis 4A: Project teams in organizational settings will show larger positive social cohesion–performance correlations than those in academic settings.

Hypothesis 4B: Project teams in academic settings will show larger positive social cohesion–performance correlations than those in organizational settings.

Method

Identification of Studies

The literature search was conducted through various procedures. First, we searched and retrieved all articles analyzed in previous meta-analyses, covering years 1951 to 2001. Then, we performed computerized bibliographic searches in PsycINFO (all journals) covering years 1990 to present with the key words *cohesiveness*, *cohesion*, *group attraction*, *group unity*, *group pride*, *performance*, *productivity*, *effectiveness*, or *efficiency*. We selected such time span because previous meta-analyses already identified studies prior to 1990. Given the great number of articles identified in the numerous existing meta-analyses and our ability to add French studies to our PsycINFO search, we did not search other electronic databases. However, as suggested by Cooper (1998), we complemented these procedures by communicating with researchers specialized in this field. Together, these procedures yielded 157 studies written in English or French, consisting of 135 articles, 19 doctoral dissertations, 3 monographs, and 2 narrative reviews.

Coding of Studies

The coding scheme included cohesion (task and social), performance (either behavioral, which included task and contextual performance, or outcome performance), team type (project, production, and service), and team setting (organizational or academic), according to definitions outlined in the introduction. Both authors independently coded a common random sample of studies consisting of approximately one third of all primary studies. Meetings were then held to review each study, and discuss and resolve discrepancies, which were scarce. Hence, the remaining studies were coded conjointly with synchronous discussions when needed.

Inclusion and Exclusion Criteria

Each of these studies was then carefully examined to select those meeting criteria established for the final analysis. Studies were included if they (a) present self-assessed measures of cohesion from team members, thus excluding assessments from people outside the team; (b) use an external source of performance assessment, such as managers or teachers, thus excluding self-reported performance assessments; (c) assess participants older than 18 years of age performing tasks that can be generalized to organizational or academic settings and therefore excluding all sports and military settings; (d) conform to definitions of project, production, and service teams; (e) whose members had been acquainted for at least 4 weeks prior to measurements, thus excluding those involving very brief tasks, such as one-time tasks, laboratory studies with students; (g) display correlations, *t* tests or *F* values on variables of interest; and finally (h) were conducted at the group level.

It is worth mentioning that seven studies (Casey-Campbell, 2005; Jaffe & Nebenzahl, 1990; Keller, 1986; Lee & Farh, 2004; Lee, Tinsley, & Bobko, 2002; Smith et al., 1994; Terborg et al., 1976) present data collected at various time points. For these, we retain only the latest reported cohesion-performance data (which were all over the 4-week mark as per the 5th criterion). Finally, two articles appear to be from the same study conducted at one time (i.e., not a longitudinal design), yet display different correlations (Michalisin, Karau, & Tangpong, 2004a; Michalisin, Karau, & Tangpong, 2004b). In this case, we have computed average correlations.

As a result, our meta-analysis includes 29 studies published between 1952 and 2006—9 of which are new studies not identified in previous meta-analyses. These 29 studies include 9,416 participants distributed in 1,598 teams. Table 1 shows additional descriptive information. A total of 33 independent correlations were identified, 9 for social cohesion–behavioral performance, 19 for social cohesion–outcome performance, 1 for task cohesion–behavioral performance, and 4 for task cohesion–outcome performance.

These procedures also resulted in the exclusion of 123 studies. Some comments are worth raising regarding exclusions. First, along with Rasmussen and Jeppesen (2006) we excluded management teams because, in addition

