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John Mathieu, M. Travis Maynard, Tammy Rapp and Lucy Gilson  
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# Team Effectiveness 1997-2007: A Review of Recent Advancements and a Glimpse Into the Future

John Mathieu\*

*Management Department, University of Connecticut, Storrs*

M. Travis Maynard

*Department of Management, Colorado State University, Fort Collins*

Tammy Rapp

Lucy Gilson

*University of Connecticut, Storrs*

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*The authors review team research that has been conducted over the past 10 years. They discuss the nature of work teams in context and note the substantive differences underlying different types of teams. They then review representative studies that have appeared in the past decade in the context of an enhanced input-process-outcome framework that has evolved into an inputs-mediators-outcome time-sensitive approach. They note what has been learned along the way and identify fruitful directions for future research. They close with a reconsideration of the typical team research investigation and call for scholars to embrace the complexity that surrounds modern team-based organizational designs as we move forward.*

**Keywords:** *teams; effectiveness; teamwork; organizational behavior*

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Cohen and Bailey's (1997) review of the work teams literature has proven to be one of the most influential *Journal of Management* articles, with more than 545 citations as of 2007 (Harzing, 2007). Although they concluded at the time that substantial knowledge about teams had accumulated, they predicted that much would be learned in the future. As they

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\*Corresponding author. Tel: (860) 486-3735; fax: (860) 486-6415.

E-mail address: [John.Mathieu@business.uconn.edu](mailto:John.Mathieu@business.uconn.edu)

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anticipated, there has been an explosion of work in the decade since their review. Literally hundreds of primary studies have been conducted, several meta-analyses have been performed, and numerous reviews of the literature have been published (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; McGrath, Arrow, & Berdahl, 2001; Salas, Stagl, & Burke, 2004; Sundstrom, McIntyre, Halfhill, & Richards, 2000). Given the enormity of the body of literature on work teams, and the fact that several high-quality reviews exist, we have taken a somewhat different approach for this article. Rather than attempting to provide a comprehensive review of work that has been done over the past 10 years, we have opted to highlight particular examples of themes or trends in the teams research arena. In so doing, we identify what is known, and what remains unknown, in each area. Notably, rather than focusing attention on what has been done, our orientation is more in terms of looking ahead and outlining a future agenda for the next 10 years.

We begin by defining teams and discussing the evolution of the input-process-outcome (IPO) framework for studying team effectiveness. Using this as our foundation, we feature selected works from the past decade that have focused on different aspects of the team effectiveness model. We have chosen these studies because they are either representative of the work that has been done or because they provide a vehicle for highlighting a novel finding or approach. In many cases, meta-analyses have been conducted during this period that serve to summarize trends in the research. Afterwards, we revisit the five substantive areas that Cohen and Bailey (1997) advocated that research should consider and summarize the progress that has been made to date. Finally, we conclude with our own recommendations for future teams research.

### *Teams Defined*

Numerous definitions of groups, teams, and other forms of collectives have been proffered over the years. Such definitions share many attributes and have subtle differences. Given that our focus is on work teams, we adopt a definition advanced by Kozlowski and Bell (2003: 334):

collectives who exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity.

Notably, some of the key elements of this definition are that work teams have some level of interdependence and operate in an organizational context that influences their functioning. Whereas we include research that has been conducted in laboratory or simulated work environments, the target of generalizations for us are *teams in organizations* rather than social groups, sports teams, or collectives that operate in other contexts.

Teams come in many different configurations and are tasked with performing different types of functions. Accordingly, several taxonomies of team types have been advanced in the literature (e.g., Cohen & Bailey, 1997; Devine, 2002; Hackman, 1990; Sundstrom, 1999). Whereas taxonomies draw attention to the fact that not all teams are alike, it is important to

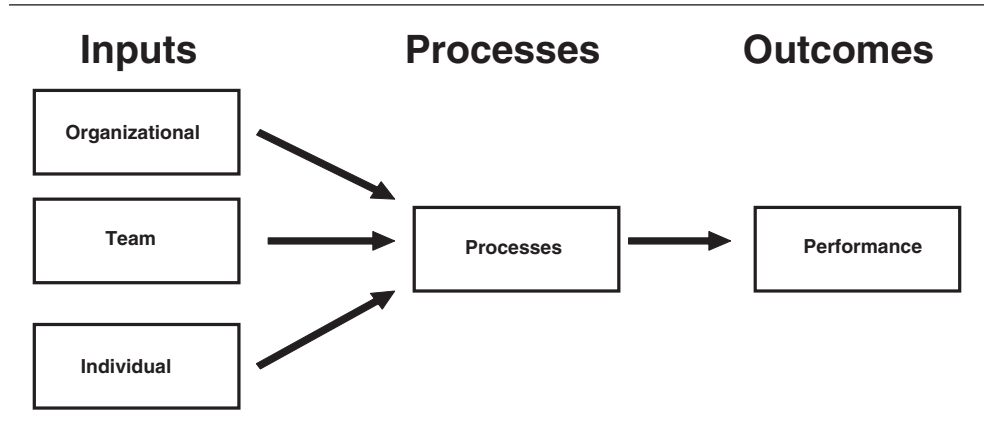
appreciate that the categories themselves are simply proxies for more substantive issues. For example, some teams contain fairly functionally homogeneous members, whereas others are usually more functionally heterogeneous. Furthermore, whereas certain teams operate in intense and complex environments, others' environments are more stable. Finally, teams can be distinguished based upon how long they are together as a unit and the fluidity of the team's membership. A theme that we will continually revisit throughout this review is that it is critically important to remember that different types of teams face different demands and as a result function quite differently; it is also true that often there is as much heterogeneity within team types as there is across types. Accordingly, we focus our attention on what we consider to be underlying substantive themes rather than types of teams.

### *Team Effectiveness Framework*

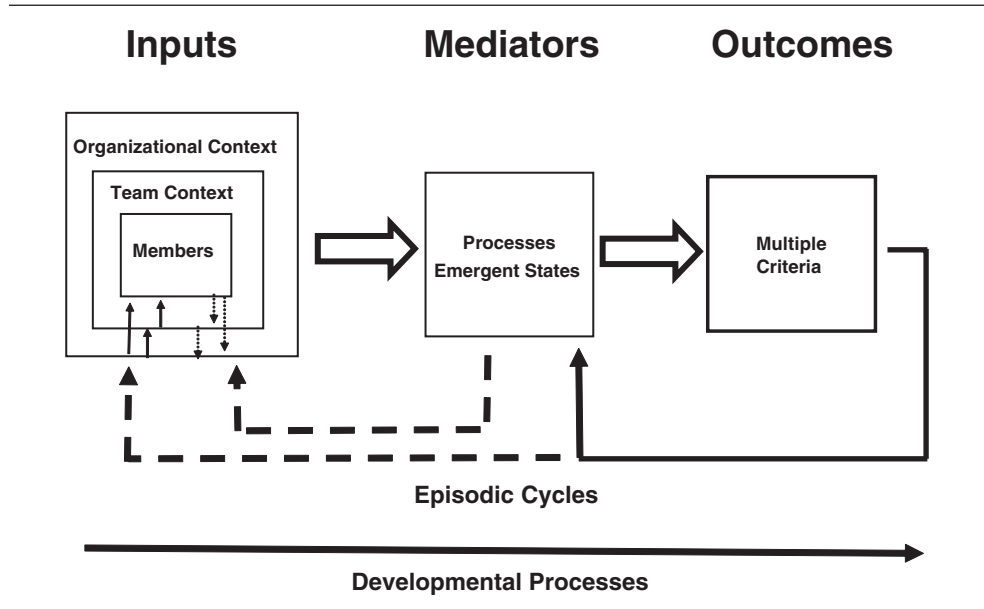
More than 40 years ago, McGrath (1964) advanced an input-process-outcome (IPO) framework for studying team effectiveness. Figure 1 contains an adapted version of this framework. *Inputs* describe antecedent factors that enable and constrain members' interactions. These include *individual team member characteristics* (e.g., competencies, personalities), *team-level factors* (e.g., task structure, external leader influences), and *organizational and contextual factors* (e.g., organizational design features, environmental complexity). These various antecedents combine to drive team *processes*, which describe members' interactions directed toward task accomplishment. Processes are important because they describe how team inputs are transformed into outcomes. *Outcomes* are results and by-products of team activity that are valued by one or more constituencies (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Broadly speaking, these may include *performance* (e.g., quality and quantity) and members' *affective reactions* (e.g., satisfaction, commitment, viability).

The IPO model has served as a valuable guide for researchers over the years, but it has also been modified and extended in several ways (Cohen & Bailey, 1997; Hackman & Morris, 1975; Ilgen et al., 2005; McGrath et al., 2001; Salas, Dickinson, Converse, & Tannenbaum, 1992). Most of the adaptations to the IPO model have either placed it in a larger context, emphasized a temporal element, or rediscovered more subtle aspects of the model that have gone overlooked. For example, Cohen and Bailey (1997) addressed the contextual issue by depicting environmental factors as drivers of team and compositional inputs. In effect, this approach embraces the inherent multilevel nature of teams, in that individuals are nested in teams, which in turn are nested in organizations, which exist in environments. Whereas more complex work arrangements exist as well (a point we will return to later), this nesting arrangement of entities is a hallmark of multilevel models (Klein & Kozlowski, 2000). As shown in Figure 2, the nesting arrangement suggests that environmental and organizational contextual factors affect the nature of leadership practices, task design, and other features that teams will likely enact. In turn, the team context and demands place premiums on certain competencies of members and the distributions of such competencies throughout the team. Generally speaking, outer layers (i.e., higher level factors) influence inner layers (shown by solid lines in the left-hand side of Figure 2) more so than the reverse, although upward influences can be evident as well (shown by the dotted lines in the left-hand side of Figure 2).

**Figure 1**  
**Input-Process-Outcome (IPO) Team Effectiveness Framework**



**Figure 2**  
**Input-Mediator-Outcome (IMO) Team Effectiveness Framework**



IPO models have been criticized for failing to distinguish multiple types of “processes” and outcomes. Ilgen et al. (2005: 520) noted that “many of the mediational factors that intervene and transmit the influence of [team] inputs to outcomes are not processes.” For

example, Cohen and Bailey (1997) differentiated internal processes from group psychological traits. Marks, Mathieu, and Zaccaro (2001) advanced a similar distinction in the context of an episodic model of team effectiveness. They noted that team processes involved members' actions, whereas other mediating mechanisms are better conceived of as cognitive, motivational, or affective states. They referred to these latter mediators as *emergent states* (e.g., potency, psychological safety, and collective affect). Given this development, Ilgen et al. (2005) coined the phrase input-mediator-outcome (IMO) model to differentiate this approach from the standard IPO framework.

Numerous authors have also emphasized that time plays a critical role in team functioning that is not adequately depicted in typical unidirectional  $I \rightarrow P \rightarrow O$  frameworks (Ancona & Chong, 1999; Marks et al., 2001; McGrath, 1991). The past decade, however, has seen a much greater appreciation of temporal dynamics in teamwork. Although time can be depicted in a number of ways (Ancona, Goodman, Lawrence, & Tushman, 2001; Ancona, Okhuysen, & Perlow, 2001), two of the more prominent approaches are (a) developmental models and (b) episodic approaches. The *developmental models* illustrate how teams qualitatively change and are differentially influenced by various factors as they mature over time (Kozlowski, Gully, Nason, & Smith, 1999). In contrast, the *episodic approaches* argue that teams must execute different processes at different times, depending on task demands that recur in a cyclical fashion (cf. Marks et al., 2001; McGrath, 1984).

As shown by the solid line running at the bottom of Figure 2, developmental processes unfold over time as teams mature. Also depicted are feedback loops that represent the more cyclical or episodic processes. Ilgen et al. (2005) recognized this feature as well and referred to their framework as IMOI (input-mediator-output-input) to represent the inherent cyclical nature of team functioning. We should note that such feedback actually occurs as teams transition from *one episode to another*, not within episodes as such depictions are sometime thought to imply. The solid line from outcomes to subsequent mediators, within Figure 2, suggests that feedback of this type is likely to be quite influential, whereas the dashed line suggests that outcome and process influences on subsequent inputs would likely be less potent. This follows from the fact that team states are likely to be readily influenced by their progress over time, and teams may readily adopt different processes as a function of outcomes. Alternatively, the influence of team outcomes or mediators on subsequent member composition, team structure, organizational contextual factors, or other inputs, is likely to be less immediate or malleable. Finally, we should note that team effectiveness criteria have evolved over the past decade to include many different forms (e.g., creativity, customer service) and combinations. In this sense, what constitutes "effectiveness" has become far more complex in recent years. We delve into this point more extensively in the next section.

The remainder of this article is organized as follows. First, moving from right to left across Figure 2, we feature work that has been done over the past decade that informs each of the linkages depicted. Along the way, we note directions for future research in each area. Second, we revisit the challenges for future research outlined by Cohen and Bailey (1997) and highlight where progress has been made, as well as areas where progress is still needed. Finally, we pose a challenge for future scholars to move beyond our current paradigm and to pursue more complex approaches to the study of team effectiveness.

## Team Outcomes

When considering the outcomes of interest in teams research, Cohen and Bailey (1997) categorized effectiveness into three categories: performance, attitudes, and behaviors. Other reviews also have more fully delineated the construct of team effectiveness. For example, Sundstrom et al. (2000) listed more than 20 outcomes that were studied in the 1980s and 1990s. However, the range of outcomes considered in the extant literature and the subtle nuances used to differentiate them makes neat categorizations difficult.

Teams exist to perform tasks and “performance is the most widely studied criterion variable in the organizational behavior and human resource management literatures” (Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995: 587). Interestingly, in teams research the focus is predominantly on *who* is a member of the team, *how* they work together, and *what* they do to perform their work—hence, the construct of performance has been “less systematically addressed” (Ilgen, 1999: 131). This has resulted in a literature where there is a great deal of consistency and construct clarity on the left-hand side of the equation (i.e., antecedents and mediating influences) and much less so when it comes to the criterion, or right-hand side. In part, this can be attributed to measurement issues. Whereas there are many established and valid measures of inputs, processes, and emergent states, criterion measures, and in particular performance indices, are often idiosyncratic and organizationally specific. That said, the notion of spending a great deal of time delineating and describing predictor variables as opposed to outcomes is not new to the applied social science literature (Beal, Cohen, Burke, & McLendon, 2003; Smith, 1976). Accordingly, we discuss outcomes in terms of traditional broad classifications, yet also identify fruitful areas for future research concerning work team effectiveness criteria.

### *Team Performance*

There is an extensive literature that has incorporated team performance as the criterion variable of interest because it has long been argued that the definition of a team is that they produce something useful to an organization (Argote & McGrath, 1993; Goodman, 1986). We organize our review of the team performance literature along three subcategories: (a) organizational-level performance, (b) team performance behaviors and outcomes, and (c) role-based performance.

*Organizational-level performance.* Team research has recently started to incorporate organizational-level outcomes. Organizational performance is particularly relevant for top management teams (TMTs) where there is a one-to-one alignment between team characteristics and organizational outcomes. For example, Barrick, Bradley, Kristof-Brown, and Colbert (2007) found that communication and cohesion among credit union TMTs positively affected their firms’ financial ratios. Similarly, Srivastava, Bartol, and Locke (2006) reported organizational-level performance data for hotel management teams, while Bunderson and Sutcliffe (2002) measured profitability as it related to unit outcomes adjusted for team history and market conditions. Whereas it is relatively easy to align TMT functioning and

organizational outcomes, this is not the case when teams operate at a lower level of analysis. In these instances, a compilation model needs to be advanced to associate collective lower level team outcomes with higher level indices of effectiveness. This might be relatively easy to do in cases such as sales teams—where their outcomes align well with organizational profits. However, it will be much harder to derive a direct linkage, for example, between teams of maintenance workers and organizational outcomes. Accordingly, as organizations continue to adopt team-based designs, particularly ones that have high interteam interdependence (cf. Mathieu, Marks, & Zaccaro, 2001), there will be a need to articulate models of how team outcomes combine to yield organizational benefits.

*Team performance behaviors and outcomes.* In a meta-analysis of the relationship between cohesion and team performance, Beal and his colleagues (2003) differentiated between *performance behaviors* and *performance outcomes*. Behaviors are actions that are relevant to achieving goals, whereas outcomes are the consequences or results of performance behaviors. Examples of performance behaviors include team process improvement, learning behaviors, and cognitive task performance. Kirkman, Rosen, Tesluk, and Gibson (2004) assessed team process improvements by measuring feedback seeking, error discussion, and experimentation, which they argued should lead to the ability to adapt and improve. Similarly, Edmondson (1999) examined team learning behaviors whereas Jehn and Shah (1997) assessed team cognitive task performance, or the degree to which a team's decision matches those of an expert committee. Finally, Kirkman and Rosen (1999) had team leaders rate teams' levels of proactivity, which encompassed behaviors such as whether the team could fix things and whether they were always looking for better ways to do something.

