Is there a "Big Five" in Teamwork?

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IS THERE A "BIG FIVE" IN TEAMWORK?

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The study of teamwork has been fragmented through the years, and the findings are generally unable to be used practically. This article argues that it is possible to boil down what researchers know about teamwork into five core components that the authors submit as the "Big Five" in teamwork. The core components of teamwork include team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. Furthermore, the authors examine how these core components require supporting coordinating mechanisms (e.g., shared mental modes, closed-loop communication, and mutual trust) and vary in their importance during the life of the team and the team task. Finally, the authors submit a set of propositions for future research.

Keywords: *teamwork; teamwork taxonomy; team development; team task episode*

Organizations are increasingly turning to team-based structures to contend with the growing complexity of the environment in which their employees operate (Katzenback & Smith, 1993). Teams may operate in the complexity of a boardroom where the team must envision their organization 10 years forward, the complexity of an emergency room where the team coordinates to save a life, or the complexity of combat in which the team must battle an

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ever-changing enemy in an ever-changing environment. Teams have the potential to offer greater adaptability, productivity, and creativity than any one individual can offer (e.g., Gladstein, 1984; Hackman, 1987) and provide more complex, innovative, and comprehensive solutions to organizational problems (Sundstrom, DeMeuse, & Futrell, 1990). Although teams have great potential, their failure can have far-reaching effects on their respective organization (e.g., missed deadlines, low productivity, lost revenue, faulty products; Alderfer, 1977; Janis, 1972; Whyte, 1955).

The team's failure may be due to factors such as poor planning, a lack of support by their creators, or a breakdown in internal team processes (e.g., communication). In fact, many researchers have shown that it is the team's processes that ensure team effectiveness (e.g., Gladstein, 1984; Hackman, 1987; McGrath, 1964). Based on both antidotal experiences with teams and empirical or theoretical support, it is known that teams are not easily implemented, that the creation of a team of skilled members does not ensure success, and that teamwork does not just happen (e.g., Hackman, 1998). In fact, many teams never reach their full potential, and many fail altogether. This begs the question, what ensures the success of a team? We submit the answer is teamwork.

Managers, executives, coaches, and academicians alike discuss and/or have an opinion about what teamwork is and how it is fostered in a team. Unquestionably, teamwork is a popular topic that has lead to an explosion of researcher and practitioner interest. This is exemplified by a cursory search of *Google* and *PsychINFO*, using the keyword *teamwork*, which resulted in 1,160,000 and 1,168 matches, respectively (retrieved August 2003). Despite extensive interest in the topic, a clear definition of teamwork continues to be elusive. What can be discerned from even a cursory review of these sources is that there are innumerable variables that can affect the success and viability of a team.

As the use of teams has increased, research attention focusing on the prediction of effective team performance and the variables that may promote or detract from team performance has increased (Hackman, 1990). A number of researchers have conceptualized team performance as a function of each team member's individual

input minus the process losses associated with working with others (e.g., Shiflett, 1979; Steiner, 1966, 1972). Shaw's (1976) conceptualization of teamwork includes the productivity gains due to team coordination. Through the study of team performance and team processes, a number of models of team effectiveness have been developed (e.g., Campion, Medsker, & Higgs, 1993; Fleishman & Zaccaro, 1992; Hackman & Morris, 1975; Marks, Mathieu, & Zaccaro, 2000; Roby, 1968; Salas, Dickenson, Converse, & Tannenbaum, 1992; Stevens & Campion, 1994). It is important to make a distinction between team performance and team effectiveness (for a review, see Guzzo & Dickson, 1996; Salas, Stagl, Burke, & Goodwin, in press). Team performance accounts for the outcomes of the team's actions regardless of how the team may have accomplished the task. Conversely, team effectiveness takes a more holistic perspective in considering not only whether the team performed (e.g., completed the team task) but also how the team interacted (i.e., team processes, teamwork) to achieve the team outcome. This is an important differentiation because many factors external to the team may contribute to the success (or failure) of the team, and therefore in some cases team performance measures may be deficient in understanding the team.

On closer inspection of most team effectiveness models, it is apparent that none of these models specify exactly what teamwork is, nor provide consistent tests of the various influences on teamwork. Instead, these models provide discussions of various factors that promote or detract from effective teamwork. For example, Stevens and Campion (1994) examine the effect of interpersonal skills and self-management skills (i.e., conflict management, goal setting) on team effectiveness. Hackman and Morris (1975) provide a more broad understanding of team performance as it relates to the amount of effort required by the team task, the strategy needed to perform the task, and the knowledge or skills of the individual team members. The model presented by Marks, Mathieu, and Zaccaro (2000) examines the temporal framework of team processes in addition to interpersonal processes. As can be seen, there is inconsistency among the factors these authors included in their models and a failure to specify what defines teamwork. This incon-

sistency may be primarily due to lack of agreement regarding which factors are appropriate and which are not. This has left researchers and practitioners alike still asking, "What is teamwork?" This article is motivated to answer this question, to uncover a model of teamwork that is empirically supported but practically relevant.

To answer this question, we submit that a framework of the key dimensions of what teamwork is (and what teamwork is not) is needed. This is needed to guide future research and to provide practitioners with more precise guidelines on how to manage, develop, and build effective teams. We conducted an extensive review of the literature of the past 20 years. This review included both empirical studies and theoretical models of team effectiveness sources collected using *PsychINFO* and other common academic search engines. We used keywords such as *teamwork*, and *team effectiveness*, and/or *team performance*. This process yielded more than 138 models (see Salas, Stagl, Burke, & Goodwin, 2004). A close examination of these models revealed they varied in their precision in explaining teamwork. All of them (with a few exceptions) treat it as a process (a sort of black box) variable. Next, we focused on studies or analyses where researchers tried to uncover the black box in team effectiveness and where the tasks used were interdependent (i.e., uncover what specific processes lead to effective team functioning). We identified more than 20 primary and secondary sources (see Table 1). We also looked for variables that could be developed through interventions (i.e., something could be done to improve it). A thematic analysis of the variables most commonly discussed and having the greatest effect on team performance were included in our framework. Sources that included adolescents or extraordinary populations were excluded from the review. This thematic analysis (i.e., classifying articles in general themes) suggested that in interdependent teams, the variables that seemed to affect team functioning evolve around issues of leadership (e.g., Zaccaro, Rittman, & Marks, 2001), supporting behavior (Porter et al., 2003), and flexibility (e.g., Kozlowski, Gully, Nason, & Smith, 1999). These were the most frequent variables. Therefore, we identified the important aspects of teamwork as team leader-

ship, mutual performance modeling, backup behavior, adaptability, and team orientation (see Table 1). Based on our analysis, we suggest that these are the five core components that promote team effectiveness—that which we submit as the "Big Five" in teamwork.

The "Big Five" in teamwork differs from other taxonomies and models already available by offering a practical yet inclusive taxonomy that only includes components that most heavily affect team performance and that are found in almost all teamwork taxonomies. Although we put forth that teamwork is summarily described by the "Big Five," supporting and coordinating mechanisms are needed to meld together the value of each of the five factors. We propose the coordinating mechanisms for effective teamwork are the development of shared mental models (e.g., Stout, Cannon-Bowers, Salas, & Milanovich, 1999), achievement of mutual trust (e.g., Webber, 2002), and engagement in closed-loop communication (e.g., McIntyre & Salas, 1995). Furthermore, we acknowledge that the ability for the team to engage in the "Big Five" and its coordinating mechanisms will vary over the course of the team task as the team gains experience working together.

