UNDERSTANDING AND IMPROVING TEAMWORK IN ORGANIZATIONS: A SCIENTIFICALLY BASED PRACTICAL GUIDE

EDUARDO SALAS, MARISSA L. SHUFFLER, AMANDA L. THAYER, WENDY L. BEDWELL, AND ELIZABETH H. LAZZARA

Teams are pervasive in today's world, and rightfully so as we need *them. Drawing upon the existing extensive body of research surrounding the topic of teamwork, we delineate nine "critical considerations" that serve as a practical heuristic by which HR leaders can determine what is needed when they face situations involving teamwork. Our heuristic is not intended to be the definitive set of all considerations for teamwork, but instead consolidates key findings from a vast literature to provide an integrated understanding of the underpinnings of teamwork—specifically, what should be considered when selecting, developing, and maintaining teams. This heuristic is designed to help those in practice diagnose team-based problems by providing a clear focus on relevant aspects of teamwork. To this end, we first define teamwork and its related elements. Second, we offer a high-level conceptualization of and justification for the nine selected considerations underlying the heuristic, which is followed by a more in-depth synthesis of related literature as well as empirically-driven practical guidance. Third, we conclude with a discussion regarding how this heuristic may best be used from a practical standpoint, as well as offer areas for future research regarding both teamwork and its critical considerations. © 2014 Wiley Periodicals, Inc.*

Keywords: teams, groups

Teams are pervasive in today's world, and rightfully so as we *need* them. We need them in our hospitals, flight decks, oil rigs, military, nuclear power plants, and a host of other organizations involved in our everyday functioning. To be effective, these teams must operate through the interdependent actions of individuals working toward a common goal—a set of actions and processes known as teamwork (Marks, Mathieu, & Zaccaro, 2001). But what exactly is teamwork? What influences it? Perhaps most importantly, how do we develop and maintain it? A plethora of research driven by increased interest in teams has resulted in a seemingly endless array of literature attempting to explain teamwork and the conditions surrounding its success or failure.

Correspondence to: Eduardo Salas, Institute for Simulation and Training, Department of Psychology, University of Central Florida, 3100 Technology Parkway, Orlando, FL 32826, Phone: 407-882-1325, Fax: 407-882-1550, E-mail: esalas@ist.ucf.edu

Although this literature base has provided us with vast knowledge, it can be difficult to summarize this information into a useful set of principles to aid practitioners in understanding what factors must be considered when teamwork is enacted. Thus, the focus of this article is to offer an overarching, practical heuristic of the most critical considerations for teamwork. The novelty of the current work is not necessarily in the review of teamwork itself, but instead in the offering of a concise framework that organizes previous findings in a meaningful, practically relevant manner. Drawing upon the current extensive body of research regarding teamwork, we delineate nine "critical considerations" that serve as a guiding heuristic by which individuals, teams, organizations, and other collaborating entities can determine what is needed when they face situations involving teamwork. This heuristic provides a basic understanding of the underpinnings of teamwork—specifically, what should be considered when selecting, developing, and maintaining teams.

Drawing upon the current extensive body of research regarding teamwork, we delineate nine "critical considerations" that serve as a guiding heuristic by which individuals, teams, organizations, and other collaborating entities can determine what is needed when they face situations involving teamwork.

Our heuristic is not intended to be the definitive set of all considerations for teamwork nor a *definition* of teamwork, but rather serves as a practical attempt to consolidate key findings from a vast literature to provide useful guidelines for those outside this area of research. To this end, we first define teamwork and offer a high-level conceptualization of the nine selected considerations. This is followed by a more in-depth review of each consideration, delineating relevant research and describing why each consideration is critical to understanding teamwork. We also offer practical advice and recommendations that can be leveraged by organizational leaders and others involved in ensuring teamwork success. Finally, we conclude with a discussion of how this heuristic may best be used from a practical standpoint and for future research.

Defining Teamwork

To provide a heuristic of critical considerations for teamwork, it is important to clearly define teams and teamwork. Teams are "a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p. 4). This definition captures the primary components of teams—multiple individuals, interdependencies, and a shared goal—while also remaining comprehensive so as to not exclude any particular type of team or teamwork.

For teams to be effective, they must successfully perform both taskwork and teamwork (Burke, Wilson & Salas, 2003; Morgan, Glickman, Woodward, Blaiwes, & Salas, 1986). Taskwork involves the performance of specific tasks that team members need to complete in order to achieve team goals. In particular, tasks represent the work-related activities that individuals or teams engage in as an essential function of their organizational role (Wildman et al., 2012b). Conversely, teamwork focuses more on the shared behaviors (i.e., what team members *do*), attitudes (i.e., what team members *feel* or *believe*), and cognitions (i.e., what team members *think* or *know*) that are necessary for teams to accomplish these tasks (Morgan, Salas, & Glickman, 1994). Both taskwork and teamwork are critical to successful team performance, with the effectiveness of one facilitating the other. Although taskwork often becomes a key focus for teams as they work toward goals, it is teamwork that aids in ensuring taskwork is performed effectively. Despite having an extensive knowledge of the task at hand, a team will fail if the members cannot successfully share knowledge, coordinate behaviors, and trust one another (Mathieu, Maynard, Rapp, & Gilson, 2008). In fact, individuals who have extensive task-relevant expertise are still vulnerable to poor team outcomes if teamwork is inadequate (Gregorich, Helmreich, & Wilhelm, 1990; Ruffel-Smith, 1979; Schmidt, Keeton, Slack, Leveton, & Shea, 2009). In sum, teamwork is an adaptive, dynamic, and episodic process that encompasses the thoughts, feelings, and behaviors among team members while they interact toward a common goal. Teamwork is necessary for effective team performance, as it defines *how* tasks and goals are accomplished in a team context.

Critical Considerations for Teamwork: A Heuristic

Given this definition of teamwork, we now turn to identifying the critical considerations for its effectiveness. These critical considerations are the summation of a wide range of teamwork literature accumulated over the past several decades. Indeed, many reviews exist to highlight the different conditions and processes that can impact teamwork (e.g., Cannon-Bowers & Bowers, 2010; Kozlowski & Ilgen, 2006; Marks et al., 2001; Mathieu et al., 2008; Sundstrom, McIntyre, Halfhill, & Richards, 2000). Table I provides a more complete list

TABLE I	Sample of Team Effectiveness Reviews in the Past 15 Years	
Source	**Approach**	**Major Contribution(s)**
Balkundi & Harrison, 2006	Meta-analysis	Examined the effects of social network structures on team effectiveness, illustrating that denser networks and those with centralized leaders are more effective.
Beal et al., 2003	Meta-analysis	Examined the role of team cohesion in relation to performance, finding that the relationship differs depending on how cohesion and performance are operationalized.
Cannon-Bowers & Bowers, 2010	Literature synthesis	Comprehensive review of major teamwork and team development theories, and future team research needs.
Chiocchio & Essiembre, 2009	Meta-analysis	Examined the moderating effect of team type and team setting on the relationship between cohesion and performance, providing support for both.
De Dreu & Weingart, 2003	Meta-analysis	Examined the relationships of task and relationship conflict with team performance and member satisfaction, finding differential effects for these two types of cohesion.
DeChurch & Mesmer-Magnus, 2010	Meta-analysis	Examined the effects of team cognition on teamwork processes and outcomes, highlighting both broad relationships and moderating effects among cognition, behavior, motivation, and performance.
Devine & Philips, 2001	Meta-analysis	Illustrated the results of several meta-analyses investigating the relationship between different team-level metrics of member cognitive ability and team performance.
Gully Devine, & Whitney, 1995	Meta-analysis	Investigated level of analysis and interdependence as moderators of the relationships between task-specific team efficacy, generalized potency, and performance.
Horwitz & Horwitz, 2007	Meta-analysis	Empirically summarized findings regarding the impact of team diversity on team outcomes, specifically focusing on bio-demographic and task-related diversity.
Ilgen, Hollenbeck, Johnson, & Jundt, 2005	Literature synthesis	Reviewed team literature from the context of an IMOI framework, organizing research around a two-dimensional system of time and exploratory mechanisms.
Kozlowski & Ilgen, 2006	Literature synthesis	Synthesized the past 50 years of team process and performance research, highlighting foundational findings and recommending future research areas.
LePine et al., 2008	Meta-analysis	Provided empirical support for the three higher-order teamwork processes (action, transition, and interpersonal), as proposed by Marks and colleagues (2001).
Manser, 2009	Qualitative review	Qualitatively summarized research on teamwork in health care, finding support for the relationship between teamwork and patient safety.
Marks, Mathieu, Zaccaro, 2001	Synthesis & theory advancement	Provided a framework examining the temporal nature of team processes and emergent states.
Mathieu et al., 2008	Literature synthesis	Provided a synthesis of the literature on teamwork and team effectiveness from 1997–2007, highlighting major findings and providing future research directions.
Mesmer-Magnus & DeChurch, 2009	Meta-analysis	Examined the relationship between information sharing and team performance, finding that information sharing uniqueness and openness have different effects on team performance.
Piña, Martínez, & Martínez, 2008	Qualitative review	Qualitatively analyzed recent findings on organizational teams, highlighting the multidimensional nature of team outcomes and the need for multimethod metrics and analyses in team contexts.
Salas et al., 2008	Meta-analysis	Examined the impact of team training on team outcomes, delineating when team training is effective for teamwork.
Stewart, 2006	Meta-analysis	Reviewed the relationships between team design features and team performance, finding differential effects for team composition variables, team type, and team task types.
Sunstrom et al., 2000	Synthesis & theory advancement	Provided a seminal typology of types of teams.

summarizing these reviews and their contributions to the teamwork literature. Although these reviews provide key points in terms of important factors that affect teamwork, they do not necessarily provide practitioner-friendly insight regarding what really matters to teamwork. That is, the numerous attempts to define and consolidate teamwork research oftentimes results in more questions than answers and does not necessarily serve to guide organizations and collaborators in addressing teamwork challenges in the real world (Salas, Cooke, & Rosen, 2008).

A few assumptions must be presented prior to further discussion regarding each of these considerations. First, we do not identify directional paths among these considerations within our heuristic (see Figure 1). This is intentional, as the literature suggests that these factors may influence one another under a range of circumstances. Indeed, the potential interactions among these factors are one of the driving reasons behind their selection as a set. Thus, we are arguing that these factors should not be considered in isolation from one another, but rather that they must be holistically considered in trying to determine how to establish effective teamwork practices. Second, there is no hierarchy among these considerations. In other words, one consideration is not necessarily more or less important than any other consideration. Instead, organizations should attend to each of these considerations and determine, based upon their unique team situations, if any are more or less influential for the given team environment. Finally, we propose this as an initial set of considerations and associated practical implications, with the understanding that as research advances our knowledge regarding teamwork, there may be a need for continued refinement. In sum, this heuristic serves to be a living, parsimonious, organizing set of considerations that individuals, teams, and organizations can utilize to develop and sustain effective teamwork.

So what do organizational leaders and team members need to know to enact effective teamwork? To answer this, we turn to the literature to derive a set of nine critical considerations for teamwork aimed at creating a more parsimonious path to effective practices in organizations (see Table II). Each of these critical considerations has been selected due to (1) its prevalence in the theoretical team literature and (2) the empirical evidence indicating its impact on team outcomes, resulting in a need for organizations to pay close attention to its influences in real-world settings. It should be noted that these considerations are also selected for their ability to provide a memorable framework. The use of nine "C" words to encompass teamwork may appear to be superficial, but

These factors should not be considered in isolation from one another, but rather that they must be holistically considered in trying to determine how to establish effective teamwork practices.
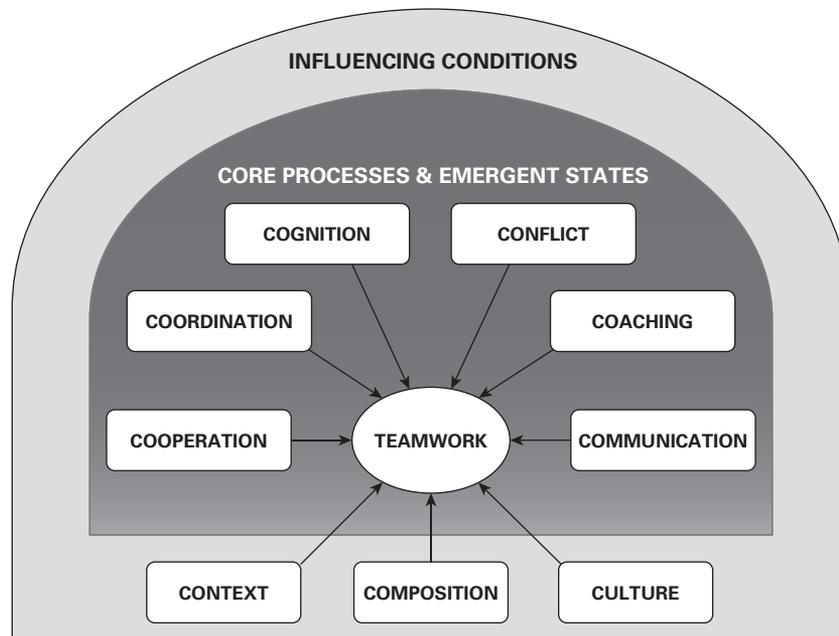

FIGURE 1. Heuristic of the Critical Considerations of Teamwork

research has indicated that there are limitations to human information processing and memory (Miller, 1956). Thus, to ensure that researchers and practitioners acknowledge and scrutinize each consideration accordingly, it is beneficial to develop a memorable heuristic such as the "C" phrasing.