In terms of team outcomes, Tesluk and Mathieu (1999) examined both work crew problem management (behavior) along with supervisor rated performance (outcome) for construction and maintenance road crews. As another example of performance outcomes, Langfred (2000) used supervisors' ratings of the accuracy and quality of the work performed by social services and military teams. Mathieu, Gilson, and Ruddy (2006) used a composite measure of archival indices (e.g., parts expenditure and machine breakdown times) that was sensitive to differences across teams. Elsewhere, Lester, Meglino, and Korsgaard (2002) used both the dollar sales of student-run companies and instructor-rated performance scores as criteria.

Other types of team-level outcomes have gained prominence in the past decade. For example, Kirkman, Tesluk, and Rosen (2004) used evaluations of satisfaction with team service. Tjosvold, Tang, and West (2004) had managers rate team innovativeness, whereas Perretti and Negro (2007) used archival measures to understand the role of team membership changes on innovation in the film industry. Mathieu et al. (2006) employed measures of external customer satisfaction, whereas Kirkman and Rosen (1999) employed supervisor ratings of customer service.

*Role-based performance.* Some research has focused on indices of *role-based performance* believed to be generalizable across teams. Role-based outcomes capture the extent to which members exhibit the requisite competencies necessary to perform their jobs (Welbourne, Johnson, & Erez, 1998). In several recent publications, Chen and his colleagues (Chen, 2005; Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Chen & Klimoski, 2003) have



used this approach to examine whether teams are competent with regard to their task, team, and organizational roles. This body of work yields measures that are comparable across teams. However, this issue of time has not been fully exploited. Specifically, how long does it take teams to internalize their roles, and does the amount of time differ by role? For some roles, immediate behaviors may be apparent, whereas for others it may take time for members to be “on board” with what is expected of them.

*Performance composites.* In contrast to the above works where performance behaviors and outcomes can be differentiated, many studies have used blended or a *composite* measure of team outcomes. For instance, Lester and colleagues (2002) defined performance as meeting constituent needs, achieving objectives, and recognizing key survival factors. Likewise, Hiller, Day, and Vance (2006) used a measure of effectiveness composed of planning, problem solving, support and consideration, mentoring and development, and overall effectiveness. Similarly, Van der Vegt and Bunderson (2005) had supervisors rate efficiency, quality, overall achievement, productivity, and mission fulfillment. Elsewhere, Barrick, Stewart, Neubert, and Mount (1998) included knowledge, quality, quantity, initiative, interpersonal skills, planning, and overall commitment in their measure of performance.

Given that teams perform multiple functions, these blended composite measures may well be excellent indicators of overall team effectiveness as compared to those that only assess one aspect of performance. In effect, they more closely map onto work that utilized a balanced scorecard approach (e.g., Kirkman, Rosen, et al., 2004). Interestingly, whereas the balanced scorecard remains a popular practitioner tool, it is not used all that frequently in the academic literature. Work by Pritchard (Pritchard, 1995; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988) offered an outcome productivity measure (ProMES) that asked teams to identify their key outcomes, estimate how each outcome contributed to their unit's effectiveness, and then use these weighted scales to assess their overall productivity. This measure addresses both the organizational relevance concern raised earlier and the multiple functions performed by teams. Unfortunately, because the ProMES scale development is both cumbersome and time-consuming, it has not been used that often. Moreover, the multiple dimensions do not always evidence discriminant validity. For example, although research sought to capture quality and planning, all items loaded onto a single dimension. Hence, measures that are composed of multiple dimensions rated by different constituencies may be hard to interpret and understand.

### *Members' Affect and Viability*

A review of team outcomes would be remiss not to mention members' *affective reactions* and *viability* outcomes, which continue to receive attention and guide research—although it should be noted that they are considerably less prevalent than they were 10 years ago. Team, job, and organizational satisfaction (e.g., Janz, Colquitt, & Noe, 1997; Kirkman & Rosen, 1999; Tesluk & Mathieu, 1999) along with team and organizational commitment (e.g., Janz, Colquitt, & Noe, 1997; Kirkman & Rosen, 1999; Tesluk & Mathieu, 1999) continue to receive the most attention. An interesting perspective on affective outcomes was adopted by

Janssen, Van de Vliert, and Veenstra (1999), who asked members to evaluate whether their team had a good atmosphere and if they were treated with respect.

Team viability remains a popular criterion measure yet suffers from much construct confusion. Sometimes viability is conceived of as team-level criterion whereby members have a collective sense of belonging (similar to the notion of social cohesion). Elsewhere, viability is likened to team membership stability over time. Yet further, viability is often considered in terms of the extent to which individuals wish to remain as members of the team. Thus, team viability has become a generic term for a variety of different constructs. Moreover, team viability (i.e., Barrick et al., 2007) is often combined with affect or attitudinal measures. For example, in their meta-analyses, Balkundi and Harrison (2006) included measures of group member satisfaction, team climate or atmosphere, team commitment, and group cohesion as indicators of viability. Although conceptually important, viability and affective outcomes are often not used as primary criteria because of their self-report nature. However, several studies have tried to use supervisor ratings (e.g., Barrick et al., 2007; Hiller et al., 2006; Lester et al., 2002; Stewart & Barrick, 2000) of both viability and affective outcomes and found that they lack discriminant validity from team performance. This finding is likely due to some sort of a "halo effect" or measurement artifact leading researchers to employ composite approaches as discussed previously.

### *Summary Impressions and Future Directions*

The criteria side of the team effectiveness framework continues to be the least well specified. With the exception of TMT studies, few investigations offer any sort of compilation model to link team performance with organizational outcomes. Development in this arena would be beneficial. Additionally, although research should continue to use performance measures that are organizationally relevant, investigators also should consider using measures that offer greater generalizability across organizational settings, such as role-based performance.

One of the difficulties with generalizing performance is that it is context specific and, thus, often varies between studies by virtue of teams' being nested within organizations. For example, the much cited and often used performance measure developed by Kirkman and Rosen (1999) captures components of meeting or exceeding goals and completing tasks on time, which they reported were 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. Therefore, are these dimensions all relevant to the subsequent organizations in which this measure has been applied? To this end, 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. For instance, for production teams quantity and quality of outputs are appropriate metrics, whereas customer satisfaction would be a more accurate gauge of team performance for service teams. Accordingly, team performance criteria should be (a) carefully tied to the function and tasks of the teams being studied, (b) differentiated into constituent parts (e.g., quality, quantity, or customer satisfaction) rather than a general all-encompassing composite, and (c) combined using a formally articulated combination algorithm such as that employed in balanced scorecard techniques.

In our introduction, we discussed the importance of understanding temporal dynamics in team research. Time is particularly relevant to the collection of outcome data, and time lags have not been sufficiently considered. For example, does performance data cumulated for three months after a survey (e.g., Mathieu et al., 2006) represent the same thing as data cumulated for six months (e.g., Kirkman & Rosen, 1999) or one year (e.g., Barrick et al., 2007)? Similarly, several lab studies measure performance at multiple points in time (e.g., Johnson, Hollenbeck, Humphrey, Ilgen, Jundt, & Meyer, 2006) but devote relatively little attention to how many episodes are meaningful to the task being performed by the team. We urge future researchers to link their outcomes to either the developmental stage (Kozlowski et al., 1999) or episodic (Marks et al., 2001) models of group development. This approach makes the issues of what to use as criteria measures, and when to measure them, more substantive decisions. In effect, decisions concerning the outcome measure(s) employed, when to collect them, and for how long should be guided by the team task and performance environment.

Related to time is the relationship between performance behaviors and outcomes. Recent work has started to consider several performance behaviors as outcomes (e.g., learning [Edmondson, 1999] or creativity [Gilson & Shalley, 2004]) as well as mediators in subsequent work (e.g., Gilson, Mathieu, Shalley, & Ruddy, 2005). This suggests that at some stage during a team's life cycle such behaviors are outcomes of interest, yet at other stages they are antecedents or mediators driving performance outcomes. What does this cycle look like? The answer to this question, again, needs to be tied directly to the episodic nature of the performance environment within which teams work. For instance, for some teams a sales cycle may be two months, whereas others may work on a two-year sales cycle (e.g., in the aerospace industry). Therefore, the effects of trying new things (creativity) on outcomes may be manifest quite differently across settings. A similar relationship may exist between affect, viability, and performance outcomes. Teams that have more satisfied and committed members may, at some later point in time, exhibit higher performance. In short, we need to think not only in terms of what should be measured to understand team effectiveness, but when should different variables be assessed. Decisions of this type are particularly important when studying, for example, project-based teams whereby different activities are being performed at different stages of project completion. In contrast, such issues would become relatively less salient for production or sales teams who might perform the same types of activities for long periods of time. Regardless, we do need to emphasize that researchers should establish reasonable discriminant validity between measures of team mediators and outcomes. All too often, we would submit, close inspection of mediator–outcome relationships reported in team research reveals that the criterion measures were at least partially contaminated with measures of team states or processes. Such shortcomings can be overcome if researchers begin with a clear articulation of the team criterion space.

Finally, related to the above concerns are issues of aggregation. Historically, team researchers were concerned with aggregation of data from the individual- to the team-level. However, we have, to some extent, moved beyond this concern with the development of a number of good team-level measures. Whereas we now have several methods to test multilevel effects (Kozlowski & Klein, 2000), models of how team process and outcomes compile to yield organizational benefits are still lacking. With the advent of more complex teams-of-teams style

organizational designs (cf. Mathieu et al., 2001), the combination of team-level variables becomes a more challenging task. Nevertheless, the challenge needs to be met for research to be relevant for modern-day organizational arrangements.

## **Mediator–Team Outcome Relationships**

During the past decade, researchers have begun to give more attention to “mediating processes that explain why certain inputs affect team effectiveness and viability” (Ilgen et al., 2005: 519). Accordingly, in this section we consider a number of mediators and their relationship with team outcomes. As detailed previously, mediators fall into two major categories: processes and emergent states, in addition to those that represent a blending of these two categories.

### *Team Processes*

Team processes have played a central role in most, if not all, team effectiveness models (Gist, Locke, & Taylor, 1987; Guzzo & Shea, 1992; Hackman, 1983). Historically, team processes were categorized as either “taskwork” or “teamwork” (McIntyre & Salas, 1995; Oser, McCallum, Salas, & Morgan, 1989; Stout, Cannon-Bowers, Salas, & Milanovich, 1999). At its essence, *taskwork* describes functions that individuals must perform to accomplish the team’s task, whereas *teamwork* describes the interaction between team members (McIntyre & Salas, 1995). Building upon this foundation, Marks et al. (2001) developed a taxonomy of processes that included three superordinate categories: transition, action, and interpersonal. During *transition* phases, team members focus on activities such as mission analysis, planning, goal specification, and formulating strategies. Later, during *action* phases, members concentrate on task accomplishments, monitoring progress and systems, coordinating team members, as well as monitoring and backing up their fellow team members. Last, the *interpersonal* category includes conflict management, motivation and confidence building, and affect management and may be salient across episodic phases. Table 1 presents examples of studies that have featured team processes as important mediator variables.

*Transition processes.* Marks and colleagues (2001) conceptualized team processes as unfolding episodically with transition processes setting the stage for later actions. Transition processes, however, have received the least amount of empirical attention. As an example of such research, Janicik and Bartel (2003) found that planning contributed to the development of norms concerning how teams would manage time (e.g., deadlines). In turn, those temporal norms were found to relate significantly to performance.

Hillier et al. (2006) found that collective leadership enactment, which included variables such as planning and organizing, positively predicted supervisor-rated team performance. Mathieu and Schulze (2006) employed an episodic model of team processes and found that dynamic planning (i.e., contingency and reactive planning) was positively related to performance. Elsewhere, Mathieu and Rapp (in press) 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.

**Table 1**  
**Exemplar Team Process Mediator Studies**

Study	Sample	Process Variable	Additional Variable(s)	Outcomes	Key Findings
Jehn, Northcraft, and Neale (1999)	92 teams from the household goods moving industry	Relationship and task conflict	Informational and value diversity, interdependence, task complexity	Team performance, <sup>4</sup> satisfaction, <sup>5</sup> intent to remain, <sup>5</sup> group commitment <sup>5</sup>	Informational diversity—performance relationship was mediated by task conflict. Value diversity—affection outcomes effect was mediated by relationship conflict.
Johnson et al. (2006)	80 undergraduate student teams working on a simulation	Cooperation	Reward structures, information sharing	Decision accuracy, <sup>1</sup> decision speed <sup>3</sup>	Teams that switched from competitive to cooperative reward systems demonstrated less cooperation and performance.
LePine, Piccolo, Jackson, Mathieu, and Saul (in press)	Meta-analytic review of 138 studies	Transition, action, and interpersonal	Cohesion, potency	Team performance, <sup>4</sup> member satisfaction <sup>5</sup>	All processes related to performance and member satisfaction, and strongly related to cohesion and potency.
Mathieu, Gilson, and Ruddy (2006)	121 service technician teams	Team processes	Team empowerment	Team performance, <sup>4</sup> customer satisfaction <sup>2</sup>	Team processes mediated the relationship between empowerment and performance.
Mathieu and Schulze (2006)	29 student teams working on a simulation	Transition and interpersonal team processes	Team knowledge, use of formal plans	Team performance <sup>4</sup>	Formal planning and interpersonal process was directly related to performance.

*Note:* Performance: 1 = quantity, 2 = quality, 3 = timeliness, 4 = mixed, 5 = affective outcomes, 6 = individual-level outcomes.

*Action processes.* Whereas transition processes have received limited attention, action processes are frequently included in team studies. As a result, there is a wealth of research that demonstrates the critical role that processes such as communication and coordination play in team performance (see LePine, Piccolo, Jackson, Mathieu, & Saul, in press, for a review). For example, Tesluk and Mathieu (1999) evidenced that team coordination affected problem management actions. De Dreu and West (2001) demonstrated the importance of team member participation. Specifically, within two separate samples, it was found that participation interacts with minority dissent to increase team innovation. Similarly, Johnson and colleagues (2006) showed that a team's reward system can influence their level of information sharing and consequently the shape, speed, and accuracy of their decision making. Elsewhere, Porter (2005) demonstrated that backup behaviors had a positive relationship with decision-making performance.

*Interpersonal processes.* The interpersonal process dimension includes conflict, motivation, confidence building, and affect. Whereas research has been conducted on all of these topics, work on conflict is the most prevalent. In a meta-analysis De Dreu and Weingart (2003) found that both relationship and task conflict have strong, negative correlations with team performance and member satisfaction. Jehn, Northcraft, and Neale (1999) focused on task conflict and provided evidence that it was the means by which informational diversity positively influenced performance. Raver and Gelfand (2005) assessed relationship conflict and found that it mediated the association between ambient sexual hostility and team financial performance.

Research has considered interpersonal processes besides conflict. For instance, research has illustrated that feedback has a positive impact on motivation, interpersonal trust, and ultimately performance in virtual teams (Geister, Konradt, and Hertel, 2006). Additionally, Mathieu and Schulze (2006) considered a composite measure of interpersonal processes and found a significant, positive relationship with performance. Likewise, Maynard, Mathieu, Marsh, and Ruddy (2007) noted that such a composite measure of interpersonal processes provided the cross-level mechanism by which team-level resistance to empowerment climate related to individual-level satisfaction. Finally, Bradley, White, and Mennecke (2003: 361) argued that "the temporal dimensions of team and task are critical to the impact of interpersonal interventions on team performance." They noted that most previous studies were conducted with teams that briefly performed contrived tasks and were then disbanded. On the basis of their meta-analysis, Bradley et al. (2003) concluded that there is abundant support for the contention that interpersonal processes relate positively to team performance when teams engage in longer term tasks.