The purpose of this article is to (a) clearly describe and define each of the components of the "Big Five" and its coordinating mechanisms; (b) provide research propositions surrounding the "Big Five" to prompt further investigation and a potential research agenda; and (c) to address issues of the phase of the team task and team maturity on the manifestation on the importance of each of the "Big Five" components. We hope that this article engages the team dynamics research community into a dialogue and debate as to what precisely is teamwork, how it is achieved, and how it is promoted.

TEAMS, TEAMWORK, AND TEAM TASKS

To proceed, it is important to describe both how a team is defined in the context of this article and what is meant by teamwork from a conceptual perspective. A team is two or more individuals with

TABLE 1: The Big Five and the Coordinating Mechanisms of Teamwork

Teamwork	*Definition*	*Behavioral Makers*	*Selected Citations*
Team leadership	Ability to direct and coordinate the activities of other team members, assess team performance, assign tasks, develop team knowledge, skills, and abilities, motivate team members, plan and organize, and establish a positive atmosphere.	Facilitate team problem solving. Provide performance expectations and acceptable interaction patterns. Synchronize and combine individual team member contributions. Seek and evaluate information that affects team functioning. Clarify team member roles. Engage in preparatory meetings and feedback sessions with the team.	Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995); Hinsz, Tindale, and Vollrath (1997); Marks, Mathieu, and Zaccaro (2000); Salas, Stagl, Burke, and Goodwin (in press); Stewart and Manz (1995); Zaccaro, Rittman, and Marks (2001).
Mutual performance monitoring	The ability to develop common understandings of the team environment and apply appropriate task strategies to accurately monitor teammate performance.	Identifying mistakes and lapses in other team members' actions. Providing feedback regarding team member actions to facilitate self-correction.	McIntyre and Salas (1995).
Backup behavior	Ability to anticipate other team members' needs through accurate knowledge about their responsibilities. This includes the ability to shift workload among members to achieve balance during high periods of workload or pressure.	Recognition by potential backup providers that there is a workload distribution problem in their team. Shifting of work responsibilities to underutilized team members. Completion of the whole task or parts of tasks by other team members.	Brigg (1968); Marks, Mathieu, and Zaccaro (2000); McIntyre and Salas (1995); Porter et al. (2003).
Adaptability	Ability to adjust strategies based on information gathered from the environment through the use of backup behavior and reallocation of intrateam resources. Altering a course of action or team repertoire in response to changing conditions (internal or external).	Identify cues that a change has occurred, assign meaning to that change, and develop a new plan to deal with the changes. Identify opportunities for improvement and innovation for habitual or routine practices. Remain vigilant to changes in the internal and external environment of the team.	Campion, Medsker, and Higgs (1993); Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995); Kozlowski, Gully, Nason, and Smith (1999); Klein and Pierce (2001); Priest, Burke, Munim, and Salas (2002).

Team orientation	Propensity to take other's behavior into account during group interaction and the belief in the importance of team goal's over individual members' goals.	Taking into account alternative solutions provided by teammates and appraising that input to determine what is most correct. Increased task involvement, information sharing, strategizing, and participatory goal setting.	Bandura (1991); Campion, Medsker, and Higgs (1993); Driskell and Salas (1992); Eby and Dobbins (1997); Hackman and Oldham (1980); Shamir (1990); Wagner (1995).
Shared mental models	An organizing knowledge structure of the relationships among the task the team is engaged in and how the team members will interact.	Anticipating and predicting each other's needs. Identify changes in the team, task, or teammates and implicitly adjusting strategies as needed.	Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995); Klimoski and Mohammed (1994); Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000); Stout, Cannon-Bowers, Salas, and Milanovich (1999); Zaccaro, Rittman, and Marks (2001).
Mutual trust	The shared belief that team members will perform their roles and protect the interests of their teammates.	Information sharing. Willingness to admit mistakes and accept feedback.	Bandow (2001); Webber (2002).
Closed-loop communication	The exchange of information between a sender and a receiver irrespective of the medium.	Following up with team members to ensure message was received. Acknowledging that a message was received. Clarifying with the sender of the message that the message received is the same as the intended message.	McIntyre and Salas (1995)

specified roles interacting adaptively, interdependently, and dynamically toward a common and valued goal (Dyer, 1984; Salas et al., 1992). However, one important lesson that can be derived from existing research is that effective teams require more than just taskwork (e.g., "interactions with tasks, tools, machines, and systems"; Bowers, Braun, & Morgan, 1997; p. 90). Teams do more than simply interact with tools; they require the ability to coordinate and cooperatively interact with each other to facilitate task objectives though a shared understanding of the team's resources (e.g., members' knowledge, skills, and experiences), the team's goals and objectives, and the constraints under which the team works. Essentially, teams also require teamwork.

Teamwork is a set of interrelated thoughts, actions, and feelings of each team member that are needed to function as a team and that combine to facilitate coordinated, adaptive performance and task objectives resulting in value-added outcomes (e.g., Morgan, Glickman, Woodard, Blaiwes, & Salas, 1986; Salas, Sims, & Klein, 2004). This raises the question of whether different types of teams engage in teamwork similarly. Recent research is beginning to suggest that different types of teams (e.g., distributed, face-to-face teams) manifest teamwork processes (e.g., communication) differently (Burke et al., 2003; Priest et al., 2004). Given this, we offer a brief discussion of the types of teams that have been reviewed in the team literature.

A number of researchers have proposed team taxonomies (e.g., Devine, 2002; McGrath, 1984; Sundstrom, 1999) to assist in more clearly delineating the tasks a team may engage in and the needed competencies, the stability of team membership, the interaction and communication of team members, and the life span of the team. For instance, McGrath (1984) explicated three types of teams (natural, concocted, quasi-groups) with 12 subtypes. Another commonly accepted taxonomy is put forth by Sundstrom (1999) and specifies six types of teams with diverse requirements and tasks: management, service, production, project, action, and parallel. However, as research has progressed in the field, a vast number of so-called labels of convenience have emerged, resulting in a muddy understanding of team types. In fact, as one begins to examine the

team literature, it becomes clear that the types of teams are as varied as the number of authors who have discussed them. Whereas some types of teams engage in distinctly dissimilar tasks, other teams share similar tasks. Therefore, it becomes necessary to focus on the actual tasks that teams perform to understand the processes that will lead to team effectiveness.

It has been argued and empirically supported that the team task will strongly affect the processes required for team performance (e.g., Hackman, Brousseau, & Weiss, 1976; Kent & McGrath, 1969; Sorenson, 1971). A number of researchers have proposed team task typologies (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Fleishman, 1975; McGrath, 1984; O'Brien, 1968; Steiner, 1972; Wageman, 1995). Many typologies focus on the order in which portions of the team task are completed and the amount of interdependence among the team members that is required (e.g., O'Brien, 1968; Steiner, 1972; Thibaut & Kelley, 1959; Thompson, 1967). For instance, Steiner (1972) distinguished among types of tasks as disjunctive, conjunctive, additive, discretionary, compensatory, complementary, and divisible. Some researchers have put forth very complex models to describe team tasks. Shaw (1976) differentiated among team tasks based on difficulty, solution multiplicity, intrinsic interest, cooperation requirements, familiarity, and problem-solving requirements. Other researchers (e.g., Boguslaw & Porter, 1962) make a distinction as to whether the team's tasks are established or emerge over the course of team performance.

The majority of models, however, have instead focused on the flexibility the team enjoys in being able to distribute portions of the team task among members and the order in which the subtasks are completed. These taxonomies take into account not only how the individual member input is combined but also the flexibility of job assignments (e.g., the degree to which other team members are able to perform other team members' tasks) have been offered. Naylor and Dickinson (1969) discussed tasks in terms of task structure (complexity) and work structure (how tasks are distributed). O'Brien (1968) and Blickensderfer, Salas, and Cannon-Bowers (2000) went further to suggest that team task characteristics should

be categorized as to whether the task must be completed by a particular team member or can be reallocated to another team member and whether there is an imposed order in which portions of the task must be completed. O'Brien (1968) differentiated collaborative tasks (team members must cooperate throughout all stages of the task) from coordination tasks (requiring different positions and subtasks to be performed sequentially).