These considerations comprise six core emergent states and processes, as well as three influencing conditions. Emergent states are the resultant dynamic properties of a team, whereas processes are defined as interdependent activities that facilitate taskwork accomplishment in the pursuit of goals (Marks et al., 2001). The six processes and emergent states we offer as critical considerations are (1) cooperation, (2) conflict, (3) coordination, (4) communication, (5) coaching, and (6) cognition. We also include three influencing conditions, which serve as factors impacting the aforementioned core processes and emergent states: (1) composition, (2) culture, and (3) context. These influencing conditions describe the broad range of factors affecting how teams operate and how variability within those factors can both directly and indirectly (through the aforementioned processes and emergent states) influence team outcomes. All of these considerations have extensive theoretical and empirical support

TABLE II	Definitions of Critical Considerations for Teamwork and Collaboration	
Critical Consideration	Definition	References
Cooperation	The motivational drivers of teamwork. In essence, this is the attitudes, beliefs, and feelings of the team that drive behavioral action.	Mathieu et al., 2008; Salas, Stagl, Burke, & Goodwin, 2007; Wiener, Kanki, & Helmreich, 1993
Conflict	The perceived incompatibilities in the interests, beliefs, or views held by one or more team members.	Bradley et al., 2011; DeDreu & Weingart, 2003; Jehn, 1995, 1997
Coordination	The enactment of behavioral and cognitive mechanisms necessary to perform a task and transform team resources into outcomes.	Marks et al., 2001; Rico et al., 2008; Sims & Salas (2007); Stewart, 2006
Communication	A reciprocal process of team members' sending and receiving information that forms and re-forms a team's attitudes, behaviors, and cognitions.	Connaughton & Daly, 2004; Craig, 1999; LePine et al., 2008
Coaching	The enactment of leadership behaviors to establish goals and set direction that leads to the successful accomplishment of these goals.	Hackman & Wageman, 2005; Morgeson et al., 2010; Zaccaro et al., 2001
Cognition	A shared understanding among team members that is developed as a result of team member interactions including knowledge of roles and responsibilities; team mission objectives and norms; and familiarity with teammate knowledge, skills and abilities.	DeChurch & Mesmer-Magnus, 2010; Klimoski & Mohammed, 1994; Wildman et al., 2012a
Composition*	The individual factors relevant to team performance; what constitutes a good team member; what is the best configuration of team member knowledge, skills, and attitudes (KSAs); and what role diversity plays in team effectiveness.	Cannon-Bowers & Bowers, 2010; Humphrey, Morgeson, & Mannor, 2009; Stevens & Campion, 1994
Context*	Situational characteristics or events that influence the occurrence and meaning of behavior, as well as the manner and degree to which various factors impact team outcomes.	Bedwell et al., 2012; Hertel et al., 2004; Johns, 2006; McGrath, 1984
Culture*	Assumptions about humans' relationships with each other and their environment that are shared among an identifiable group of people (e.g., team, organization, nation) and manifest in individuals' values, beliefs, norms for social behavior, and artifacts.	Gibson, Maznevski, & Kirkman (2009); Stahl et al., 2010; Taras et al., 2010

*Denotes influencing condition.

for their importance to teams in varying contexts and across a multitude of tasks, which serves as the impetus for their inclusion.

Core Processes and Emergent States

The core processes and emergent states described herein as critical considerations are the primary attitudes, behaviors, and cognitions that occur *within* the team and encompass the core aspects of teamwork. These considerations have emerged as critical from decades of extensive empirical work acknowledging their significance in effective teamwork. These include the attitudes and motivations within the team for engaging in teamwork (i.e., cooperation), the behavioral interactions among members (i.e., conflict, coordination, communication, coaching), and the shared knowledge that arises out of these interactions (i.e., cognition).

Cooperation

Collective efficacy is an important component of cooperation to target. In order to ensure its development, we recommend the cultivating of collective efficacy through promoting "early wins."

Cooperation is an overarching teamwork consideration that captures the motivational drivers necessary for effective teamwork. In essence, cooperation involves the attitudes, beliefs, and feelings of the team that drive behavioral action. There are a number of team-level indicators of cooperation critical to team effectiveness. For instance, Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995) discussed collective efficacy (i.e., collective sense of competence or perceived empowerment to control the team's function or environment; e.g., Katz-Navon & Erez, 2005; Mathieu, Gilson, & Ruddy, 2006; Zaccaro, Blair, Peterson, & Zazanis, 1995), trust (i.e., shared belief that all team members will contribute as required by role and protect the team; e.g., Bandow, 2001; Salas, Sims, & Burke, 2005), and team/collective orientation (i.e., general preference for and belief in the importance of teamwork; e.g., Eby & Dobbins, 1997; Jackson, Colquitt, Wesson, & Zapata-Phelan, 2006) as team-level attitudes important for successful teamwork.

Research has empirically established relationships between these cooperative mechanisms and desired team outcomes. Specifically, teams whose members collectively believe they are capable of successfully attaining goals tend to (1) exert more effort, (2) take more strategic risks, (3) have better performance, and (4) be more satisfied (Knight, Durham, & Locke, 2001; Lester, Meglino, & Korsgaard, 2002). Another aspect of cooperation, trust, has been found to influence the amount of

monitoring within a team (Langfred, 2004) and moderate the relationships between (1) team training proficiency and performance, as well as (2) task and relationship conflict. Trust also leads to citizenship behaviors, organizational commitment, job satisfaction, positive attitudes toward the organization, and greater levels of performance (e.g., Colquitt, Scott, & LePine, 2007; Costa, 2003; Dirks & Ferrin, 2002; Kanawattanachai & Yoo, 2002; Kirkman, Rosen, Tesluk, & Gibson, 2006; Langfred, 2007; Webber, 2008). Recent research on adaptation (and the associated importance of learning and continuous development) has highlighted the significance of other components of cooperation in relation to team effectiveness, including psychological safety (i.e., shared feeling of safety within a team allowing for interpersonal risk taking; e.g., Edmondson, 1999) and team-learning orientation (i.e., shared belief regarding the degree to which team goals are geared toward learning; e.g., Bunderson & Sutcliffe, 2003). Goal commitment (i.e., the determination to achieve team goals) has also been suggested as a critical attitude for effective teamwork, though this has been proposed as a subdimension of the more broadly defined cohesion construct (Beal, Cohen, Burke, & McLendon, 2003).

Practical Guidance

The research surrounding this critical consideration offers several important recommendations in terms of ensuring that cooperation will lead to enhanced teamwork, two of which are particularly essential to organizations. First, collective efficacy is an important component of cooperation to target. In order to ensure its development, we recommend the cultivating of collective efficacy through promoting "early wins" (Tasa, Taggar, & Seijts, 2007). Specifically, newly formed teams that experience high levels of initial success use these "wins" to develop a collective sense of accomplishment that permeates through to later performances. Therefore, leaders who can help teams facilitate such wins—which may be simple, easily achievable goals that precede more challenging tasks—should see heightened collective efficacy and cooperation.

Our second recommendation regarding cooperation is related to the establishment of trust in teams. Trust is a well-studied attitude contributing to teamwork success, especially in terms of the antecedents that lead to its formation (Lewicki, Tomlinson, & Gillespie, 2006). To develop trust in teams, it is recommended that team members discuss prior experiences relevant to the tasks to be performed in their team. For example, operating teams preparing for surgery may benefit from

discussing previous experiences in similar types of surgeries. This discussion of previous experience plays two important roles. First, it allows members to ascertain the abilities of others on the team, a critical antecedent to trust (Mayer, Davis, & Schoorman, 1995). Furthermore, such discussion can create a sense of perceived similarity, as members begin to realize that they may have experienced similar events in the past. Social identity theory and social categorization (Tajfel & Turner, 1986; Turner, 1987) suggest that if individuals perceive others as similar to themselves, this similarity is associated with a set of predetermined assumptions and a sense of predictability and comfort. Simply stated, individuals are likely to trust others perceived to be similar to themselves (Brewer, 1979; Brewer & Kramer, 1986; Kramer & Brewer, 1984). Thus, these discussions, conducted prior to performance, can aid in the facilitation of trust as well as related cooperative attitudes that can subsequently have a positive impact on teamwork.

Conflict

Teams inevitably experience conflict during their life cycle. Indeed, one of the most classic models of team development includes a "storming" stage, during which members are expected to work out differences in opinions and ideas (Tuckman, 1965). Conflict may be as simple as a brief disagreement regarding who is responsible for performing a particular task or as extreme as a heated fight when personalities differ strongly (Jehn, 1995, 1997). Conflict is particularly an issue for teams, as it can lead to errors and breakdowns in performance (Salas et al., 2008), and its impact on performance is further magnified by the complexity of the team's task (De Dreu & Weingart, 2003).

Conflict can be defined as perceived incompatibilities in the interests, beliefs, or views held by one or more team members (Jehn, 1995). Generally speaking, conflict is a result of perceived deprivation of resources or treatment because of the actions or inactions of another party. Team conflict can be either task-based (i.e., differences in viewpoints or opinions regarding how members should best execute tasks), or relationship-based (i.e., interpersonal differences that spark annoyance or tension among team members). Additionally, recent literature points to the inclusion of process conflict as a third dimension, which refers to conflict regarding how to divide and delegate tasks and responsibilities among team members (Behfar, Peterson, Mannix, & Trochim, 2008; Jehn, 1997).

Different views exist with regard to the specific impact of conflict on team processes and outcomes. Some argue that it is relationship conflict that is the most detrimental to team performance, while task conflict can positively impact team performance under certain conditions (Bradley, Postlethwaite, Klotz, Hamdani, & Brown, 2011). Specifically, task conflict serves as a means for members to express multiple potentially conflicting options for problem solving or task completion, meaning that the team is presented with a variety of viewpoints, opinions, or solutions from which to choose the most viable. This clearly has implications for team performance outcomes, especially in problem-solving tasks that require innovation and creativity. In contrast, De Dreu and Weingart (2003) found that conflict, both relationship and task, has a strong negative correlation with team performance as well as team member satisfaction. Further, though conflict can have a beneficial impact initially, this effect quickly diminishes over time, as it results in decreased group cohesion (Copeland & Wida, 1996; Klein & Christiansen, 1969).

Recent research also suggests that the interactions between relationship and task conflict may be more complex than initially thought. More specifically, a recent study of work teams revealed a moderating effect of relationship conflict on the task conflict–team performance relationship (Shaw et al., 2011); when relationship conflict was low, task conflict had a curvilinear relationship with team performance, but when relationship conflict was high, there was a negative and linear relationship. In other words, when team members had positive interpersonal relationships, a moderate amount of task conflict was most beneficial for team performance, whereas task conflict was consistently detrimental to performance when team members' interpersonal relationships were strained. Understanding these dynamics between different types of conflict is therefore extremely important to promoting successful teamwork.

Practical Guidance

Given the potentially negative influences of conflict on teamwork and the complexities associated with this consideration for teamwork, it is particularly important for organizational leadership to consider the management and resolution of conflict (e.g., being both proactive and reactive). That is, prior to performance, teams should work to set norms and guidelines regarding how to handle conflict through the adoption of appropriate conflict management strategies. Furthermore, once teams experience conflict, they should not be afraid to confront it and instead should react by utilizing the previously agreed upon conflict management strategies. Conflict management strategies have been found to alleviate the negative

impacts of conflict, particularly its effects on team cohesion (Tekleab, Quigley, & Tesluk, 2009). Indeed, recent literature supports this assertion, as teams that manage conflict directly are better able to create healthy, open, and constructive environments that enhance team performance (Cameron, 2000; Campbell & Dunnette, 1968; Montoya-Weiss, Massey, & Song, 2001).

