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ABSTRACT

The term collaboration has been used throughout a variety of research disciplines to describe multiple types of interaction; yet, a unified, comprehensive definition of the construct remains elusive. This lack of clarity regarding the distinctions and commonalities between collaboration and other interaction concepts has resulted in conceptual confusion that affects practice and research in human resource management. Practitioners see collaboration as more of a buzzword than as an effective human resource strategy. Previous theory development efforts have not yet taken a comprehensive multidisciplinary approach. This has resulted in failure to integrate key themes across disciplines into an overall view of collaboration, which is a commonplace practice in business and military sectors alike. This paper describes a multidisciplinary conceptualization of collaboration and discusses the implications of this integrative theory to human resource management and strategy development as well as future research efforts.

1. Introduction

Across various work settings, managers and employees rely on collaborative processes and outcomes within and across teams, organizations, and industries to reach organizational goals. These interactions take many forms including everyday work teams, interorganizational coalitions, strategic alliances, and joint ventures. Through these activities, organizations seek to enhance their ability to work together to improve their competitive advantage. Effective collaboration often depends largely on the ability of human resource managers to select, train and develop, and assess employees engaged in these joint activities. Unfortunately, case studies reveal that fostering successful collaboration can be difficult for managers and practitioners to accomplish (Thomson, 2001; Thomson & Perry, 1998).

One primary impediment to effectiveness is the general lack of understanding as to what conceptually and practically constitutes collaboration. Scholars suggest that the term collaboration has been used "in a variety of inappropriate ways in both research and practice settings… [hindering] its usefulness as a variable in studies which attempt to evaluate its effectiveness" (Henneman, Lee, & Cohen, 1995, p. 104). In other words, the lack of a descriptive, precise, and unifying definition of collaboration has led to unfortunate construct contamination as well as deficiency. This poses a barrier to advances in research as well as practice, making development of human resource management (HRM) best practices for enhancing collaboration difficult, at best. Managers and other organizational practitioners cannot determine the appropriate employee knowledge, skills, attitudes, and other characteristics (KSAOs) to select, train, and assess without a clear understanding of the attitudes, cognitions, and behaviors required for effective collaboration.

Therefore, in an effort to improve collaboration-aimed HRM practices, we seek to synthesize and clarify current conceptualizations of collaboration. It should be noted that we do not intend to impose a new construct, but rather to integrate current multidisciplinary conceptualizations and clarify an existing construct through a qualitative approach (D'Abate, Eddy, & Tannenbaum, 2003). First, we briefly delineate criteria for the systematic development of construct definitions. Drawing upon these criteria,

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we then analyze extant conceptualizations of collaboration across selected disciplines to offer a current state of the multidisciplinary literature. Third, we present our integrated, comprehensive definition of collaboration, grounded in common themes emerging from this multidisciplinary review. To further aid in clarification, this definition is compared and contrasted with related constructs, providing the foundational elements required for future development of a nomological network. Fourth, we introduce and discuss a theoretical framework, emphasizing how this conceptualization of collaboration informs HRM practices. Finally, we end with suggestions for future research stemming from our clarified view of the construct.

2. Collaboration across disciplines: current state of the literature

Nearly two decades ago, Wood and Gray (1991) called upon both scientists and practitioners to provide clarity towards understanding collaboration. Since then, scientific efforts have focused on theory development (e.g., Thomson, Perry, & Miller, 2009), while the popular press capitalized on the increased reliance on collaboration as a strategic aim (e.g., *Collaboration Handbook: Creating, Sustaining, and Enjoying the Journey*, Winer & Ray, 1994; *Group Genius: The Creative Power of Collaboration*, Sawyer, 2007; and *Collaboration: How Leaders Avoid the Traps, Create Unity, and Reap Big Results*, Hansen, 2009). Yet, none of these works has taken a comprehensive multidisciplinary approach to construct clarification. In fact, depending on the specialization of the authors, the same term could refer to different forms of interactions, providing little, if any, construct clarity. Therefore, to date, neither the scientific nor practical literatures have adequately addressed Wood and Gray's call. To ensure a strong theoretical contribution, we addressed both the need for parsimony and the need for comprehensiveness by avoiding "throw[ing] in the kitchen sink" (Whetton, 1989) and by identifying four criteria that are critical to developing a unified construct definition of collaboration[1]:

1. *Levels of Analysis*: First, the definition must explicitly apply to various levels of analysis. If collaboration is conceptualized as a construct involving individuals, teams, organizations, multiteam systems, etc., there may be processes that are isomorphic across levels or emerge compilationally, and thus differ in magnitude of variability, relationship patterns, and/or variant behavior-outcome relationships (Kozlowski & Klein, 2000). Moreover, cross-level collaboration (i.e., teams collaborating with organizations, etc.) should also be considered when developing a definition of collaboration. Thus, a definition needs to be broad enough to account for multiple levels of analysis and allow for all forms of emergence.
2. *Fundamental Underlying Processes*: Second, the definition must provide some explanation regarding the fundamental processes inherent in collaboration. To be useful, the definition must go beyond the generic "working together" by delineating specific elements that constitute collaboration and differentiate it from other similar constructs. Cronbach and Meehl (1955) delineated the distinction between implicit and explicit definitions, noting that most constructs of interest are defined by the role they serve in the nomological net (implicitly) rather than by what they referred to as the inner nature. Yet it is critical that a definition not become so narrow that it is not applicable to multiple domains.
3. *Process-Orientation*: Third, collaboration must be defined and described as a process rather than a structure or an outcome. While there are clearly outcomes that result from collaboration, they are distinct from the actual engagement of entities working together to accomplish a goal. Collaboration can be described as a particular process used to achieve outcomes, not as the outcomes themselves. The emphasis should be placed on collaboration as a process that leads to outcomes rather than an endpoint.
4. *Time*: Finally, the definition must acknowledge the influence of time. There has been an emphasis in the literature regarding the notion of time as an important variable, specifically noting how it has generally been ignored in models that involve performance at a team or higher level (e.g., McGrath, 1991). Thus, there has been a push towards incorporating elements of time in either a developmental approach (i.e., differential influences of factors over time; Kozlowski, Gully, Nason, & Smith, 1999) or episodic approach (i.e., the execution of different processes at different times; e.g., Marks, Mathieu, & Zaccaro, 2001).