In the following sections, we begin with a description of the coordinating mechanisms that we propose support and facilitate the enactment of the "Big Five." Although we have given a substantial amount of attention to the type of teams and team tasks, we propose that the coordinating mechanisms will be needed in all cases and will have little variance across the team type or task. The exception to this statement is in regards to closed-loop communication and is discussed in greater detail in future sections.

DEFINING THE COORDINATING MECHANISMS

If a team were able to effectively enact the five teamwork components that have been proposed as the "Big Five," would the team be guaranteed success? We argue that the team would enjoy degrees of improved performance as compared to teams that do not engage in the prescribed competencies. In fact, past research has found that teams that were trained on three of five of the suggested teamwork dimensions (performance monitoring, adaptation, and facilitative leadership) had better performance (Entin, Serfaty, & Deckert, 1994). However, it would only be with the addition of coordinating mechanisms that the team could be assured success. The teams studied by Entin et al. (1994) were better able to anticipate each other's behaviors and had better communication. This may provide preliminary evidence that mechanisms such as shared mental model and closed-loop communication are necessary facilitators of the "Big Five" suggested here.

The need for coordinating mechanisms is not a unique concept. In fact, a similar concept was proposed in Shiflett's (1979) model of team performance in which the team inputs (e.g., the "Big Five")

required so-called transformers to achieve team outputs. Shiflett's transformers were variables that determined the manner in which the team inputs were incorporated. The coordinating mechanisms as envisioned herein do not determine how the inputs are incorporated but rather ensure that the "Big Five" are consistently updated and that relevant information is distributed throughout the team. Throughout the introduction of the "Big Five," it will become clear that for team members to effectively work together, individuals must have a clear understanding of their roles in the task, of the resources available, and of their teammates' capabilities (i.e., task-related competencies, preferences). In addition, teams must maintain a degree of mutual trust to freely communicate information throughout the team (Cannon-Bowers et al., 1995). These coordinating mechanisms, which are discussed in turn, include shared mental models, closed-loop communication, and mutual trust.

SHARED MENTAL MODELS

Working cooperatively requires that team members coordinate by anticipating and predicting each other's needs through common understandings of the environment and expectations of performance. This shared understanding or representation of team goals, individual team member tasks, and the coordination of the team to achieve common goals is frequently referred to as mental models (Cannon-Bowers et al., 1995). Mental models are what individuals use to organize or encode information such as the dynamics of the environment in which they are embedded and the response patterns needed to manage these dynamics, the purpose of the team, and the interdependencies among team members' roles (Zaccaro et al., 2001). Two types of mental models have been frequently discussed in relation to team performance: team-related mental models and task-related mental models (e.g., Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Team-related mental models have to do with the team functioning and expected behaviors, whereas task-related mental models contain information regarding the materials needed for the task or the manner in which the equipment is used.

Shared mental models facilitate the team's progression toward goal attainment by creating a framework that promotes common understanding and action (Zaccaro et al., 2001). With this shared understanding, teams can perform the needed teamwork skills (e.g., backup behavior, mutual performance monitoring) required for effective team performance. Conversely, without this shared understanding, the individual members may be headed toward different goals, thereby leading to ineffective feedback or assistance (e.g., Salas, Burke, & Fowlkes, in press) or the inability to anticipate each other's actions or needs (Cannon-Bowers, Salas, & Converse, 1990, 1993). Further evidence of the importance of shared mental models has been found, indicating that teams that share similar mental models communicate more effectively, perform more teamwork behaviors (i.e., backup behaviors), are more willing to work with team members on future projects (Rentsch & Klimoski, 2001), and generally perform better (e.g., Griepentrog & Fleming, 2003; Mohammed, Klimoski, & Rentsch, 2000; Stout et al., 1999), although some types of mental models are more important for certain tasks than are others (Cannon-Bowers et al., 1993).

This is not to suggest that a complete overlap of the understanding of the team functioning and team members' capabilities across all team members is superior. It may be time consuming, if not impossible, to expect an exact replication of mental models across all members (Woehr & Rentsch, 2003). Furthermore, an exact replication would reduce the availability of alternative solutions or strategies because of team members' varying perspectives and understandings, thereby resulting in decreased adaptability (Kozlowski et al., 1999). Therefore, each member is only required to have sufficiently similar and compatible mental models that guide the team toward the same team objectives. It is with this shared understanding that teams can initially perform the needed teamwork skills (e.g., backup behavior, mutual performance monitoring) required for effective team performance. Then, it is expected that as the team members perform together over time, they will update their shared understanding through closed-loop communication, mutual trust, and the "Big Five" of teamwork.

The importance of this coordinating mechanism increases in teams that must perform in stressful conditions. As team members encounter stress, the amount of communication often decreases, forcing the team to rely more heavily on implicit coordination rather than on explicit communication (Kleinman & Serfaty, 1989; Orasanu & Salas, 1993). Empirical research has found that teams that have developed shared mental model have more accurate expectations for the needs of the team and the teammates during periods of stress (Salas, Cannon-Bowers, & Johnston, 1997).

CLOSED-LOOP COMMUNICATION

In general terms, communication is the exchange of information between two or more individuals irrespective of the medium (McIntyre & Salas, 1995; Salas & Cannon-Bowers, 2000). Communication is especially important as the environment increases in complexity (e.g., emergency situations) as it not only distributes needed information to other team members but also facilitates the continuous updating of the team's shared mental model (Salas et al., 1997) and team members' ability to engage in the "Big Five" activities. For these reasons, communication is invaluable in teamwork. However, consider when communication is not received or is not understood by the person needing it the most.

There are many reasons why communication fails to occur and, if it does occur, why it may not be heard or interpreted as it was initially intended (e.g., noise, linguistic difficulties, misinterpretation). Very often, individuals will receive very different messages when hearing the same communication because of their own perspectives and biases (Bandow, 2001). Communication may be hindered because the environment has become stressful and team members have become focused on their individual tasks rather than on how those tasks affect other team members' tasks. Furthermore, consider that providing too much information (information overload) can degrade performance in teams that are performing in stressful environments (Johnston & Briggs, 1968).

Roby (1968) suggests that the difficulty of communication in teams is maintaining the appropriate balance of enough informa-

tion to the right individuals at the proper time and using the most effective mode of communication. However, Lanzetta and Roby (1956) suggest that teams experience difficulty in developing a system of communication that is able to anticipate what information is needed by whom and when that information is needed. Lanzetta and Roby's solution to this has been to provide team members with direct access to needed information (e.g., control panels were within sight) rather than to depend on other teammates to provide the information. A study by Morrissette, Hornseth, and Shellar (1975) found that providing access to information to multiple team members (i.e., redundant information) improved team performance. The problem with the suggestions is that neither of these solutions addresses improving the communication within the team but rather provides contingencies for when communication does not occur. Furthermore, these solutions are not always feasible for the team or the team task. For instance, it may not be possible for team members to have direct access to all information because of the shear amount of information available.

We propose that introducing closed-loop communication will be a more effective means for combating information exchange difficulties and ensuring that sent communications are heard and accurately understood. Closed-loop communication involves (a) the sender initiating a message, (b) the receiver receiving the message, interpreting it, and acknowledging its receipt, and (c) the sender following up to insure the intended message was received (McIntyre & Salas, 1995). Seigel and Federman (1973) found that teams trained on communication dimensions tended to perform better than did teams that were not trained on communication dimensions.