Table 1
Correlations From Each Study According to Variables of Interest

Study	*N*	*K*	Social Cohesion–Behavioral Performance	Social Cohesion–Outcome Performance	Task Cohesion–Behavioral Performance	Task Cohesion–Outcome Performance	Type of Team	Setting
Bakeman and Helmreich (1975)	48	10	.725				PJ	ORG
Barrick, Stewart, Neubert, and Mount (1998)	652	51	.270				PD	ORG
Colarelli and Boos (1992)	258	86		.050			PJ	ACA
Darley, Gross, and Martin (1952)	130	13		.318	.298		PJ	ACA
Deep, Bass, and Vaughan (1967)	93	9	.480	–.220			PD	ACA
Duffy and Shaw (2000)	566	137	.200	.200			PD	ACA
Gekoski (1952)	231	21		.100		.100	PD	ORG
George and Bettenhausen (1990)	233	33	.500	.040			SE	ORG
Keller (1986)	221	30	.510	.360			PJ	ORG
Klein and Mulvey (1995)	222	52		.230			PJ	ACA
Langfred (2000, Sample 1)	633	67		.280			SE	ORG
Lee and Farh (2004)	260	45		.330			PJ	ACA
Lee, Tinsley, and Bobko (2002)	164	27		.450			PJ	ACA
Lent, Schmidt, and Schmidt (2006)	312	42	.520	.520			PJ	ACA
Lodahl and Porter (1961)	567	55		.190			PD	ORG
Mason and Griffin (2003)	157	46		.070		.440	PJ	ACA
Mulvey and Klein (1998, Sample 1)	247	59		.370		.350	PJ	ACA
Mulvey and Klein (1998, Sample 2)	383	101		.350			PJ	ACA
Neubert (1999)	252	21	.490				PD	ORG
Ng and Van Dyne (2005)	815	176	.620	–.040			PJ	ACA

(continued)

Table 1 (continued)

Study	N	K	Social Cohesion–Behavioral Performance	Social Cohesion–Outcome Performance	Task Cohesion–Behavioral Performance	Task Cohesion–Outcome Performance	Type of Team	Setting
Podsakoff, MacKenzie, and Ahearne (1997, Study 1)	218	40		.260			PD	ORG
Podsakoff, MacKenzie, and Ahearne (1997, Study 2)	617	71		.025			SE	ORG
Porter and Lilly (1996)	464	80				.190	PJ	ACA
Raver and Gelfand (2005)	207	27	−.050	.500			SE	ORG
Riolli-Saltzman (1999)	150	50		−.010			PD	ORG
Seers, Petty, and Cashman (1995)	103	5		.700			PD	ORG
Stewart, Fulmer, and Barrick (2005)	220	45		−.060			PJ	ACA
Terborg, Castore, and DeNinno (1976)	133	42		−.300			PJ	ACA
Tesluk and Mathieu (1999)	473	88	.080				PD	ORG
Villeneuve (1997)	387	69	.260	.260	.365	.365	PD	ORG

Note: N = total number of subjects; K = total number of teams; PJ = project teams; PD = production teams; SE = service teams; ORG = organizational setting; ACA = academic setting.

to their habitual tasks of coordinating work and business processes of units under their jurisdiction, such teams may be involved in projects, such as that of merging two divisions (Sundstrom et al., 2000). We also exclude advisory teams (e.g., quality circles, selection committees), because they perform tasks often only indirectly related to the core business of their organization. We exclude action teams as well (e.g., music groups, negotiating teams), because they often occur in atypical contexts. Finally, we exclude sports and military teams due to difficulties in generalizing results to organizational or academic settings.

Second, 11 studies display measures of cohesion mostly irrelevant to either the social or the task cohesion constructs, have near equal numbers of items related to both these constructs combined indistinctively into one dimension, or lack clarity or specificity (i.e., no description of the instrument or examples of items). Examples of irrelevant items include "The team wasted a lot of time" (Michalisin et al., 2004b, p. 133), "My work group is usually aware of important events and situations" (Wech, Mossholder, Steel, & Bennett, 1998, p. 482). Of these 11 studies, 10 are included in Beal et al.'s (2003) meta-analysis. Interestingly, we noticed that the latter authors did not classify 7 of these studies in any of their cohesiveness categories, whereas Mullen and Copper (1994) chose to exclude them altogether (at least, those published at the time of their article). Consequently, we opted to exclude these 11 studies. We excluded one study conducted on teams solely interacting through computer-based mediums (Gonzalez, Burke, Santuzzi, & Bradley, 2003)—all other studies implied face-to-face interactions. Another study was discarded because measurements were obtained by averaging results across only two out of eight team members (Careless & De Paola, 2000), which we find insufficient.