Given that multidisciplinary approaches to construct conceptualization lead to a more holistic view (Rousseau, Sitkin, Burt, & Camerer, 1998), while at the same time highlight micro, meso, and macro insights (Griffiths & Zammuto, 2005), we conducted a comprehensive multidisciplinary literature review to advance our understanding of collaboration. Searches were performed in a variety of databases such as *EBSCOhost, Anthropology Plus, Humanities Full Text, Sociological Abstracts, Biological Abstracts,* and *MEDLINE*. Results of the search suggest that collaboration has been discussed across a variety of disciplines including organizational behavior, management, environmental science, communication, education, sociology, anthropology, history, and medicine. Each discipline has its own unique view of collaboration as a form of interaction. We extracted themes relevant to collaboration from each discipline (see Table 1).

Although the multitude of researchers and practitioners using the *same* construct from a variety of perspectives may, at first glance, seem promising for both scientific and applied communities, Table 1 clearly demonstrate little construct clarity or agreement across fields. Some researchers refer to collaboration as comprising a specific process or processes that occur during interactions (e.g., conflict management in the management literature; compliance in the medical literature; boundary spanning, motivation, and persuasion in the anthropology literature). Others focus on collaboration as a structure (e.g., organizational behavior, management, anthropology), a process (environmental science, education, medicine), something in-between (e.g., communication, sociology), or fail to adequately delineate whether it is a process or a structure (e.g., history, biology). Throughout

[1] We followed a similar approach to that used by Wilson, Goodman, and Cronin (2007) when developing their theory of group learning.

literatures, the notion of problem-solving arises, whether collaboration is itself a problem-solving activity or structure designed for problem resolution (e.g., management, environmental science, communication); yet, some suggest collaboration is more than just a problem-solving mechanism (e.g., education, biology).

The synthesis of the literature revealed several weaknesses that pervade current conceptualizations of collaboration. Existing definitions: (1) are too vague or too specific (e.g., Kelly, Schaan, & Joncas, 2002; Leinonen, Jarvela, & Hakkinen, 2005; McLaughlin & Ponte, 1997), (2) explain context without providing an explicit definition (e.g., Harrison, Price, Gavin, & Florey, 2002; Roschelle & Teasley, 1995; Schrage, 1990), (3) operate at a restricted level of analysis (e.g., Plummer & Fennell, 2007), (4) are not conceptualized as a process (e.g., Appley & Winder, 1977; Kenis & Knoke, 2002; Sundaramurthy & Lewis, 2003), and/or (5) describe another type of interaction altogether (e.g., Rahim & Magner, 1995). These weaknesses are particular problematic given that the lack of a concise definition and understanding of how collaboration unfolds across-levels limits both the precise operationalization of this construct in empirical research and, ultimately, hinders recommendations for best practices in work organizations.

In the following section, we address the above mentioned limitations and present, in detail, a unified and concise definition of collaboration. Underlying theoretical support for included definitional components found throughout the multidisciplinary literatures is also provided.

3. Emerging themes: defining characteristics of collaboration

We define collaboration as *an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal*. This definition represents the most critical underlying assumptions regarding collaboration drawn from the literature review while avoiding the previously described limitations inherent in existing definitions.

3.1. Collaboration is an evolving process

Some have conceptualized collaboration as a relationship structure, but by far, the majority of the literature has conceptualized collaboration as a *process* (e.g., Gray, 1989; Keyton, Ford, & Smith, 2008; Wood & Gray, 1991). Gray (1989) highlights this issue, stating "collaboration is essentially an emergent process rather than a prescribed state of organization" (p. 15). By conceptualizing collaboration as a process[2] that involves parties interacting together, this definition retains the dynamic and *evolving* nature pervasive in definitions across disciplines (e.g., medicine—D'Amour, Ferrada-Videla, Rodriguez, & Beaulieu, 2005; environmental science—Selin & Chavez, 1995).

We support this perspective and argue that conceptualizing collaboration as a relationship structure erroneously implies that it is static. Collaboration is the *process* that people engage in to achieve some desired outcome(s); however, the outcome(s) itself is not collaboration. For example, a product, such as a car built on an assembly line can be considered an example of a collaborative outcome—but it not the collaboration itself. The process, involving mechanics, engineers, and factory workers, who worked interdependently to assemble the car, is the collaboration. As explained by Lewis (2006), "we don't *have* a collaboration, nor *are we* a collaboration; we *engage* in collaboration" (emphasis added, p. 213). Furthermore, collaboration is an active process (Tucker, 1991), involving interpersonal interactions and relationships that change over time (Graham & Barter, 1999). Along these lines, we view collaboration as a process that can evolve—improving and changing—over the course of its life cycle.

3.2. Collaboration requires two or more social entities

Collaboration is seen by scholars in organizational behavior, sociology, and anthropology as a process that involves interaction among social units, including people and organizations (e.g., Graham & Barter, 1999; Longoria, 2005). The dictionary similarly defines collaboration as a verb, "working together" (e.g., Marttiin, Lehto, & Nyman, 2002). For both social interaction and working together, two or more entities are required. Moreover, collaboration can occur between a variety of entities, including "individuals, groups, organizations, or even societies" (Longoria, 2005). Thus, we use the term entities to refer to individuals, teams, units, departments, functional areas, organizations.

We also propose that the interactions of these entities can occur at many levels of analysis. Specifically, collaboration is not limited to just the same level of entities (i.e., two organizations or two teams), but rather it can also occur across-levels. For instance, collaborative engagements can occur between a single organization and a group (e.g., environmental activists working with an organization) or any combination of entities.[3] Collaborative processes at a lower level of analysis may affect collaboration at a higher level or vice versa. In sum, our definition of collaboration addresses the fact that collaboration can occur (1) beyond just individuals or teams and (2) across levels of analysis and involve any combination of entities, yet is reserved to only apply to *social* entities.