*Other processes.* Although the work of Marks et al. (2001) provides a convenient taxonomy, not all team processes fall neatly into one of the three higher order dimensions. For example, team creative processes have been defined as "members working together in such a manner that they link ideas from multiple sources, delve into unknown areas to find better or unique approaches to a problem, or seek out novel ways of performing a task" (Gilson & Shalley, 2004: 454). It has long been argued that creativity is a vital driver of team effectiveness (Hackman & Morris, 1975; Stein, 1974; Taggar, 2002; Tesluk, Farr, & Klein, 1997), and recent research has found that team creative processes have a significant positive effect

on performance (Gilson et al., 2005). Furthermore, whereas Gilson et al. (2005) found no direct relationship between creativity and customer satisfaction, they did find that creativity interacted with standardization such that high standardization and creativity resulted in high levels of customer satisfaction. No research that we are aware of has examined team creative processes and affective outcomes. However, it is interesting to note that the brainstorming literature has consistently found that groups who brainstorm are *more* satisfied and pleased with the ideas they generate (Paulus, 2000). These findings open the door for future research on creative processes and affective outcomes.

*Summary impressions and future directions.* A recent meta-analysis by LePine and colleagues (in press) found support for the implicit hierarchical arrangement of team processes advanced by Marks et al. (2001). Moreover, this work found substantial support for positive effect sizes between each of the lower order and higher order dimensions, as related to team outcomes. That said, most of the team process research to date is fragmented. To this point we found only three articles that have considered more than one of the higher order process dimensions (i.e., transition, action, and interpersonal) within a single study.

DeShon, Kozlowski, Schmidt, Milner, and Wiechmann (2004) found that team performance was positively affected by both strategy planning (i.e., transition processes) and team-focused effort (i.e., action process). Mathieu et al. (2006) considered the role that a composite measure of team processes played within the team empowerment–team performance nomological network and found that processes provided the link by which empowerment had an indirect effect on both customer satisfaction and objective performance. However, in further analyses separating the three team process dimensions, they found that only transition processes had a marginally significant relationship with customer satisfaction, whereas only action processes were significantly related to quantitative performance. Similar to these results, Maynard et al.'s (2007) cross-level study found that transition processes were positively related to customer satisfaction, whereas action processes appeared more salient for quantitative performance. However, this study also provided evidence that interpersonal processes had a significant, cross-level relationship with individual employees' level of satisfaction.

In summary, whereas it is clear that processes play a key role within team effectiveness models, many questions remain. Namely, while work has been done to provide a framework of team processes (e.g., Marks et al., 2001) researchers have yet to fully investigate *when* the respective team processes are most critical in explaining performance. Therefore, we call on researchers to devote more attention to the specific types of processes, assessing multiple types within a single study, and to more fully understand their individual and collective relationships with team outcomes.

### *Emergent States*

Marks and colleagues (2001: 357) described emergent states as “cognitive, motivational, and affective states of teams [that are] . . . dynamic in nature and vary as function of team context, inputs, processes, and outcomes.” Examples of emergent states that have received



**Table 2**  
**Exemplar Emergent States Mediator Studies**

Study	Sample	Emergent States	Additional Variable(s)	Outcomes	Key Findings
Austin (2003)	27 continuing groups within sporting goods company	Transactive memory systems	N/A	Goal performance, group evaluations <sup>4</sup>	Transactive memory systems were positively related to goal performance, external and internal group evaluations.
Beal, Cohen, Burke, and McLendon (2003)	Meta-analytic review of 64 studies	Cohesion	N/A	Team performance <sup>4</sup>	Cohesion was more highly correlated with performance than other outcomes, and more highly with efficiency than effectiveness.
Edmondson (1999)	51 work teams in a manufacturing company	Team learning	Psychological safety; team efficacy; team safety	Team performance <sup>2</sup>	Team learning behavior mediates the relationship between psychological safety and team performance.
Gibson and Gibbs (2006)	56 aerospace design teams	Psychological safety	Team virtuality	Innovation <sup>4</sup>	Each of the four dimensions of team virtuality were negatively associated with innovation.
Gully, Incalcaterra, Joshi, and Beaubien (2002)	Meta-analytic review of 67 studies	Team efficacy, team potency	Level of analysis, interdependence	Team performance <sup>4</sup>	Both efficacy and potency had positive relationships with performance.
Kilduff, Angelmar, and Mehra (2000)	35 simulated management teams	Strategic consensus	Demographic and cognitive diversity	Firm performance <sup>4</sup>	High-performance teams did not exhibit consensus at the beginning but converged as the team interacted.
Langfred (2005)	89 manufacturing teams	Individual- and team-level autonomy	Task interdependence	Team performance <sup>4</sup>	Individual- and team-level autonomy interacted with task interdependence to explain team performance.
Lubatkin, Simsek, Ling, and Veiga (2006)	139 top management teams	Behavioral integration	Ambidextrous orientation	Firm performance <sup>4</sup>	TMT behavioral integration was indirectly associated with firm performance.

(continued)



**Table 2 (continued)**

Study	Sample	Emergent States	Additional Variable(s)	Outcomes	Key Findings
Mathieu, Heffner, Goodwin, Cannon-Bowers, and Salas (2005)	70 undergraduate teams working on a combat simulation	Task- and team-shared mental models	Team processes	Team performance <sup>4</sup>	The relationship between task SMMs and performance was mediated by team processes. Team SMMs interacted with the quality of SMMs in shaping team processes and performance.
Schneider, Ehrhart, Mayer, Saltz, and Niles-Jolly (2005)	56 supermarket departments	Service climate	Leader behavior, citizenship behavior	Customer satisfaction <sup>2</sup> and unit sales <sup>1</sup>	Service climate was significantly, positively related to customer-focused citizenship behavior.
Stewart (2006)	Meta-analytic review of 93 studies	Team design-related psychological states	Group composition, leadership	Performance <sup>4</sup>	Meaningfulness exhibited a relationship with performance. Autonomy and intrateam coordination corresponded with higher performance.

*Note:* Performance: 1 = quantity, 2 = quality, 3 = timeliness, 4 = mixed, 5 = affective outcomes, 6 = individual-level outcomes. TMT = top management team; BI = behavioral integration; SMM = shared mental model.

significant attention during the past decade include team confidence, empowerment, team climate, cohesion, trust, and collective cognition (e.g., shared mental models, strategic consensus). Table 2 presents examples of studies that have featured emergent states.

*Team confidence.* The team confidence category of emergent states includes two related, but distinct, constructs—team efficacy and potency. *Team efficacy* has been defined as “a shared belief in a group’s collective capability to organize and execute courses of action required to produce given levels of goal attainment” (Kozlowski & Ilgen, 2006: 90). *Potency*, on the other hand, is generally defined as a collective belief regarding the team’s ability to be successful (Shea & Guzzo, 1987). The primary distinction between the two is that *efficacy* relates to the team’s belief that it can be successful on a *specific* task whereas *potency* refers to a team’s more *general* sense of its capabilities in relation to various tasks and different contexts. It should be noted that both constructs assume that these underlying beliefs are shared by all team members (e.g., Gully, Incalcaterra, Joshi, & Beaubien, 2002). Accordingly, these constructs do not represent the simple aggregation of team members’ self-efficacy or their individual beliefs in themselves across various tasks (e.g., Kozlowski & Ilgen, 2006).

Team efficacy and potency are theorized to have a positive impact on performance through their respective effects on the actions teams take (i.e., which goals are set), their level of effort, and resilience when task performance does not attain the aspired level. There is a large body of empirical research that has supported the positive relationship between team efficacy and potency with performance (e.g., Jung & Sosik, 1999). For example, Lester et al. (2002) provided evidence that potency was positively related to satisfaction, effort, and overall performance, whereas Knight, Durham, and Locke (2001) provided support for efficacy having a positive relationship with a team’s level of strategic risk.

Gully and colleagues (2002) conducted a meta-analytic review of this literature and concluded that team efficacy and potency exhibit mean corrected correlations with performance of .41 and .37, respectively. Moreover, they found that the relationship between efficacy and performance was higher when teams had greater, as compared to less, interdependence. This finding is consistent with the results of Gibson (1999), who found that the relationship between team efficacy and performance was moderated by task uncertainty and collectivism. Whereas work subsequent to Gully et al.’s meta-analyses has generally provided further support for the positive relationship that team efficacy and potency have on performance (e.g., Srivastava et al., 2006), de Jong, de Ruyter, and Wetzels (2005) provided a unique perspective indicating that potency can have negative implications on performance—in this case, service quality.

*Team empowerment.* To date, there have been two primary conceptions of team empowerment: structural and psychological (Mathieu et al., 2006). Structural empowerment considers the impact that the actual practice of delegating authority and responsibility can have on performance (e.g., Arnold, Arad, Rhoades, & Drasgow, 2000). Psychological empowerment is a team’s “collective belief that they have the authority to control their proximal work environment and are responsible for their team’s functioning” (Mathieu et al., 2006: 98). Within this section, we are concerned with emergent state constructs and, accordingly, we focus on psychological rather than structural empowerment. Initially, research focused on the relationship between psychological empowerment and overall team performance with

Hyatt and Ruddy (1997) finding a positive relationship. Kirkman and Rosen (1999) broadened the scope of psychological empowerment by considering a variety of performance and affective outcomes. Specifically, in a study of teams from four different organizations, they evidenced that empowerment had a positive impact on customer service, job satisfaction, and organizational and team commitment. Mathieu et al. (2006) found that psychological empowerment had a positive indirect effect on both performance and customer satisfaction, as transmitted through team processes.

Team empowerment has also been examined from a multilevel perspective. Empirical support has demonstrated that psychological empowerment is distinct from individual-level psychological empowerment (e.g., Seibert, Silver, & Randolph, 2004). Specifically, Seibert and colleagues (2004) found that team empowerment can influence individuals' performance and job satisfaction through its relationship with individual-level empowerment. More recently, Chen et al. (2007) examined how individual- and team-level empowerment interacted in shaping individual performance. Namely, they demonstrated a positive relationship between team empowerment and team-level performance and found that team-level empowerment moderated the relationship between individual-level empowerment and individual-level performance.

*Climate.* Climate refers to "the set of norms, attitudes, and expectations that individuals perceive to operate in a specific social context" (Pirola-Merlo, Hartel, Mann, & Hirst, 2002: 564) and was originally conceptualized as an organizational-level construct (e.g., Dickson, Resick, & Hanges, 2006). With the trend toward establishing teams with greater discretion in terms of policy setting and procedure implementation, it has been suggested that climate is more salient at the team-level of analysis (e.g., Tesluk, Vance, & Mathieu, 1999). The impetus for considering the role of climate at the team-level is that members' understanding of a situation has been shown to affect their attitudes and behaviors (e.g., Naumann & Bennett, 2002).

Whereas most research has examined the relationship between a general team climate and performance (e.g., Pirola-Merlo et al., 2002), there has been a noticeable trend for researchers to follow Schneider's (1975) recommendation and focus on specific dimensions of team climate. Climate research now includes such concepts as creativity climate (Gilson & Shalley, 2004) and learning transfer climate (e.g., Smith-Jentsch, Salas, & Brannick, 2001). In addition to considerations of such climate dimensions, there is a sizeable body of research on safety, service, and justice climates—as discussed below.

*Safety climate.* Zohar (2000) was one of the first researchers to measure safety climate at the team-level. His work developed a measure that demonstrated both within-group homogeneity and between-groups variation within a manufacturing company and also demonstrated that safety climate significantly predicted time-lagged team accident rates. Building upon this work, Katz-Navon, Naveh, and Stern (2005) examined four dimensions of safety climate and their respective, and interactive, effects on the number of treatment errors within hospital units. Their results revealed that perceived detailing of safety procedures exhibited a curvilinear relationship with treatment errors and that perceived priority of safety moderated the relationship between perceived detailing of safety procedures and the number of

treatment errors. Safety climate research also has evidenced cross-level effects, with Neal and Griffin (2006) finding that team-level safety climate predicted subsequent changes in individual-level safety motivation.

*Service climate.* Service climate has been conceptualized as employees' assessment of the organization's concern for customer well-being (Borucki & Burke, 1999). Accordingly, de Jong, de Ruyter, and Lemmink (2005) found that service climate was positively related to customer-rated perceptions of service quality. Additionally, in a study of units in a supermarket chain, Schneider, Ehrhart, Mayer, Saltz, and Niles-Jolly (2005) found that service climate has an indirect effect on customer satisfaction as mediated by unit customer-focused citizenship behavior. Finally, Hui, Chiu, Yu, Cheng, and Tse (2007) assessed the interactive effect of service climate and leadership behaviors on individual-level service. Their findings suggested that leadership was most critical to individual-level service quality within unfavorable service climates. In contrast, leadership was not as critical for individual-level service quality within favorable service climates. In fact, for internal customers, the results implied that leadership may actually be detrimental for service quality.

*Justice climate.* Naumann and Bennett (2002: 882) provided one of the first examinations of the group-level justice climate construct—"distinct group-level cognition about how a work group as a whole is treated." Colquitt, Noe, and Jackson (2002) assessed the relationship between procedural justice climate and team-level outcomes, finding that team-level procedural justice climate was significantly related to both performance and absenteeism. In addition, this study illustrated that the linear effect of justice climate was accentuated by the strength of the climate perceptions. Finally, Yang, Mossholder, and Peng (2007) considered the cross-level effects of procedural justice climate on individual-level organization commitment. Their study of Taiwanese work groups suggested that team-level procedural justice climate had a positive incremental impact on individual-level organizational commitment. Additionally, their work provided evidence that the climate construct interacted with team-level power distance as related to individual-level organizational commitment.

*Cohesion.* Cohesion, or the commitment of team members to the team's overall task or to each other (Goodman, Ravlin, & Schminke, 1987), has been one of the more thoroughly researched emergent states (Kozlowski & Ilgen, 2006). For example, Bass, Avolio, Jung, and Berson (2003) found support for cohesion as a mediator of the transformational leadership–performance relationship. Elsewhere, Raver and Gelfand (2005) found support for cohesion as a mediator of team-level ambient sexual hostility's negative influence on team financial performance. Michalisin, Karau, and Tangpong (2004) found a positive relationship between TMT cohesion and overall returns within their simulation study.

Given the amount of research pertaining to team cohesion, there are several meta-analytic reviews (e.g., Gully et al., 2002; Webber & Donahue, 2001). Most recently, Beal et al. (2003) examined studies conducted between 1951 and 2002 and found that cohesion had a mean corrected correlation with performance behaviors and performance outcomes of .30 and .17, respectively. Furthermore, Beal and colleagues illustrated that three dimensions of cohesion

(*interpersonal, task, and group pride*) were each significantly related to team performance and that “as team workflow increased, the cohesion-performance relationship became stronger” (p. 998).

*Trust.* Another prominent emergent state construct is trust. Most researchers have adopted the definition of trust advanced by Mayer, Davis, and Schoorman (1995):

the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party. (p. 712)

Langfred (2004) provided evidence that team-level trust exhibits a downward concave curve relationship with the level of monitoring within the team. His results showed that monitoring and the level of individual autonomy within the team interact, such that when individual autonomy is high and monitoring is low, team performance is negatively affected. Elsewhere, Kirkman, Rosen, Tesluk, and Gibson (2006) found trust served as a positive moderator of a team training proficiency–performance relationship. Finally, trust also appears to be a moderator within TMT performance models with Simons and Peterson (2000) finding that intragroup trust moderated the relationship between task and relationship conflict.

*Collective cognition.* Answering a call made by Klimoski and Mohammed (1994), extensive work has been done in the area of collective cognition during the past decade. For example, researchers have pointed toward shared mental models (e.g., Levesque, Wilson, & Wholey, 2001; Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005) and strategic consensus (e.g., Ensley & Pearce, 2001; Kellermanns, Walter, Lechner, & Floyd, 2005) as important antecedents to team effectiveness.

*Shared mental models (SMMs).* SMMs, or “an organized understanding or mental representation of knowledge that is shared by team members” (Mathieu et al., 2005: 38), is one of the more developed collective cognition literature streams. Early theoretical work within the SMM literature suggested that teams hold multiple mental models simultaneously (e.g., Klimoski & Mohammed, 1994; Wilson & Rutherford, 1989). Based upon such arguments, Cannon-Bowers, Salas, and Converse (1993) developed a typology, and their dimensions included (a) technology, (b) task, (c) team interaction, and (d) team. Whereas this SMM typology is widely accepted, research has predominantly only focused on a single dimension within a given study or collapsed the SMM dimensions into a composite measure. For example, Marks, Sabella, Burke, and Zaccaro (2002) investigated the role of cross-training on the development of team interaction SMMs. As an example of the later approach, Marks, Zaccaro, and Mathieu (2000) assessed the role that team interaction training and leader briefings had on the development of an omnibus SMM construct and found positive relationships.