MUTUAL TRUST

Without sufficient trust, team members will expend time and energy protecting, checking, and inspecting each other as opposed to collaborating to provide value-added ideas (Cooper & Sawaf, 1996). Trust in the team setting has been defined as "the shared perception . . . that individuals in the team will perform particular

actions important to its members and . . . will recognize and protect the rights and interests of all the team members engaged in their joint endeavor" (Webber, 2002, p. 205). Trust is cited as affecting a variety of team processes and outcomes such as group participation and contribution, cycle times, product quality, and even team member retention (Bandow, 2001). Jones and George (1998) found that, in addition to mediating cooperation and teamwork, trust also fosters a willingness to disseminate information more freely among team members. If team members do not feel that their input is valued or that the information they provide will be used appropriately, they may be less willing to share that information (Bandow, 2001). In addition, team members may not be willing to participate in information sharing if they fear being perceived as incompetent (Bandow, 2001). Inherently, trust is needed in teams because when team members work interdependently, they must be willing to accept a certain amount of risk to rely on each other to meet deadlines, contribute to the team task, and cooperate without subversive intentions.

A culture of mutual trust is important in supporting the core components of teamwork as well. This is because of the finding that trust has a critical influence on how individuals within a team will interpret other's behaviors (Simons & Peterson, 2000). If a group level of trust has not been developed, team members may be more likely to interpret behaviors such as disagreement, missed deadlines, or other seemingly ambiguous events as intentionally damaging acts against the individual or team. Frequently, when this attribution is made, the team member will respond in a reciprocal manner, leading to a spiraling degradation of team functioning (Creed & Miles, 1996). Consequentially, teamwork behaviors such as performance monitoring and backup behaviors may be misinterpreted as team members keeping tabs on each other. Therefore, through the fostering of mutual trust, it is understood and accepted by team members that group members are in fact looking out for each other for the good of the team. Trust is also needed in the acceptance of team leadership behaviors. If team members do not trust each other or their team leader, they will be less willing to

appear uninformed, thereby hindering the team leader from effectively managing the team.

In the following section, we will now provide a deeper description of the components included in the "Big Five" and an explanation of the importance each variable plays in ensuring team effectiveness and performance. In addition, a number of future research propositions will be offered regarding the interrelationships among the "Big Five" components and team effectiveness.

INTRODUCING THE BIG FIVE OF TEAMWORK

We propose that regardless of the team task that is examined, a focal set of teamwork components will be required to complete the task, and we present the components as the "Big Five" of teamwork. This set of components includes team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. As each of the dimensions is defined, and as its individual importance as it relates to team effectiveness is explained in the next pages, a number of research propositions will also be provided. In Figure 1, we provide a graphical representation of the interrelationships of the "Big Five" and include the research propositions we propose between each of the variables.

Although we put forth that each of the "Big Five" is required for team effectiveness, we acknowledge that each component may be manifested differently across most team task types because of the constraints of the team task and the varying needs of the team during a given challenge or change. McIntyre and Salas (1995) support this in suggesting that understanding the tasks of a particular team will assist in understanding the importance that a given teamwork dimension holds. For this reason, as each of the components included in the "Big Five" is discussed in turn, a brief description of how the component may be manifested while performing the team task is provided. We limit our discussion to an illustrative set of team tasks (collaborative and cooperative tasks) that are described by O'Brien (1968). We acknowledge that the typology used may be a simplistic description of the tasks that teams perform, but we

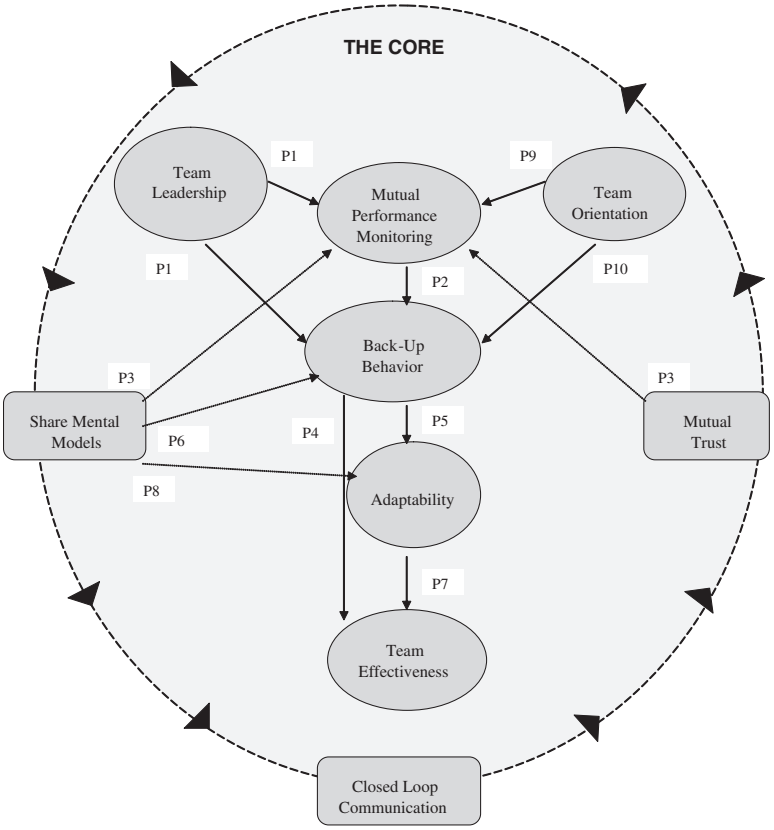

Figure 1: Graphical Representation of High-Level Relationship Among the Big Five and the Coordinating Mechanisms Including Research Propositions

argue that these team tasks are intended to be descriptive and to spark thought in how the "Big Five" may differ across different types of tasks rather than to provide a definitive answer.

We further qualify our discussion of these tasks in terms of the manifestation of the "Big Five" such that the team members must be highly interdependent (e.g., team members must depend on one another to complete the task; for a description of degrees of interdependence in teams, see Saavedra, Earley, & Van Dyne, 1993). As

discussed in the initial definition of a team, interdependence is a significant characteristic of a team (e.g., Salas et al., 1992; Wall, Kemp, Jackson, & Clegg, 1986) and is crucial for the "Big Five" to hold true because it increases the team members' sense of responsibility for each others' behaviors (Kiggundu, 1983) and their motivation to perform teamwork behaviors (Campion et al., 1993). In a collaborative task, team members are interdependent because of their need to collaborate through all aspects of the team task (e.g., a NASCAR mechanic team must complete diverse tasks to insure the driver's ability to complete the race). Conversely, team members engaged in a coordination task are interdependent with each other because a failure in earlier stages of the task will affect the ability for each subsequent team member to complete his or her portion of the task (e.g., air strike teams must clear the ground enemies before the ground team may proceed).

TEAM LEADERSHIP

Team leadership warrants its place as one of the "Big Five" because the team leader's failure to guide and structure team experiences to facilitate coordinative, adaptive action can be a key factor in ineffective team performance (Stewart & Manz, 1995). Generally it is believed that a leader who is managing independent individuals should diagnose a problem, generate possible solutions, and implement the most appropriate solution (e.g., Fleishman et al., 1991; Zaccaro, Marks, O'Connor-Boes, & Costanza, 1995). In this scenario, the leader's responsibility "is to do, or get done, whatever is not adequately handled for the group needs" (McGrath, 1962, p. 5) including defining the goals, organizing resources to maximize performance, and guiding individuals toward those goals. However, team leadership affects team effectiveness not by handing down solutions to the team but rather by facilitating team problem solving through cognitive processes (e.g., shared mental models), coordination processes, and the team's collective motivation and behaviors (e.g., performance expectations; Salas, Burke, & Stagl, in press; Zaccaro et al., 2001). However, it should be noted that much of what is known about team leadership has been adapted

from individual leadership theory (e.g., Fleishman et al., 1991; Offerman, Kennedy, & Wirtz, 1994), and there have been a number of calls for additional empirical research to gain a deeper understanding of the effect of team leader support on team effectiveness (e.g., Campion et al., 1993; Dyer, 1984). For this reason, most of this discussion of team leadership is based on theoretical work.