[2] Further delineation of the specific affective, cognitive, and behavioral processes and emergent states that make up the collaborative process are described in the section below introducing the collaboration framework.

[3] We thank our reviewers for suggesting this interesting cross-level potential for collaboration.

Table 1
Conceptualizations of collaboration by discipline.

Discipline	Conceptualizations	References
Organizational behavior	1. Pooling resources: • Two or more stakeholders perform this in an effort to solve a set of problems that neither can solve individually. • Creates more superior solution than could be achieved alone. • Occurs in three stages, problem-setting, direction-setting, and structuring including stakeholders at the individual, group, or organizational level. • Interdependence is the key driver. 2. Organizing structure: • Occurs when a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain. • Autonomy must be retained or else a merger is created. • The reason for collaboration is that stakeholders bring different resources to bear on the issue at hand.	Gray (1985); Gray (1989); Gray and Wood (1991); Kelly et al. (2002); Logsdon (1991)*; McCann (1983)*; Westley and Vredenburg (1991)*
Management	1. Conflict management: • Focused on achieving a mutually beneficial solution for both parties and is characterized by high concern for self and others. • Often compared to accommodating (low concern for self, high concern for others), avoiding (low concern for self, low concern for others), competing (high concern for self, low concern for others), and compromising (moderate concern for self and others) styles of conflict management. • Has been used synonymously with a variety of other terms. For example, the collaborative approach has also been labeled cooperative, integrative and problem solving across several studies. • Focus on achieving win–win solutions for both parties. • Has been found to be positively related to team performance and satisfaction 2. Management approach or structure: • View collaboration as the opposite end of a continuum with control that involves greater emphasis on collectivistic and cooperative tendencies, goal alignment and trust. • Others use collaboration to refer to strategic alliances and joint ventures, noting that variables such as communication are critical for "interorganizational collaborative ties" that are the result of calculated gains versus costs • Collaboration in this context is not seen as a process, but rather a relationship structure or effective management strategy.	Alper, Tjosvold, and Law (2000)*; Beersma and De Dreu (1999, 2002, 2005)*; Chen, Liu, and Tjosvold (2005)*; Chou and Yeh (2007)*; DeChurch and Marks (2001)*; Desivilya and Eizen (2005)*; Desivilya and Yagil (2005)*; Janssen Van De Vliert, and Veenstra (1999)*; Jordan and Troth (2004)*; Kenis and Knoke (2002); Rahim and Magner (1995); Tjosvold, Poon, and Yu (2005)*; Sundaramurthy and Lewis (2003)
Environmental science	1. Understanding resource problems: • The majority of the literature uses Gray's (1989) model of collaboration. • The model was modified to include an antecedent stage prior to the problem-setting stage and an outcome stage after the structuring stage. Additionally, feedback arrows were included in the model to emphasize the cyclical nature of collaboration. • Collaboration used as a superordinate term to integrate research on transactive planning, open decision making, partnerships, and co-management. • Collaboration is more of a macro level process that focuses on cooperative actions at the cultural and organizational level, whereas co-management is viewed at a more micro level and concerns itself with the interactions of individuals and small groups.	Ashor et al. (1986)*; Bentrup (2001), Carlsson and Berkes (2005)*; Plummer and Fennell (2007); Rao and Geisler (1990)*; Selin and Chavez (1993, 1995)*; Sirmon et al. (1993)*
Communication	1. Resolving common problems and exploring new ideas: • Seen as both a structure and a process which promotes actions or doing. • Typically viewed as an emergent, informal, and volitional process with a beginning, middle, and end.	Keyton et al. (2008); Kolb (1996)*; Lewis (2006)

(continued on next page)

Table 1 (*continued*)

Discipline	Conceptualizations	References
Communication	• If the collaborative process is good, the outcome will also be good. ◦ While this may be true for some forms of collaboration, others that are dependent upon external factors such as resources may have excellent processes but poor outcomes due to uncontrollable circumstances. • The processes are open to all individuals, groups, or organizations that are directly influenced by actions others take to solve the problem. However, this idea is problematic because: ◦ It is often impossible to allow everyone engaged in collaboration to provide equal input. ◦ Structure cannot be imposed during collaboration.	
Education	1. Collaborative practice • Working jointly and reflectively on a clearly defined primary task in a reflective manner. 2. Collaborative effort • The discourse and planning between professionals with a common goal. 3. Collaborative consultation • The interactive process by which individuals with differing expertise creatively solve mutually identified issues. 4. Overarching theme • An interactive process among groups and/or individuals of differing backgrounds and disciplines directed at solving a common problem or achieving a shared goal	James, Dunning, Connolly, and Elliott (2007)*; Purcell and Leppien (1998)*; Idol, Paolucci-Whitcomb, and Nevin (1995)*; Paulsen (2008)*
Sociology	1. Relational system • Individuals have a shared understanding of a problem, are concerned about the well being of others in the collaborative relationship, are committed to work with each other over time, are working together because they choose to, and interact with one another in a fair and just manner 2. Meeting mutual goals • Defining features of collaboration include having shared goals, resources, power, and authority. • Different from cooperation in that is focused on meeting the goals of an individual stakeholder • An intermediate step occurs between identifying a shared direction and creating an organizing structure	Appley and Winder (1977); Graham and Barter (1999)
Anthropology	1. Collaborative anthropology • When scientists work side-by-side with natives from the cultures they are studying to learn about the customs and the traditions of the people • For the most part, anthropologists have not examined the actual phenomenon that is collaboration from a societal perspective, but instead discuss it in a practical manner regarding their field of work. 2. University–community collaboration • There are several necessary roles for successful university-community collaboration: the spider, the firesoul, and the little finger ◦ The spider is in essence a boundary spanner—they bring together the diverse members of the collaboration by gathering information and coordinating efforts between the different branches of the collaboration.	Lightfoot (2005)*; Nocon, Nilsson, and Cole (2004)*