Further, drawing from the perspective that certain conditions can foster positive and beneficial task conflict, Bradley and colleagues (2011) found in their study of project teams that a psychologically safe climate, or one in which team members feel comfortable sharing information and being open with one another without threat of repercussions (Edmondson, 1999), can reduce relationship conflict while simultaneously promoting a small degree of task conflict that positively impacts team performance. Moreover, research suggests that certain patterns of intragroup conflict can derail team performance and other critical team outcomes. In real-world settings, this can mean the difference between a successful surgery or flight and a life-threatening error. Thus, creating norms for handling conflict prior to performance, as well as assessing and effectively managing conflict on a regular basis, is a critical consideration for teamwork across organizational contexts.

> *Research suggests that certain patterns of intragroup conflict can derail team performance and other critical team outcomes. In real-world settings, this can mean the difference between a successful surgery or flight and a life-threatening error.*

Coordination

Effective coordination is a primary driver behind positive team outcomes. Coordination can be defined as the enactment of behavioral mechanisms necessary to perform a task and transform team resources into outcomes (Sims & Salas, 2007). Behavioral mechanisms are undoubtedly vital for effective team processes and outcomes. Because of their criticality and prevalence, one systematic review integrated 29 frameworks that focused on teamwork behaviors specifically, with coordination frequently cited as a vital dimension (Rousseau, Aube, & Savoie, 2006). In essence, coordination involves "orchestrating the sequence and timing of interdependent actions" (Marks et al., 2001, p. 363). Coordination involves the use of team-level strategies to align knowledge and actions to achieve common goals (Arrow, McGrath, & Berdahl, 2000; Brannick, Prince, Prince, & Salas, 1995). Coordination can take several forms, as individuals within a team may be performing the same or complementary tasks, which may range as a function of their interdependence (Guastello & Guastello, 1998). Furthermore, coordination can be explicit, where team members intentionally utilize mechanisms such as planning and communication to manage interdependencies, or implicit, whereby team members anticipate team needs and dynamically adjust their behaviors accordingly without having to be instructed (Rico, Sánchez-Manzanares, Gil, & Gibson, 2008).

Both implicit and explicit coordination are pivotal drivers of team performance, as demonstrated in a range of field and lab studies. Indeed, teams that utilize routines and distribute responsibilities have been found to be more effective than those that do not (Gersick, 1988; Gersick & Hackman, 1990; Weick & Roberts, 1993). More generally, Stewart (2006) conducted a meta-analysis of 93 studies, finding that within-team coordination corresponded with higher team performance. Coordination also appears to become even more important when investigating systems that require multiple teams to work together toward a common goal, or multiteam systems (Mathieu et al., 2008). Several studies have found that effective coordination at the multiteam system level—that is, coordinated actions between the component teams comprising the system—also aided in the facilitation of coordination within component teams (de Jong, de Ruyter, & Wetzels, 2005; Kirkman & Rosen, 1999; Mathieu & Schulze, 2006). This nesting of coordination may be particularly important for organizations that are dynamic in nature, such as in health care or the military.

Practical Guidance

Based on the existing literature, organizational leaders and others involved in the management of teams should critically scrutinize team coordination when developing and assessing teams, as effective coordination helps to ensure positive outcomes, while breakdowns in coordination can lead to increases in errors, misunderstandings, and ultimately derail performance (Sims & Salas, 2007). In terms of specific recommendations, it is first critical that team member roles are defined prior to performance in such a way that they are clear yet not overly rigid (Salas, Rosen, Burke, Goodwin, & Fiore, 2006). That is, in order to maximize the contributions of all team members and prevent any redundancies in work, an understanding of roles and responsibilities should be clarified in order to guide expectations regarding how to coordinate. However, teams should remain relatively flexible such that if unexpected needs arise, appropriate members can step in and fulfill such

demands. Accordingly, Rosen, Bedwell, Wildman, Fritzsche, Salas, and Burke (2011) developed a list of behavioral markers of team adaptability, highlighting the importance of coordination. Their suggestions rely on effective communication regarding status and needs as well as noting any cues that may affect how members synchronize their behaviors. Thus, such communication should be trained and encouraged within teams to ensure flexibility in coordinating.

In addition to role clarification and structuring as a means for establishing effective coordination patterns prior to interaction, teams can also utilize debriefs following performance episodes in order to review positive and negative aspects regarding their coordination efficiency (Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008). Debriefs serve developmental purposes in that they allow teams to reflect on how to improve in future performance episodes and have been empirically linked to positive team outcomes (Ellis, Ganzach, Castle, & Sekely, 2010). Indeed, by using properly constructed debriefs, team coordination and other performance outcomes can be improved by 20 to 25 percent (Tannenbaum & Cerasoli, 2013). In sum, by addressing coordination both prior to and following performance episodes, organizations should be better prepared to foster effective teamwork.

Communication

Communication is essential to all types of organizations, from high-tech multinational firms to daily hospital operations. In fact, Parker (2009) cites communication breakdowns as one of the leading sources of preventable errors in medicine. In terms of defining team communication, there are two perspectives that can be taken. The more simplistic view is that communication is essentially a transfer of information between sender and receiver (Deetz, 1994). However, this transmission model of communication does not fully capture the internal and external factors that may influence information sending, interpretation, and response, especially in a team context. Instead, communication is more of a transactional process, by which communicators can send and receive information simultaneously, with factors such as how and from whom the message is sent influencing interpretation and response (Barnlund, 2008). Thus, we define communication in teams as a reciprocal process of team members' sending and receiving information that forms and re-forms a team's attitudes, behaviors, and cognitions (Craig, 1999).

The significance of team communication as an important factor in team performance is well documented. Industries such as aviation, the military, and health care have particularly noted the importance of effective team communication in the reduction of errors (Helmreich, Merritt, & Wilhelm, 1999), the ability to self-adjust plans in light of teamwork breakdowns (Smith-Jentsch, Zeisig, Acton, & McPherson, 1998), and the acknowledgment of proper information (Weaver et al., 2010). A recent meta-analysis of 72 studies conducted by Mesmer-Magnus and DeChurch (2009) uncovered the finding that information sharing in teams positively and significantly predicts team performance, particularly in terms of sharing unique information.

Moreover, as previously discussed, team communication can influence other critical teamwork aspects, such as coordination and conflict (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008; Rosen et al., 2011). Team communication structure has a role in influencing critical team processes, as the way in which information flows among team members can subsequently influence the team's ability to work together and accomplish goals (Dyer, 1984). Further, teams that communicate effectively may alternate between explicit communication, or overt transmission and acknowledgment of messages, and implicit communication, whereby information is more passively conveyed (Espinosa, Lerch, & Kraut, 2004). Indeed, some highly effective teams may explicitly say only a few words to one another during dynamic periods of performance, instead relying on nonverbal cues and an ingrained understanding of one another's expertise in order to perform appropriately (Entin & Serfaty, 1999).

Some highly effective teams may explicitly say only a few words to one another during dynamic periods of performance, instead relying on nonverbal cues and an ingrained understanding of one another's expertise in order to perform appropriately.

Practical Guidance

So how can organizations work to produce teams that communicate well? According to the extant research on teamwork, effective team communication is characterized by: (1) the sharing of unique information held by team members in face-to-face environments and openness of information in virtual environments (Mesmer-Magnus & DeChurch, 2009; Mesmer-Magnus, DeChurch, Jimenez-Rodriquez, Wildman, & Shuffler, 2011), as well as (2) the implementation of closed-loop communication procedures that acknowledge the receipt of information and clarify any discrepancies in information interpretation (McIntyre & Salas, 1995). In terms of sharing information, teams operating in face-to-face environments should be encouraged

by managers and leaders to communicate information that is uniquely held by individual team members. For example, this may be expertise held by a single team member, or task-relevant information that is provided to only one member (Stasser & Titus, 1987). Encouragement to share unique information is critical—though such information is typically critical to teamwork success, face-to-face teams tend to share only information that is commonly held (Mesmer-Magnus & DeChurch, 2009). However, in virtual environments, teams tend to focus more on unique information in the sharing of task-relevant messages, and therefore can lose the rich context afforded by openness of information. Thus, virtual teams should be encouraged to be more open in their information sharing, as having an open flow of information promotes the exchange of social information needed for developing cooperative attitudes (Mesmer-Magnus et al., 2011).

The second recommendation regarding communication as a critical consideration for teamwork involves the use of closed-loop communication protocols. Closed-loop communication refers to team members ensuring that a message has been successfully relayed and received (Salas, Sims, & Burke, 2005). Teams should establish procedures for such closed loop communication prior to performance in order to ensure that all team members receive information when needed, and that the receipt of the intended information is confirmed (McIntyre & Salas, 1995). By using such protocols, information exchange challenges should be minimized, thereby promoting successful communication and subsequent teamwork effectiveness.

Coaching

Teams on their own may not necessarily recognize when breakdowns are occurring or where expertise may lie within the team (Hackman, 2011). Coaches (i.e., leaders), both internal and external to a team, can provide the necessary direction and support to help team members overcome this potential for process loss (Hackman & Wageman, 2005; Zaccaro, Rittman, & Marks, 2001). Furthermore, there may even be a need to have multiple individuals share leadership behaviors from either a formal or informal standpoint in order to effectively facilitate teamwork (Morgeson, DeRue, & Karam, 2010). From an empirical standpoint, literature abounds to support the value of leadership behaviors, such as initiating structure and providing consideration in contributing to overall team effectiveness (Burke, Stagl, Salas, Pierce, & Kendall, 2006). Thus, it is important to understand how to integrate coaching and leadership into team design, development, and performance.

Coaching has been used to describe many activities performed by both individuals and teams for the sake of team effectiveness (Hackman & Wageman, 2005). For the purposes of this paper, we refer to coaching as the enactment of leadership behaviors to establish goals and set direction that leads to the successful accomplishment of these goals (Fleishman et al., 1991). Coaching can come from one or several leaders internal or external to the team, including those formally acknowledged as serving in a leadership positions or informally stepping up when a need for leadership is recognized (Morgeson et al., 2010). Although coaching and leadership can be viewed from multiple perspectives, we advance this functional perspective as a critical consideration, in that it promotes an understanding of the specific behaviors that must be enacted from a coaching perspective for team success.

So why does coaching matter to teams? Most significantly, the successful enactment of leadership behaviors facilitates the emergence of effective processes and states in teams (Hackman, 2011; Zaccaro et al., 2001). By recognizing the performance and process gaps that occur within a team, coaching can serve to dynamically guide and foster team development and performance throughout the team life cycle (Hackman & Wageman, 2005; Kozlowski, Watola, Jensen, Kim, & Botero, 2009). In particular, coaching is necessary to recognize and help correct vital team errors or problems, as well as to provide guidance in challenging situations. For example, Baran and Scott (2010) noted the necessity of coaching behaviors such as direction setting, role modeling, sensemaking, and framing in 100 "near miss" situations where firefighters narrowly escaped death or injury. Furthermore, in recent meta-analyses, such behaviors have been positively associated with perceived team effectiveness, team productivity, and team learning (Burke, Sims, Lazzara, & Salas, 2007) as well as follower job satisfaction, leadership effectiveness, satisfaction with the leader, and group performance (DeRue, Nahrgang, Wellman, & Humphrey, 2011). Certainly, such behaviors are fundamental for effective teamwork.

Practical Guidance

In recognizing that coaching is a critical consideration for teamwork, researchers have spent substantial time discerning what leaders can do to best facilitate teamwork. In terms of practical implications, research has concentrated on identifying the outcomes linking specific coaching and leadership behaviors to team outcomes. Perhaps the most critical role of leaders in teams that has emerged is that of diagnosing and addressing team problems

as they arise. This means that team coaches must be attuned to the needs of the team before, during, and after performance, not just during the performance period (Kozlowski et al., 2009), in order to best develop teams to succeed. Most importantly, team coaches must attend to both the overall needs of the team and individual needs of members. Research has provided recommendations regarding specific approaches to coaching a wide range of team members (Coultas, Bedwell, Burke, & Salas, 2011; Hackman & Wageman, 2005). However, it is important to note that coaching in terms of diagnosing and solving the team's problems does not necessarily mean performing taskwork but instead is about helping guide team members to be successful. Indeed, coaching in this sense is "… about building teamwork, not doing the team's work" (Hackman, 2002, p. 167).