Team leaders enable effective teamwork and interdependent action through three overarching functions. First, the team leader has a role in the creation, maintenance, and accuracy of the team's shared mental model. During the initial formation of the team and throughout the team's lifespan, the leader establishes and maintains an accurate shared understanding of the team objectives, the team constraints, the roles of each team member, and the resources that are available to the team. The team leader is often in the best position to provide accurate and comprehensive information to the team regarding the resources and constraints of the team (Zaccaro et al., 2001). Empirical evidence by Marks et al. (2000) indicates that the provision of enriched information by team leaders results in more similar and accurate mental models among team members. Second, the team leader facilitates team effectiveness by monitoring the internal and external environment of the team to facilitate team adaptability and to ensure teams are not caught off guard when changes in their environment occur. The leader promotes team effectiveness by using the information about the external environment (see Roby, 1968) to coordinate team behaviors and interactions (Zaccaro et al., 2001) as well as by providing skill development opportunities as needed. If the internal team functioning (e.g., nonproductive team conflict) is faulty, the leader must determine what changes are needed and must reestablish adaptive norms and performance expectations accordingly, which is the final function of the team leader discussed here.

A final function of the team leader is establishing behavioral and performance expectations and tracking the abilities and skill deficiencies of each team member (Salas, Burke, & Stagl, in press). Team leaders must set expectations for acceptable interaction patterns (e.g., promoting information exchange) and create a team climate that encourages behaviors such as mutual performance moni-

toring, backup behavior, and adaptability. Developing task-based and team-based norms benefits teams because individual members will enforce norms and team expectations in nonconforming members (Festinger, Schachter, & Back, 1950).

Considering the three leadership functions together, we argue, as have others (e.g., Hinsz, Tindale, & Vollrath, 1997; Zaccaro et al., 2001), that team leaders ultimately facilitate team effectiveness not only by synchronizing and combining the individual contributions of each of the team members but also by insuring individuals on the team understand their interdependence and the benefits of working together. For this reason, we propose that there is not a direct but rather a mediated relationship between team and its effect on team effectiveness. It is proposed that team leaders' reinforcement of the needed team processes is an effective means of ensuring that the behaviors occur. This is supported by past research that examined assertiveness training that found that team leaders affected the manifestation of the trained skills (Smith-Jentsch, Zeisig, Acton, & McPherson, 1998). Future research will need to determine whether other behaviors (e.g., performance monitoring) are able to be reinforced within the team by team leaders.

Proposition 1: The team leader will influence team effectiveness through his or her ability to set or reinforce performance expectations including performance monitoring and backup behavior.

Although this article argues that all teams require team leadership to be effective, the manifestation of team leadership may differ across different types of team tasks. Illustrative examples of how team leadership may differ across team tasks are provided below.

Coordination task. In tasks in which subtasks must occur in a specified order, a team leader is likely to assign specific roles and play a large part in coordinating the integration of the individual subtasks. Further, he or she should assist the team in determining contingency plans if a sequence is delayed or unable to be completed. Take for instance, the service team at your favorite local restaurant. The host or hostess seats the guest, the server takes the

guest's order, and the cook fills the order. After the guest completes the meal, the table must be cleaned and reset for the next guest. Different members of the team fulfill each of these steps of the overall task (i.e., customer service) while the team leader (i.e., the general manager) must oversee all of the steps. The team leader assists in managing the workflow when there are fluctuations in the number of customers and/or changes in staff shifts to ensure that each step is performed.

Collaborative task. In tasks in which roles or responsibilities are less clearly defined and there is flexibility in who may perform the subtasks, the team leader must set expectations about the dynamic nature of the task (e.g., the degree to which team members will be able to adopt each other's subtasks) so that the team may quickly adapt while the team is performing. Consider the flight service team that ensures the safety and comfort of each passenger. Although there may be predetermined roles that each flight service team member assumes at the start of a flight, the team leader must set the expectation that, should an unexpected event arise (e.g., turbulence, an unruly passenger), the roles of each team member may change. Because of the ambiguity of the unexpected events that may arise during flight or the tasks that may be needed, the team leader may not be able to overtly coordinate the team tasks but must instead ensure that accurate shared mental models are developed and must set performance expectations early in the team members' tenure together.

MUTUAL PERFORMANCE MONITORING

Effective teams are comprised of members who maintain an awareness of team functioning by monitoring fellow members' work in an effort to catch mistakes, slips, or lapses prior to or shortly after they have occurred. Mutual performance monitoring has been defined as the ability to "keep track of fellow team members' work while carrying out their own . . . to ensure that everything is running as expected and . . . to ensure that they are following procedures correctly" (McIntyre & Salas, 1995, p. 23).

Although it is proposed that mutual performance monitoring will improve team performance throughout a team task, this dimension of the "Big Five" will become increasingly important to team performance when the team is engaging in stressful tasks. Roby and Lanzetta (1957) found that overloaded team members are more likely to make errors. Potentially compounding this problem is that research has shown that individuals may not be aware of their own performance deficiencies (e.g., Bolin, Sadacca, & Martinek, 1965; Doten, Cockrell, & Sadacca, 1966). Fortunately, team member feedback can lead to individuals becoming more cognizant of their performance. We propose that it is the information gathered through mutual performance monitoring that affects team performance by identifying errors or lapses, and this information, expressed through feedback and backup behavior (discussed in the next section), boosts the team from the sum of individual performance to the synergy of teamwork and ultimately to team effectiveness.

We propose that there is a mediated relationship between mutual performance monitoring and team effectiveness. To examine this proposition, a measure of the process or behavior must be developed. Many researchers have indicated that mutual performance monitoring is difficult to measure because it is not outwardly manifested (i.e., researchers are unable to determine when or if the team member is consistently monitoring performance). Specifically, if there are no errors or lapses that require backup behavior, there is no accepted method to determine when mutual performance is occurring. Therefore, a research priority is to develop new ways to assess performance monitoring to test the proposed moderated relationship.

Proposition 2: Mutual performance monitoring affects team effectiveness through effective backup behavior.

Two prerequisites to effective mutual performance monitoring were identified. First, effective mutual performance monitoring requires a shared understanding of the task and team responsibili-

ties (i.e., shared mental model). A shared mental model is important for mutual performance monitoring because it provides teammates with an understanding of what other team members are supposed to be doing. Therefore, a shared understanding is not only required for performance monitoring to occur but it also acts as a foundation for the effectiveness of performance monitoring and feedback. If the team does not share the same mental model for how the team should be performing, performance monitoring becomes ineffective, and any feedback that could potentially be given becomes inconsequential.

A second perquisite to effective mutual performance monitoring is the creation of an open, trusting, and cohesive team climate because, for it to be effective, mutual performance monitoring must become an accepted norm intended to maximize team performance rather than an opportunity for team members to keep tabs on each other (McIntyre & Salas, 1995). Without this team climate, team members may view performance monitoring negatively and may react critically to feedback or assistance provided by a team member.

Proposition 3: Effective mutual performance monitoring will only occur in teams with adequate shared mental models and a climate of trust.

We do not expect that mutual performance monitoring will manifest itself differently for different types of team tasks. Instead, team members will have different opportunities to engage in the behavior depending on the team task. Illustrative examples of how mutual performance monitoring may occur during different types of team tasks are described below.