	◦ The firesoul is the motivator of the collaboration, who provides energy to the work by sharing their passion and devotion to the cause with others. ◦ The little finger is a leader with a gentle approach that could subtly persuade others to see their point of view.	
History	1. Largely undefined • Several studies use the term frequently but never define it. • All that can be inferred from these studies is that collaboration entails some sort of partnership.	Akera (2001)*; Bockman and Bernstein (2008)*; Brandel (2008)*; Colomina (1999/2000)*; Fine, Grabelsky, and Narro (2008)*; Gilboa (2008)*; LeSage, McMillan, and Hepburn (2008)*; Lorence (1999)*; Maddrell (2000)*; Witwer (2008)*; Wolske (2000)*
Biology	1. Interaction between microorganisms • No explicit definition of collaboration ◦ While it can be inferred that an interaction has occurred, it is unclear if collaboration implies that output of the two interacting objects is greater than their individual inputs, a mere summation of their individual inputs, or simply the process of interacting without any concern for the magnitude of the output. 2. Synergy • Defined as the interdependent effects produced by two or more parts, elements, or individuals. • Very broad and merely refers to the positive, negative, or neutral effects produced by things that operate together.	Chitikila et al. (2002)*; Gurevich et al. (2006)*; Izraeli et al. (2007)*; Lupien et al. (2008)*; Corning (2000)*; Zhou et al. (2007)*
Medicine	1. Relationship between multiple medical professionals • Has the goal of generating hypotheses to form diagnoses. 2. Compliance • Involves providers as well as patients with the goal of getting patients to adhere to medical plans • The extent to which an individual chooses behaviors that coincide with a clinical prescription, the regiment must be consensual, that is achieved through negotiations between the health professional and the patient. 3. Difference from teamwork • Healthcare providers can collaborate with one another without being part of a team. 4. Overarching key characteristics • Individuals must be willing to engage in the process. • Team members must be willing to question each other and receptive to ideas. • There must be a distribution of power based on expertise rather than status. • Considered at the macro level, and not limited to team-level analysis	Dracup and Meleis (1982)*; Haynes (1978)*; Kyngas, Duffy, and Kroll (2000)*; Sackett (1976)*; Oandasan et al. (2006)*; Baggs and Schmitt (1997)*

Note. References used in this table, but not used throughout the text, (denoted with *) are available upon request.

3.3. Collaboration is reciprocal

A variety of fields (e.g., sociology—Graham & Barter, 1999; environmental science—Selin & Chavez, 1995; anthropology—Mullen, 2000; medicine—Henneman et al., 1995) have described collaboration as distinctly *reciprocal*. We posit that collaboration cannot be one-sided. Rather, it requires active, mutual engagement in the collaborative process at some level from all involved parties (e.g., Longoria, 2005; Tucker, 1991). More simply stated, one party dictating and controlling another party cannot be considered collaboration as this type of interaction would be better defined as delegation of work, or even as coercion. Although it should be emphasized that engagement or participation from each party does not have to be *equal,* it is critical that all involved entities work interdependently and contribute sufficiently towards reaching their joint aims. Therefore, we assume that collaboration, in essence, is a back-and-forth reciprocal process that requires each involved party to actively contribute in some way across the lifecycle of collaborative effort.

3.4. Collaboration requires participation in joint activities

Although collaboration is relevant for a variety of activities both within and outside of the work environment, the majority of theorizing about collaboration has largely been conducted within organizations. For example, Gray (1985) emphasizes that collaboration is a joint decision making process in which all parties have input. While the goals differ across disciplines from issues such as co-authoring a paper to engaging in a business venture, collaboration is frequently seen as an approach used to share resources and solve a problem (e.g., organizational behavior—Gray, 1985; sociology—Graham & Barter, 1999). Collaboration has also been associated with action-oriented or execution task activities. For example, individual military personnel with expertise in a wide variety of domains, including weapons training, foreign cultures, and medicine, often collaborate in teams to accomplish their missions around the globe such as delivering aid or securing a region. Given the applicability of collaboration to a variety of task types, we have kept our definition broad enough to suggest that all collaboration requires interdependent effort focused on *joint activities*.

3.5. Collaboration is aimed at achieving a shared goal

Finally, the existence of a *shared goal* is likely the key element separating collaboration from all other forms of shared work. Specifically, the process of collaboration can only occur if the involved entities, at some level, share at least one mutually agreed upon or mutually defined goal (Gallant, Beaulieu, & Carnevale, 2002; Graham & Barter, 1999; Wood & Gray, 1991). Shared goals are what make collaboration "collaborative." Without at least one shared goal or endpoint, there would be no reason for two or more entities to work together at all. Many argue having a shared goal is the most critical aspect of collaboration (Henneman et al., 1995).

Our definition does not exclude the possibility that collaborating entities cannot simultaneously have conflicting goals. In fact, collaborating parties often have both shared *and* conflicting goals and must, therefore, work through their conflicts to ultimately achieve their shared goal. If the involved parties do not have any shared goals whatsoever and only have conflicting or competing goals, the interaction becomes more reflective of negotiation than collaboration. To emphasize this point, we are not arguing that all goals in a collaborative effort must be mutual. Clearly, some entities engaged in collaboration may benefit more than others and, therefore; each entity may have differing, and even competing, sub-level goals. The point remains that this aspect of the definition—a commitment to at least one shared goal—is the essence of collaboration and therefore is a necessary defining characteristic.

3.6. Summary

The above discussion highlights the common themes that emerged from the multidisciplinary literature review of collaboration. Each included component is part of definitions from at least one field; yet, no previous definition includes all of these components. This comprehensive definition may be argued to be broader than some existing definitions. Indeed, we suggest it is, but this breadth is necessary to truly capture all joint activities that are collaboration. Rather than invent new names for various processes, we argue that the breadth of this definition creates simplicity for researchers and practitioners by calling these activities what they actually are—examples of collaboration. At the same time, we consider our definition to provide greater clarity and precision. This may seem contradictory, but when considering a superordinate construct like collaboration that describes interaction, we are extending others' conceptualization to more than one level of analysis (to include cross-level potentials), previously ignored in other definitions.