When researchers have sought to measure more than one type of SMM, more often than not, they have collapsed the dimensions into two (task and team). *Task SMMs* suggest that

team members hold a common schema regarding their task and the potential role that the broader environment may play. In contrast, *team SMMs* represent a shared understanding among team members about how they will interact with one another. For example, Mathieu et al. (2000) provided evidence that team SMMs have a direct impact on performance, in contrast to task SMMs, which evidenced an indirect effect through their effect on processes.

Research has begun to consider the interaction between the dimensions of SMMs. In a study of safety and efficiency in air traffic control towers, Smith-Jentsch, Mathieu, and Kraiger (2005) reported that neither category of SMMs evidenced a direct effect, but the interaction of the two SMMs exhibited a positive relationship with both tower safety and efficiency. Another recent development within the SMM literature is the consideration of whether it is the "sharedness" of mental models that is most critical to team performance, as compared to the accuracy or quality of the underlying mental models (e.g., Lim & Klein, 2006). Work by Edwards, Day, Arthur, and Bell (2006) suggests that accuracy is a stronger predictor of team performance as compared to SMM similarity. Moreover, Marks et al. (2000) and Mathieu et al. (2005) found that SMM sharedness and quality interacted to positively influence both team processes and performance.

*Strategic consensus.* Kellermanns et al. (2005: 721) defined strategic consensus as "the shared understanding of strategic priorities among managers at the top, middle, and/or operating levels of the organization." In contrast to SMMs, which consider overlapping mental representations on various factors, strategic consensus represents the agreement on strategic priorities. Although we should note that early strategic consensus work focused exclusively on TMTs (e.g., Amason, 1996; Bourgeois, 1985), more recent work has broadened the application to management teams across the organizational hierarchy (e.g., Floyd & Lane, 2000).

Given the focus on high-level management teams, Kellermanns and colleagues (2005) noted that the criteria for strategic consensus is typically in terms of organizational or major unit outcomes. For example, Iaguinto and Fredrickson (1997) showed that strategic consensus within TMTs was positively related to organizational performance. Additionally, research indicates that the positive impact of strategic consensus on organizational performance may be mediated by consensus on decision commitment (Dooley, Fryxell, & Judge, 2000). Finally, Kilduff, Angelmar, and Mehra (2000) illustrated that successful TMTs did not possess strategic consensus at the beginning of their life cycle but gradually moved toward consensus near the end of their life cycle. Additionally, this work suggested that strategic consensus and firm performance have a reciprocal relationship, whereby firm performance is affected by and likewise affects strategic consensus.

### *Blended Mediators*

Whereas the constructs discussed above are easily categorized as either processes or emergent states, there are several other mediators of the team input-outcome relationship that are a blend of processes and emergent states. We consider three: (a) team learning, (b) behavioral integration, and (c) transactive memory.



*Team learning.* Edmondson (1999: 350) was one of the first to acknowledge that the teams and learning literatures had developed with little “cross-fertilization.” The construct of team learning is said to represent an ongoing process of reflection and action, through which teams acquire, share, combine, and apply knowledge (Argote, Gruenfeld, & Naquin, 1999; Edmondson, 1999). In this sense, it reflects an active set of team processes, and yet team learning is also referred to as knowledge being embedded within the team (Argote & Olivera, 1999). Embedding knowledge requires that teams codify what they have learned by documenting their work processes and thus converting tacit knowledge into explicit knowledge (Gibson & Vermeulen, 2003). Knowledge codification, however, represents a state that characterizes what a team has learned at any given time (Cohendet & Steinmueller, 2000).

Zellmer-Bruhn and Gibson (2006) found a positive relationship between team learning and both task performance and the quality of intrateam relations. Wong (2004) assessed the relationship between learning that occurs from within (i.e., local learning), as well as from outside the team (i.e., distal learning) and found both to be positively related to efficiency and innovativeness. Moreover, the two forms of team learning interacted, such that distal learning negatively affected the relationship between local learning and team efficiency. Edmondson (1999) provided insight into other variables that are included in the team learning nomological network. Specifically, in assessing the relationship between team learning and performance, Edmondson provided evidence that team learning served as a mediator for the relationship between psychological safety (“a shared belief held by members of a team that the team is safe for interpersonal risk taking” [p. 350]) and performance.

*Behavioral integration.* In the context of his work on TMTs, Hambrick (1994: 189) introduced the concept of behavioral integration proposing that it “has three major elements: (a) quantity and quality (richness, timeliness, accuracy) of information exchange, (b) collaborative behavior, and (c) joint decision making.” In other words, a state of behavioral integration (BI) exists when teams engage in the above three types of processes. Thus, BI is a blended construct that describes how three related processes yield a resulting state.

Simsek, Veiga, Lubatkin, and Dino (2005) found evidence that TMT goal preference diversity, educational diversity, and size were negatively related to BI. Elsewhere, Lubatkin, Simsek, Ling, and Veiga (2006) found that BI exhibited a positive relationship with firm performance, as mediated by TMT ambidextrous orientation. Finally, Carmeli and Schaubroeck (2006) found that BI was positively associated with decision quality and negatively with organizational decline.

*Transactive memory systems (TMSs).* TMSs have been defined as the collection of knowledge possessed by each team member and a collective awareness of who knows what (e.g., Austin, 2003; Rulke & Rau, 2000). Accordingly, TMSs should benefit teams through enhanced communication and coordination as a result of the groups’ awareness of the collective knowledge that is available and where it resides within the team (e.g., Wegner, 1986). For example, Rulke and Rau (2000: 373) found that individuals within teams that possess higher levels of TMSs “declared domains of expertise during earlier rather than later periods of group interaction, and the frequency with which members evaluated others’ expertise and competence increased with time.” Lewis (2004) reported a positive relationship between the presence of TMSs and both team performance and viability.

As with SMMs, Austin (2003) considered whether teams could have multiple TMSs. Specifically, he examined the relationship between task and external relationship TMSs and team performance and provided evidence that both types of TMSs had a positive impact on various measures of team performance (i.e., goal performance, as well as both internal and external group evaluations). Lewis, Lange, and Gillis (2005) further developed the TMS construct when they suggested that the positive benefits of TMSs go beyond the specific task for which the TMS was developed. In fact, these researchers provided evidence that TMSs affect a team's ability to apply prior learning to new tasks—a concept referred to as learning transfer. Finally, research has begun to consider various types of team cognitive constructs within a single study. As an example, Ellis (2006) investigated the role of acute stress on the performance of teams working on a command-and-control simulation. The results of this study indicate that the negative effect of stress on performance is attributable to the negative impact that stress had on both SMMs and TMSs.

### *Summary Impressions and Future Directions*

The distinction between process and emergent states appears to be gaining acceptance in the literature and helping to sort out the mediator portion of many team effectiveness models. Moreover, as discussed previously, there is growing empirical evidence to support the various team process dimensions. Nevertheless, empirical analyses have demonstrated that different processes are highly correlated. Moreover, conceptually distinguishable types of emergent processes are typically highly correlated with one another. And to make matters worse, measures of processes and emergent states are typically highly correlated with each other—particularly when assessed at the same time and from the same source of measurement.

What are the implications of this collinearity? First, if processes, emergent states, and other variables are highly correlated, then any study that features only one type of variable is susceptible to problems associated with what is commonly referred to as omitted- or 3rd-variable issues. For example, if empowerment is found to be a significant mediator, one might wonder if the effect is really attributable to cohesion, planning processes, or other mediators, unless they too were measured and incorporated into the analyses. Second, if these various mediators are highly correlated, one might question their discriminant validity. Whereas powerful statistical techniques such as confirmatory factor analyses may support their empirical differentiation, researchers are still left to wonder whether members can really make such fine distinctions as compared to developing more general impressions about how well their team functions.

Finally, the high correlations found among different mediators are no doubt somewhat attributable to the modal study design employed by most researchers. LePine et al. (in press) argued that high correlations likely result from researchers measuring all processes and states at the same point in time and often from the same source. They called for more research that uses time-based designs that align the different measurements of constructs with when they are thought to be activated (e.g., transition processes prior to action processes). Furthermore, they suggested that researchers consider using multiple forms of measurement so as to minimize



same-source concerns. We echo those sentiments, as well as Tesluk et al.'s (1997) recommendations that different sources of measurement are likely to be better suited for assessing different constructs. For example, emergent states such as cohesion are perhaps best assessed by team members, as they refer to individuals' collective social psychological feelings. In contrast, backup behaviors are visible and thus can be assessed by others who are not actively engaged in team activities. Deliberate plans typically yield physical traces and other by-products that can be assessed by other techniques. In short, more elaborate research designs and measurement systems can better inform us about the empirical differentiation (or not) of various mediating mechanisms and their interrelationships.

In a related temporal theme, emergent states are believed to do just that—*emerge* over time. Therefore, numerous intriguing questions about such constructs have yet to be addressed. For example, once a team is formed, how long does it take for shared perceptions of collective efficacy to form and solidify? How vulnerable to transgressions are shared perceptions of trust? Does it matter when such transgressions occur? These questions and others like them home in on the issues of when emergent states develop and how impervious they are over time. Morgeson and Hofmann (1999) referred to this issue as the emergence of the collective structure of constructs over time. Here again, adopting a developmental perspective has much to offer our understanding of team mediators. Moreover, such development may not be a simple linear progression over time. Salient questions in this regard include whether there are critical moments or stages in development or whether discontinuous changes such as “tipping points” might increase our understanding of the function of team mediators over time.

## Team Composition Inputs

Team composition research focuses on the attributes of team members and the impact of the combination of such attributes on processes, emergent states, and ultimately outcomes. Composition has been incorporated into studies of team effectiveness for nearly 50 years (e.g., Mann, 1959) and has been conceptualized as including job-related (Webber & Donahue, 2001) as well as surface and deep-level attributes (Harrison, Price, & Bell, 1998). Individual inputs to team mediators implicitly evoke *composition* or *compilation* processes. Kozlowski and Klein (2000) described *composition processes* as relatively simple combination rules, such as averaging lower level units to represent a higher level construct. Diversity indices are also compositional in nature, as they represent the higher level construct as a variance of lower level entity characteristics. An important point to note about compositional models is that all lower level entities are presumed to be comparable and weighted equally in the construction of the higher level construct. In contrast, “in *compilation models*, the higher-level phenomenon is a complex combination of diverse lower-level contributions” (Kozlowski & Klein, 2000: 17). In other words, compilation describes a situation where the higher level construct is something different than a mere descriptive statistic of lower level entities. For example, team performance may be unduly influenced by the least (or most) competent individual member. Over the past 10 years, researchers have emphasized the operationalization of member's attributes in team effectiveness models, because different methods

of indexing can yield different results (Barrick et al., 1998). Below we review three general approaches to indexing team composition. Two approaches, *mean values* and *diversity indices* are compositional models, whereas the last, which we refer to as *complex combinations*, is a compilational approach. Table 3 presents examples of studies that have used team composition variables as drivers of mediators and outcomes.

### *Mean Values*

The form of emergence that underlies the average of member attributes is referred to as a summary index (Chen, Mathieu, & Bliese, 2004) and relies on some measure of central tendency of members' attributes. Using this methodology, the pooled value of a characteristic is presumed to affect a team, regardless of how that characteristic is distributed among members (Barrick et al., 1998; Stewart, 2006).

*Personality.* Several trends are evident in the team personality research. First, the range of personality factors being considered has been extended beyond the Big Five to include achievement orientation, dependability (LePine, 2003), assertiveness (Pearsall & Ellis, 2006), and locus of control (Boone, Van Olffen, Van Witteloostuijn, & De Brabander, 2004). Second, there has been increasing recognition that complex dynamics accompany personality factors. For instance, Halfhill, Sundstrom, Lahner, Caldron, and Nielsen (2005) found that teams composed of members with high levels of both conscientiousness and agreeableness exhibited the highest levels of performance. Others suggest that the effects of personality on team performance may vary according to the nature of the task (e.g., English, Griffith, & Steelman, 2004; LePine, Colquitt, & Erez, 2000; Neuman & Wright, 1999).

Recently, Bell (2007) conducted a meta-analysis on the relationship between personality and performance. Her results indicate that average team conscientiousness, agreeableness, extraversion, emotional stability, and openness to experience related positively to performance in field settings. In addition to the direct effects, research has also begun to examine the mediators through which compositional variables relate to outcomes, such as by facilitating cooperation, conflict resolution, communication, and teamwork (e.g., Barrick et al., 1998). Ellis, Hollenbeck, Ilgen, Porter, West, and Moon (2003) revealed that teams with high average levels of cognitive ability learned more when the team's workload was evenly distributed. In comparison, teams composed of people with high average agreeableness were not as adept in terms of team learning.

*Competencies.* Because of the unique demands of working in a team, the knowledge, skills, and abilities (KSAs) needed for effective performance differ from those needed by individuals working alone (Morgeson, Reider, & Campion, 2005). The interaction required in team settings introduces a unique set of teamwork KSAs (see Stevens & Campion, 1994, for a full discussion) that have been shown to facilitate performance (e.g., Cooke, Kiekel, Salas, & Stout, 2003; Hirschfeld, Jordan, Feild, Giles, & Armenakis, 2005; McClough & Rogelberg, 2003; Stevens & Campion, 1999).

**Table 3**  
**Exemplar Team Composition Input Influence Studies**

Study	Sample	Composition Factor	Team Mediators	Outcomes	Findings
Barrick, Stewart, Neubert, and Mount (1998)	41 assembly and maintenance teams	Personality; ability	Cohesion	Performance; <sup>4</sup> team viability <sup>5</sup>	General mental ability (GMA), conscientiousness, agreeableness, extraversion, and emotional stability related positively to team performance. GMA, extraversion, and emotional stability related positively to team viability. Cohesion partially mediated some relationships.
Bell (2007)	Meta-analysis of 89 studies	Personality; ability		Performance <sup>4</sup>	The strength of team composition and performance was moderated by the study setting (lab or field) and the operationalization of the team composition variable. Minimum agreeableness and mean conscientiousness, openness to experience, collectivism, and preference for teamwork were strong predictors of performance in field studies.
Bunderson and Sutcliffe (2002)	45 business unit management teams	Functional diversity	Information sharing	Performance <sup>1</sup>	Dominant function diversity (extent to which team members differ in the functional areas within which they have spent the greater part of their careers) had a negative, and intrapersonal functional diversity, a positive effect on information sharing and team performance.

(continued)

**Table 3 (continued)**

Study	Sample	Composition Factor	Team Mediators	Outcomes	Findings
Ellis, Bell, Ployhart, Hollenbeck, and Ilgen (2005)	65 command and control simulation teams <sup>3</sup>	Teamwork; knowledge	Communication	Competencies <sup>2</sup>	Teamwork training related positively to cognitive and skill-based outcomes. Also, the effects of declarative knowledge differed across team members depending on their roles and responsibilities. The team benefited the most from the knowledge held by the team member who occupied the most critical position in the workflow. The length of time team members worked together weakened the effect of surface-level diversity and strengthened the effects of deep-level diversity.
Harrison, Price, and Bell (1998)	71 hospital and grocery store teams <sup>2</sup>	Demographic, personality, ability, and attitude diversity		Cohesion <sup>5</sup>	

*Note:* Performance: 1 = quantity, 2 = quality, 3 = timeliness, 4 = mixed, 5 = affective outcomes, 6 = individual-level outcomes.

In a meta-analysis of 19 studies, Devine and Philips (2001: 523) concluded “that the functional amount of cognitive ability in teams does indeed predict team performance across a broad variety of team contexts.” They submitted that the effects would likely be most pronounced for teams who performed intellectual or decision-making tasks as compared to more physical ones. Whereas member cognitive ability may be valuable for teams in general, task-related knowledge levels are likely to be even more important to teams that perform a task over time. For example, Mathieu and Schulze (2006) found that teams with high levels of task-related knowledge not only performed better but were better able to execute transition processes.

*Other attributes.* Numerous other characteristics have been used to index team composition. For example, in contrast to stable traits that predispose one to adopt a particular response pattern across situations, orientations refer to transient dispositions that prompt situationally determined responses (Button, Mathieu, & Zajac, 1996). Goal orientations (i.e., an individual’s approach to achievement situations: Dweck, 1986) and teamwork orientation (i.e., propensity for accomplishing work as part of a team as opposed to individually: Driskell & Salas, 1992) have been used as composition variables. Researchers have conceptualized goal orientation as the average of members’ orientations (LePine, 2005; Porter, 2005) as well as a referent-shift-type construct (Chen, Mathieu, & Bliese, 2004) that considers the effects associated with a team’s goal orientation (e.g., Bunderson, 2003, DeShon et al., 2004). Results indicate that goal orientation is predictive of team mediators (e.g., commitment, efficacy, processes) as well as performance. Bunderson and Sutcliffe (2003) suggested that team learning orientation can have both positive and negative consequences. Specifically, team learning orientation can enhance team adaptive behaviors and overall team performance in the long run, although in the short term, an extreme focus on learning and competence development can impair performance. Finally, LePine (2005) found that members’ goal orientation interacted with goal difficulty to predict adaptability in a dynamic environment, and that goal orientation predicted team processes and ultimately performance. LePine’s study demonstrates that orientations may combine with other factors in complex ways, and provides insight into some of the mechanisms by which orientations influence performance.