Coordination task. An example of a coordination task can be seen in a team working on an assembly line. An error that occurs early in the production line can have far reaching effects on the team outcome regardless of the quality of the subsequent subtasks. Imagine an assembly line team member who fails to fully tighten a

screw. If the error is never identified, the final product may be faulty. Depending on the product, this may result in lower customer satisfaction (e.g., sunglasses falling apart) or even deaths (e.g., airplane mechanical problems). Therefore, it must be every team member's responsibility to identify and initiate a remedy. For this reason, a team member may manifest team performance monitoring by directly examining the quality or completeness of the product that is provided from the previous step. Thus, team performance monitoring may occur in a more disjointed fashion in coordination tasks than in other types of tasks.

Collaborative task. In this type of task, team members can be expected to be involved in every step of the task and therefore have more opportunity to provide frequent, real-time feedback about the team's performance rather than feedback that follows the completion of subtasks, as seen in coordination tasks. An example of this type of task might be a professional moving team. The overall task is to move all the items from one location to the moving truck or vice versa. Although there may be a loose order in which items should be loaded into a truck (e.g., mattresses prior to boxes), the team has flexibility in the order in which items are moved and in the team member who will move each item. Because of the team task, physical exhaustion is possible, and team members should be observant of each other to prevent injury and/or damaged items. The team can engage backup behavior (discussed in the next section) by altering the type or amount of items the exhausted member is moving. Alternatively, because the packing of a moving truck can affect the speed in which it is unloaded and the likelihood of damage occurring, team members must be mutually accountable for how the truck is loaded. If a team member is not loading the items into the truck correctly, the other team members can provide feedback to the individual. However, this feedback must be provided in a way that all members understand that the intent is to improve team performance (i.e., completing the move more quickly) rather than in a way that places blame or that makes a member look bad.

BACKUP BEHAVIOR

Backup behavior has been defined as "the discretionary provision of resources and task-related effort to another . . . [when] there is recognition by potential backup providers that there is a workload distribution problem in their team" (Porter et al., 2003, pp. 391-392). Marks et al. (2000) identify three means of providing backup behaviors: (a) to provide feedback and coaching to improve performance; (b) to assist the teammate in performing a task; and (c) to complete a task for the team member when an overload is detected. If it is determined through mutual performance monitoring that a team member's workload has surpassed his or her capacity, the team can engage in backup behaviors by shifting work responsibilities to other underutilized team members as it becomes necessary. Should the tasks of the overloaded team member not be facilitated or taken over, it is expected that team performance will drastically degrade.

Proposition 4: Backup behavior affects team performance directly by ensuring that all aspects of the team task are completed.

Research that has shown that providing flexibility in how work is completed increases team effectiveness (Campion et al., 1993). The ability of the team to reduce work overload is an important component of team effectiveness as workload can often act as a stressor. Johnston and Briggs (1968) found that teams that were able to compensate for each other under periods of high stress had fewer errors. Although each team member had specific tasks for which they were responsible for this task, it is the ability of the team to self-assess overloads within one or more team members and the team's ability to redistribute that overload that resulted in adaptation to the changing environment. Therefore, the importance of backup behavior does not simply lie in improved performance outcomes but rather in how backup behavior affects team processes to allow greater team adaptability in changing situations and environments. Depending on the task, this compensation (i.e., backup behavior) may be manifested in the ways described by Marks et al. (2000; e.g., physically taking over the task, ensuring that someone

corrects the error). The difficulty in examining the proposed relationship is in defining what effective adaptation means in the particular team and team task and in the conditions under which the team is performing. Future researchers must pay attention to this concern in testing the following research proposition.

Proposition 5: The effect of backup behavior on team effectiveness is mediated by the team's ability to effectively adapt to changes internal and external to the team.

Although there has been a great deal of empirical work on helping behavior in dyads (e.g., Anderson & Williams, 1996), there appears to be a dearth of empirical attention to backup behavior in teams. Although backup behavior has sometime been referred to as helping (e.g., Organ, 1997), theorists have begun to suggest there are differences between the two constructs in both their occurrence and their effect on teamwork. Porter and colleagues (2003) suggest the primary difference is that backup behavior is a response to the recognition of a genuine need for assistance. Porter et al. suggest that a request for help that does not reflect a legitimate request for assistance or recognition of a legitimate need for help may lead to poorer team outcomes if assistance occurs at the cost of other tasks being completed. Conversely, helping behavior does not appear to require a legitimate need (i.e., a workload capacity distribution problem), only a request for assistance. This suggests that both shared mental models and mutual performance monitoring are necessary antecedents to effective backup behavior because they form the foundation for decisions of when a team member must step in to provide back up, who should step in, and what assistance is needed.

Proposition 6: Effective backup behavior requires the existence of adequate shared mental models and mutual performance monitoring.

Similar to mutual performance monitoring, we expect that backup behavior will be dictated by the needs of the team. Not only will team members have different opportunities to engage in the behavior depending on the team task, but the needs of the team

member may differ (e.g., unable to complete the subtask and requiring another team member to complete the task vs. needing assistance in completing the task). Below we provide examples of how backup behavior may be evident in different team tasks.

Coordination tasks. Although the subtasks of the coordination team task must occur in a particular sequence, it is possible that any team member with the appropriate knowledge or skills may provide backup behavior. For instance, consider a high school swim team competing in a relay race. Each segment of the race requires different swim strokes, and each segment occurs in a predetermined order. A team member may be able to provide backup behavior for a weakened member by swimming his or her segment (i.e., complete the task for them) or by providing him or her with suggestions for conserving energy or by improving his or her speed.

Collaborative tasks. In this task, team members may have more flexibility in the order of subtask completion and the particular member who may complete the task. Similar to the cooperative task, backup behaviors may include assisting with or taking over subtasks or providing constructive feedback to improve task performance. One example of this type of team is a project team of students completing a school assignment. Assuming that each member of the team has a relatively similar skill set, it is possible that any member of the team is capable of performing any aspect of the final report. The team may split up the project into portions, working separately until the final integration. Backup behavior in this scenario could occur by finishing another team member's section. Alternatively, if the team members were able to review each other's work periodically, team members could provide constructive feedback on how to better complete another member's portion of the task.

ADAPTABILITY

Adaptability is commonly considered a team outcome for which the team strives, but some theorists contend that adaptability is best

understood as a team process that moves the team more effectively toward its objectives (Burke, Stagl, Salas, Pierce, & Kendall, 2005). Adaptability has been defined as the ability to recognize deviations from expected action and readjust actions accordingly (Priest, Burke, Munim, & Salas, 2002). The ability of a team to maintain a culture of adaptability requires that there is a global perspective of the team task, of how changes may alter team member's roles in the team task, and of the ability to recognize that changes are occurring. As was discussed in regard to backup behaviors and performance monitoring, team members must remain vigilant in the activities of other team members to detect errors and determine if additional information or assistance is needed and whether the team as a whole should adapt their planned actions.

The team's operational need for team adaptation is driven by the complexity within which many teams operate (i.e., things do not always go as planned). The ability to adapt to the individual actions of fellow team members and the environment in which the team exists is a prerequisite for coordinative action seen in teams. Research by Campion, Medsker, and Higgs (1993) has shown that teams whose members were more adaptable were rated as more effective than were teams with members who were not flexible. However, for team performance to be improved by adaptability, the team's adaptation must be focused and purpose driven. In other words, changes in the environment or team task must be constantly assessed to determine if the current team processes will continue to be effective in reaching the team objectives.