4. Related concepts: foundation for a nomological network

We have defined collaboration as a superordinate construct, which subsumes and overlaps with several related variables. Yet, collaboration is more than just the sum of its parts. Coordination, cooperation, teamwork, and collaboration: more often than not, these words are used interchangeably in the literature (e.g. Dailey, 1977; Schmidt, 1991; Sigmund, 2007). Unpacking what constitutes collaboration requires clear articulation of how it is distinct from other commonly used terms. These constructs have been extensively studied in their own right and trying to synthesize each body of research into a paragraph would be an injustice.

Rather than providing a cursory and relatively naïve review of related constructs, Table 2 discusses these constructs, presenting prototypical definitions mapped to the proposed definition of collaboration. Also, the level of analysis (see definition criteria) is compared for each construct.

To further elucidate the relationships among these constructs and lay the foundation for a nomological network, we also devised a Collaboration Venn Diagram (see Fig. 1) in which collaboration is compared with these constructs to help clarify where construct space is shared and where it is unique. Below, we highlight overlaps and distinctions between these constructs.

We begin with *teamwork*, which most closely resembles the definition of collaboration. Both constructs are multidimensional and represent processes that involve two or more entities actively and reciprocally working towards achievement of a shared goal (Kahn & McDonough, 1997; Marks et al., 2001; Salas, Burke, & Cannon-Bowers, 2000). The main distinction between collaboration and teamwork lies in the level of analysis. Collaboration can involve individuals, groups, units, organizations, or any cross-level combination thereof. In contrast, teamwork, as defined, exclusively involves individuals within one team—not between teams, organizations, or societies. We suggest that teamwork is an instantiation of collaboration. All teamwork is, thus, an example of collaboration. However, collaboration can exist at a level beyond a team (e.g., a military unit collaborating with a village), so not all collaborative activities can be classified as teamwork. This is an example of a construct that is completely subsumed within the collaboration construct domain (as indicated in Fig. 1) since all defining criteria of collaboration also describe teamwork, just at one specific level of analysis.

Coordination is another construct frequently used to describe collaboration (often at the team level). This construct refers to the sequencing of interdependencies to most efficiently accomplish work tasks (Marks et al., 2001). Similar to collaboration, coordination can involve two or more social entities; however, it can also describe two or more *resources* that are non-social in nature (Salas et al., 2000). Additionally, there is no demand for active and reciprocal participation by entities. Depending on the tasks, a collaborative effort may involve any one of the four identified interdependency types: pooled, sequential, reciprocal, or team (Van de Ven, Delbacq, & Koenig, 1976). At the pooled level, individual contributions are not contingent upon one another. At the sequential level, member A must complete the task prior to Member B completing the next task. In tasks relying on either of these interdependencies, there is no need for reciprocity of effort. Yet, both types of interdependencies still involve coordination, to some degree, as coordination is focused on efficiency of task sequencing (Denise, 1999). Thus, reciprocity is not a requirement of coordination. This is depicted in Fig. 1 as the non-overlapping component of coordination extending beyond collaboration. In essence, collaboration is too broad a term to simply refer to temporal sequencing of actions, but as an evolving

Table 2
Related constructs and their overlap with collaboration.

Constructs and construct definitions	Evaluation criteria and definition components					
	Level of analysis	Evolving	Process	2 or more social entities	Actively and reciprocally participate	Achieving at least one shared goal
Collaboration						
• "an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal"	Multiple	✓	✓	✓	✓	✓
Teamwork:						
• "Cooperative or coordinated effort on the part of a group of persons acting together as a team or in the interests of a common cause" (Dictionary.com, n.d.)	Team only	✓	✓	✓	✓	✓
• "… dynamic and multidimensional [construct consisting of] … eight core dimensions" (Salas et al., 2000, p. 339)						
• "Teamwork processes describes interdependent team activities that orchestrate taskwork in employees' pursuit of goals" (Marks et al., 2001, p. 358)						
Coordination:						
• Dynamic interaction to "orchestrate the sequence and timing of interdependent actions" (Marks et al., 2001, p. 363)	Multiple	✓	✓			✓
• "Process by which team resources, activities and responses are organized to ensure that tasks are integrated, synchronized and completed within established temporal constraints." (Salas et al., 2000, p. 342)						
Cooperation:						
• "…dyadic process, usually through examining the dynamics of interactions between [functional areas]" (Pinto et al., 1993, p. 1282)	Multiple	✓			✓	✓
• "…willful contribution of employee effort to the successful completion of interdependent organizational tasks" (Wegner, 1995, p. 152)						
• Attitudinal construct describing the extent to which entities are concerned about the overall goal rather than individual goals (Salas et al., 2005)						

✓ denotes that descriptor is always a characteristic of the construct, not just under certain circumstances (i.e., coordination can involve 2 or more social entities, but it also can refer to coordination of resources that are non-social in nature, therefore there is no ✓ in that category).

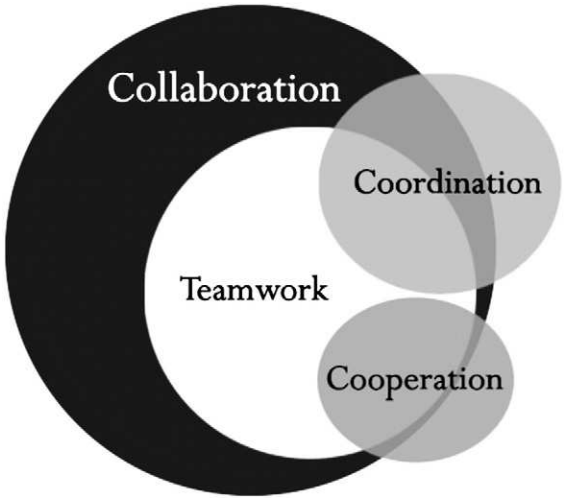

Fig. 1. Shared criterion space among collaboration and related constructs.

process that involves two or more entities, all effective collaborative efforts require varying levels of coordination, depending on task and the size of the entities involved.