A second practical recommendation regarding coaching relates to the source of the coaching. Team coaching does not necessarily have to rely solely upon a single individual, as is often the assumption (Conger & Pearce, 2003). Indeed, there may be multiple leaders of a team, with different members sharing leadership responsibilities or rotating leadership to ensure effectiveness (Zaccaro & DeChurch, 2012). While still a relatively new area of study and primarily focused on face-to-face teams, there have been promising findings supporting the idea that sharing leadership in teams can facilitate effective teamwork and enhance team performance (Balkundi & Harrison, 2006; Carson, Tesluk, & Marrone, 2007; Conger & Pearce, 2003; Mehra, Smith, Dixon, & Robertson, 2006). Thus, it is recommended that especially when team members face very challenging tasks requiring high degrees of interdependence, team members distribute leadership responsibilities among members, based on expertise where possible, in order to avoid overloading a single individual.

Cognition

Team cognition, or shared team knowledge, is arguably one of the most widely studied factors in team research, and with good reason. Team cognition serves as a foundation to effective team process in that it allows for teams to enter into a team performance episode with a shared understanding of how the team will engage in the task at hand. Defined as a shared understanding (e.g., shared mental models, transactive memory systems) among team members that is developed as a result of team member interactions (Klimoski & Mohammed, 1994), team cognition includes knowledge of roles and responsibilities; team mission objectives and norms; the situation within which the team is operating; and familiarity with teammate knowledge, skills, and abilities (Wildman et al., 2012a). In organizational settings, a failure to establish a *shared* understanding of the situation can result in impaired teamwork and negative outcomes, including life-threatening errors. Having a shared understanding of team objectives, roles, expertise, and the operating situation allows teams to preemptively avoid potential missteps and failures.

Results of a recent meta-analysis evaluating the cognitive underpinnings of teamwork indicates that team cognition serves as an important foundation for teamwork and is strongly related to team processes, emergent affective states, and team performance (DeChurch & Mesmer-Magnus, 2010). In fact, a recent 15-year review of the team cognition literature identified a variety of team-level outcomes that have been empirically investigated, including team norms, coordination, communication, team performance, team viability, and strategy implementation (Mohammed, Ferzandi, & Hamilton, 2010). Furthermore, both theoretical and empirical research suggests that team cognition has implications for team adaptation (Burke et al., 2006; Resick et al, 2010) and implicit coordination (Rico et al., 2008). Though it is clear that team cognition is important for a variety of outcomes, less is known about the development of team cognition because of the difficulty in studying the phenomena. Though it is relatively simple to assess basic shared knowledge, it is substantially more difficult for researchers to measure and examine dynamic moment-to-moment shared understanding. However, research to date has indicated that member characteristics such as tenure, experience, and similarity play a role in the development of shared knowledge.

Having a shared understanding of team objectives, roles, expertise, and the operating situation allows teams to preemptively avoid potential missteps and failures.

Practical Guidance

Research indicates that team training and interventions can be effective in developing team cognition and reducing errors. In terms of specific guidance regarding cognition, we recommend two primary strategies. First, based on this area of research, it is apparent that it is important to establish a clear shared understanding of team functioning; however, this understanding may need to be adjusted over the course of the team life cycle, which can be accomplished through the use of self-correction. Guided team self-correction is a debriefing strategy developed around

an expert model in which team members are given responsibility for systematically diagnosing and solving team problems (Smith-Jentsch et al., 1998). This type of team training has been found to help teams develop a more accurate set of team knowledge, which in turn improves team process and performance (Smith-Jentsch et al., 2008). Thus, teams that leverage self-correction should be able to effectively establish the shared cognition needed to enhance teamwork.

Similarly, cross-training is effective in developing more accurate understanding of member roles and responsibilities (Cannon-Bowers, Salas, Blickensderfer, & Bowers, 1998) and team interaction training and computer based training have also been found to be effective (Marks, Zaccaro, & Mathieu, 2000; Smith-Jentsch, Baker, Salas, & Cannon-Bowers, 2001). Cross-training involves having team members learn the tasks of other team members, in order to create shared task models and knowledge regarding task-specific role responsibilities (Blickensderfer, Cannon-Bowers & Salas, 1998; Salas et al., 2005). This type of training can have a potentially high impact on teams, with team performance increases of 12 to 40% being reported following its implementation (Volpe, Cannon-Bowers, Salas, & Spector, 1996). However, it should be noted that cross-training is only beneficial when the benefits of learning a task outweigh the process loss in time and energy to learn the task. Thus, from a practical standpoint, such training may be highly beneficial in ensuring that cognition at the team level is effectively established for teamwork success, but is likely most useful when tasks are not highly complex or specialized.

Summary

Previous literature suggests that teamwork processes and emergent states are critical to team performance. Taken together, cooperation, conflict, coordination, communication, coaching, and cognition serve to ensure that the team is motivated and able to engage in the behaviors or processes that lead to successful team performance outcomes. In understanding their importance, organizational leadership can monitor the attitudes, behaviors, and cognitions within teams and subsequently enact various interventions to develop and sustain teamwork.

Influencing Conditions

We now turn to the influencing conditions of teamwork. These conditions are those factors that have an impact on the core teamwork processes and emergent states. Specifically, the influencing conditions are not the attitudes, behaviors, and cognitions that occur *within* the team (i.e.,

teamwork), but rather are the factors that shape the manner or degree to which teams engage in teamwork. We next discuss in further detail how composition, context, and culture impact teamwork and team performance, and therefore, must be critically considered.

Composition

Our first influencing condition has existed as a critical consideration since the inception of teamwork research. Team composition has been considered in relation to team effectiveness for over 50 years (e.g., Mann, 1959). This work stems from a very practical rationale: understanding how team composition relates to team performance allows for development of selection systems that can aid managerial decisions when composing teams. This requires an understanding of the individual factors relevant to team performance; what constitutes a good team member; what the best configuration of team member knowledge, skills, abilities, and other characteristics (KSAOs) is; and the role that diversity (i.e., differences among team members, including function/role, occupation/discipline, culture, race/ethnicity, and gender) plays in team effectiveness (Cannon-Bowers & Bowers, 2010). Additionally, the identification of trainable individual composition variables (e.g., teamwork KSAs, described next) that affect team performance can guide training and development decisions (Stevens & Campion, 1994); teams weak in certain characteristics can undergo remedial training to improve those necessary KSAs.

Although early composition work focused primarily on understanding the role of team member personality, the past decade has witnessed a resurgence of composition research. Such theory development is important in helping to disentangle individual contributions from team contributions, which ultimately can inform composition efforts. For example, research has shown that generic teamwork skills determine team success above and beyond unique individual technical skills and abilities (e.g., Baker & Salas, 1992; Stevens & Campion, 1994). This work led to identification of several important teamwork KSAs, such as providing and accepting feedback, adaptability, and problem solving (see Salas, Rosen, Burke, & Goodwin, 2009, for a review). Stevens and Campion (1994) advanced these efforts with development of a valid measure of teamwork KSAs within individuals to aid composition efforts.

With regard to specific insights, research reveals that teams whose members have a strong team orientation, or a propensity for working with others in group settings (Salas et al., 2005), are more likely to successfully achieve group

outcomes (Driskell, Salas, & Hughes, 2010). Furthermore, meta-analytic findings suggest that all of the "Big Five" personality traits relate to performance in field settings (i.e., extraversion, agreeableness, conscientiousness, openness to experience, emotional stability; Bell, 2007). However, personality research has moved beyond the Big Five to consider achievement orientation, dependability, assertiveness, and locus of control (see Mathieu et al., 2008, for a more comprehensive review of composition variables).

Another important characteristic for composition research is member diversity. Considering the influence of time as well as the influence of perceived versus actual diversity, Harrison, Price, Gavin, and Florey (2002) found that the influence of surface-level differences (e.g., gender, race) on team performance decreases over time, whereas the effects of deep-level factors (e.g., beliefs, norms) is strengthened. As such, Harrison and colleagues suggest maximizing variation in individual KSAs and taking efforts to minimize deep-level differences to improve team effectiveness.

Practical Guidance

Clear links between composition variables and team performance have been empirically established, and while we are not at a point where we can develop a complex algorithm to compose the perfect "dream team," scientific evidence lends itself to practical guidance. Our first recommendation for composition involves the selection of members high in team orientation. Ideally, when organizational leaders and managers decide that a team is required to accomplish a specific goal or set of goals, the individuals selected for this team should be high on team orientation in order to ensure that members are willing to work in a cooperative manner (Driskell et al., 2010). Teams whose members enjoy and understand the benefits of working in a collective environment will be more likely to work toward the greater good of the team and to contribute to the effectiveness of behavioral mechanisms such as coordination and communication (Mohammed & Angell, 2004). Thus, selecting for such team-oriented individuals should help facilitate teamwork via composition.

Our second set of practical guidance regarding team composition involves selecting team members based on both the teamwork and taskwork demands of the specific team. As previously discussed, effective teamwork goes beyond simply putting together a team of experts who have the taskwork knowledge needed to perform (Salas et al., 2005). In order to form an expert team from a team of experts, it is important that the characteristics that foster teamwork are also taken into account. Measuring and selecting team members on teamwork generic skills in addition to task-work-related knowledge may be one critical way to effectively develop teams, along with selecting complementary personalities. For example, the variance in and minimum level of team conscientiousness on a team is associated with team performance (Barrick, Stewart, Neubert, & Mount, 1998); thus, it may be important to ensure that there is some variability in team member conscientiousness, but that all team members have at least a moderate level of the trait. Selecting teams may not be an easy task, but by taking both task-work and teamwork demands into account, the effort should pay off in a higher degree of team effectiveness.

Context

Research supports the notion that differences exist in how teams accomplish work as compared to individuals, namely that in teams, social processes and influences (e.g., communication, coordination, trust, ingroup/outgroup formation) shape the way in which tasks are accomplished. However, teams operate within a wide variety of contexts that can further influence team functioning, including what components of teamwork are more or less important. For our purposes, context is defined as situational characteristics or events that influence the occurrence and meaning of behavior, as well as the manner and degree to which various factors (e.g., team member characteristics, team behavioral processes) impact team outcomes (Johns, 2006). According to Johns (2006), organizational context can be thought of in terms of the whole picture (i.e., occupation, location, time, and rationale) or as discrete phenomena, including task and physical contexts. The task context includes factors such as team or individual autonomy, uncertainty, accountability, and the resources available, while the physical context includes visible features of the working environment such as temperature, lighting, or décor.

Context is critical to teamwork because it has the capability to shape the very nature in which team members interact with one another. For instance, rapid technological advances have allowed organizations to collaborate across time and space, and as a result modern teams are often operating as virtual, distributed teams

Clear links between composition variables and team performance have been empirically established, and while we are not at a point where we can develop a complex algorithm to compose the perfect "dream team," scientific evidence lends itself to practical guidance.

and multiteam systems (MTS), and often across national or organizational boundaries. Teams that are physically distributed are unable to engage in the face-to-face interaction that can occur when team members are co-located. In particular, these teams may have more difficulty establishing and maintaining goals (Hertel, Konradt, & Orlikowski, 2004), as well as developing personal relationships, cohesion, and trust (Gibson & Gibbs, 2006). Further, recent research suggests virtuality improves sharing of unique knowledge (i.e., information that is held by a particular member instead of the whole team) but hinders openness of information sharing, despite the fact that open information sharing is more important to team performance in virtual settings (Mesmer-Magnus et al., 2011). Teams that are operating across boundaries to collaborate with other distinct teams (i.e., MTS) may also face additional challenges as compared to traditional teams, including distribution, goal incongruence, identity, and coordination issues. However, leader strategizing and coordinating has been shown to be effective in improving interteam coordination and overall MTS performance (DeChurch & Marks, 2006).

One size does not fit all when it comes to teamwork—it is important to anticipate contextual factors that may influence team success and create plans to address such factors.

Organizational climate is perhaps one of the most relevant contextual variables for workplace teams. Organizational climate is broadly defined as collective agreement regarding the perception of formal and informal organizational policies, practices, and procedures (Reichers & Schneider, 1990). These policies, practices, and procedures communicate the values of the organization and are one way that the organizational context can shape how teams function. Organizations that promote teamwork through their policies and practices convey the message to their employees that teamwork is important and valued.