Team adaptability is important to many types of teams in many different situations. Adaptability assists teams to respond to unexpected demands (e.g., deterioration of patient health). It is the ability of this team to identify cues that the conditions have changed (e.g., time allotted to complete the task), to assign meaning to that change (e.g., requiring a change in strategy), and finally to develop and successfully carry out a new plan of treatment. If any step within this process is skipped or breaks down, the chance of team success decreases. Therefore, the strength of this component of the "Big Five" of teamwork is not only the ability to change team behaviors but also the ability of these changes to combat the newly

encountered deviation. However, as stated earlier, the difficulty in assessing this component of the "Big Five" is in defining the quality of the adaptation in which the team engages. Future researchers must make take care in defining this construct prior to testing the following research propositions.

Proposition 7: Adaptability of a team has a direct effect on team effectiveness.

Proposition 8: Effective adaptability requires the existence of adequate shared mental models and effective engagement in mutual performance monitoring and backup behavior.

Team adaptability is also important for team tasks that require innovation (e.g., research and design team needing to redesign a product) or for teams that experience a setback or failure (e.g., loosing the championship basketball game). Frequently, team members act in routine or habitual ways with each other. However, when team actions become mindlessly habitual, the members may not see changes in the environment as quickly. This mindlessness can result in a greater chance of errors, productivity loss, or missed opportunities for innovation and improvement (Gersick & Hackman, 1990; Weick & Roberts, 1993). Consider Eastman Chemical Company, better known as Kodak. In the late 1980's, the organization began to lose its position in the photography industry. In response to this, management reorganized the company into teams and ultimately improved product quality, customer satisfaction, and operating efficiency, thereby regaining its reputation as an industry leader (Anfuso, 1994). As seen in this example, the adoption of a team structure may even be a means of adapting. Similar to backup behavior, adaptability can be manifested in many different ways depending on the team task and the challenge encountered (e.g., rate of work, tasks engaged in, who performs the task). We offer examples of how teams may adapt when performing collaborative or cooperative tasks but offer the reminder that there are innumerable means by which a given team or team member may engage in adaptability, and the following examples are merely descriptive.

Coordination tasks. Although coordination tasks do not allow flexibility in the order of tasks, it is possible that the set of subtasks that are performed may change. A vivid example might be easily envisioned in the emergency room. Imagine a team of medical professionals working with a patient who has symptoms of an anxiety attack (e.g., dizziness, difficulty breathing, and chest pain). In treating an anxiety attack, there are prescribed sets of tasks that must be performed. As the treatment progresses, the patient's condition worsens, and the physicians realize that the patient is in fact experiencing a heart attack. Obviously, this change in the patient's condition drastically changes the type of treatment needed, the subtasks that will need to be performed, and the time pressure under which the team must operate.

Collaborative tasks. In this type of task, the team is able to adapt in a number of ways including who completes the task, the order in which the subtasks are completed, and the set of subtasks that are undertaken. A research and design team, which contains a variety of team members with specific expertise, may develop a strategy to design a new model of SUV for the company. However, as reports of low gas mileage and safety concerns become the focus of potential buyers, the team must adapt to the buyers' concerns (e.g., designing special safety features) or adjust the marketing strategy (e.g., focusing on aspects of the vehicle besides gas mileage).

TEAM ORIENTATION

The final dimension proposed as an essential aspect of teamwork in the "Big Five" is team orientation. Although the previous dimensions included in the "Big Five" have been behavioral in nature, team orientation is attitudinal. Team orientation is not only a preference for working with others but also a tendency to enhance individual performance through the coordination, evaluation, and utilization of task inputs from other members while performing group tasks (Driskell & Salas, 1992). The terms *team orientation* and *collective orientation* are frequently used interchangeably in team and group literature; however the two terms are not synony-

mous. Collective orientation is frequently culturally based and is context free (i.e., it does not have to be work related) such that it is a general preference to accomplish group goals rather than individual goals (e.g., concern for the welfare of society) and to cooperate in groups (Hofstede, 1984; Wagner, 1995; Wagner & Moch, 1986). In addition, team orientation can be differentiated from team cohesion. Team cohesion is an attraction or desire to work with a particular team (e.g., Cartwright, 1968; Goodman, Ravlin, & Schminke, 1987; Zander, 1979) rather than a general preference to work in team settings.

Team orientation is an important dimension in the Big Five not only because it improves individual effort and performance within a team (Shamir, 1990; Wagner, 1995) and individual satisfaction (Campion et al, 1993; Cummings, 1981; Hackman & Oldham, 1980) but also because it has been found to facilitate overall team performance (e.g., better decision making; Driskell & Salas, 1992). Team orientation has also been found to result in increased cooperation and coordination among team members (Eby & Dobbins, 1997), and this may facilitate team performance through increased task involvement, information sharing, strategizing, and goal setting. For instance, Driskell and Salas (1992) found that individuals with a team orientation more frequently considered teammate input to decide on a final course of action. Although team member input was not always accepted as correct in Driskell and Salas's study, error detection improved and resulted in higher quality decisions. With most tasks, there are a number of ways to approach any problem and an equally large number of solutions. Returning to the example of a research and design team that has been tasked with developing a new automobile. These teams may include diverse members such as engineers, artists, marketers, and customer representatives. Each team member has different perspectives that add unique value to the automobile (e.g., comfort of the vehicle, the aesthetic value, the safety, and the cost of development). However, if the concerns of the engineer are not considered, the vehicle may be unfeasible to build or unsafe. If the concerns of the customer are not weighed, the vehicle may not be marketable to the general public. Together, the research and design project team must value each

others' perspectives to be successful. For this reason, a willingness to accept feedback and assistance from other teammates is likely to improve work processes. This provides evidence that team orientation will affect the occurrence of mutual performance monitoring and backup behavior.

Proposition 9: Team orientation affects team effectiveness through team members' willingness to engage in mutual performance monitoring

Proposition 10: Team orientation affects team performance through team members' acceptance of feedback and/or assistance through backup behavior.

Research suggests that team orientation may be a malleable attitude (Eby & Dobbins, 1997) based on past experiences in teams (Loher, Vancouver, & Czajka, 1994), on the perceived ability to complete the task (e.g., Bandura, 1991; Loher et al., 1994; Vancouver & Ilgen, 1989), and on expected positive outcomes (Eby & Dobbins, 1997). However, it should be noted that there does not appear to be a direct relationship between the preference to work in team settings and individual performance. Eby and Dobbins (1997) have suggested factors, such as individual differences (e.g., locus of control, self-efficacy, need for affiliation) and past experiences with working on teams, that may moderate the relationship between team orientation and performance. Therefore, some ways in which management can facilitate the development of a team orientation is by providing feedback about team successes and cooperation; by focusing on expectations of workload sharing, communication, and accountability; and by creating a norm for cooperative behavior through reward systems (Eby & Dobbins, 1997). However, future research is needed to determine which of these suggestions is most effective and under what conditions it is most effective.

Because of the attitudinal nature of team orientation, it is not expected that the attitude will differ in its manifestation across different types of team tasks but rather will facilitate the occurrence of the other needed behaviors (e.g., mutual performance monitoring,

backup behavior). It is for this reason that no behavior examples of team orientation will be provided.

THE BIG FIVE IN RELATION TO TEAM DEVELOPMENT AND TASK EPISODES

Dyer (1984) argued that to suggest that teamwork was all that was needed to ensure teams were successful was too superficial of a response. He suggested that knowledge about how team members interact and whether those interactions differ over time because of the situation and/or the experience of the team was needed. Further, he suggested that one of the largest measurement problems in team research is the failure to examine the sequence of team behavior and the related outcome of that sequence of behaviors. We concur with Dyer's assessment that teamwork is dynamic and that its manifestation can vary based on a vast number of variables (e.g., team environment, type of task, individual difference, perceived workload). For this reason, we argue, as have others (e.g., Campion & McClelland, 1993; Griffin, 1991; Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003; Kozlowski et al., 1999; Marks et al., 2000; McGrath, Arrow, & Berdahl, 2000; Morgan et al., 1986), that to fully understand team performance, it is insufficient to take a single snapshot of team performance. Instead, performance should be sampled during a variety of conditions and situations, including both laboratory and applied research settings, to get an accurate picture.