Alternatively, *cooperation* does imply some kind of reciprocal interaction. Pinto, Pinto, and Prescott (1993) suggest that cooperation is a dyadic process, which can be best understood through observation and examination of dynamic interactions among two groups (i.e., functional areas). Yet, cooperation is a term that has long been used, and is widely accepted, to describe behavior in the animal kingdom (Allee, 1951), not just in humans. Beyond this difference, the concept of cooperation is somewhat harder to fully separate from collaboration than more tightly defined concepts such as coordination, as the Oxford English dictionary does technically define cooperation and collaboration as synonyms. For our purposes, we define cooperation as an attitudinal construct that helps to facilitate the process of collaboration. Salas, Sims, and Burke (2005) describe a construct known as team orientation, which, in essence, is an individual's propensity to consider other's behavior when interacting in a group and the belief in the importance of the team's goals over individual goals. In other words, team orientation describes the extent to which individuals are predisposed to work well with others; the extent to which they are *cooperative*. Therefore, we define cooperation as an attitude or predisposition held by the involved parties to be concerned about the overall collaborative goal rather than their own individual goal. In this way, cooperation is conceptualized as an individually held attitude that is required for effective collaboration, but it is not a description of collaboration itself. Given the extensive use in the medical literature, we further suggest this term is appropriate for referencing interactions among non-social entities.

In the previous sections, we have presented findings from our literature review on the construct of collaboration across various disciplines using specific construct definition criteria. We have then drawn upon the strengths and weakness of these extant conceptualizations of collaboration to provide a unified definition of collaboration and demonstrated how our definition is unique compared to other related concepts such as cooperation, teamwork and coordination. We believe that this definition will be helpful in guiding theory and research of collaboration from a human resource perspective. To continue to clarify the construct, we present a theoretical framework describing the inputs, processes, and outcomes of collaboration.

5. A theoretical framework of collaboration

We now focus on the final foundational aspect required for further explication of a nomological network—an overarching theoretical framework. This depiction (Fig. 2) is based on the input–mediator–output–input framework (IMOI) suggested by Ilgen, Hollenbeck, Johnson, and Jundt (2005) which has been used to describe phenomena related to performance.

The inputs (i.e., characteristics) are intentionally all inclusive as the specific collaborative setting will dictate which inputs are most relevant. Similarly, the output is labeled 'distal collaborative output' to signify the achievement of a shared goal that motivated the collaborative initiative. Consistent with previous work by Marks et al. (2001), we include cognitive and affective emergent states, defined as "properties of the team that are typically dynamic in nature and vary as a function of team context, inputs, processes, and outcomes" (Marks et al., 2001, p. 357), as well as collaborative behaviors, as mediators that comprise the collaborative performance cycle. The emergent states are initially driven by the characteristics of those individuals and/or collective entities that are involved in the collaborative effort, but also influence one another and reciprocally influence collaborative behaviors enacted during a collaborative performance episode. This creates essentially a feedback loop, which incorporates initial collaborative performance outcomes back into the collaborative cycle until the distal collaborative outcome is achieved. In addition to these inputs, mediators, and outputs, our collaborative framework considers the moderating impact of contextual factors. Below we describe each component in detail, providing a foundation for future work aimed at establishing a complete nomological network of the collaboration construct.

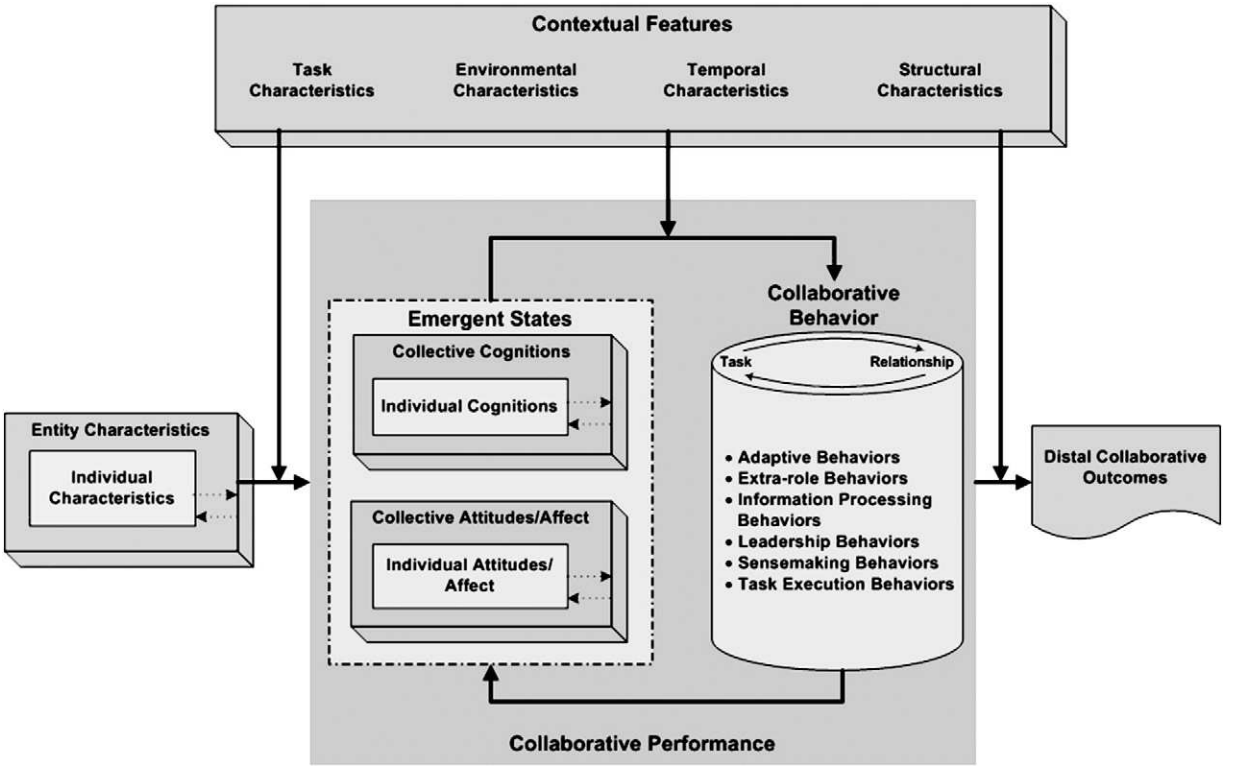

Fig. 2. Collaborative performance framework.