Statistical Procedures

When studies reported effect sizes other than *r*, such as *t* tests or *F* ratios, these were transformed to *r* using standard formulas (Wolf, 1986). All correlations were then corrected for attenuation (i.e., unreliability; Hunter & Schmidt, 2004), based on information found in each primary study. For measures of cohesion, Cronbach's alpha was the most commonly used estimate of reliability. When alphas were not reported (22% of measures), the average alpha for cohesion found in the other studies was used ($M = 0.851$, $SD = 0.08$). As for task performance, contextual performance or outcome measures of performance provided by supervisors, Cronbach's alpha was also the most commonly used estimate of reliability. Measures of outcome performance unaffected by human judgment were considered perfectly reliable. Examples include the use of records such as sales records (e.g., George & Bettenhausen, 1990) or specific outcome data such as number of envelopes zip-sorted monthly (e.g., Riolli-Saltzman, 1999). For studies that did not report reliability for performance (47%), the average alpha found in others that did so, specifically .813 (SD = 0.094), was used as a substitute.

Disattenuated correlations were then entered in specialized software based on Hedges's meta-analysis technique (Biostats, 2005; Hedges, 1994) to compute and compare sample-weighted mean correlations. We assumed a random rather than fixed effects model because there are no theoretical reasons to believe that all studies were equivalent.

Results

Table 2 integrates effect sizes so that each combination of forms of cohesion (task and social) with performance (behavioral and outcome) relationships is represented separately. The first row shows results based on nine studies totaling 2,994 participants grouped in 445 teams. These teams display a moderate to large disattenuated sample weighted mean correlation between social cohesion and behavioral performance (ρ = .485) that is statistically significant beyond $p \leq .05$, because confidence intervals do not include 0 and because Z—which tests the null hypothesis that $\rho = 0$—is high ($Z = 4.05$; $p \leq .001$). A fail-safe N of 204 means that it would take 204 additional studies confirming the null hypothesis before changing the conclusion that the found relationship (i.e., ρ = .485) exists (Cooper, 1998; Rosenthal, 1979). However, because of problems discussed in the introduction, results that stem from grouping different types of teams from different settings suffer conceptual and practical problems. Results confirm these problems. For example, Q statistics test the null hypothesis of homogeneity among studies—a significant result indicates heterogeneity—and I^2 reports the amount of true variance as a proportion of the total variance and, as such, quantifies the magnitude of heterogeneity and amount of variance between studies (Huedo-Medina, Sanchez-Meca, Botella, & Marin-Martinez, 2006). In the case of social cohesion and behavioral performance, one can conclude that the sample of nine studies is not homogenous ($Q = 42.95$, $p \leq .01$) with I^2 = 81% of heterogeneity explained by between studies variance. Hence, in addition to conceptual reasons to examine if types of teams and setting moderate the social cohesion and behavioral performance correlation, there are statistical justifications as well. The next six rows distinguish types of

Table 2
Disattenuated Sample Weighted Mean Correlations Between Cohesion and Performance for Various Teams and Settings

Relationships	Teams	Setting	*S*	*K*	*N*	ρ	CI −95%	CI +95%	*Z*	Fail-safe *N*	*Q*	I^2
Social cohesion and behavioral performance	PJ + PD + SE	ORG + ACA	9	445	2994	.485	.267	.656	4.05***	204	42.95**	81%
	PJ	ORG	2	40	269	.697	.482	.833	5.03***	—	.691	0%
	PJ	ACA	1	176	815	.649	.554	.727	10.18***	—	—	—
	PD	ORG	3	160	1377	.295	.018	.530	2.09**	7	5.36	63%
	PD	ACA	1	9	93	.577	−.141	.897	1.62	—	—	—
	SE	ORG	2	60	440	.332	−.414	.812	0.86	—	8.59**	88%
	SE	ACA	0	—	—	—	—	—	—	—	—	—
Social cohesion and outcome performance	PJ + PD + SE	ORG + ACA	19	922	4794	.201	.076	.321	3.12**	124	56.46***	68%
	PJ	ORG	1	30	221	.487	.154	.721	2.77**	—	—	—
	PJ	ACA	11	692	2989	.185	.021	.340	2.21*	42	42.05***	76%
	PD	ORG	4	131	1051	.136	−.060	.323	1.36	0	3.36	11%
	PD	ACA	1	9	93	−.264	−.790	.485	−0.66	—	—	—
	SE	ORG	2	60	440	.326	−.249	.731	1.12	—	4.87*	80%
	SE	ACA	0	—	—	—	—	—	—	—	—	—