Other research has suggested that average member teamwork orientation enhances effectiveness (e.g., Bell, 2007; Harris & Barnes-Farrell, 1997; Jung & Sosick, 1999; Watson, Johnson, & Merritt, 1998), teamwork (Eby & Dobbins, 1997; Harris & Barnes-Farrell, 1997), and ultimately viability (Harris & Barnes-Farrell, 1997). With regard to member attitudes, Harrison et al. (1998) found that the average levels of job, supervisor, and work satisfaction related positively to cohesion. Similarly, Jehn and Mannix (2001) found that group value consensus related positively to beneficial patterns of conflict via higher levels of trust, respect, cohesiveness, and liking. Hobman, Bordia, and Gallois (2004) found that a team’s openness to diversity exhibited a positive relationship with team involvement.

## *Diversity*

Diversity factors consider the influence of the heterogeneity of team member characteristics on team mediators and outcomes (Chen et al., 2004). Findings indicate that diversity is a

complex input factor in team effectiveness models, with studies reporting diversity as being beneficial, detrimental, and having no impact on processes, states, and performance (see Webber & Donahue, 2001). Additionally, research has shown diversity effects interact with time (Harrison et al., 1998), task type (Joshi & Jackson, 2003; Pelled, Eisenhardt, & Xin, 1999), and organizational culture (Brickson, 2000; Ely & Thomas, 2001). Although there is a large literature dealing with team diversity and several comprehensive reviews (Jackson, Joshi, & Erhardt, 2003; Jackson, May, & Whitney, 1995; Milliken & Martins, 1996; Williams & O'Reilly, 1998), we focus on the diversity among team members in terms of demographic, functional background, personality, and attitudes/values, as well as complex combinations.

*Demographic.* A meta-analysis by Webber and Donahue (2001) sought to distill the influence of demographic diversity, and found no support for a relationship with either cohesion or performance. However, a number of studies have found diversity in age (Kilduff et al., 2000) and tenure (Jehn & Bezrukova, 2004) to be beneficial to performance. In contrast, race/ethnicity, gender, age, tenure, and education (e.g., Jackson, Joshi, & Erhardt, 2003; Kirkman, Tesluk, & Rosen, 2001; Leonard, Levine, & Joshi, 2004; Li & Hambrick, 2005; Mohammad & Angell, 2003, 2004; Pelled et al., 1999; Simons, Pelled, & Smith, 1999; Timmerman, 2000; Townsend & Scott, 2001; Watson et al., 1998) have all been shown to be detrimental to processes (e.g., relationship conflict), emergent states (e.g., empowerment; organizational commitment), and performance. Interestingly, when time is added into the equation, the results vary. For instance, Harrison et al. (1998) found that surface-level diversity (e.g., age) interacted with time such that its influence was neutralized as members spent more time working together. Also notable in this area are the studies that consider complex interactions among diversity attributes. Jackson and Joshi (2004) found evidence of a three-way diversity interaction, with sales team performance being lowest for teams with a combination of relatively high tenure, gender, and ethnic diversities. In summary, it appears that the effect of diversity may vary as a function of a team's task and embedding context, such as culture and climate, as well as time (see Jackson et al., 2003).

*Functional.* Functional diversity has been examined primarily within the context of management teams, and it is thought to provide them with a breadth of perspectives, skills, and expertise (Hoffman & Maier, 1961). However, functional diversity has not always been associated with higher performance (e.g., Carpenter, 2002; Jehn & Bezrukova, 2004; Pelled et al., 1999; Pitcher & Smith, 2001) and has, in fact, been shown to inhibit processes and effectiveness through increased conflict (Knight et al., 1999; Pelled et al., 1999), reduced information sharing (Ancona & Caldwell, 1992), and slower competitive response (Hambrick, Cho, & Chen, 1996). Despite this, there have been some recent theoretical and operational developments related to functional diversity. Specifically, Bunderson and Sutcliffe (2002) demonstrated that the various conceptualizations of functional diversity may differentially affect processes and performance. They also introduced the notion of intrapersonal functional diversity (i.e., the extent to which team members are functional specialists or broad generalists with work experiences spanning a range of functional areas) and found that interpersonal functional diversity (i.e., between-person heterogeneity) exhibited a negative effect, whereas average intrapersonal (i.e., within-person heterogeneity) exhibited a positive effect, on team information processing and thereby performance.

*Personality.* Much like the findings associated with the diversity of other attributes, heterogeneity in personality traits has yielded a vast array of mixed results. Researchers have found diversity of team extraversion (Mohammad & Angell, 2003; Neuman, Wagner, & Christiansen, 1999) and emotional stability (Neuman et al., 1999) to relate positively to performance. Diversity in extraversion, however, has been shown to be detrimental to processes (Mohammad & Angell, 2004), whereas member diversity in terms of agreeableness and neuroticism have been shown to negatively affect performance (Halfhill et al., 1999) Mohammad & Angell, 2003). Moving beyond the Big Five, Mohammad and Angell (2004) found that diversity in members' time urgency (i.e., a trait variable relating to perceptions of deadlines, time awareness, and the rate at which tasks must be performed; Landy, Rastegary, Thayer, & Colvin, 1991) was positively related to relationship conflict in teams.

*Attitudes/values.* While sparse team composition research has examined the diversity of team member attitudes, work by Harrison and his colleagues (Harrison et al., 1998; Harrison, Price, Gavin, & Florey, 2002) represents an exception. In their earlier (1998) study, they differentiated between surface (i.e., easily identifiable attributes such as race, age, and gender) and deep-level attributes (i.e., underlying attributes such as attitudes, values, etc.). More recently, Harrison et al. (2002) examined the diversity of members' attitudes regarding terminal values, task meaningfulness, and outcome importance. They employed a four-wave longitudinal design that highlighted the interaction between time and diversity and delved deeper into the dynamics associated with attitudinal diversity including the interplay of perceived and actual diversities.

### *Complex Combinations*

Although means and variances of individuals' characteristics represent popular compositional approaches for indexing member influences, more complex compilational approaches have also been advanced in the past decade.

*Faultlines.* The concept of faultlines was introduced by Lau and Murnighan (1998) and refers to hypothetical dividing lines that split a group into subgroups based on one or more attributes (e.g., demographic, functional and educational background, geographical location, etc.). Faultline strength has been shown to exhibit a negative relationship with processes (Li & Hambrick, 2005; Polzer, Crisp, Jarvenpaa, & Kim, 2006; Thatcher, Jehn, & Zanutto, 2003) and emergent states such as cohesion (Molleman, 2005) and behavioral/social integration (Li & Hambrick, 2005; Rico, Molleman, Sanchez-Manzanares, & Van der Vegt, 2007). However, Lau and Murnighan (2005) unexpectedly found that faultline strength was associated with less conflict and more group learning, psychological safety, and team satisfaction. Their counterintuitive findings suggest that faultlines are not yet fully understood. More complex relationships have also been investigated, and results indicate that the influence of faultlines depends on autonomy (e.g., Molleman, 2005; Rico et al., 2007) and that the effectiveness of communications depends on faultline strength (Lau & Murnighan, 2005). Thatcher et al. (2003) simultaneously examined faultlines composed of multiple team



member characteristics and found evidence of a curvilinear relationship, with groups having no or strong faultlines exhibiting higher levels of conflict and lower levels of morale and satisfaction than teams with moderate faultlines. In sum, the literature on faultlines is somewhat limited compared to other composition issues. It offers promise, however, in terms of unraveling the dynamics given rise to by composition differences among team members and can certainly be expanded to consider the mechanisms by which faultlines influence performance, as well as how the effect of faultlines may change over time.

*Position and status issues.* Team composition research that focused on relative position or status often attends only to the highest or lowest individual composition score in a team. The underlying assumption is that a single individual, such as the most intelligent team member, can have a significant and disproportional influence on a team. Researchers often rely on Steiner's (1972) task classification to justify operationalizing a composition factor in this way. For instance, Steiner argued that in disjunctive tasks (e.g., problem solving), team performance is influenced by the smartest member, whereas in conjunctive tasks (e.g., assembly line), the capabilities of the weakest member tends to limit overall performance. Similarly, Barrick et al. (1998) argued that a single disagreeable member could hamper a team's ability to work together cooperatively and that a single emotionally unstable member can impair a team's functioning. This approach has been used by other researchers (e.g., Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003; Halfhill et al., 1999; Neuman & Wright, 1999; Pearsall & Ellis, 2006; Day, Arthur, Miyashiro, Edwards, Tubre, & Tubre, 2004; Ellis, Bell, Ployhart, Hollenbeck, & Ilgen, 2005). Recently, Bell (2007) conducted a meta-analysis on deep-level composition factors and found that in lab settings, both minimum and maximum general cognitive ability predicted performance, whereas in field settings, minimum agreeableness was a strong predictor of performance. There also appears to be opportunities for integration between this and the network conceptualization of composition, as research on the "critical member" (cf. Ellis et al., 2005) also points to issues of position and status. While less prevalent among team composition research, considerations of the circumstances under which, and the mechanisms by which, a single member or subset can substantively influence processes and performance is an area that would benefit from future research.

*Network features.* The network perspective is increasingly prevalent in teams research (Borgatti & Foster, 2003). Research that examines network features associated with teams focuses on the social connections (i.e., ties) that link members between and within teams. One research stream considers the dynamics associated with network connections among members of a single team and suggests that factors relating to individuals in specific network positions within a team can influence outcomes at the team-level (e.g., Ellis et al., 2005; Mehra, Kilduff, & Brass, 2001; Pearsall & Ellis, 2006). Ellis and colleagues (2005), for instance, focused on criticality (i.e., the extent to which removing a particular task position might break down the team's workflow) and found that the knowledge held by critical team members was especially important for effectiveness. Their research suggests that criticality can play an important role in team settings, because critical team members may serve as a conduit for effective team functioning. Klein, Lim, Saltz, and Mayer (2004) considered how composition factors function as antecedents and found that member personality and



demographic factors can predict member centrality. Specifically, they found that members with high levels of education and low levels of neuroticism were highly central.

A second vein of this research considers the network position of a team within its larger embedding context. Balkundi and Harrison (2006) conducted a meta-analysis of 37 studies and found that social networks have important implications for team performance and viability. Specifically, teams with dense configurations of ties (i.e., the level of interrelatedness among all possible social ties) exhibited higher levels of goal attainment and were more likely to remain together as compared to teams with sparse network ties. Their study also found that teams with leaders who were high, rather than low, in centrality tended to be more productive and that a team's centrality in an interteam network was conducive to performance. Centrality appeared to provide teams with advantages in terms of acquiring and applying resources. Finally, Balkundi and Harrison illustrated a moderating effect of time (i.e., in terms of both familiarity and temporal precedence) and tie content. This dual approach of examining networks within and between teams offers a comprehensive perspective of social networks in team context. It also provides a realistic perspective in terms of inherently recognizing that teams do not work in a vacuum, but instead they function within larger organizational networks and are in themselves social networks of team members.

### *Summary Impressions and Future Directions*

Over the past decade, the team composition research has continued to flourish and to answer important questions about assembling individuals to work together as a team. Yet as many questions remain as have been answered. Below we outline six areas that we believe warrant further attention.

First, we believe that greater scrutiny should be devoted to the construct validity of compositional (mean and variance approaches) variables. In other words, *what does the average level or variance of individual characteristics represented within a team really mean?* Is average cognitive ability a resource that can be deployed by the team if it has effective transactive memory systems in place? Does a high variance in conscientiousness imply that there will be disagreements about how and when things should be done (i.e., a sign of a weakness), or does it imply that the team is "balanced" in terms of who will monitor work and keep the team on pace (i.e., a sign of strength)? In short, we believe that many team compositional studies may be ones of convenience where researchers had measures of individual differences available and sought to "make something interesting out of them." While we encourage creative thinking in research, we worry about Type I errors that may result from scholars looking at a myriad of combination strategies and featuring the ones that "work out best." In contrast to such approaches, Hofmann and Jones (2005) advocated an isomorphic referent-shift theory of team personality that likened Big 5 constructs at the team-level of analysis to emergent climate variables. This is one example of construct development that goes beyond a simple aggregation of individuals' attributes.

A second issue concerns *how compositional indices operate over time*. Recall that Harrison and colleagues (1998, 2002) demonstrated that the influence of surface-level differences diminished over time, whereas the influence of deeper differences strengthened.

Their studies, however, are more the exception than the norm, and our understanding is far from complete. Teams do not operate in static environments, yet more often than not, team composition research is cross-sectional and provides little insight into temporal dynamics.

Third, we believe that future advances are likely to come from viewing *team composition as a complex combination of member attributes*. Mean and diversity indices implicitly assume that all members contribute equally to a team composition, we believe that it is far more often the case that members exert disproportionate influences on team functioning by virtue of the positions that they occupy, their relative status, and so forth.

Fourth, there has been very little in the way of research on *dynamic team composition*. The modal composition study indexes team composition at one point in time and associates it with mediators and outcomes measured at later times. However, members move on and off teams for a variety of reasons ranging from promotions and turnover to changing task demands that necessitate compositional changes. For example, the second author conducted a study of accounting audit teams that worked with several different organizations. Few team members were present throughout the entire project, as some members worked the initial stages and left while others came in and wrapped up the latter portions of each project. Very few studies that we are aware of mentioned such dynamics, let alone accounted for them empirically.

Fifth, there are interesting questions regarding *how to best balance team composition needs with the desire to develop individual members*. In real organizational settings, managers often face decisions about staffing a team with an individual that is most qualified for the task, or a less qualified individual for whom the assignment would provide an important developmental opportunity. While managers appear to rely on some internal cognitive algorithm to make such decisions, the research on teams has not yet begun to address this issue. Thus, there are opportunities for researchers to investigate when, and under which circumstances, team leaders may consider incorporating developmental considerations into team staffing decisions.

Finally, although scholars have acknowledged *that individuals often belong to multiple teams simultaneously* (e.g., Espinosa, Cummings, Wilson, & Pearce, 2003), there is scant research devoted to how this influences either teams or individuals. For instance, in project-based settings, individuals are often part of a resource pool that is drawn from according to some combination of their KSAs and the needs of the project or team task. Individuals may simultaneously be members of four or five teams. How do such a work arrangements influence their contributions, identity, and so forth to each team? What impact does this have on the members themselves? Does it matter if they occupy similar or widely different roles across those various team memberships? Although this type of work arrangement is quite prominent these days, very little is known about its implications for teams and individuals alike.

## Team-Level Inputs

There are numerous team-level input variables discussed within the literature that influence mediators and outcomes. In the following section, we focus on a select group of such

constructs that have received substantial attention within the past decade: interdependence, virtuality, training, leadership, and team structure. Table 4 presents examples of studies that employed team-level variables as antecedents of mediators and outcomes.

### *Interdependence*

Researchers have long sought to distinguish between different types of teams based on the contexts within which they work, their type of task, and the length of time the team is together (e.g., Chen, 2005). Using such variables as evaluative characteristics, various typologies of teams have been suggested (e.g., Cohen & Bailey, 1997; Katzenbach & Smith, 1993; Mohrman, Cohen, & Mohrman, 1995; Sundstrom, De Meuse, & Futrell, 1990). However, a potentially more informative way in which to characterize teams is accordingly to their underlying substantive nature, such as in terms of their degree and type of interdependence.

At its core, interdependence describes the “extent to which team members cooperate and work interactively to complete tasks” (Stewart & Barrick, 2000: 137). Although prominent in many definitions of organizational teams (e.g., Guzzo & Dickson, 1996; Kozlowski & Bell, 2003), researchers have continued to call for empirical work to include considerations of interdependence. In fact, Kozlowski and Bell (2003) stated that research that fails to consider interdependence has little value in developing knowledge about organizational teams. In an attempt to include greater depth to discussions of team interdependence, many researchers have attempted to highlight different types of interdependence and assess their respective impacts on processes and effectiveness (e.g., Guzzo & Shea, 1992). The primary types of interdependence discussed include input, process, and outcome interdependence.