Another contextual factor that has a dramatic impact on teamwork and team functioning is external threat and stress. Teams functioning in "extreme environments" (involving isolation, confinement, or high levels of threat and risk; Stuster, 1998), such as fire and rescue squads, medical teams, flight crews, and military units, are uniquely susceptible to the disastrous consequences of error. Furthermore, in high-stakes situations with high levels of time pressure, individuals are more likely to take risks (Van Mierlo & Kleingeld, 2010). However, research indicates that these contextual conditions actually serve to enhance cohesion (Kansas et al., 2001). Furthermore, in these contexts, leadership and identification with the mission serve to mitigate stress and enhance mission culture, organizational citizenship behaviors, and motivation (Gromer, Frischauf, Soucek, & Sattler, 2006). This complex, high-stakes context makes the very nature of team functioning different from how project teams might operate; extreme contexts have a real and important impact on how teams think, feel, and behave.

Practical Guidance

Overall, research indicates that situational characteristics or events can change the effectiveness of various types of processes (e.g., communication, type of information sharing) and emergent states (e.g., trust) in achieving team outcomes. As a result, organizations may need to consider implementing different procedures or interventions depending on the context in which the team operates. In other words, one size does not fit all when it comes to teamwork—it is important to anticipate contextual factors that may influence team success and create plans to address such factors. For example, working in distributed and virtual environments may be challenging due to the lack of social cues (Kirkman & Mathieu, 2005), but in anticipation of this, organizational leaders can facilitate initial face-to-face meetings of team members to facilitate the development of trust and establish effective behavior patterns (Cascio & Shurygailo, 2003; Monalisa et al., 2008). Similarly, training for extreme teams can emphasize standard protocols and developing decision-making skills to minimize errors of judgment in high-stakes or time-sensitive situations.

Another way in which organizational leadership can address context as a consideration is through the establishment of an organizational climate that fosters teamwork. This can be done through setting organizational policies, practices, and procedures that promote teamwork, such as the establishment of rewards based on team performance or creating collaborative and open work spaces (Salas, Kosarzycki, Tannenbaum, & Carnegie, 2004). Organizational practices that set goals at the individual level or reward individual success might detract from the team's motivation to work together, and instead lead to various forms of conflict, including competition and perceived unfairness (Mitchell & Silver, 1990; Tjosvold & Yu, 2004; Van Mierlo & Kleingeld, 2010). Thus, by closely aligning policies and procedures such as selection, reward, and performance measurement systems so that they support teamwork, a context for commitment to teamwork can be established.

Culture

Culture has increasingly become an important consideration for organizations, particularly those that rely on teams to accomplish work. In fact, culture has been identified as a major concern with regard to accidents occurring within air and space crews, hospitals, and in military contexts (Wilson, Salas, Priest, & Andrews, 2007). Culture is defined as the assumptions people hold about relationships with each other and the environment that are shared among an identifiable group of people (e.g., team, organization, nation) and manifest in individuals' values, beliefs, norms for social behavior, and artifacts (Gibson, Maznevski, & Kirkman, 2009). In other words, culture is a driving force for member values, norms, and behavior and can originate from any collective, including teams, the organization as a whole, a field or discipline, or at the national level.

The cultural values of the organization, team, and members within a team have a broad range of implications for teamwork. In particular, cultural values shape the way that individuals view themselves in relation to the team and, thus, play an important role in shaping teamwork attitudes (e.g., trust and collective efficacy), cognitions (e.g., shared mental models), and behaviors (e.g., information exchange and backup behavior; Shuffler, DiazGranados, & Salas, 2011), including communication and conflict management (Taras, Kirkman, & Steel, 2010). For instance, individualism-collectivism, or the degree to which individuals view themselves as unique individuals or as a part of a collective, is arguably the most researched cultural value in the teams literature because of its implications for whether members will engage in teamwork processes (Bell, 2007). Furthermore, power distance (i.e., the degree to which individuals value or acknowledge hierarchy and status) has implications for interpersonal interaction within teams; in fact, it has been cited as a primary contributing factor in the accidents of Avianca Flight 052 and Korean Air Flight 801, as well as a major factor in cases of medical error due to a deeply ingrained culture of respect for hierarchy within the medical field (Helmreich, 1994, 2000; Strauch, 2010). When individuals or organizations place high value on hierarchy and status, they are less likely to voice potential errors being made by superiors because it is considered culturally inappropriate or disrespectful to do so. However, in high-stakes contexts, deference or failure to identify errors can have catastrophic outcomes.

In recognizing increasing globalization and the impact of culture on teamwork and collaboration, researchers have begun to evaluate the positive and negative effects of various cultural differences on team process and performance. A recent meta-analysis found that the advantages of having a culturally diverse set of individuals (i.e., different values and norms among the team members) working together include higher levels of creativity and satisfaction (Stahl, Maznevski, Voigt, & Jonsen, 2010). However, heterogeneity in cultural values and norms was also cited as a source of conflict and process loss, specifically in terms of a lack of social integration (i.e., cohesion, identity, and commitment), communication, and shared meaning. Furthermore, research suggests that culture has greater predictive power than personality traits for outcomes such as commitment, citizenship behavior, identification, and team-related attitudes (Taras et al., 2010).

Practical Guidance

Though research suggests that cultural heterogeneity and diversity may have positive implications for creativity and innovation due to the availability of a wider range of perspectives, it also opens the door for conflict in values, beliefs, and biases. To combat these issues, organizations can take steps toward creating a teamwork climate that emphasizes engaging in effective teamwork processes regardless of status. One such example is crew resource management protocols that have since been implemented across the airline industry, which focus on effective coordination and communication among crew members. At an even more basic level, with diversity comes a host of barriers to effective team processes due to language and miscommunication, or norms regarding meeting times or work habits. Thus, when organizations are composed of diverse individuals or groups, leaders must take active steps in developing a climate that emphasizes the norms and values of that particular organization.

Another set of practical guidance related to the culture of teams is the need to create a team culture that embraces similarities and respects differences. Individuals bring their own cultural influences, norms, and beliefs into team interaction. However, this does not have to be a detriment to team performance if team members are able to meld their cultural values into a new, hybrid team culture that acknowledges similarities among team members (Earley & Mosakowski, 2000). A hybrid team culture is an emergent set of norms, rules, expectations, and behaviors that individuals within a team create themselves after some period of interaction. The degree to which these values are shared determines the strength of the culture, but the establishment of any degree of team culture that team members can unify

under can be beneficial during team interaction. Furthermore, highly heterogeneous groups that set norms for appreciating differences that can contribute to the overall goal of the team will be better able to leverage these differences to maximize team performance (Mannix & Neale, 2005).

Summary

Teams and organizations cannot ignore the influence of team composition; the context in which the team is operating; and the culture of the organization, team, and individuals. Research has indicated that these conditions have an impact on the degree to which teams can successfully engage in teamwork and obtain performance outcomes. As well-intentioned as a team may be, these factors matter—they shape the motivations and interactions of teams as well as the effectiveness of team processes and emergent states in achieving outcomes. In turn, teams will not necessarily be successful under optimal conditions if the core processes and emergent states are not in place. Together, these two categories of considerations serve as a useful heuristic for teams and organizations looking to develop and sustain teamwork.

Discussion

As noted at the outset of this article, organizations are increasingly realizing the benefits of teams for solving complex problems and are implementing team-based structures to meet this need. In response to this change, research on teams has grown, especially over the past several decades. Although we are far from understanding every detail of teams and team effectiveness, we arguably have a firm grasp on the basic, key components of teamwork and some of the conditions that impact teamwork effectiveness. In fact, dozens of reviews and meta-analyses of the teamwork literature have been published within the past 15 years in an effort to summarize this vast body of knowledge. However, one of the widespread challenges of scientific research is the transition from basic science into practical application, and organizational science is no exception (Briner & Rousseau, 2011; Thayer, Wildman, & Salas, 2011). Basic science is research performed for its own sake—the development of knowledge in order to understand. Applied science, however, is research performed with a specific goal in mind. Although the divide between basic and applied science has been the topic of considerable debate within the scientific literature (e.g., Reagan, 1967), we argue here that given the significance and abundance of teamwork research, translating this literature into something practical for organizational leadership is of utmost importance.

The heuristic presented here is designed precisely to serve as a means for translating the science of teamwork into something concise and useful for those involved in developing and managing teams, as well as to serve as a means for making connections and spurring future research regarding teamwork and these critical considerations. Empirical research, including individual studies and meta-analyses of the vast teamwork literature, demonstrate that the factors outlined in this heuristic have important implications for teamwork and performance outcomes. Though we acknowledge that this heuristic is by no means exhaustive of every factor that has implications for team effectiveness, we have encapsulated within our heuristic the nine factors that have emerged from the literature as being crucial. Namely, we identified six core processes and emergent states that represent the attitudes, behaviors, and cognitions that are central to teamwork: cooperation, conflict, coordination, communication, coaching, and cognition. Furthermore, we have identified three primary influencing conditions that have received attention within the literature as having an impact on teamwork: composition, context, and culture.

In addition to briefly describing the importance and empirical evidence in support of each of these considerations, we have gone beyond the existing reviews on teamwork to also offer several pieces of advice regarding how to address each of the critical considerations in order to enhance teamwork and performance outcomes (see Table III). However, in order to better integrate these in a more holistic manner, we provide the overarching recommendation that organizational leaders think of team development interventions from a pre-, during, and post-performance framework (Gregory, Shuffler, DiazGranados, & Salas, 2012). That is, there are interventions that can be conducted prior to teams beginning a performance episode, such as making specific decisions regarding the team composition, as well as conducting team cross-training and team building in order to ensure that considerations such as cognition and cooperation develop effectively. During performance episodes, interventions such as self-correction can be highly beneficial, as this type of intervention can be administered when teams realize there is a problem that requires adjustment. Finally, after teams perform, debriefs and huddles can be highly beneficial in recognizing where teams were efficient regarding each of the critical considerations, as well as where improvement can be made. By acknowledging this temporal unfolding of interventions, organizational leaders and others involved in teamwork development and maintenance can be better prepared to ensure

TABLE III	**Advice for Utilizing the Considerations for Teamwork**
Critical Consideration	**Practical Advice**
Cooperation	• Build collective efficacy through promoting "early wins." • Build trust through the discussion of past experiences relevant to team goals.
Conflict	• Be proactive—set expectations for how to handle conflict. • Be reactive—confront conflict when it occurs instead of ignoring it.
Coordination	• Self-correct via huddles and debriefs. • Ensure team member roles are clear but not overly rigid.
Communication	• Share unique information among team members. • Utilize closed-loop communication patterns.
Coaching	• Use coaches to diagnose and address teamwork problems. • Distribute leadership responsibilities among multiple members of the team.
Cognition	• Foster understanding of roles and how these roles fit together through cross-training. • Establish a clear shared understanding of team functioning through self-correction.
Composition*	• Select for a strong team orientation. • Compose teams based upon both the teamwork and taskwork demands.
Context*	• One size does not fit all—anticipate and plan for contextual teamwork challenges. • Set organizational policies, practices, and procedures that promote and support teamwork.
Culture*	• Create a hybrid culture that leverages pro-team values and creates a safe environment for voicing ideas and concerns. • Create a team culture that embraces similarities and respects differences.

*Denotes influencing condition.

that these critical considerations for teamwork are addressed at all stages of team development.

As discussed previously, these critical considerations may vary in terms of their importance to any given team or organization. For instance, there is a growing field of knowledge on how culture impacts teamwork, and we are beginning to understand the complexity of culture and its impact. However, though culture generally is an important consideration, it may be a less important consideration for homogenous organizations with a strong organizational culture already in place. Similarly, coordination and cognition may be less of a concern for teams with a formal leader than for highly autonomous teams. In other words, the influencing conditions (i.e., culture, context, composition) play a large role in the extent to which the core processes and emergent states are more or less critical to team performance outcomes. Therefore, though the importance of the considerations varies across teams and organizations, they provide at least a starting point by which leaders can begin to determine what might have the most impact on the teamwork and team outcomes critical to their organizations.