(continued)

Table 2 (continued)

Relationships	Teams	Setting	*S*	*K*	*N*	ρ	CI −95%	CI +95%	*Z*	Fail-safe *N*	*Q*	I^2
Task cohesion and behavioral performance	PJ + PD + SE	ORG + ACA	1	13	130	.359	−.239	.760	1.19	—	—	—
	PJ	ORG	0	—	—	—	—	—	—	—	—	—
	PJ	ACA	1	13	130	.359	−.239	.760	1.19	—	—	—
	PD	ORG	0	—	—	—	—	—	—	—	—	—
	PD	ACA	0	—	—	—	—	—	—	—	—	—
	SE	ORG	0	—	—	—	—	—	—	—	—	—
	SE	ACA	0	—	—	—	—	—	—	—	—	—
Task cohesion and outcome performance	PJ + PD + SE	ORG + ACA	4	206	1099	.346	.169	.502	3.72***	21	5.07	41%
	PJ	ORG	0	—	—	—	—	—	—	—	—	—
	PJ	ACA	3	185	868	.380	.188	.544	3.73***	19	3.93	49%
	PD	ORG	1	21	231	.117	−.331	.522	0.50	—	—	—
	PD	ACA	0	—	—	—	—	—	—	—	—	—
	SE	ORG	0	—	—	—	—	—	—	—	—	—
	SE	ACA	0	—	—	—	—	—	—	—	—	—

Note: PJ = project teams; PD = production teams; SE = service teams; ORG = organizational setting; ACA = academic setting; *S* = number of studies; *K* = number of teams; *N* = total number of participants; ρ = mean correlation corrected for attenuation and sample size; CI = confidence intervals: −95%/+95%: lower/upper 95% confidence interval around ρ; *Z* = test of ρ different from 0; fail-safe *N* = Rosenthal's fail-safe *N* (cannot be computed with fewer than 3 studies); *Q* = total homogeneity within a row; significance indicates rejection of the hypothesis of homogeneity; I^2 = amount of heterogeneity explained by between-studies variance.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

teams and setting. Results indicate that project teams have consistently stronger correlations in organizational settings ($\rho = .697$) and in academic settings ($\rho = .649$) than production or service teams in either organizational or academic settings. Once these moderators are taken into account, study groupings become homogenous, except for organizational service teams ($Q = 8.59$, $p \leq .01$).

A similar conclusion holds true for social cohesion–outcome performance correlations. A substantial amount of heterogeneity is present when teams and settings are undifferentiated ($I^2 = 68\%$, $Q = 56.46$, $p \leq .001$), making the small to medium effect size (i.e., $\rho = .201$) less meaningful. Disentangling teams and settings, one can see that only project teams have statistically significant correlations: $\rho = .487$ in organizational settings and $\rho = .185$ in academic settings. An additional test of homogeneity between settings for these project teams show borderline statistical significance ($Q = 3.77$, $p = .052$). Hence, even if there is still unexplained variance in academic project teams ($I^2 = 76\%$, $Q = 42.05$, $p \leq .001$), it is not due to type of team or contextual moderators.

Studies of task cohesion with behavioral or outcome performance are much less frequent. Nevertheless, the only statistically significant correlation involves task cohesion and outcome performance in academic project teams (i.e., $\rho = .380$), and although there is some heterogeneity ($I^2 = 49\%$), not enough of it is present to reject the null hypothesis of homogeneity ($Q = 3.93$, ns).

Hypothesis 1 stated that project teams should have larger positive task cohesion–performance correlations than product or service teams. Academic project teams appear to have medium positive effect sizes between task cohesion and behavioral performance ($\rho = .359$) and outcome performance ($\rho = .380$). The only other correlation we can compare these with involves organizational production teams ($\rho = .117$). These data are insufficient to support our hypothesis and more studies are necessary to reach a reliable conclusion.

Hypothesis 2 stated that correlations in project teams would be rank ordered in the following fashion: task cohesion–outcome performance, social cohesion–outcome performance, task cohesion–behavioral performance, and social cohesion–behavioral performance. The only case in which this could be tested involves projects undertaken in academic settings. Results show that correlations in decreasing order of magnitude are social cohesion–behavioral performance ($\rho = .649$), task cohesion–outcome performance ($\rho = .380$), task cohesion–behavioral performance ($\rho = .359$), and social cohesion–outcome performance ($\rho = .185$). Hence, there is no support for Hypothesis 2.