5.1. Inputs and outputs

Drawing upon work by Mathieu, Maynard, Rapp, and Gilson (2008), we incorporate the nesting effect of individuals within higher levels of analysis to depict the reciprocal influence that individual characteristics exert on teams, that teams exert on departments, etc., and vice versa (denoted by the dotted arrows in both directions linking individual characteristics to entity characteristics). To highlight the multilevel aspect of collaboration, we place individual characteristics within entity characteristics to allow for any level of analysis. Individual can refer to a single person, in which case entity would refer to a team. Alternatively, individual can refer to a single team, and entity could then describe multiple teams as is the case in a multiteam system collaboration. At a more macro-level, collaboration can occur in strategic alliances and joint ventures between organizations.

We suggest that characteristics of the individual (or whatever is the lowest level of analysis) contribute to the composition of the collective entity. The amount and nature of similarities and differences between entities will affect collaboration through their influence on behavioral processes and affective and cognitive emergent states. For instance, research suggests that when entities differ in meaningful ways, it can often be difficult for them to work together effectively (for a review, see Van Knippenberg & Schippers, 2007). Differences in terms of language, knowledge, and backgrounds can lead to a lack of common understanding (Cronin & Weingart, 2007; Postrel, 2002). In addition, differences between entities in terms of status, industry reputation, and social capital may also affect collaboration and shape interaction (see Mathieu et al., 2008 for a review of characteristics that can affect teams). Alternatively, drawing upon similarity-attraction theories (e.g., Byrne, 1971) and social identity theories (e.g., Tajfel & Turner, 1979) similarities between entities may facilitate a greater desire to collaborate with like others compared to those that are different. We propose that both the nature and configuration of these similarities and differences can influence collaboration. Thus, we have the individual and entity characteristics directly affecting the collaborative performance cycle.

The collaborative process results in individual and/or collective collaborative outcome(s), which can encompass a tangible product, an idea, shared understanding, personal growth, or viability and satisfaction. Yet, outcomes extend beyond those distal products that are related to the overall goal for collaborating (e.g., building a water treatment facility). They can also be more proximal outcomes, such as entity satisfaction or performance feedback, that are the result of the collaborative cycle and feed back into various parts of the collaboration framework to guide the ongoing collaborative cycle. Changes in collaborative processes and behaviors ultimately shape collaborative performance.

5.2. The collaborative process

The mediating mechanism between inputs and outputs in our framework is the collaborative process, consisting of both emergent states and behaviors. Marks et al. (2001) conceptualize emergent states as the cognitions, motivations, affect, and values that

emerge from the processes of team interaction. We extend this notion to the broader construct of collaboration and suggest that emergent states, such as trust (Kramer, 1999; Salas et al., 2005), social identification (Gaertner & Dovido, 1986); shared mental models (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000), and other affective and cognitive processes affect collaborative performance.

5.2.1. Emergent states

These initial inputs lead to emergent states (Marks et al., 2001). Within the team literature, emergent states have been defined as "properties of the team that are typically dynamic in nature and vary as a function of team context, inputs, processes, and outcomes" (Marks et al., 2001, p. 357). These are cognitions, motivations, affects and values (Marks et al., 2001) that emerge from the processes of team interaction and have been conceptualized as either moderators of team performance processes (e.g., Ilgen et al., 2005) or as proximal inputs and outputs for team processes (i.e., team interaction produces an emergent state which subsequently influences future team processes; Burke, Stagl, Salas, Pierce, & Kendall, 2006; Marks et al., 2001). There has been considerable research supporting significant correlations among various team processes and emergent states (Mathieu et al., 2008). Mathieu and colleagues therefore suggest that it is crucial to include emergent states as well as various process measures in research to avoid the problem of the "3rd variable issue" — whether a finding is actually due to the construct under investigation or to some other variable not included in the study but found to be highly correlated in previous efforts. We extend these ideas to entities beyond just teams, considering them as proximal inputs to collaborative behaviors, and thus, a part of the collaborative performance cycle.

5.2.2. Collaborative behaviors

Along with emergent states, particular collaborative behaviors also shape performance outcomes. The collaborative process essentially unpacks the nebulous black box that was previous labeled "working together." Drawing on a breadth of empirical research investigating the factors that shape collaborative outcomes at multiple levels of analysis, we outline 6 key collaborative behaviors, which include: (1) adaptation, (2) extra-role, (3) information processing, (4) leadership, (5) sensemaking, and (6) task execution. Although a complete overview of each of these social phenomena is beyond the scope of this manuscript, we briefly define each behavior. By clarifying the specific attitudes, cognitions, and behaviors that comprise collaboration, our definition provides opportunities for further developing theory and research, aimed to improve strategic human resource practices employed in the workplace.

Adaptive behaviors include any behaviors that contribute to effectiveness in dynamic, complex, and uncertain settings (Griffin, Neal, & Parker, 2007). *Information processing* includes the perception, encoding, storing, processing, and retrieving of information within the collaborative entity (Hinsz et al., 1997). Within groups, the processing of information really occurs when the information is shared, discussed, and interpreted (e.g., *sensemaking*) between collaborating parties. *Task execution behaviors* are the behaviors and activities directly focused on completing the tasks necessary to achieve the collaborative goals. *Extra-role behaviors* are not defined in advance by the collaborative task, and they are not recognized by formal reward systems, but contribute to performance via acts such as helping others and taking advantage of self-development opportunities (Podsakoff, MacKenzie, Paine, & Bachrach, 2000; Van Dyne & LePine, 1998). Finally, *leadership behaviors* are those aimed at (1) influencing others to comprehend and agree upon what needs to be done and (2) coordinating efforts to achieve the goals (Yukl, 2006). This includes many relationship-oriented behaviors such as conflict management and encouraging/motivating involved parties (Marks et al., 2001) as well as task-related behaviors as outlined by Morgeson et. al. (2010) such as performing team tasks, solving problems, and providing resources.