From a practical standpoint, the heuristic and corresponding advice serves as an evidence-based tool for organizational leaders to utilize in diagnosing and developing teams. In particular, the heuristic provides awareness and a means to systematically consider the factors with the greatest likelihood to facilitate or hinder team effectiveness; in turn, the corresponding advice provides a set of straightforward recommendations for setting the conditions to foster teamwork through each of the considerations. As such, organizational leaders can use the heuristic and practical advice across the team life span to aid in the process of (1) determining if teams are, in fact, an appropriate solution given the organizational needs and environment; (2) selecting individuals to work within a team environment and composing teams of complementary members; (3) developing and preparing teams for successful teamwork interactions; (4) diagnosing and correcting team problems and performance breakdowns; and (5) assessing team performance and outcomes.

From a future research perspective, we hope that this heuristic will engage researchers in research activities that will result in findings that are meaningful to real-world organizations. Throughout the article, we have identified several areas that would benefit from additional

From a practical standpoint, the heuristic and corresponding advice serves as an evidence-based tool for organizational leaders to utilize in diagnosing and developing teams.

research within a particular consideration. For example, although composition has been widely acknowledged as an important factor for more than 50 years, there are many remaining questions to be answered surrounding the complementarity of team members and what constitutes a "dream team." Furthermore, we hope that this work will spur researchers to give careful thought to the interplay of these different factors in influencing one another as well as overall team outcomes. As mentioned previously, these considerations do not operate within silos; instead, they exist as a system whereby a change in one factor has implications for other considerations (open systems theory; Katz & Kahn, 1966). Though we have some understanding of how a subset of these considerations may impact one another, the teamwork "map" has yet to be fully theorized, tested, and understood.

Teamwork researchers have the potential to make a strong impact on the future of teams in organizations, if they continue to recognize the needs and challenges that influence real-world teamwork. This initial heuristic can serve as a means by which researchers can continue to push boundaries in our understanding of teams and bridge current gaps in the literature in areas that are particularly relevant for real-world teams. For example, continuing to explore new contexts such as virtuality and multiteam systems and their influence on core processes such as conflict and cognition can enhance subsequent training and development programs for organizations that operate in such contexts (Shuffler et al., 2011). Similarly, technology continues to develop in ways that will allow for the use of algorithms to comprise "dream teams"; as such, it is important that researchers explore teamwork and taskwork KSAs as well as team complementarity in various contexts and across task types. Furthermore, we fully expect and hope that current and future teamwork researchers will respond to this heuristic with debate and discussion in regards to what exactly are the most critical considerations of teamwork. We believe that this heuristic will continue to serve its purpose as a translation of science to practice only if researchers continue to question and expand our present understanding of teamwork and its critical considerations.

Conclusion

Given the increasing shift to team-based work in order to facilitate advancements in a range of different organizational contexts, it is unlikely that team-based structures will be disappearing anytime in the near future. Thankfully, the science of teams has provided a solid foundation from which to draw a set of critical considerations for successful team development, sustainment, and performance. However, as we have identified, there is much ground left to cover. Only through continued research efforts will our understanding of teams continue to develop and move forward. As the complexity of team tasks continues to increase, this understanding will be of ever-greater importance. Extrapolating from the past successes of the science of teams, this challenge should be well within the capabilities of the field. Though teams are complex, their benefits are salient and tangible. It is the responsibility of the field to ensure that the science continues to inform the successes of teams in the years to follow.

Acknowledgment

EDUARDO SALAS is trustee chair and Pegasus Professor of Psychology at the University of Central Florida. He also holds an appointment as program director for the Human Systems Integration Research Department at UCF's Institute for Simulation and Training. Before joining UCF, he was a senior research psychologist and head of the Training Technology Development Branch of NAWC-TSD for 15 years. Dr. Salas has coauthored over 450 journal articles and book chapters and has coedited 25 books. His expertise includes assisting organizations in fostering teamwork, designing and implementing team training strategies, facilitating training effectiveness, managing decision making, and assessing performance.

MARISSA L. SHUFFLER is an assistant professor of industrial/organizational psychology at Clemson University. Her areas of expertise include team and leadership training and development in high-risk and complex environments. Dr. Shuffler has conducted interdisciplinary research and practical translation to assess training and development needs for both military and civilian populations operating in virtual, multicultural, and high-stress environments.

Dr. Shuffler's research has targeted a range of audiences, including the US Army Research Institute, Department of Labor, US Air Force, and NASA. Her work includes over 100 publications and presentations. She received her PhD from the University of Central Florida.

AMANDA L. THAYER is an industrial/organizational psychology doctoral candidate at the University of Central Florida, previously earning a BA in psychology from the University of North Carolina at Wilmington. She is a graduate research associate at the Institute for Simulation and Training, where she is student scientific lead on several grant-funded, basic and applied research projects. Her research focuses on the impact of interpersonal dynamics and team composition on teamwork and team performance in complex settings, with a particular emphasis on trust, cohesion, interpersonal deviance, and complex organizational systems.

WENDY L. BEDWELL is an assistant professor of industrial/organizational psychology at the University of South Florida. Dr. Bedwell researches collaboration, working to understand how teams operating in complex, dynamic environments effectively adapt to changing/rotating membership, tasking, and resources. With regard to training, she seeks to (1) improve performance through evidence-based training design, delivery, and evaluation; and (2) tie simulation and game-based training techniques to learning outcomes. Dr. Bedwell emphasizes both science and practice, through lab and field research with students as well as medical, military, NASA, and other professional populations. She received her PhD from the University of Central Florida.

ELIZABETH H. LAZZARA holds a dual appointment as a research assistant professor at the University of Kansas School of Medicine Wichita and Wichita State University. Dr. Lazzara received her doctorate in applied experimental human factors psychology from the University of Central Florida. Although she has extensive experiences in military, academic, and commercial settings, her primary interests lie within improving the quality of patient care within health care. Dr. Lazzara strives to make an impact by examining and advancing the science and practice of clinical care and patient safety issues pertaining to human performance, teamwork, team training, simulation-based training, and performance measurement.

References

Arrow, H., McGrath, J. E., & Berdahl, J. L. (2000). Small groups as complex systems: Formation, coordination, development, and adaptation. Thousand Oaks, CA: Sage.

Baker, D. P., & Salas, E. (1992). Principles for measuring teamwork skills. Human Factors, 34, 469–475.

Balkundi, P., & Harrison, D. A. (2006). Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. Academy of Management Journal, 49(1), 49–68.

Bandow, D. (2001). Time to create sound teamwork. Journal for Quality and Participation, 24(2), 41–47.

Baran, B. E., & Scott, C. W. (2010). Organizing ambiguity: A grounded theory of leadership and sensemaking within dangerous contexts. Military Psychology, 22(1), S42–S69.

Barnlund, D. C. (2008). A transactional model of communication. In C. D. Mortensen (Ed.), Communication theory (2nd ed., pp 47–57). Piscataway, NJ: Transaction Publishers.

Barrick, M. R., Stewart, G. L., Neubert, M. J., & Mount, M. K. (1998). Relating member ability and personality to work-team processes and team effectiveness. Journal of Applied Psychology, 83, 377–391.

Beal, D. J., Cohen, R. R., Burke, M. J., & McLendon, C. L. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relations. Journal of Applied Psychology, 88(6), 989–1004.

Bedwell, W. L., Wildman, J. L., DiazGranados, D., Salazar, M., Kramer, W. S., & Salas, E. (2012). Collaboration at work: An integrative multilevel conceptualization. Human Resource Management Review, 22, 128–145.

Behfar, K. J., Peterson, R. S., Mannix, E. A., & Trochim, W. M. K. (2008). The critical role of conflict resolution in teams: A close look at the links between conflict type, conflict management strategies, and team outcomes. Journal of Applied Psychology, 93, 170–188.

Bell, S. T. (2007). Deep-level composition variables as predictors of team performance: A meta-analysis. Journal of Applied Physiology, 92, 595–615.

Blickensderfer, E. L., Cannon-Bowers, J. A., & Salas, E. (1997). Theoretical bases for team self-correction: Fostering shared mental models. In M. Beyerlein, D. Johnson, & S. Beyerlein (Eds.), Advances in interdisciplinary studies in work teams series (Vol. 4, pp. 249–279). Greenwich, CT: JAI Press.

Bradley, B. H., Postlethwaite, B. E., Klotz, A. C., Hamdani, M. R., & Brown, K.G. (2011). Reaping the benefits of task

conflict in teams: The critical role of team psychological safety climate. Journal of Applied Psychology, 97(1), 151–158.

Brannick, M. T., Prince, A., Prince, C., & Salas, E. (1995). The measurement of team process. Human Factors, 37(3), 641–651.

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. Psychological Bulletin, 86(2), 307–324.

Brewer, M. B., & Kramer, R. M. (1986). Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. Journal of Personality and Social Psychology, 50(3), 543.

Briner, R. B., & Rousseau, D. M. (2011). Evidence-based I-O psychology: Not there yet. Industrial and Organizational Psychology, 4(1), 3–22.

Bunderson, J. S., & Sutcliffe, K. M. (2003). Management team learning orientation and business unit performance. Journal of Applied Psychology, 88(3), 552–560.

Burke, C. S., Sims, D. E., Lazzara, E. H., & Salas, E. (2007). Trust in leadership: A multi-level review and integration. Leadership Quarterly, 18(6), 606–632.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. L. (2006). Understanding team adaptation: A conceptual analysis and model. Journal of Applied Psychology, 91(6), 1189–1207.

Burke, C. S., Wilson, K. A., & Salas, S. (2003). Teamwork at 35,000 feet: Enhancing safety through team training. Human Factors and Aerospace Safety, 3(4), 287–312.

Cameron, D. (2000). Styling the worker: Gender and the commodification of language in the globalized service economy. Journal of Sociolinguistics, 4, 323–347.

Campbell, J. P., & Dunnette, M. D. (1968). Effectiveness of T-group experiences in managerial and development. Psychological Bulletin, 70(2), 73–104.

Cannon-Bowers, J. A., & Bowers, C. A. (2010). Team development and functioning. In S. Zedeck (Ed.), APA handbook of industrial and organizational psychology: Vol. 1. Building and developing the organization. Washington, DC: American Psychological Association.

Cannon-Bowers, J. A., Salas, E., Blickensderfer, E., & Bowers, C. A. (1998). The impact of cross-training and workload on team functioning: A replication and extension of initial findings. Human Factors, 40(1), 92–101.

Cannon-Bowers, J. A., Tannenbaum, S. I., Salas, E., & Volpe, C. E. (1995). Defining competencies and establishing team training requirements. In R. A. Guzzo & E. Salas (Eds.), Team effectiveness and decision making in organizations (pp. 333–380). San Francisco, CA: Jossey-Bass.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. Academy of Management Journal, 50(5), 1217–1234.

Cascio, W. F., & Shurygailo, S. (2003). E-leadership and virtual teams. Organizational Dynamics, 31(4), 362–376.

Chiocchio, F., & Essiembre, H. (2009). Cohesion and performance: A meta-analytic review of disparities between project teams, production teams, and service teams. Small Group Research, 40(4), 382–420.

Colquitt, J. A., Scott, B. A., & LePine, J. A. (2007). Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. Journal of Applied Psychology, 92(4), 909–927. doi: 10.1037/0021-9010.92.4.909

Conger, J. A., & Pearce, C. L. (2003). A landscape of opportunities: Future research on shared leadership. In C. L. Pearce & J. A. Conger (Eds.), Shared leadership. Reframing the hows and whys of leadership (pp. 285–303). Thousand Oaks, CA: Sage.

Connaughton, S. L., & Daly, J. A. (2004). Identification with leader: A comparison of perceptions of identification among geographically dispersed and co-located teams. Corporate Communication: An International Journal, 9(2), 89–103.

Copeland, B. W., & Wida, K. (1996). Resolving team conflict: Coaching strategies to prevent negative behavior. Journal of Physical Education, Recreation, & Dance, 67(4), 52–54.

Costa, A. C. (2003). Work team trust and effectiveness. Personnel Review, 32(5), 605–622. doi: 10.1108/00483480310488360

Coultas, C., Bedwell, W. L., Burke, C. S., & Salas, E. (2011). Values sensitive coaching: The DELTA approach to coaching culturally diverse executives. Consulting Psychology Journal: Research and Practice, 63, 149–161.

Craig, R. T. (1999). Communication theory as a field. Communication Theory, 9, 119–161.

De Dreu, C. K., & Weingart, L. R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. Journal of Applied Psychology, 88(4), 741–749.

de Jong, A., de Ruyter, K., & Wetzels, M. (2005). Antecedents and consequences of group potency: A study of self-managing service teams. Management Science, 51(11), 1610–1625.