Hypothesis 3 stated that project teams should have larger positive cohesion–outcome performance correlations compared with product or service teams. Results show that for social cohesion–outcome performance correlations in organizational settings, project teams display larger positive effect sizes ($\rho = .487$) than production ($\rho = .136$) or service teams ($\rho = .326$). For correlations in academic settings, project teams display larger positive effect sizes ($\rho = .185$) than production teams ($\rho = -.264$). For task cohesion and outcome performance, a direct comparison of types of teams and settings is not possible. However, academic project teams display a larger positive correlation ($\rho = .380$) than organizational production teams ($\rho = .117$). Given (a) that of all the correlations relevant to Hypothesis 3, only the ones involving project teams are statistically different from 0, and (b) that all of these show larger and positive effects sizes compared with those of production and service teams, there is strong support for social cohesion–outcome performance and moderate support for task cohesion–outcome performance.

Hypotheses 4A and 4B suggest competing hypotheses. Hypothesis 4B states that because of low ability and high homogeneity, the social cohesion and performance relation will be stronger for projects in academic settings compared to projects in organizational settings whereas hypothesis 4A suggests the reverse due to member heterogeneity (i.e., cross-functionality) and creative tensions in organizational settings. Results show that for social cohesion and behavioral performance, organizational project teams ($\rho = .697$) and academic project teams ($\rho = .649$) are similar ($Q = .22$, ns). For social cohesion and outcome performance, organizational project teams ($\rho = .487$) and academic project teams ($\rho = .185$) are quite dissimilar ($Q = 3.77$, $p = .052$). Therefore, there is moderate support in favor of Hypothesis 4A and the positive role of heterogeneity in the relation between social cohesion and outcome performance in organizational project teams whereas homogeneity or heterogeneity do not appear to affect the social cohesion–behavioral performance correlations in either setting.

Discussion

Projects teams are receiving growing attention because of their effectiveness in dealing with increased competitiveness and globalization (Hackman, 1987; Hoegl & Parboteeah, 2006; Kristof-Brown & Stevens, 2001). Furthermore, researchers note an important gap in knowledge regarding differences between types of teams (Sundstrom et al., 2000), and even suggest using different models to explain team processes (Cohen &

Bailey, 1997). Contextual factors are paramount as different team configurations migrate into diverse settings (Sundstrom et al., 2000). Yet, comparative studies of intrateam processes across types of teams and settings are rare. In fact, to our knowledge, the present meta-analysis is the first to examine the cohesion-performance relationship from a project team perspective. We have done so by applying very stringent criteria designed to alleviate problems with past meta-analyses: a clear definition of projects that enables distinctions between academic and organizational settings; clear conceptualization of types of teams that make possible comparisons between uncertain and complex tasks (i.e., project teams), and streamlined and routinized tasks (i.e., production and service teams); and measurement at the group level of different forms of cohesion and performance that allow for theoretical development and control for common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003); all the while controlling for time elapsed after team inception.

Unfortunately, our cohesion × performance × team type × team setting design and rigorous criteria far exceeds the availability of primary studies. Despite challenges related to statistical power, the major contribution of this meta-analysis is that general conclusions on task and social cohesion relative to behavioral and outcome performance cannot be understood without team type and setting as moderators. Much of the heterogeneity present in all-encompassing correlations—either from past meta-analyses or our from own nonmoderated results—disappears or diminishes when these moderators are factored in.

Overall, looking at types of teams, the cohesion–performance relationship is very important in project teams and arguably much less important in other teams. Of the six statistically significant effect sizes, four involve project teams. Three of those four effect sizes range from $\rho = .697$ to $\rho = .487$, and one is $\rho = .185$. Only one correlation is statistically significant in other teams (i.e., production teams, $\rho = .295$). In terms of setting, there is no difference between project teams in academic or organizational settings regarding social cohesion and behavioral performance, although setting matters for social cohesion and outcome performance.