Wageman (1995) was one of the first to differentiate *input* and *process* interdependence. Specifically, she suggested that team members’ level of interaction (or interdependence) is shaped by their individual skill sets and the extent to which they must share resources and technologies (i.e., input interdependence). Likewise, the way in which the work is structured (i.e., process interdependence) can also affect the level of interdependence within the team. For example, Wageman described the job of salespeople and how their work can be designed to either make sales calls individually or as a team. Campion, Medsker, and Higgs (1993) described a third type of interdependence—reward and feedback interdependence (or what Guzzo & Shea [1992] referred to as outcome interdependence). The importance of *outcome* interdependence is based on the statement that “individual feedback and rewards should be linked to the group’s performance in order to motivate group-oriented behavior” (Campion et al., 1993: 827). Equally important to considerations of the various types of interdependence is the manner in which interdependence is conceptualized. Specifically, researchers have considered it as both an input variable and as a moderating variable.

Stewart and Barrick (2000) assessed the level of process interdependence and found that task type greatly affected the relationship between interdependence and manager-rated team performance. Specifically, they found that for conceptual tasks, teams with both low and high levels of interdependence exhibited strong performance results (i.e., interdependence exhibited a u-shaped relationship with performance). Conversely, for behavioral tasks—that is, that is execution of manual tasks (McGrath, 1984), interdependence exhibited an inverted

**Table 4**  
**Exemplar Team-Level Input Influence Studies**

Study	Sample	Input Factor	Emergent States	Processes	Outcomes	Findings
Balkundi and Harrison (2006)	Meta-analysis of 37 studies	Network density, team leaders; centrality; familiarity			Performance; <sup>4</sup> team viability <sup>5</sup>	Network density related positively to team performance and viability, and time (i.e., familiarity and precedence) moderated structure–performance relationships. Team and team leader centrality also related positively to performance. Task-focused leader behaviors moderately related to team effectiveness (.33, .20); person-focused behaviors related positively to team effectiveness (.36, .28) and to team learning (.56). The internal team environment and external coaching related positively to shared leadership, which predicted team performance.
Burke et al. (2006)	Meta-analysis (50 studies, 113 effect sizes)	Leadership	Internal team environment	Team learning	Performance <sup>4</sup>	Each of the four dimensions of team virtuality was negatively associated with innovation. External leaders' actions enhanced team empowerment experiences. Empowered teams exhibited higher levels of productivity, customer service, job satisfaction, organizational and team commitment.
Carson, Tesluk, and Marrone (2007)	59 consulting teams	Shared leadership	Psychological safety	Shared leadership emergence	Performance <sup>2</sup>	
Gibson and Gibbs (2006)	56 aerospace design teams	Team virtuality			Innovation <sup>4</sup>	
Kirkman and Rosen (1999)	111 teams from 4 organizations	Leader behaviors, team responsibility			Productivity, <sup>1</sup> customer service, <sup>2</sup> job satisfaction, <sup>5</sup> organizational commitment, <sup>5</sup> team commitment <sup>5</sup>	

(continued)

**Table 4 (continued)**

Study	Sample	Input Factor	Emergent States	Processes	Outcomes	Findings
Kirkman, Rosen, Tesluk, and Gibson (2004)	40 geographically distributed service teams	Training proficiency	Trust		Performance <sup>2</sup>	Training proficiency related positively to performance when teams had high levels of trust and technology support, and when team leaders had longer tenures.
Langfred (2005)	89 manufacturing teams	Task interdependence	Individual- and team-level autonomy		Team performance <sup>4</sup>	Individual- and team-level autonomy interacted with task interdependence to explain team performance.
Moreland, Argote, and Krishnan (1998)	186 student assembly (lab) teams	Training condition (individuals vs. intact teams)	Transactive memory		Performance <sup>4</sup>	Teams trained as intact groups exhibited higher levels of transactive memory and performance.
Stewart (2006)	Meta-analytic review of 93 studies	Team design (meaningfulness, autonomy, intrateam coordination)			Performance <sup>4</sup>	Meaningfulness exhibited a model relationship with performance. Additionally, autonomy and intrateam coordination corresponded with higher performance.

*Note:* Performance: 1 = quantity, 2 = quality, 3 = timeliness, 4 = mixed, 5 = affective outcomes, 6 = individual-level outcomes.

u-shaped relationship with performance. While such findings in terms of the relationship between interdependence and performance are consistent with earlier interdependence research (e.g., Saavedra, Earley, & Van Dyne, 1993; Wageman, 1995), Stewart and Barrick extended this work by demonstrating that intrateam processes (e.g., communication, conflict, flexibility, and shirking) served as a mediator of the relationship.

De Dreu (2007: 634) focused on outcome interdependence and found that “cooperative outcome interdependence related to more information sharing, to learning, and to higher levels of team effectiveness when task reflexivity was high.” In contrast, Langfred (2005) found that interdependence interacted with team-level autonomy in shaping overall performance. Specifically, he provided evidence of “a positive relationship between team autonomy and team performance under conditions of high task independence and a negative relationship between team autonomy and team performance under conditions of low task interdependence” (p. 520). Similarly, Barrick et al. (2007) illustrated that interdependence positively moderated the relationship between a blended cohesion and communication team mediator and organizational performance. Finally, Van Der Vegt, Emans, and Van De Vliert (2000) featured team interdependence as a cross-level moderator variable of individual-level task interdependence—individual-level affective outcomes (e.g., job satisfaction, team satisfaction, job commitment, and team commitment) and found that the lower level relationships were stronger when teams had higher levels of interdependence.

### *Technology/Virtuality*

Technological advancements have allowed organizations to make greater use of virtual teams. In fact, estimates suggest that 60% of professional workers work within virtual teams (VT; Kanawattanachai & Yoo, 2002). Martins, Gilson, and Maynard's (2004) review of the VT literature noted that early research typically contrasted VT functioning to that of traditional face-to-face teams. Rather than replicate Martins et al.'s work, herein we focus on two topics that they highlighted as needing more research attention and that have subsequently been considered—leadership and the extent of virtuality.

VT leadership has received some attention (e.g., Hedlund, Ilgen, & Hollenbeck, 1998; Johnson, Suriya, Yoon, Berrett, & La Fleur, 2002), but is still an area that is not all that well understood. For example, Carte, Chidambaram, and Becker (2006) studied semester-long virtual student project teams and found that higher performing VTs displayed significantly more leadership behaviors. However, they extended prior work by providing evidence that specific leadership behaviors, namely, behaviors focused on *performance* and *keeping track of group work*, were the primary drivers of such an effect. In contrast, Hambley, O'Neill, and Kline (2007) investigated the role of leadership style (i.e., transformational, transactional) and failed to find any significant relationships with either style and the quality of team interactions.

Martins et al. (2004) also highlighted that not all VTs are created equal, and therefore researchers should consider the effect that a team's *extent of virtuality* has on mediators and outcomes. Researchers appear to have taken this recommendation to heart, as work has evolved to consider virtuality as an enabling mechanism for many if not all types of teams. For instance, Kirkman and Mathieu (2005) defined team virtuality in terms of three dimensions: (a) the

degree of reliance on virtual tools, (b) the informational value of the mediums used, and (c) the synchronicity of interactions. Empirically, Kirkman et al. (2004) demonstrated that the extent to which teams met face to face moderated the relationship between team empowerment and performance (i.e., process improvement). Elsewhere, Gibson and Gibbs (2006) found evidence that four dimensions of virtuality (geographic dispersion, electronic dependence, structural dynamism, and national diversity) were distinct and had differential negative effects on team innovation.

### *Team Training*

Training refers to a systematic, planned intervention aimed at facilitating the development of job-related KSAs (Goldstein, 1992). There has been much research on the basic principles of team training and a number of comprehensive reviews on the training literature (e.g., Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; Salas & Cannon-Bowers, 2001; Salas, Rozell, Mullen, & Driskell, 1999; Salas, Wilson, Burke, & Wrightman, 2006). Still, key questions remain about what to train, how to train, and when to train (Kozlowski & Bell, 2003). A recent team training meta-analysis conducted by Salas, Nichols, and Driskell (2007) confirmed a small to moderate correlation of .29 for the overall influence of team training on improvements in both objective and supervisor ratings of team performance. Furthermore, their analysis found training interventions focused on adaptive team mechanisms exerted the strongest influence on team performance, relative to guided team self-correction and cross-training interventions.

There are numerous aspects of team training that can be discussed including training needs analyses, training motivation, specific training/learning approaches, transfer, and evaluation. Because a full review of the training literature is beyond the scope of this article, we focus on three areas that we believe are particularly in need of attention: individual versus intact-team training, delivery systems, and embedded training.

*Individual versus intact-team training.* Given the limited empirical evidence concerning the benefits of training individuals versus intact teams, Kozlowski and Bell (2003: 357) asserted that "research on this issue is virtually nonexistent." Most researchers agree that training designed to develop task-relevant skills should be directed at individual team members (Dyer, 1984). Alternatively, training teamwork skills, or those focused on the behaviors and attitudes necessary for effective team functioning, are believed to be best delivered to intact teams rather than to individual members (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Moreland, Argote, & Krishnan, 1998). The logic underlying this position is that training intact teams provides opportunities for members to integrate their teamwork skills and to jointly practice complex coordinated actions (Kozlowski, 1998; Kozlowski, Brown, Weisbein, Cannon-Bowers, & Salas, 2000). Cannon-Bowers and colleagues' (1995) framework continues to guide researchers' decisions about this training design issue. They depicted competencies as either task-related or team-related, and specific (i.e., contextually related to the team or its task) or generic (i.e., applicable and transportable across team and task contexts). Their work provides the foundation for an emerging literature



that demonstrates that generic teamwork competencies can be improved through training interventions (e.g., Chen, Donohue, & Klimoski, 2004; Ellis et al., 2005; Rapp & Mathieu, 2007).

*Delivery system.* While most team training research has focused on traditional, face-to-face training (Goldstein & Ford, 2002), there are alternative training delivery methods, such as self-administered CD, multimedia instruction, and Web-based training, which have received less attention (Kirkman, Rosen, Tesluk, & Gibson, 2006; Rapp & Mathieu, 2007). Because these new methods offer superior flexibility and exploit the increased computing power, low cost, and enhanced connectivity that characterizes today's environment (Kozlowski & Bell, 2003), organizations are increasingly leveraging technology in their delivery of training (Salas & Cannon-Bowers, 2001). These technologies stand to make "going-to" training obsolete (Salas & Cannon-Bowers, 2001: 483) yet raise concerns about whether the implementation of technologically based delivered team training technologies is occurring without the benefit of rigorous scientific theory and evaluation (Kirkman, Lowe, & Gibson, 2006; Salas & Cannon-Bowers, 2001). There is emerging evidence that teamwork skills training delivered via computer-assisted means (e.g., CD-based) is indeed effective (e.g., Kirkman, Lowe, & Gibson, 2006; Rapp & Mathieu, 2007), but more research is needed to determine how best to deliver training content via technology, the conditions under which the various delivery mechanisms are most effective, and how to provide trainees with feedback.

*Embedded.* Research that considers the notion of embeddedness stresses that training is inextricably linked to the larger organizational context and cannot be isolated from the larger system that it supports (Salas & Cannon-Bowers, 2001). Kozlowski and Salas (1997) presented a conceptual, multilevel model for training implementation and transfer that was fully built upon the notion of embeddedness. They emphasized alignment between embedding contextual features that support training transfer systems (i.e., downward congruence processes) as well as processes that allow the aggregation of training-induced changes to affect the intended, higher level targets (i.e., upward composition processes). Some training research has taken a step toward addressing such concerns by incorporating the role that the larger embedding context plays in training transfer processes. In fact, Tracey and Tews (2005) noted that

although the nature and relevance of such constructs as "perceived organizational support" have been established and linked to a variety of work-related attitudes and outcomes . . . focused attention should be given to the conceptual meaning and operationalization of constructs associated with the work environment that are specific to training. (p. 354)

Accordingly, opportunities exist for researchers to adopt a more complex, conceptually grounded view of training embeddedness. Whereas sparse training research has adopted an embeddedness perspective, we believe such a perspective offers great promise for future research because it inherently recognizes the linkages among factors crossing the individual, team/unit, and organizational levels of analysis that allow training provided to individuals and teams to "bubble up" and yield the anticipated changes at higher levels of analysis (see Mathieu & Tesluk, in press).



## Team Leadership

Zaccaro, Rittman, and Marks (2001: 452) observed that despite the abundance of literature on leadership and team dynamics, "we know surprisingly little about how leaders create and manage effective teams." There is a vast literature on leadership in teams that has been the subject of several thorough literature reviews (e.g., Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; Zaccaro et al., 2001) as well as a recent meta-analysis (Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006). In light of these works, we direct our review toward three aspects of leadership in teams that we believe hold particular promise for future research efforts: external team leaders, team coaching, and shared leadership.

*External leadership.* External team-oriented leadership represents the traditional paradigm and focuses on the influence of a leader who is responsible for, and has authority for, the team's performance. In effect, this work generally adopts an average leadership style presuming that the external leader's behavior influences the team as a whole. Although there are dyadic leadership models, they are not typically directed at influencing team mediators or outcomes.

The influence of external leader behaviors on team mediators and outcomes have been widely documented (see Burke et al., 2006), and it has been argued that the actions of an external team leader can make or break their success (Druskat & Kayes, 2000). Overall, the research indicates that team leadership is an important ingredient in realizing team affective (e.g., Foels, Driskell, Mullen, & Salas, 2000) and behavior-based (Burke et al., 2006) outcomes. 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, Hockwarter, Douglas, & Ammeter, 2006; Chen et al. 2007; Kirkman & Rosen, 1999; Lim & Ployhart, 2004; Srivastava et al., 2006; Sy, Cote, & Saavedra, 2005; Tesluk & Mathieu, 1999). The pervasive assumption is that external team leaders are valuable because they serve as coordinators of operations, as liaisons to external teams or management, and as guides for setting the team's vision (Zaccaro et al., 2001; Morgeson, 2005).

The functional approach to understanding the roles of external leaders dates back many years (e.g., Fleishman et al. 1991; McGrath, 1962). Although many labels have been assigned to the various leader functions, they distill down to two general categories that concern facilitating teamwork and taskwork dimensions. The recent meta-analysis by Burke and colleagues (2006) echoed this notion by classifying leader behaviors as either person-focused (i.e., behaviors focused on developing team members or maintaining socioemotional aspects of the team) or task-focused (i.e., those dealing with task accomplishment). Their analysis revealed that with respect to person-focused behaviors, transformational and consideration behaviors were positively related to perceived team effectiveness ( $r = .34$  and  $.25$ , respectively). Task-focused behaviors including initiating structure and boundary spanning related positively to perceived team performance ( $r = .31$  and  $.49$ , respectively). They also found team interdependence to be a moderating influence with regard to perceived team effectiveness. Druskat and Wheeler (2003: 455) observed that despite this recognition, "external leaders appear to be a forgotten group" and that "scholars have provided little

theory to clarify their role.” More recently, Burke et al. (2006) lamented that there is a lack of integration concerning the relationship between external leader behaviors and team performance. Consequently, there remains much to be learned about the nature of the external leader’s influence on teams.

*Coaching.* Team coaching refers to “direct interaction with a team intended to help members make coordinated and task-appropriate use of their collective resources in accomplishing the team’s work” (Hackman & Wageman, 2005: 269). Examples of coaching behaviors include identifying team problems, process consultation, cueing and rewarding self-management, and problem-solving consultation (Wageman, 2001). Teams researchers have acknowledged the coaching-type leadership behaviors for more than 50 years (see Wageman, 2001, for a review). After a hiatus of sorts, however, the concept has reemerged and taken hold in the literature on work teams. With regard to the relationship between coaching and team performance, the results are equivocal with some showing a positive influence (e.g., Edmondson, 1999) and others showing no influence (e.g., Wageman, 2001). Delving deeper than performance, however, studies have shown that coaching positively influences self-management, team member relationship quality, member satisfaction (Wageman, 2001), team empowerment (Kirkman & Rosen, 1999), and psychological safety (Edmondson, 1999).