DeChurch, L. A., & Marks, M. A. (2006). Leadership in multiteam systems. Journal of Applied Psychology, 91(2), 311–329.

DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). The cognitive underpinnings of effective teamwork: A meta-analysis. Journal of Applied Psychology, 95(1), 32–53.

Deetz, S. A. (1994). Future of the discipline: The challenges, the research, and the social contribution. In S. A. Deetz (Ed.), Communication yearbook (Vol. 17, pp. 565–600). Thousand Oaks, CA: Sage.

DeRue, D. S., Nahrgang, J. D., Wellman, N., & Humphrey, S. E. (2011). Trait and behavioral theories of leadership: An integration and meta-analytic test of their relative validity. Personnel Psychology, 64(1), 7–52.

Devine, D. J., & Philips, J. L. (2001). Do smarter teams do better: A meta-analysis of cognitive ability and team performance. Small Group Research, 32(5), 507–532.

Dirks, K. T., & Ferrin, D. L. (2002). Trust in leadership: Meta-analytic findings and implications for research and practice. Journal of Applied Psychology, 87(4), 611–628.

Driskell, J. E., Salas, E., & Hughes, S. (2010). Collective orientation and team performance: Development of an individual differences measure. Human Factors: The Journal of the Human Factors and Ergonomics Society, 52(2), 316–328.

Dyer, L. (1984). Studying human resource strategy: An approach and an agenda. Industrial Relations: A Journal of Economy and Society, 23(2), 156–169.

Earley, P. C., & Mosakowski, E. (2000). Creating hybrid team cultures: An empirical test of transnational team functioning. Academy of Management Journal, 43(1), 26–49.

Eby, L. T., & Dobbins, G. H. (1997). Collectivistic orientation in teams: An individual and group-level analysis. Journal of Organizational Behavior, 18(3), 275–295.

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. Administrative Science Quarterly, 44(2), 350–383.

Ellis, S., Ganzach, Y., Castle, E., & Sekely, G. (2010). The effect of filmed versus personal after-event reviews on task performance: The mediating and moderating role of self-efficacy. Journal of Applied Psychology, 95(1), 122.

Entin, E. E., & Serfaty, D. (1999). Adaptive team coordination. Human Factors, 41(2), 312–325.

Espinosa, A., Lerch, J., & Kraut, R. (2004). Explicit vs. implicit coordination mechanisms and task dependencies: One size does not fit all. In E. Salas & S. M. Fiore (Eds.), Team cognition: Process and performance at the inter- and intra-individual level (pp.107–129). Washington, DC: American Psychological Association.

Fleishman, E. A., Mumford, M. D., Zaccaro, S. J., Levin, K. Y., Korotokin, A. L, & Hein, M. B. (1991). Taxonomic efforts in the description of leader behavior: A synthesis and functional interpretation. Leadership Quarterly, 2(4), 245–287.

Gersick, C. J. G., (1988). Time and transition in work teams: Toward a new model of group development. Academy of Management Journal, 31(1), 9–41.

Gersick, C. J. G., & Hackman, J. R., (1990). Habitual routines in task-performing groups. Organizational Behavior and Human Decision Processes, 47(1), 65–97.

Gibson, C. B., & Gibbs, J. L., (2006). Unpacking the concept of virtuality: The effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation. Administrative Science Quarterly, 51(3), 451–495.

Gibson, C. B., Maznevski, M. L., & Kirkman, B. L. (2009). When does culture matter? In R. S. Bhagat & R. M. Steers (Eds.), Cambridge handbook of culture, organizations, and work (pp. 46–68). New York, NY: Cambridge University Press.

Gregorich, S. E., Helmreich, R. L., & Wilhelm, J. A. (1990). The structure of cockpit management attitudes. Journal of Applied Psychology, 75(6), 682–690.

Gregory, M. E., Shuffler, M. L., DiazGranados, D., & Salas, E. (2012, April). Towards a temporally based framework of team development interventions. Poster presented at the 27th Annual Conference of the Society for Industrial-Organizational Psychology, San Diego, CA.

Gromer, G., Frischauf, N., Soucek, A., & Sattler, B. (2006, September). AustroMars: A simulated high-fidelity human Mars analogue mission. Proceedings of the Mars 2030 Workshop, pp. 4–12.

Guastello, S. J., & Guastello, D. D. (1998). Origins of coordination and team effectiveness: A perspective from game theory and nonlinear dynamics. Journal of Applied Psychology, 83(3), 423–437.

Gully, S. M., Devine, D. J., & Whitney, D. J. (1995). A meta-analysis of cohesion and performance: Effects of levels of analysis and task interdependence. Small Group Research, 26(4), 497–520.

Hackman, J. R. (2002). Leading teams. Boston, MA: Harvard Business Review Press.

Hackman, J. R. (2011). Collaborative intelligence: Using teams to solve hard problems. San Francisco, CA: Berrett-Koehler.

Hackman, J. R., & Wageman, R. (2005). A theory of team coaching. Academy of Management Review, 30(2), 269–287.

Harrison, D. A., Price, K. H., Gavin, J. H., & Florey, A. T. (2002). Time, teams, and task performance: Changing effects of surface- and deep-level diversity on group functioning. Academy of Management Journal, 45(5), 1029–1045.

Helmreich, R. L. (1994). Anatomy of a system accident: The crash of Avianca Flight 052. International Journal of Aviation Psychology, 4(3), 265.

Helmreich, R. L. (2000). Culture and error in space: Implications from analog environments. Aviation, Space, and Environmental Medicine, 71(9–11), 133–139.

Helmreich, R. L., Merritt, A. C., & Wilhelm, J. A. (1999). The evolution of crew resource management training in commercial aviation. International Journal of Aviation Psychology, 9(1), 19.

Hertel, G., Konradt, U., & Orlikowski, B. (2004). Managing distance by interdependence: Goal setting, task interdependence, and team-based rewards in virtual teams. European Journal of Work and Organizational Psychology. 13(1), 1–28.

Horwitz, S. K., & Horwitz, I. B. (2007). The effects of team diversity on team outcomes: A meta-analytic review of team demography. Journal of Management, 33, 987–1015.

Humphrey, S. E., Morgeson, F. P., & Mannor, M. J. (2009). Developing a theory of the strategic core of teams: A role composition model of team performance. Journal of Applied Physiology, 94(1), 48–61.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: From input-process-output models to IMOI models. Annual Review of Psychology, 56(1), 517–543.

Jackson, C. L., Colquitt, J. A., Wesson, M. J., & Zapata-Phelan, C. P. (2006). Psychological collectivism: A measurement validation and linkage to group member performance. Journal of Applied Psychology, 91(4), 884–899.

Jehn, K. A. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. Administrative Science Quarterly, 40(2), 256–282.

Jehn, K. A. (1997). A qualitative analysis of conflict types and dimension in organizational groups. Administrative Science Quarterly, 42(3), 530–557.

Johns, G. (2006). The essential impact of context on organizational behavior. Academy of Management Review, 31(2), 396–408.

Kanawattanachai, P., & Yoo, Y. (2002). Dynamic nature of trust in virtual teams. Journal of Strategic Information Systems, 11(3–4), 187–213.

Kansas, M., Salnitskiy, V., Grund, E. M., Weiss, D. S., Gushin, V., Kozerenko, O., … Marmar, C. R. (2001). Human interactions in space: Results from shuttle. Mir. Acta Astronautica, 49, 243–260.

Katz, D., & Kahn, R. L. (1966). The social psychology of organizations. New York, NY: Wiley.

Katz-Navon, T. Y., & Erez, M. (2005). When collective- and self-efficacy affect team performance. Small Group Research, 36, 437–465.

Kirkman, B. L., & Mathieu, J. E. (2005). The dimensions and antecedents of team virtuality. Journal of Management, 31(5), 700–718.

Kirkman, B. L., & Rosen, B. (1999). Beyond self-management: Antecedents and consequences of team empowerment. Academy of Management Journal, 42(1), 58–74.

Kirkman, B. L., Rosen, B., Tesluk, P. E., & Gibson, C. B. (2006). Enhancing the transfer of computer-assisted training proficiency in geographically distributed teams. Journal of Applied Psychology, 91(3), 706–716.

Klein, K., & Christiansen, G. (1969). Group composition, group structure, and group effectiveness of basketball teams. In J. W. Loy & G. S. Kenyon (Eds.), Sport, culture, and society: A reader on the sociology of sport (pp. 397–408). London, England: Macmillian.

Klimoski, R., & Mohammed, S. (1994). Shared mental model: Construct or metaphor? Journal of Management, 20, 403–437.

Knight, D., Durham, C. C., & Locke, E. A. (2001). The relationship of team goals, incentives, and efficacy to strategic risk, tactical implementation, and performance. Academy of Management Journal, 44(2), 326–338.

Kozlowski, S., Watola, D., Jensen, J., Kim, B., & Botero, I. (2009). Developing adaptive teams: A theory of dynamic team leadership. In: Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches (pp. 113–155). New York, NY: Routledge/Taylor & Francis Group.

Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams. Psychological Science in the Public Interest, 7(3), 77–124.

Kramer, R. M., & Brewer, M. B. (1984). Effects of group identity on resource use in a simulated commons dilemma. Journal of Personality and Social Psychology, 46(5), 1044.

Langfred, C. W. (2004). Too much of a good thing? Negative effects of high trust and individual autonomy in self-managing teams. Academy of Management Journal, 47(3), 385–399.

Langfred, C. W. (2007). The downside of self-management: A longitudinal study of the effects of conflict on trust, autonomy, and task interdependence in self-managing teams. Academy of Management Journal, 50(4), 885–900.

LePine, J. A., Piccolo, R. F., Jackson, C. L., Mathieu, J. E., & Saul, J. R. (2008). A meta-analysis of teamwork processes: Tests of a multidimensional model and relationships with team effectiveness criteria. Personnel Psychology, 61(2), 273–307.

Lester, S. W., Meglino, B. M., & Korsgaard, M. A. (2002). The antecedents and consequences of group potency: A longitudinal investigation of newly formed work groups. Academy of Management Journal, 45(2), 352–368.

Lewicki, R. J., Tomlinson, E. C., & Gillespie, N. (2006). Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. Journal of Management, 32(6), 991–1022.

Mann, R. D. (1959). A review of the relationships between personality and performance in small groups. Psychological Bulletin, 56(4), 241–270.

Mannix, E., & Neale, M. A. (2005). What differences make a difference? The promise and reality of diverse teams in organizations. Psychological Science in the Public Interest, 6(2), 31–55.

Manser, T. (2009). Teamwork and patient safety in dynamic domains of healthcare: A review of the literature. Acta Anaesthesiologica Scandinavica, 53, 143–151.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. Academy of Management Review, 26(3), 356–376.

Marks, M. A., Zaccaro, S. J., & Mathieu, J. E. (2000). Performance implications of leader briefings and team interaction training for team adaptation to novel environments. Journal of Applied Psychology, 85(6), 971–986.

Mathieu, J. E., Gilson, L. L., & Ruddy, T. M. (2006). Empowerment and team effectiveness: An empirical test of an integrated model. Journal of Applied Psychology, 91(1), 97–108.

Mathieu, J. E., Maynard, M. T., Rapp, T., & Gilson, L. L. (2008). Team effectiveness 1997–2007: A review of recent advancements and a glimpse into the future. Journal of Management, 34(3), 410–476.

Mathieu, J. E., & Schulze, W. (2006). The influence of team knowledge and formal plans on episodic team process-performance relationships. Academy of Management Journal, 49(3), 605–619.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. Academy of Management Review, 20(3), 709–731.

McGrath, J. E. (1984). Groups: Interaction and performance. Englewood Cliffs, NJ: Prentice-Hall.

McIntyre, R. M., & Salas, E. (1995). Measuring and managing for team performance: Emerging principles from complex environments. In R. A. Guzzo, E. Salas, & Associates (Eds.), Team effectiveness and decision making in organizations (pp. 9–45). San Francisco, CA: Jossey-Bass.

Mehra, A., Smith, B. R., Dixon, A. L., & Robertson, B. (2006). Distributed leadership in teams: The network of leadership perceptions and team performance. Leadership Quarterly, 17(3), 232–245.

Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. Journal of Applied Psychology, 94(2), 535–546.