More specifically, our results offer clarifications over Mullen and Copper's (1994) and Beal et al.'s (2003) meta-analyses. There are differences between task and social cohesion—as suggested by Mullen and Copper (1994)—but that conclusion cannot be generalized across types of teams or settings. Task cohesion is more important than social cohesion only in terms of outcome performance in academic project teams ($\rho = .380$ vs. $\rho = .185$). As found by Beal et al. (2003), our results regarding social cohesion also indicate that behavioral performance is more important than outcome performance. However, nuances are required. Both project settings show arguably larger social cohesion–behavioral performance ($\rho = .697$ and $\rho = .649$) compared with social cohesion–outcome performance in organizational project teams ($\rho = .485$). In parallel, social cohesion–outcome performance is comparatively much lower ($\rho = .185$) and somewhat similar to social cohesion–behavioral performance in organizational production teams ($\rho = .295$). A number of explanations are valuable to explain the interplay of team type and setting in the various combinations of cohesion and performance.

This meta-analysis integrates empirical research for the purpose of generalization or more specifically, to seek the limits and modifiers of generalization (Cooper & Hedges, 1994). Theoretical considerations relevant to our results point to five interrelated modifiers. The first applies to task uncertainty. Streamlined tasks and known outcomes such as in production or service teams do not provide for enough traction for a phenomenon like cohesion to covary with performance (Molleman & Slomp, 2006). In project teams, on the other hand, uncertainty and creativity foster creative tensions and, although they may generate more communications and conflicts, they also yield opportunities for task commitment (Chiocchio & Lafrenière, in press), and problem-solving (Chiocchio, 2007). This encourages prosocial, task-related, or process-related improvements. One can argue from research on these issues that for project endeavors, high task conflicts combined with low interpersonal conflicts leads to higher performance, whereas in production or service teams, high performance is related to low task conflicts and low interpersonal conflicts lead to higher performance (Jehn, 1995; Jehn & Shah, 1997).

The second modifier relates to performance. Many emphasize that the difficulty with outcome performance surfaces because one can control one's performance behaviors but not environmental constraints affecting outcome performance (Beal et al., 2003; Pulakos, 2007). This should dampen any correlation with outcome performance compared to behavioral performance. Our results suggest that this dampening effect is much less pronounced in organizational project teams than in other teams. This is probably because the control argument seems more tailored to environments of production (e.g., production teams cannot control the supply of raw materials) or service teams (e.g., sales teams cannot control market demands). In fact, project management is a way to deal and control environmental constrains. Successful projects are those able to better manage the triple constraint (Webster & Knutson, 2006), where compromises and tradeoffs are made on an ongoing basis in favor of the best combination of task duration, human and material costs, and quality of the outcome. Through efficient project management, project teams gain sufficient autonomy and capabilities to exert control on constraints to warrant substantially higher cohesion–outcome performance. Moreover, in organizational settings, projects benefit from an array of metrics to monitor project progression, such as cost performance index or schedule performance index (Kerzner, 2003) as well as management techniques and indices derived from earned value management principles (Fleming & Koppelman, 2000). These metrics are most likely unknown to student project teams. In other words, although all project teams are highly concerned with outcome performance, organizational project teams benefit from means to better achieve it, while student project teams must rely solely on common sense.

The third modifier relates to student samples. Many dismiss any research using student samples (Wintre et al., 2001). However, criticisms are often based on weak criteria (Locke, 1986). By avoiding short laboratory student teams and clearly separating other student teams from organizational teams, our study demonstrates that the "essential features" (Locke, 1986; p. 7) of the cohesion–performance relationship are similar across settings for social cohesion–behavioral performance correlations but differ in terms of social cohesion–outcome performance. This provides an interesting lens to discuss the potential effect of social attraction on performance in project teams.