Other research has suggested that the effects of coaching behaviors are dependent on other conditions, such as team design factors (e.g., Wageman, 2001) and the stability of the task environment (e.g., Morgeson, 2005). Most recently, Hackman and Wageman (2005) introduced a theory of team coaching that emphasizes functional and developmental perspectives. They delineated several functions that coaches fill in teams, including motivational (i.e., encouraging process gains), consultative (i.e., encouraging effective task performance strategies), and educational (i.e., addresses members’ knowledge and skills). Hackman and Wageman adopted a temporal perspective and emphasized that coaching behaviors may be more or less important to a team’s functioning at different stages of development. The coaching aspect of leadership offers a promising avenue of research, and we hope to see future research that examines the conditions (e.g., task, team, contextual, developmental) under which team coaching can meaningfully influence team performance.

*Shared leadership.* In recent years, there has been an increasing acceptance of the idea that leadership does not only stem from an external individual in a top-down process, but can also emerge from within the team itself (for a review, see Bennett, Harvey, Wise, & Woods, 2003). Despite nuanced differences in definitions, this latter perspective of leadership has been discussed in terms of shared, emergent, distributed, and lateral leadership (see Day, Gronn, & Salas, 2004). Shared leadership refers to an emergent team property resulting from leadership functions being distributed across multiple team members rather than arising from a single, formal leader (Carson, Tesluk, & Marrone, 2007). In effect, team-level leadership emerges from members’ collective knowledge, skills, and abilities.

Relatively little research has been done in this area, although researchers have identified several antecedents to shared leadership, including a team’s internal environment, external leader coaching (Carson et al., 2007), and a collectivist orientation among team members (Hiller et al., 2006). Researchers have also demonstrated that shared leadership relates

positively to team performance (e.g., Carson et al., 2007; Ensley, Hmieleski, & Pearce, 2006; Hiller et al., 2006; Pearce & Simms, 2002; Pearce, Yoo, & Alavi, 2004; Sivasubramaniam, Murry, Avolio, & Jung, 2002; Taggar, Hackett, & Saha, 1999). Yet others (e.g., Mehra, Smith, Dixon, & Robertson, 2006) have found that distributed, or shared, leadership did not necessarily benefit performance. They found that only certain structures (i.e., distributed-coordinated) of shared leadership do and emphasized that to better understand the phenomenon, researchers must consider the structure of leadership within teams. Other research has highlighted conditions under which shared leadership may be effective. Carson et al. (2007), for instance, found that external leader coaching was important for developing shared leadership in teams that lacked a strong internal environment, whereas Taggar et al. (1999) found that the effect of emergent leadership was greatest when other team members also demonstrated high levels of leadership influence. Hiller et al. (2006) sought to differentiate which aspects of shared leadership drive performance benefits, and concluded that developing and mentoring functions were most important.

Recent shared leadership work has made strides in terms of advancing more complete conceptualizations of the construct that take into account the relational dynamics inherent to it by leveraging a network lens (e.g., Carson et al., 2007; Mehra et al., 2006), which should provide a foundation for more rigorous research in the area. However, there are clear opportunities for future research to enrich the theory by taking into account the dynamic, interactive, and temporal elements that underlie Day et al.'s (2004) shared leadership model, which suggests that team leadership resources serve as input in the ongoing cycle and episodic nature of teams (Marks et al., 2001), as well as an output that is used in subsequent team performance cycles.

### *Team Structure*

There are numerous ways in which an organization can structure its teams. Although not considered extensively, the way in which teams are structured can be important as it "serves as a bridge between organization-level strategy decisions and staffing decisions" (Hollenbeck et al., 2002: 600). Two of the more widely considered team structural options are functional and divisional team departmentalization. In essence, *functional* departmentalization occurs when individuals within a team are organized according to the similarity of the tasks they will perform. *Divisional* team departmentalization, on the other hand, organizes individuals within the team based on the geographic area served and/or the specific type of product for which they are responsible. Most of the research that considered team structure has been conducted in laboratory settings using undergraduate students working on computer simulations. For example, Hollenbeck et al. (2002) argued that managers need to consider the composition of their teams when deciding upon which specific type of structure to employ. Specifically, they illustrated that a divisional team structure was most effective for teams that possess high levels of cognitive ability. Hollenbeck et al. (2002) also demonstrated that a divisional structure combined with high levels of member cognitive ability is not beneficial if there is a poor fit between the team's structure and the external environment.

Ellis et al. (2003) broadened the team structure literature when they considered its influence on members sharing the same versus having unique pieces of information. Specifically, they articulated that a *divisional* team structure allows all individuals to share the same information which could have potential efficiency benefits for the team. However, they also highlighted research that has demonstrated that teams composed of members holding unique information often make better, more creative decisions (e.g., Hinsz, Tindale, & Vollrath, 1997). However, Ellis et al. (2003: 824) argued that whereas the *functional* and *divisional* structures predispose teams to having either unique or shared information, respectively, neither type of team structure offers "the optimal balance between commonly and uniquely distributed information within the team." As such, the researchers advocated a compromise- type of structure which they labeled *pair-based* team structures. At their core, pair-based team structures motivate members to share expertise and responsibilities, and thereby "may allow for the best mix of common and unique information within the team" (Ellis et al., 2003: 824). In fact, findings from their research suggested that teams that were pair-based experienced significantly more learning than teams that were either functionally or divisionally structured. In an innovative consideration of team structure that included temporal factors, Moon et al. (2004) assessed how changing team structures influences performance. Their findings suggested that teams were likely to perform better when transitioning from a functional to divisional structure rather than the reverse.

Whereas research on functional, divisional, and pair-based team structures is one of the more fully developed literature streams pertaining to team structure, scholars have also considered other structural or team design dimensions. Specifically, Cohen and Bailey (1997: 243) discussed design factors in their review of the team literature defining factors as "those features of the task, group, and organization that can be directly manipulated by managers to create the conditions for effective performance." These would include variables within our discussion of individual- and team-level inputs. That said, researchers have considered the role that team-level self-management (e.g., Wageman, 2001) and self-leadership (e.g., Stewart & Barrick, 2000) play within an IPO or IMO team effectiveness framework.

### *Summary Impressions and Future Directions*

Research focused on team-level inputs has made great strides in recent years, yet there remains a wealth of opportunities for further development. For example, while researchers have considered the impact that different types of interdependence have on team mediators and outcomes, scholars have yet to test whether the different types have interactive effects. Beyond the many directions for future VT research outlined by Martins et al. (2004), the team virtuality area is ripe for further development. For example, most of the work has focused on the nuances associated with interacting through different mediums. Yet virtuality enables different combinations of members to be part of a team. In other words, "going virtual" means that the composition of teams may differ markedly from who would be on the team if they had to be colocated. Rather than asking whether the same people can interact effectively through different media versus what they could do face to face, perhaps the more important question is whether comprising a virtual team of certain members is advantageous as compared to comprising a team of different members who are colocated.

As for the question of leading teams effectively, we believe that research needs to move beyond whether external leaders are superior to member-based leadership. If we adopt a perspective that team leadership is a set of functions that need to be somehow fulfilled (see Day et al., 2004), it changes the basic research questions. In other words, the question becomes, Who is best positioned to fulfill which types of leadership tasks? If leadership is distributed, how should the allocation of functions be determined? Should the allocation of functions remain fixed or be rotated among members and their leader? If they are rotated, on what basis should they change (e.g., randomly, temporally sequenced, etc.)? If leadership is a distributed function, what are the mechanisms for integrating different aspects of it? In short, we encourage researchers to take the next step beyond comparing external versus member-based leadership and explore the complexities of distributed leadership.

The topic of team coaching is becoming quite popular. Implicit in the approach outlined by Hackman and Wageman (2005) is that the same people can effectively operate as external leaders and coaches. This assumption, however, warrants closer examination. For example, do we know if people can easily transform from the leader role to a coaching role? Are those two skill sets likely to reside in the same people, and are they willing and able to transform their behaviors as necessary? Are formal leaders the best source of coaching, or might some third party better fulfill that role? Finally, do team members readily accept their external leader as a coach? Would they prefer that such encouragement come from a third party or perhaps from their teammates? The topic of team coaching is gaining attention in the practitioner and academic literatures, and we encourage researchers to explore these and other variations on the theme.

Finally, we wish to raise an important issue that relates to research about all team-level inputs. There is an implicit assumption that team-level inputs are uniform within teams and over time. Yet such an assumption is not likely to be true, and perhaps unpacking the variance that resides within teams might offer great insights. For example, it may well be that some members of a team need to work fairly closely with one another, share resources, coordinate their actions, and so forth, whereas others might work fairly independently. How would the overall interdependence of such a team be described? The VTs literature refers to "hybrid" arrangements where some members are colocated and work primarily face to face, whereas others might be at a distance and only linked to the rest of the team through virtual means. Some team leadership functions may be completed by the external team leader whereas others might be widely distributed across members. In short, a single descriptive index may not adequately capture the nature of a team-level input if it might take on different forms. There are probably lessons to be learned from the network literature and thinking about team functioning as a series of dyadic exchanges generating network properties. In sum, future research would benefit from considering more complex and differentiated team-level input factors.

## **Organizational/Contextual Inputs**

Gully (2000: 27) submitted that "to conduct research on work teams in the organizational context, the team has to be treated as the primary level of analysis." His comment illustrates

the notion that teams operate in contexts that facilitate or hinder their functioning. Moreover, contexts can be distinguished in terms of features of the embedding organizational system, as well as features of the larger environment outside of the organization. Accordingly, we define organizational contextual variables as sources of influence that are external to the team, yet emanate from the larger organizational system within which they are nested. In contrast, we define environmental contextual variables as sources of influence that emanate from outside of the organization yet influence team functioning.

Whereas the influence of context on team effectiveness has long been recognized (Gladstein, 1984; Hackman & Morris, 1975; McGrath, 1964), there is surprisingly little research devoted to it even in the past decade. Furthermore, many of the studies that purportedly test contextual influences do so at the team-level of analysis (e.g., Gladstein, 1984). In effect, these studies liken contextual influences to those that covary at the team-level of analysis rather than sources of influence that emanate from a higher level of analysis. Zellmer-Bruhn and Gibson (2006) referred to this approach as the “micro-context” and argued that it describes aspects of the setting that are often tailored to specific team needs. In contrast, they referred to “macro-[organizational] contexts” as including subsidiary and corporation characteristics that vary little among teams in an organization (or larger context) and are not likely to vary substantially across teams within a given setting. In other words, micro-contexts really describe team-level inputs, whereas macro-contexts refer to sources of influence that stem from a higher level of analysis. With this distinction in mind, below we consider work that has featured either organizational or environmental influences on team effectiveness. Table 5 presents examples of studies that have indexed different types of contextual variables as predictors of team mediators and outcomes.

### *Organizational Contexts*

*Human resource systems.* Gladstein (1984) and Campion and colleagues (Campion et al., 1993; Campion, Papper, & Medsker, 1996) were among the first to consider the influence of organizational contextual features on team mediators and outcomes. In the decade since Cohen and Bailey’s (1997) review, Hyatt and Ruddy (1997) provided evidence that organizational factors such as recognitions and rewards and training systems had both direct and indirect effects on group effectiveness. Kirkman and Rosen (1999) found that team-based human resource policies related positively to team empowerment. Notably, however, both of these investigations employed a micro-context approach and operationalized contextual influences at the team-level of analysis. In other words, researchers have employed team members’ perceptions of organizational features as indices of context without taking into consideration the hierarchical nesting of teams in contexts. In contrast, Zellmer-Bruhn and Gibson (2006) employed a cross-level design and found that multinational corporations (MNCs) that emphasized global integration related negatively to team learning, whereas MNCs that emphasized local responsiveness related positively to team learning. In turn, team learning was related positively to externally rated team performance and interpersonal relations. Thus, Zellmer-Bruhn and Gibson illustrated what Mathieu and Taylor (2007) described as a meso-mediational design, whereby the effects of higher level macro-organizational

**Table 5**  
**Exemplar Contextual-Level Influence Studies**

Study	Sample	Contextual Variable	Team Mediators	Outcomes	Findings
Atuahene-Gima and Li (2004) <sup>a</sup>	256 TMTs of Chinese new technology ventures	Technology uncertainty		New product performance <sup>1</sup>	Technology uncertainty negatively moderated a relationship between team decision comprehensiveness and product performance.
Carpenter (2002) <sup>a</sup>	247 Industrial TMTs	Internationalization (complexity)		Return on assets <sup>1</sup>	Internationalization positively interacted with TMT heterogeneity as related to return on assets.
Gibson (2003) <sup>b</sup>	71 U.S. and Indonesian nursing teams	Culture	Quality improvement focus	Quality of service provided <sup>2</sup>	Indonesian teams exhibited higher quality of service as mediated by a quality improvement focus.
Keck (1997) <sup>a</sup>	74 TMTs in cement and minicomputer industries	Environmental stability		Financial performance <sup>1</sup>	Environmental stability positively interacted with TMT composition variables as related to performance.
Kirkman and Rosen (1999) <sup>a</sup>	111 mixed team types	Team-based HR policies, and social support	Empowerment	Performance, <sup>4</sup> customer service <sup>2</sup>	Team-based HR policies and social support related positively to performance and customer service, as mediated by empowerment.
Marks, DeChurch, Mathieu, Panzer, and Alonso (2005) <sup>b</sup>	92 lab action teams	MTS action transition	MTS and team action processes	MTS performance <sup>1</sup>	MTS transition processes related positively with MTS performance as partially mediated by MTS action processes.

(continued)



Table 5 (continued)

Study	Sample	Contextual Variable	Team Mediators	Outcomes	Findings
Mathieu, Gilson, and Ruddy (2006) <sup>a</sup>	120 service teams	Team-based HR policies and supportive climate	Empowerment overall processes	Performance; <sup>1</sup> customer satisfaction <sup>2</sup>	Team-based HR policies and social support related positively to performance and customer satisfaction, as mediated by empowerment and processes.
Mathieu, Maynard, Taylor, Gilson, and Ruddy (2007) <sup>b</sup>	90 service teams	MTS coordination, and openness climate	Overall processes	Performance <sup>1</sup>	MTS coordination related positively to team performance, whereas openness climate related positively to team processes.
Sosik and Jung (2002) <sup>b</sup>	83 Korean and U.S. student teams	Individualism–collectivism	Potency	Performance <sup>1</sup>	Individualistic teams reported greater potency and performance that grew larger over time.
Zellmer-Bruhn and Gibson (2006) <sup>b</sup>	115 pharmaceutical teams	Global integration, and local responsiveness	Team learning, interpersonal relations	Task performance <sup>1</sup>	Global integration related negatively, whereas local responsiveness related positively to interpersonal relations and performance as mediated by learning.

*Note:* Performance: 1 = quantity, 2 = quality, 3 = timeliness, 4 = mixed, 5 = affective outcomes, 6 = individual-level outcomes. TMT = top management team; MTS = multiteam systems; HR = human resources.

a. Team/organizational single-level design.

b. Cross-level design.

contextual variables on lower level team outcomes were transmitted through a lower level blended team mediator (i.e., team learning).

*Openness climate.* Lawler (1993) has long advocated a systems perspective that emphasizes employee involvement as the key ingredient of successful organizational designs. He argued that the role of top management is to sculpt a vision, implement various structures and rewards, and create a general climate that is supportive of employee involvement and teamwork. Kirkman and Rosen (1999) found that an organizational climate of openness in terms of a well-developed social structure and sociopolitical support was related positively with team empowerment and outcomes. Similarly, Mathieu et al. (2006) found support for positive correlations between openness climate with team empowerment and processes. Spreitzer, Cohen, and Ledford (1999) found a significant correlation between employee involvement context and manager-rated productivity among self-managed teams. Again, however, all three of these studies were conducted at the team-level of analysis and therefore operationalized the micro-context.

However, based on our review, we noted two studies that used cross-level designs to test the influence of macro organizational district-level influences on team mediators and outcomes. Tesluk et al. (1999) found that district-level management's attitudes toward employee involvement related significantly to unit-level climates for participation in decision making. They concluded "that the extent to which the climate within a work unit [team] encourages participation is, in part, a function of the practices and policies that support employee involvement in the broader organizational context" (Tesluk et al., 1999: 293). Additionally, Mathieu, Maynard, Taylor, Gilson, and Ruddy (2007) obtained a significant and positive cross-level relationship between organizational district-level openness climate and subsequent lower level team processes.