Mesmer-Magnus, J. R., DeChurch, L. A., Jimenez-Rodriquez, M., Wildman, J., & Shuffler, M. (2011). A meta-analytic investigation of virtuality and information sharing in teams. Organizational Behavior and Human Decision Processes, 115(2), 214–225.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. Psychological Review, 63(2), 81–97.

Mitchell, T. R., & Silver, W. S. (1990). Individual and group goals when workers are interdependent: Effects on task strategies and performance. Journal of Applied Psychology, 75, 185–193.

Mohammed, S., & Angell, L. C. (2004). Surface and deep-level diversity in workgroups: Examining the moderating effects of team orientation and team process on relationship conflict. Journal of Organizational Behavior, 25(8), 1015–1039.

Mohammed, S., Ferzandi, L., & Hamilton, K. (2010). Metaphor no more: A 15-year review of the team mental model construct. Journal of Management, 36(4), 876–910.

Monalisa, M., Daim, T., Mirani, F., Dash, P., Khamis, R., & Bhusari, V. (2008). Managing global design teams. Research-Technology Management, 51(4), 48–59.

Montoya-Weiss, M. M., Massey, A. P., & Song, M. (2001). Getting it together: Temporal coordination and conflict management in global virtual teams. Academy of Management Journal, 44(6), 1251–1262.

Morgan, B. B., Jr., Glickman, A. S., Woodward, E. A., Blaiwes, A. S., & Salas, E. (1986). Measurement of team behaviors in a Navy environment. Rep. No. 86-014. Orlando, FL: Naval Training Systems Center.

Morgan, B. B., Salas, E., & Glickman, A. S. (1994). An analysis of team evolution and maturation. Journal of General Psychology, 120(3), 277–291.

Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2010). Leadership in teams: A functional approach to understanding leadership structures and processes. Journal of Management, 36(1), 5–39.

Parker, J. (2009). Patient Safety Week blogs: Day 3, Handoff Communications Journal. Retrieved from http://www.jcrinc.com/Blog/2009/3/9/Patient-Safety-Week-Blogs-Day-3-Handoff-Communications/

Piña, M. I. D., Martínez, A. M. R., & Martínez, L. G. (2008). Teams in organizations: A review on team effectiveness. Team Performance Management, 14(1/2), 7.

Reagan, M. D. (1967). Basic and applied research: A meaningful distinction? Science, 155(3768), 1383–1386.

Reichers, A. E., & Schneider, B. (1990). Climate and culture: An evolution of constructs. Organizational Climate and Culture, 1, 5–39.

Resick, C. J., Murase, T., Bedwell, W. L., Sanz, E., Jiménez, M., & DeChurch, L. A. (2010). Mental model metrics and team adaptability: A multi-facet multi-method examination. Group Dynamics: Theory, Research, & Practice, 14, 332–349.

Rico, R., Sánchez-Manzanares, M., Gil, F. & Gibson, C. (2008). Team implicit coordination processes: A team knowledge-based approach. Academy of Management Review, 33(1), 163-184.

Rosen, M. A., Bedwell, W. L., Wildman, J., Fritzsche, B., Salas, E., & Burke, C. S. (2011). Managing adaptive performance in teams: Guiding principles & behavioral markers for measurement. Human Resource Management Review, 21, 107–122.

Rousseau, V., Aube, C., & Savoie, A. (2006). Teamwork behaviors: A review and an integration of frameworks. Small Group Research, 37(5), 540–570.

Ruffel-Smith, H. P. (1979). A simulator study of the interaction of pilot workload with errors, vigilance, and decisions (Tech. Rep. No. 78485). Washington, DC: National Aeronautics and Space Administration.

Salas, E., Cooke, N. J., & Rosen, M.A. (2008). On teams, teamwork, and team performance: Discoveries and developments. Human Factors, 50(3), 540–547.

Salas, E., Dickinson, T. L., Converse, S. A., & Tannenbaum, S. I. (1992). Toward an understanding of team performance and training. In R. W. Swezey & E. Salas (Eds.), Teams: Their training and performance (pp. 3–29). Norwood, NJ: Ablex.

Salas, E., Kosarzycki, M. P., Tannenbaum, S. I., & Carnegie, D. (2004). Principles and advice for understanding and promoting effective teamwork in organizations. In R. Burke & C. Cooper (Eds.), Leading in turbulent times: Managing in the new world of work (pp. 95–120). Malden, MA: Blackwell.

Salas, E., Rosen, M. A., Burke, C. S., & Goodwin, G. F. (2009). The wisdom of collectives in organizations: An update of the teamwork competencies. Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches (pp. 39–79): New York, NY: Routledge/Taylor & Francis Group.

Salas, E., Rosen, M. A., Burke, C. S., Goodwin, G. F., & Fiore, S. M. (2006). The making of a dream team: When expert teams do best. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman, (Eds.), The Cambridge handbook of expertise and expert performance (pp. 439–453). New York, NY: Cambridge University Press.

Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a "big five" in teamwork? Small Group Research, 36(5), 555–599.

Salas, E., Stagl, K. C., Burke, C. S., & Goodwin, G. F. (2007). Fostering team effectiveness in organizations: Toward an integrative theoretical framework of team performance. In W. Shuart, W. Spaulding, & J. Poland (Eds.), Modeling complex systems: Motivation, cognition, and social processes. Nebraska Symposium on Motivation (pp. 185–243). Lincoln, NE: University of Nebraska Press.

Schmidt, L. L., Keeton, K., Slack, K., Leveton, L. B., & Shea, C. (2009). Risk of performance errors due to poor team cohesion and performance, inadequate selection/team composition, inadequate training, and poor psychosocial adaptation. In J. McMurphee & J. Charles (Eds.), Human health and performance risks of space exploration missions (NASA: SSP-2009-3405). Washington, DC: National Aeronautics and Space Administration.

Shaw, J. D., Zhu, J., Duffy, M. K., Scott, K. L., Shih, H., & Susanto, E. (2011). A contingency model of conflict and team effectiveness. Journal of Applied Psychology, 96(2), 391–400.

Shuffler, M. L., DiazGranados, D., & Salas, E. (2011). There's a science for that: Team development interventions in organizations. Current Directions in Psychological Science, 20(6), 365–372.

Sims, D. E., & Salas, E. (2007). When teams fail in organizations: What creates teamwork breakdowns? In J. Langan-Fox, C. L. Cooper, & R. J. Klimoski (Eds.), Research companion to the dysfunctional workplace: Management challenges and symptoms (pp. 302–318). Cheltenham, England: Edward Elgar.

Smith-Jentsch, K. A., Baker, D. P., Salas, E., & Cannon-Bowers, J. A. (2001). Uncovering differences in team competency requirements: The case of air traffic control teams. In E. Salas, C. A. Bowers, & E. Edens (Eds.), Improving teamwork in organizations: Applications of resource management training (pp. 31–54). Mahwah, NJ: Erlbaum.

Smith-Jentsch, K. A., Cannon-Bowers, J. A., Tannenbaum, S. I., & Salas, E. (2008). Guided team self-correction: Impacts on team mental models, processes, and effectiveness. Small Group Research, 39(3), 303–327.

Smith-Jentsch, K. A., Zeisig, R. L., Acton, B., & McPherson, J. A. (1998). Team dimensional training: A strategy for guided team self-correction. In J. A. Cannon-Bowers & E. Salas (Eds.), Making decisions under stress: Implications for individual and team training. Washington, DC: American Psychological Association.

Stahl, G. K., Maznevski, M. L., Voigt, A., & Jonsen, K. (2010). Unraveling the effects of cultural diversity in teams: A meta-analysis of research on multicultural workgroups. Journal of International Business Studies, 41, 690–709.

Stasser, G., & Titus, W. (1987). Effects of information load and percentage of shared information on the

dissemination of unshared information during group discussion. Journal of Personality and Social Psychology, 53(1), 81.

Stevens, M. J., & Campion, M. A. (1994). The knowledge, skill, and ability requirements for teamwork: Implications for human resource management. Journal of Management, 20, 503–530.

Stewart, G. L. (2006). A meta-analytic review of relationships between team design features and team performance. Journal of Management, 32(1), 29–54.

Strauch, B. (2010). Can cultural differences lead to accidents? Team cultural differences and sociotechnical system operations. Human Factors, 52(2), 246–263.

Stuster, J. (1998). Human and team performance in extreme environments: Antarctica. Human Performance in Extreme Environments, 3, 117–120.

Sundstrom, E., McIntyre, M., Halfhill, T., & Richards, H. (2000). Work groups: From the Hawthorne studies to work teams of the 1990s and beyond. Group Dynamics: Theory, Research, and Practice, 4(1), 44–67.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. Austin (Eds.), Psychology of intergroup relations (pp. 7–24). Chicago, IL: Nelson-Hall.

Tannenbaum, S. I., & Cerasoli, C. P. (2013). Do team and individual debriefs enhance performance? A meta-analysis. Human Factors: The Journal of the Human Factors and Ergonomics Society, 55(1), 231–245.

Taras, V., Kirkman, B. L., & Steel, P. (2010). Examining the impact of culture's consequences: A three-decade, multilevel, meta-analytic review of Hofstede's cultural value dimensions. Journal of Applied Psychology, 95(3), 405–439.

Tasa, K., Taggar, S., & Seijts, G. H. (2007). The development of collective efficacy in teams: A multilevel and longitudinal perspective. Journal of Applied Psychology, 92(1), 17–27.

Tekleab, A. G., Quigley, N. R., & Tesluk, P. E. (2009). A longitudinal study of team conflict, conflict management, cohesion, and team effectiveness. Group Organization Management, 34(2), 170–205.

Thayer, A. L., Wildman, J. L., & Salas, E. (2011). I-O psychology: We have the evidence; we just don't use it (or care to). Industrial & Organizational Psychology: Perspectives on Science and Practice, 4, 32–35.

Tjosvold, D., & Yu, Z. (2004). Goal interdependence and applying abilities for team in-role and extra-role performance in China. Group Dynamics: Theory, Research, and Practice, 8, 98–111.

Tuckman, B. W. (1965). Developmental sequence in small groups. Psychological Bulletin, 63(6), 384–399.

Turner, J. C. (1987). Rediscovering the social group: A self-categorization theory. Oxford, England: Blackwell.

Van Mierlo, H., & Kleingeld, A. (2010). Goals, strategies, and group performance: Some limits of goal setting in groups. Small Group Research, 41(5), 524–555.

Volpe, C. E., Cannon-Bowers, J. A., Salas, E., & Spector, P. E. (1996). The impact of cross-training on team functioning: An empirical investigation. Human Factors: The Journal of the Human Factors and Ergonomics Society, 38(1), 87–100.

Weaver, S., Rosen, M., DiazGranados, D., Lazzara, E., Lyons, R., Salas, E., & King, H. B. (2010). Does teamwork improve performance in the operating room? A multi-level evaluation. Joint Commission Journal of Quality Patient Safety, 36(3), 133–142.

Webber, S. S. (2008). Development of cognitive and affective trust in teams. Small Group Research, 39(6), 746–769.

Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. Administrative Science Quarterly, 38(3), 357–381.

Wiener, E. L., Kanki, B. G., & Helmreich, R. L. (1993). Cockpit resource management. San Diego, CA: Academic Press.

Wildman, J. L., Thayer, A. L., Pavlas, D., Salas, E., Stewart, J. E., & Howse, W. R. (2012a). Team knowledge research: Emerging trends and critical needs. Human Factors, 54(1), 84–111.

Wildman, J. L., Thayer, A. L., Rosen, M. A., Salas, E., Mathieu, J. E., & Rayne, S. R. (2012b). Task types and team-level attributes: Synthesis of team classification literature. Human Resource Development Review, 11, 97–129.

Wilson, K. A., Salas, E., Priest, H. A., & Andrews, D. (2007). Errors in the heat of battle: Taking a closer look at shared cognition breakdowns through teamwork. Human Factors, 49(2), 243–256.

Zaccaro, S. J., Blair, V., Peterson, C., & Zazanis, M. (1995). Collective efficacy, self-efficacy, adaptation, and adjustment: Theory, research, and application. New York, NY: Plenum Press.

Zaccaro, S. J., & DeChurch, L. A. (2012). Leadership forms and functions in multiteam systems. In S. J. Zaccaro, M. A. Marks, & L. A. DeChurch (Eds.), Multiteam systems: An organizational form for dynamic and complex environments. New York, NY: Taylor & Francis.

Zaccaro, S. J., Rittman, A. L., & Marks M. A. (2001). Team leadership. Leadership Quarterly, 12(4), 451–483.