The fourth modifier refers to the mental representation of the project's outcome. Referring to shared mental models (Fiore & Schooler, 2004; Tindale, Meisenhelder, Dykema-Engblade, & Hogg, 2001), student teams differ from organizational teams in terms of mental representations of the project's outcome. For example, even if after building many different water pumps, an experienced group of engineers still faces uncertainty when working on a new pump project, students faced with building their *first* water pump experience much more uncertainty and might not have an adequate representation of the project's outcome. Hence, students might have no shared understanding of the outcome or a shared, yet incorrect understanding of the outcome, while organizational project teams with more knowledge will more likely start off with a better mix of shared and correct understanding. What is interesting with cohesion is that task cohesion might be what helps teams with blurred mental models achieve a better outcome, not social cohesion. As our results suggest, social cohesion and outcome performance for organizational project teams (ρ = .487) differ from academic project teams (ρ = .185) but is somewhat similar to task cohesion and outcome performance in academic project teams ($\rho = .380$). Because group cognition (e.g., collective knowledge structures) relies on knowledge of individual members and on interpersonal interaction processes (Curseu, Schruijer, & Boros, 2007), it might be that interactions actually involve task rather than social cohesion. This primacy of task cohesion over social cohesion in student project teams may be a mechanism by which inexperienced team members motivate themselves to enhance their collective self-confidence in achieving team goals. Interestingly, although both social and task cohesion are considered interpersonal processes, task cohesion is more motivational whereas social cohesion can serve as a regulative affect management process (Marks, Mathieu, & Zaccaro, 2001). Furthermore, past studies on collective efficacy and group potency (i.e., task specific vs. general collective belief regarding group effectiveness) found that these phenomena are correlated to performance, cohesion, and group commitment (Hecht, Allen, Klammer, & Kelly, 2002; Lent et al., 2006).

The fifth and last modifier refers to group composition. Homogeneity is another boundary construct that helps us understand cohesion and performance and the impact of moderators such as team type and setting. Our results show stronger social cohesion–performance correlations for heterogeneous project teams (i.e., organizational setting) compared to homogenous project teams (i.e., academic setting). Generally, arguments supporting a positive relationship between heterogeneity and performance focus on creativity associated with diversity in viewpoints and skill sets, while arguments supporting homogeneity focus on the notion that similar people experience less conflict (Stewart, 2006). However, these assertions are not mutually exclusive, which probably explains why the belief that team members must get along and be socially cohesive to perform well is widespread, albeit difficult to validate (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). This difficulty might be explained by the fact that team composition diversity is a multidimensional construct involving separation (differences in beliefs, attitudes, and values), variety (differences in functional background and type of expertise), and disparity (inequalities in status, power, and resource availability; Harrison & Klein, 2007). According to this taxonomy, low separation leads to reduced cohesiveness, but it is unclear which of the other two leads to more cohesion or if the three components interact to affect cohesion. It seems, however, that the social cohesion–behavioral performance correlation in project teams is insensitive to either forms of diversity across setting.

Limitations

Beal et al., (2003) made useful distinctions between outcome and behavioral performance. One limitation of their meta-analysis and ours is that different components of behavioral performance, namely task and contextual performance, are combined. For reasons we will discuss shortly, we consider this a worthy limitation to note. However, as meta-analysis specialists underscore, any aggregation of research involves some dissimilarity between studies (Hall et al., 1994). Although we believe that our stringent criteria contributed to conceptual clarity and practical relevance over and above past meta-analyses, our criteria were also limiting in terms of number of studies. In other words, there is a price to pay in increasing conceptual clarity, as it reduces the number of studies and statistical power. Thus, caution is necessary when interpreting these results. Along with Hunter and Schmidt (2004), our attitude is to accept the meta-analytic provisionally and strongly encourage other scholars to conduct additional studies. What should these future studies focus on?

Future Directions

Additional research on cohesion and performance in project teams is necessary both in terms of measurement issues and of new hypotheses. The measurement of cohesion is one area of potential betterment (Mudrack, 1989), namely because of conceptual overlap with other intrateam processes such as communication, conflicts, and workload distribution (Barrick, Stewart, Neubert, & Mount, 1998). Future research should disentangle such overlap and systematically assess different forms of the construct, such as social and task cohesion. As our results show, there is a paucity of studies measuring task cohesion. Furthermore, our results suggest that social and task cohesion may differ across teams or settings, yet warrant additional empirical verification. In terms of performance, both behavioral and outcome performance are related (Bernardin et al., 1998), and it is difficult to consider cohesion and outcome performance without the potential mediating effect of behavioral performance (Beal et al., 2003). Moreover, scholars in the field of project management overemphasize the importance of outcome performance while mostly ignoring behavioral (i.e., task or contextual) performance. In parallel, most outcome performance metrics developed in project management such as cost performance and schedule performance indices (Kerzner, 2003), earned value management indices (Fleming &