*Multiteam systems coordination.* Gully (2000: 32) argued that "organizational teams are coupled to one another and to the organization as a whole, but their boundaries are distinct enough to give them a separate identity. This is similar to the notion of loose coupling, or partial inclusion. In this sense, boundaries of teams both separate and link the work done by teams." Mathieu et al. (2001) advanced the notion of multiteam systems (MTSs), a particular organizational arrangement whereby teams of teams work collaboratively to achieve collective goals. Hyatt and Ruddy (1997) suggested that teams function more effectively as self-contained units when they have strong information networks along with communication and cooperation channels both within and between teams. Kirkman and Rosen (1999); de Jong et al. (2005); and Mathieu et al. (2006) all found that teams benefit from working in (micro-) contexts that have effective MTS coordination. Mathieu et al.'s (2007) cross-level study found that macro-organizational district MTS coordination related significantly to lower level team performance, but not to team processes. They also found a cross-level interaction whereby MTS coordination moderated lower level team process-performance relations. In a cross-level laboratory flight simulation, Marks, DeChurch, Mathieu, Panzer, and Alonso (2005) found that *intrateam* processes were enhanced by effective MTS coordination (i.e., transition processes) only when teams worked in interdependent settings.

### *Environmental Context*

While research on the influence of organizational contexts has been relatively sparse, that which has incorporated environmental factors from outside of the embedding organizations is even rarer. There have, however, been two exceptions to this trend. One area involves the interface between TMT features and organizational environments, whereas the other concerns the influence of cultural factors on team-level phenomena.

*TMT–environment interface.* TMT-context studies represent a unique situation when viewed from a “levels perspective.” Normally teams are nested in larger entities such as organizations, which in turn are nested in strategic groups, industries, and so forth. However, given that there is only one TMT per organization, they reside at the same level of analysis as organizational properties and their environments. Nevertheless, team-contextual relationships are still salient.

Carpenter (2002) found positive relationships between TMT educational, functional, and tenure heterogeneity and performance in relatively complex versus relatively simple environments. Goll and Rasheed (1997) found that environmental munificence and dynamism moderated the relationship between TMT rational decision making and performance. Keck (1997) examined the relationship between various indices of TMT composition and organizational performance. She hypothesized and found support for positive relationships between team tenure heterogeneity, member replacements, less stratification, and shorter team tenure with organizational performance in relatively turbulent versus stable environmental periods. Hough and White (2003) tested whether pervasiveness of knowledge within teams is related to the quality of the decisions they make. Their results showed that pervasiveness of knowledge was positively related to decision quality in moderate to stable environments, but not in dynamic environments. Finally, Atuahene-Gima and Li (2004) found that team decision comprehensiveness related positively to new product performance when there was relatively low technology uncertainty, but not when there was relatively high technology uncertainty.

In summary, the research evidence is fairly consistent in terms of the role of the external environmental and TMT functioning. Complex environments place a premium on heterogeneous TMT compositions and flexible processes. In this sense, although the nature of the performance environments certainly differ between TMTs and other types of teams, the underlying nature of the team IMOI relationships appear to be fairly generalizable across team types (cf. Barrick et al., 2007).

*Cultural influence on teams.* Several studies have sought to examine the nature of team-related relationships in the context of cultures presumed to be supportive, or not, of such work arrangements. For example, Sosik and Jung (2002) examined the relationships between functional heterogeneity, potency, and performance of student teams from the United States and Korea. They found that U.S. student teams reported greater functional heterogeneity, potency, and performance as compared to Korean student teams, and these differences grew larger over time. Gibson (2003) studied the relationship between team quality improvement focus and the quality of service delivered by Indonesian and U.S. nursing teams. She found that Indonesian teams reported significantly greater social quality improvement, as compared

to U.S. teams. In turn, social quality improvement was related positively with service quality suggesting a mediated relationship. Notably, numerous other studies examined the influence of culture on team-level mediators and outcomes but did so indexing culture as a team composition variable (i.e., as an average of members' individual cultural orientations; e.g., Gibson, 1999; Kirkman & Shapiro, 2001). Therefore, we consider those studies as indicative of team composition effects rather than micro- or macro-contextual influences.

In summary, work on the role of the larger cultural context on team functioning is beginning to emerge. That literature, however, has indexed culture in terms of (a) average individual orientations, (b) a team climate variable, or (c) a description of some larger context such as a region or country. Whereas all approaches represent viable ways to study cultural influences, they are not the same or interchangeable (Kirkman et al., 2006). When viewed in terms of an embedding context, however, cultures that are consistent with cooperation, collective activities, and so forth, appear to facilitate team effectiveness.

### *Summary Impressions and Future Directions*

Although the extant literature has long theorized that both micro- and macro-contexts influence team functioning, relatively little research has examined such relationships. The vast majority of the work that has been done along these lines has featured micro-contextual variables with noticeably few true cross-level investigations. No doubt this pattern is somewhat attributable to the difficulties associated with sampling teams across contexts. Traditional team-focused studies are difficult to conduct, as teams constitute the focal level of analysis and securing a sufficient number of comparable ones for statistical analyses is challenging. Moreover, sampling a large number of teams from contexts that differ along substantive variables of interest is indeed a daunting task. Nevertheless, true progress along these lines will require such investments. Alternatively, this is clearly a domain where in-depth case studies offer a powerful alternative research design. If such cases are sampled selectively to represent varying levels of some substantive input (e.g., individual vs. team-based organizational reward systems, placid vs. turbulent performance environments), then qualitative investigations may prove to be particularly enlightening. Alternatively, large-scale collaborative efforts such as the *Globe Project* (House, Javidan, Hanges, & Dorfman, 2002) represent rare opportunities to test contextual hypotheses with adequate statistical power.

The alignment of micro- and macro-contextual features represents a fruitful avenue for future research (cf. Tesluk et al., 1999; Zellmer-Bruhn & Gibson, 2006). On one hand, one might expect that the more proximal micro-contexts would exert the most immediate influence on team mediators and outcomes given their immediate salience to team members. On the other hand, given the more pervasive influence of macro-contextual variables, in the long run perhaps they would influence team mediators and processes more so than micro-factors. And perhaps such factors may interact (cf. Mathieu et al., 2007; Tesluk et al., 1999). Additional research is clearly warranted in this area.

Given the proliferation of MNCs and the globalization of business, cultural influences are likely to play a larger and larger role on team functioning. The diversity literature to date has predominantly examined the compositional mixes of teams sampled from a given organization.

Yet what is the role of culture on the functioning of, say, sales teams promoting the same product in different regions of the world? How does culture influence the functioning of cross-organizational teams? Would such effects be accentuated or mitigated if the teams interacted primarily through virtual rather than face-to-face means? In short, the open frontier for future researchers is to “look up” and consider downward influences on team functioning, as well as to explore further how members work to shape such contexts.

## Conclusion

### *Looking Back*

About a decade ago Cohen and Bailey (1997) provided a comprehensive review of the team literature. They identified five key areas that future research should explore: (a) group cognition, affect, and mood, (b) group potency and collective self-efficacy, (c) virtual and global teams, (d) environmental (institutional) factors, and (e) time. Using their recommendations as a framework, we have summarized our impressions of progress along these lines as detailed in Table 6. As shown, we conclude that there has been substantial work and great progress in the areas of group cognition, group potency and collective efficacy, and virtual and global teams. The topics of team affect and mood have garnered far less attention, although they continue to offer interesting avenues for future research. Most notably, although we see important theoretical advancements in the areas of environmental (institutional) factors and time, empirical research has not developed at the same pace. We believe that these two areas represent prime territories for future advancements.

Looking beyond Cohen and Bailey's (1997) recommendations, summing up the research that has been done over the past decade, we are quite impressed with both the quality and quantity of work conducted. As this and other reviews have documented, researchers are dealing with multifaceted questions, advancing and testing more complex models, and enhancing our overall understanding of team effectiveness. Moreover, the field has become more differentiated. Laboratory research continues to be done, but now often using highly complex and informative simulations. These have enabled researchers to test far more realistic team dynamics than were possible before the advent of today's technology. That said, field studies are now far more prevalent than they have been in the past and represent a particular strength that organizational scholars have brought to the study of groups. In short, the field is alive, well, and thriving. Yet we believe there is still something lacking.

The IPO model and its latter-day derivatives (e.g., IMOI) have served the field well. They have articulated the nature of the components that drive team effectiveness (i.e., inputs), the nature of the “black box” linking such drivers with outcomes (i.e., mediators), and the complex nature of the criteria space (i.e., outcomes). However, the IPO/IMO frameworks were most suitable for situations where a given set of members operate within a clearly defined boundary for a set period of time and produce some quantifiable output or service. Modern-day organizational designs call into question such arrangements and, therefore, the applicability of the predominant research frameworks.

**Table 6**  
**Progress Regarding Cohen and Bailey's (1997) Agenda**

Agenda Items	Summary Impressions
Group cognition	Substantial progress in the areas of shared mental models (e.g., Marks, Sabella, Burke, & Zaccaro, 2002), strategic consensus (e.g., Iaquinto & Fredrickson, 1997), and transactive memory systems. Numerous laboratory and field investigations, and recent moves toward more complex combinations. Future research would benefit from a synthesis of different forms of team cognition.
Affect	Relatively little work in the past decade, although there has been work on the construct validity of collective affect (e.g., Mason & Griffin, 2005) and evidence of a negative relationship between positive affective tone and group absenteeism (Mason & Griffin, 2003).
Mood	Some work in this area including how a leader's mood can influence the affective tone of the team (Sy, Cote, & Saavedra, 2005) and how teammates' moods can influence other members (Totterdell, 2000). Other work has examined the role that environmental factors play in the development of group-level mood (e.g., Kelly & Barsade, 2001).
Group potency and collective efficacy	Substantial work in this area as chronicled by numerous meta-analyses (e.g., Gully, Incalcaterra, Joshi, & Beaubien, 2002). Group potency and collective efficacy have both evidenced fairly consistent and moderate correlations with outcomes, particularly for highly interdependent teams. Future work should consider the evolution of such effects over time, as well as the antecedents of these emergent states.
Virtual and global teams	Work in this area has exploded in the past decade. The construct of virtuality has been elaborated (cf. Kirkman & Mathieu, 2005; Martins, Gilson, & Maynard, 2004) and field investigations are becoming more prominent. Future research should consider the role of virtual team compositions more deeply and investigate emergent state variables that have not received sufficient attention to date (e.g., shared cognition).
Environmental (institutional) factors	Whereas the theoretical distinction between "micro-context" and "macro-context" has been advanced, relatively little research has been done—with especially few cross-level studies of macro influences.
Time	While theoretical advancements concerning team maturation (e.g., Kozlowski, Gully, Nason, & Smith, 1999) and episodic approaches (e.g., Marks, Mathieu, & Zaccaro, 2001) have been made over the past decade, relatively little empirical work has featured time as a substantive variable. There are encouraging signs that this issue is attracting greater attention in recent years (e.g., Harrison, Price, & Bell, 1998; Harrison, Price, Gavin, & Florey, 2002; Mathieu & Rapp, in press)—a pattern that we hope accelerates in the future.

### *A Look Forward—Embrace the Complexity*

Let us revisit the typical modern-day organizational team research design where members are sampled from a number of teams at some point in time (e.g., Mathieu et al., 2007). Initially, usually using either archival information or members' ratings, variables such as team composition, leadership, and other predictors are typically indexed. Then, perhaps at some latter point in time, measures of team processes or emergent states, often along with perceptions of contextual factors, are gathered, again usually from team members. These inputs and mediators are then associated with outcome indices, ideally gathered at some latter time either from team members, supervisors, or organizational records. Appreciate that such an approach represents more of an ideal than common design, as researchers often

gather inputs, mediators, and even outcomes during one or two measurement occasions. This is not necessarily bad or sloppy research, as it is difficult to gain access and to measure relevant variables repeatedly in real-world teams. The current authors have faced a number of such challenges, invested a great deal of time, and know how difficult it is to move beyond the typical design. But we must begin to ask ourselves whether such an approach truly reveals the important dynamics of modern-day teamwork? For instance, is the initial assessment conducted at a uniformly meaningful point in time to use as a base point going forward for all teams in the sample? Probably not. We may well be sampling teams that vary widely in terms of their history of working together, stage of development, and so forth. Whereas some of these factors may be adequately indexed using measures such as team tenure, clearly many important nuances are not captured. In short, there are no doubt a slew of maturation differences, historical influences, and a wide variety of other threats to validity that go as simply unrecognized in our typical research designs.

Modern-day organizational designs are far more complex than ones from the past. As an example, consider a project team assigned with the design of a new product. Some of the members of this team may have a long history of working together (both good and bad), whereas others may be complete strangers assigned to the group solely for this task. They might meet face-to-face initially to determine the project scope, constituencies, resources, and so forth. An external leader may play a prominent role in this early stage, but then "hand off" control to the team members once they get rolling. The team may then break into individual or subgroup work and coordinate their subsequent actions, in part, through virtual means. Some individuals or subgroups are likely to work closely with one another, whereas others might work largely on their own for a while. They may well come together at various times for gateway reviews or checkpoints (i.e., episode transitions), and they may reconfigure into different working arrangements as the project develops. Sometimes feedback may be encouraging and generate positive affect and momentum; at other times the feedback could reveal performance problems and heighten anxieties.

As the project progresses from one stage to another, members may leave or join the team in different capacities. Some of these replacements may be planned, and some may arise because of a specific challenge being faced by the team or because a team member was unexpectedly needed elsewhere. In such a scenario, the team's developmental stage, progress toward their ultimate goal, episodic processes, interpersonal relationships, degree of virtuality, interdependence, structure, and leadership are all likely *dynamic inputs* to their later processes, emergent states, and outcomes. All the while team members are each working on other teams, sometimes with the same people, and sometimes not. These multiple team memberships are not likely to be all that well coordinated, meaning that at any given moment some members may be underutilized while others may be subject to undue pressures. Moreover, organizational and larger contexts are not static and often vary wildly over time. Time lines are slashed, budgets are cut, and some teams are even disbanded in midstream because their product was not progressing sufficiently or is no longer needed. Customer requirements change, projects creep into areas never anticipated, or some regulation may change project parameters or operating constraints. The clear message here is that investigating the function of such a team on two or three occasions is likely to miss far more of the important dynamics than it is to capture them, thereby rendering the traditional research design



as lacking. The simple fact is that team arrangements suitable for IPO-style investigations may be more of the exception than the rule in modern-day organizations.

So, our challenge for future researchers is to embrace the complexity of current team arrangements. Rather than viewing these complex features of organizational teams as confounds or design problems to overcome, we submit that they are important variances to assess, model, and understand. They may, in fact, be the most important sources of influence to understand. This may well necessitate a new research paradigm, one that incorporates both quantitative and qualitative methodologies and one that is time sensitive and able to capture the inherent multifaceted nature of teamwork. Strategies in this regard may include qualitative research, time-sampling or diary-style investigations, and clever archival approaches. For example, teams who interact through virtual means leave traces of their interactions (e.g., threaded discussion lists, e-mails, video conferences), which, with the proper ethical consideration, can be used to index member interaction in a far more detailed way than would be available for traditional face-to-face teams.

In summary, we believe that great progress has been made in team research over the past decade. Additionally, there is every reason to feel confident that such progress will continue into the future. But, we also believe that we are at a turning point in that we have a solid theoretical foundation and empirical base from which to ground our future work. However, as we move forward, we need to not only build on what we have, but be willing to take great strides and in some cases leaps to ensure that we are capturing and embracing the complexities of current team arrangements and seeking to better understand them rather than to fit them into our current frameworks. We encourage researchers to “go there” in the next decade.

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**John Mathieu** (John.Mathieu@business.uconn.edu) is a professor and the department head of management at the University of Connecticut. He also holds the Cizik Chair in Management. He received a PhD in industrial/organizational psychology from Old Dominion University. He is a member of the Academy of Management and a fellow of the Society of Industrial Organizational Psychology and the American Psychological Association. His current research interests include models of team and multiteam processes and cross-level models of organizational behavior.

**M. Travis Maynard** (travis.maynard@business.colostate.edu) is an assistant professor in the Department of Management at Colorado State University. He received his PhD degree in organizational behavior at the University of Connecticut. His current research interests include the role that team contextual variables have on team processes and the development of team psychological states.

**Tammy Rapp** (Tammy.Rapp@business.uconn.edu) is a PhD candidate in organizational behavior at the University of Connecticut. She is a member of the Academy of Management. Her current research interests include team processes, learning/training, and multilevel theory.

**Lucy Gilson** is an associate professor and Ackerman Scholar at the University of Connecticut. She earned her PhD in organizational behavior from the Georgia Institute of Technology. Her research focuses primarily on teams and creativity; here she has examined teams in different organizational settings and performing a diverse range of jobs. Specifically, she studies how creativity, employee empowerment, diversity, fairness issues, and virtual communication influence team effectiveness.