Teams become more effective over time as members learn to work together and become increasingly proficient in their taskwork (Morgan et al., 1986). Improvement in team performance may in part be due to team members developing expectations about each other, establishing procedures for working together (Dyer, 1984), and developing shared knowledge and requisite communication behaviors (Bowers, Weaver, Barnett, & Stout, 1998). Several researchers have offered models of team development that suggest that teams go through stages of development in which teams learn their tasks, their roles, and their expected performance and then

progress into more complex relationship building and teamwork behaviors (Jordan, Jensen, & Terebinsky, 1963; Morgan, Salas, & Glickman, 1994). Conversely, Tuckman (1965) discussed team performance in terms of forming, storming, norming, and performing, which suggests that developing interpersonal relationships is important before the team can focus on team tasks.

The steps of team development do not form a clear-cut lockstep but rather a pattern that is guided by individual team member characteristics and experiences, by the team task, and by environmental constraints (Morgan et al., 1994). Therefore, it is hypothesized that the "Big Five" and its coordinating mechanisms will vary in importance or prominence in the early development stages of the team (e.g., team leadership, communication), whereas other core components will gain prominence later in team development as teams proceed through phases of the team task (e.g., performance monitoring, backup behavior). For this reason, the issues of team development and team task cycles will be briefly discussed in relation to the core teamwork dimensions presented in this article. Throughout this discussion, we provide empirical support for our arguments when it is available. It is important to note, however, that although there have been a number of calls for more longitudinal team research, few answers have been offered.

TEAM DEVELOPMENT

In reviewing the literature, there was little empirical or theoretical research available to guide our understanding of how the "Big Five" and the coordinating mechanisms may differ as team mature. However, we suspect that during the initial stages of team development, team leadership and team orientation will play a large role in teamwork as teams begin to explore their task interrelationships and the roles for which each member is responsible. Team leadership is important during this stage of team development because the leader will need to set initial performance expectations and specify the members' roles and responsibilities. Team orientation will also be needed during the initial team formation to overcome the early hurdles of learning the strengths and challenges of each team mem-

ber and the members' preferences of how tasks are completed. We propose that as teams progress through this cycle, the groundwork for performance expectations and interpersonal interactions will be set, and team members can then focus on becoming more proficient in performing their individual tasks and can begin to spend more time monitoring others' behaviors and providing backup behaviors.

The largest amount of empirical evidence related to team processes throughout team development focused on communication, one of the coordinating mechanisms we have proposed. Empirical support by George and Dudek (1974) has also shown that the lack of communication during the initial stages of team development can have a detrimental effect on team performance. Communication during this stage may be used to learn to anticipate each other's needs through nonverbal clues and through establishing norms for communication. This is further supported by studies examining specific aspects of communication (e.g., timing, accuracy, brevity, information content, frequency of communications) that found that more experienced teams communicated less than did inexperienced ones. These studies suggest that over time, teams appear to develop a common vocabulary that will reduce the length of the message (e.g., Obermayer & Vreuls, 1974; Obermayer, Vreuls, Muckler, Conway, & Fitzgerald, 1974).

TEAM TASK CYCLE

Not only do we expect the amount of time team members have spent working together to affect the importance of different dimensions of teamwork, we also expect that the phase of team performance may also affect the importance each dimension plays in team performance. Currently there is no research to suggest which of the dimensions included in the "Big Five" might play the largest role in the preliminary stages of the team task. However, we propose that adaptability and team orientation may be most important when the team initially develops a strategy for approaching the team task. Both of these dimensions suggest that team members

must be willing to adjust and consider alternative perspectives while developing a plan for future team action.

Although there is a lack of research that considers the dimensions during the early stages of the team task included in the "Big Five," a considerable amount of research has been conducted on changes in and the importance of communication during the course of the team task cycle. Brown (1967) found that frequency of communication varied based on the phase of the task. In fact, research has found that teams that take time to strategize before engaging in a more complex team task have better performance than those that do not, suggesting that communication may be one of the more important team processes in the initial stages of performance. These strategies often include a plan for how the team will engage in the task should changes in the environment occur.

Once the team progresses to the performance stage of the task in which the team is actively pursuing the team objectives, performance monitoring, backup behaviors, and adaptability are expected to increase in importance. As the team engages in performing the team task, there is greater susceptibility to errors and the need to remain vigilant. When the team completes the task, team members progress into a transition phase in which they reevaluate their performance, provide and receive feedback, and make adjustments to their strategies as needed (Marks et al., 2000). In this stage, teams will require team leadership to provide additional guidance and feedback. Members' team orientation will play a role in receiving and using performance feedback from the team leader and other team members. This is a particularly important phase in team performance as the team is able to develop prescriptions for future performance cycles (e.g., Marks et al., 2000; Roby, 1968). This series of performance and transition phases repeats until the team completes its task.

CONCLUSION

Although a remarkable amount of research has been conducted to determine how to make teams function maximally, no one has

been able to clearly define exactly what is teamwork. The study of teamwork has been fragmented over the years and has not lent itself to being used practically. The general consensus, however, is that teams require a complex mixture of variables that include not only organizational support and individual skills but also teamwork. Therefore, based on a review of the team literature, we have argued that it is possible to condense what we know about teamwork into five core components, which we submit as the "Big Five" of teamwork, and three coordinating mechanisms.

We have provided a theoretical model of the interrelations among the "Big Five" dimensions and their subsequent research propositions in Figure 1. We have proposed that these dimensions are commonly occurring in many other models of teamwork and must be manifested during any team task that can be suggested. These components have been presented here as team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation and require coordinating mechanisms of shared mental models, closed-looped communication, and mutual trust.

By distilling the team literature into five core teamwork dimensions, this article has two primary implications. First, we believe that the "Big Five" will bridge the gap between academicians and practitioners by providing a practical framework for understanding the conceptual processes involved in team processes and the manner in which these processes occur in different team tasks on a day-to-day basis. Currently, many organizations create teams without the benefit of what has been gleaned from team research. We believe that one reason this is occurring is because of the overwhelming sources of suggestions and recommendations that have been made to ensure team effectiveness. Therefore, this core model of the "Big Five" of teamwork makes the implementation of research findings to applied settings more manageable.

A second implication of this article is the reiteration of the glaring need for longitudinal research to provide greater understanding of how team processes change both in the terms of a team's ability to perform the "Big Five" tasks and in the importance that each of the "Big Five" factors plays over time. In an effort to address this

issue, we have taken an additional step to propose how all of these factors will vary in their importance and the skill with which they are performed during the life of the team and team task. It is our hope that this article will be a stepping-off point for more directed empirical interest in testing the core components of teamwork within a framework that takes into account the stages of team development and the stages of the task in which the team is engaged over time.

In conclusion, although the "Big Five" provides a theoretical framework of the core components of teamwork, additional variables that have also been found to affect team performance and team effectiveness should not be disregarded. We chose the word *core* carefully; other variables may affect teamwork as well under certain conditions. We agree that teamwork is a complicated process, and we do not intended to discourage research of variables not included in the "Big Five." However, the team literature as it currently exists has become unmanageable for any practical purposes. Therefore, the "Big Five" is intended to provide a more focused direction for future research by identifying some of the larger gaps in the team literature and providing practical guidance to those in applied settings in designing and facilitating teams. And as we noted at the onset, we hope this article generates thinking, dialogue, research, debate, and discussion as to what precisely is teamwork and what we can do about it. Time will tell.

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