Koppelman, 2000), and net present value calculations (Gardiner & Stewart, 2000) have been, to our knowledge, ignored as outcome measures in project teams research. Such omission is unfortunate because, compared with aggregated measures of individual performance, these outcome measures are true indices of team performance that can be used after each phase of a project and, of course, on its termination. A more generalized use of such indices could provide interesting advancements and perhaps a reevaluation of the utility of aggregated measures of individual performance on which the field of industrial and organizational psychology heavily relies on. Hence, future research should systematically provide clear-cut measures of task, contextual, and outcome performance. Even if outcome performance has its caveats (Murphy & Cleveland, 1995), systematic measurement of all components of performance should be employed so that the impact of task and contextual performance on outcome performance can be further investigated, intrateam process' effect delineated, and situational constraints understood (Bernardin et al., 1998), as they are frequently invoked to dismiss measurement of outcome performance (White, 2006). Interesting hypotheses stem from systematic multidimensional measurement of cohesion (task and social) and performance (task, contextual, and outcome). One can hypothesize, for instance, that task cohesion and task performance would yield larger positive effect sizes, and so would social cohesion and contextual (i.e., prosocial) performance, compared to mixed pairings. Moreover, with such systematic multidimensional measurements, it would be possible to determine which of task or contextual performance moderates the relationship between task cohesion and outcome performance and between social cohesion and outcome performance.

Project teams are distinctive in that work proceeds through phases such as initiation, planning, execution, control, and close-out with the three middle phases conceptualized as a loop (Project Management Institute, 2004). Early phases of a project are usually more creative and conceptual while later phases more technical (Enberg, Lindkvist, & Tell, 2006). A recent generic temporal conceptualization of teamwork focused on project, production, and service teams suggests that teamwork evolves through multiple sequential occurrences of transaction (i.e., evaluation and planning activities) and action phases (i.e., acts that contribute directly to goal accomplishment; Marks et al., 2001). However, much ambiguity remains. On the one hand, this taxonomy states that interpersonal processes such as cohesion occur in both transaction *and* action phases, thus implying that cohesion is similar across types of team and more specifically across the life of a project. Moreover, definitions of transaction and action phases do not easily concur with project specific phases where initiation, planning, and control might relate to transition, while execution and close-out might relate to action, leaving out the loop characterizing planning, execution, and control. As a general starting point, we hypothesize that social cohesion will play a more important role at the beginning of the project and that task cohesion will be more significant once much of the creativity is generated and execution has started.

However, it will not be possible to effectively measure task and social cohesion, as well as task, contextual, and outcome performance within these or other hypotheses before a substantial conceptual clarification occurs in instruments used to measure cohesion and performance. Many items found in social cohesion scales mimic items used to measure contextual performance. For example, contextual performance items such as offers to "help others accomplish their work" (Motowidlo & Van Scotter, 1994, p. 477) are almost identical to social cohesion items such as "team members consistently help each other on the job" (Barrick et al., 1998, p 383). Similarly, task performance can be measured with items such as encouraging co-workers to "do more than what is expected" (Hochwarter, Witt, Treadway, & Ferris, 2006, p. 483) and task commitment can measured with items like "superior performance is very important to our group" (Porter & Lilly, 1996, p. 376).

From a practical perspective, even if we cannot conclude to cause and effect relationships, our meta-analysis provides strong incentive to foster social cohesion and perhaps task cohesion in project teams. In organizational settings, interpersonal attraction is a challenge because of different cultures and language across organizational boundaries. Perhaps project managers should first bring team members to bond over task commitments and then add social cohesion onto that foundation. In student teams, professors should not simply assemble teams and make them work on a project. Because the final outcome is abstract to inexperienced high-homogenous low-ability students, professors should invest time in managing the project by providing frequent feedback on the interplay of cohesion, collaboration, communication, and performance behaviors in relationship with the quality of the outcome.

In closing, even if some advocate unifying theories of teamwork into a single model (Baker & Salas, 1997), our results suggest that interdisciplinary research combined with the development of team specific models are warranted (Cohen & Bailey, 1997; Sundstrom et al., 2000), especially when it comes to project teams. We conducted this meta-analysis in that spirit.

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