5.2.3. Contextual Factors

Much of what influences collaborative inputs, processes, and outcomes are the contexts surrounding the performance situation. This may be driven by the types of tasks that collaborative entities perform (McGrath, 1984), the environment in which they operate (Bell & Kozlowski, 2002), facets of time and temporality that impact processes (Marks et al., 2001), or the structure of the entities engaged in collaboration (Dyer, 1984). Given this significant influence of context, we include four key factors that have the potential to substantially influence the nature of collaboration. *Task characteristics* focus on the actual work being performed, not the manner in which it is performed (McGrath, 1984). *Environmental characteristics* can include the degree of risk that is prevalent in the environment, the level of autonomy that members have in their work, stressors such as dangerous work conditions, or uncertainty—all of which can affect collaboration. As an example, Schein (1992) defines organizational culture as pattern of shared basic beliefs that is taught to new members as the most appropriate way to perceive, think, and feel. Organizations with different cultures will each believe in a different manner to approach the collaboration. Collaborative efforts can differ on *temporal characteristics* including team lifespan, performance episode duration, performance episode frequency, and continuity of membership (e.g., Marks et al., 2001). Finally, collaboration can be influenced by the *structural characteristics* of the entities involved, which include the structure of leadership, communication structure among members, division of work and roles among members, and distribution (physical and temporal) of members (e.g., Mickan & Rodger, 2000; Morgeson, Lindoerfer, & Loring, 2010).

6. Collaboration and strategic HRM: implications of the new conceptualization

In this final section, we outline how our conceptualization of collaboration informs human resource strategies that can ultimately enhance the ability of an organization to collaborate. Strategic human resource management (SHRM) should enhance organizational performance (Schuler & Jackson, 2005). The challenge faced by SHRM is the explanation of the proverbial black box

that explains the logic between a firm's HR architecture and its performance (Becker & Huselid, 2006). For growth and prosperity, it is critical for organizations to acquire and maintain their competitive advantage, and effective collaboration is one way in which organization can gain this advantage. By enhancing dynamic capabilities (e.g., exploiting existing internal and external competencies), organizations can distinguish themselves from other competitors (Nelson & Winter, 1982). We suggest the collaborative framework we present in Fig. 2 can help organizations identify specific capabilities required for effective interactions. To illustrate how this new conceptualization of collaboration informs HRM, we organize this section around specific HRM functions and tie each back to our definition and framework.

6.2. Planning

When engaging in strategic planning (i.e., allocating resources towards the design of collaborative efforts, as well as to staffing and training and development efforts), human resource managers should consider the moderating contextual variables included in our framework (task, environmental, temporal, and structural characteristics). For example, collaborative performance on a highly complex task will require appropriate staffing and selection decisions that take into account both the task demands and skill requirements necessary to foster success (i.e., the input portion of our framework describing the characteristics of the entities involved in the collaboration). As such, careful consideration should be placed on how to structure collaboration, which members will be involved in the collaborative effort, and identifying the factors that can support their interaction. Yet, if it is already known who will engage in the collaborative efforts, resources would not need to be allocated to staffing efforts, but rather to training and development personnel, who are in the position to train required knowledge, skills, and/or attitudes required for effective collaboration.

Furthermore, we suggest that strategic aims will only be achieved when the collaboration is planned and appropriately structured (e.g., contextual factors are considered). At the organizational level, hierarchical structure and more complex arrangements, including matrix-reporting structures, can be useful in facilitating collaboration between work groups that have different functions and existing bases of expertise. Inter-organizationally, strategic alliances may be arranged at arm's length or in close proximity to foster the transfer of knowledge and skills that can facilitate successful joint ventures. Hence, the alignment between human resource planning strategies and structures is a key component of supporting effective collaboration.

6.3. Selection and staffing

When selecting or staffing a unit that will engage in collaboration, it is critical to consider the requisite KSAOs necessary to complete the task that is the focus of the collaboration. These KSAOs represent distinct resources unique to an organization. It is these unique resources of an organization which aid in attainment of strategic advantage (Teece & Sherry, 2002). As depicted in the framework, task characteristics moderate the link between entity characteristic inputs and the collaborative performance cycle. For instance, task-related knowledge attributes may be more relevant than demographic characteristics (e.g., sex, race, gender) for particular types of tasks. In contrast, collaborative work related to manual labor may require particular physical attributes that will enhance performance. Hence, selecting individuals with particular KSAOs that are aligned with the task type is essential to the success of the collaboration.

In collaborative settings where a diversity of expertise or skills is needed, it may also be critical to staff these work units in ways that foster collaboration across individuals and units. Research suggests that similarities and differences between people or units that are collaborating can form the basis for categorizing one's own group and others into ingroups and outgroups (Tajfel & Turner, 1979). A human tendency to favor and trust members of one's own group, can lead to a greater willingness to collaborate with fellow group members than with outgroup members (Brewer, 1979; Brewer & Brown, 1998; Tajfel & Turner, 1979). As a consequence, conflict and divisive dynamics can occur within collaboration, hindering performance. To avoid the negative climate and dynamics that may emerge, staffing practices for collaborative efforts should involve selecting employees who overlap with people outside of their primary social or work groups in terms of skills and knowledge. Efforts to develop a shared or superordinate identity are also likely to help enable successful collaboration between diverse units (Tajfel & Turner, 1979).

As noted in the framework, the characteristics of the involved entities in any collaborative effort directly affect the collaborative performance cycle through development of emergent states and engagement in collaborative behaviors. Each of these states and behaviors can be tied back to the definition. One key definition component is reciprocity, discussed in detail previously. As an example, consider extra-role behaviors, or citizenship behaviors as defined by Organ (1997), which draw from Barnard's (1938) concept of a "willingness to cooperate." An example of the importance of reciprocal helping during collaboration is evident in emergency room teams. These medical teams must reciprocally assist one another to successfully assess the patient and provide the most appropriate level of care based on the sustained injuries. Failure to help one another (through ineffective information exchange, failure to use one's skills for the team's benefit, or unwillingness to work with others with different training backgrounds) can be detrimental to the team and potentially fatal for the patient. HR professionals should, therefore, consider willingness to cooperate during selection for certain collaborative initiatives.

It is also critical that a collaborating unit possess leadership skills. Leadership has been argued to play a pivotal role in determining team and organizational effectiveness (e.g., Bass & Avolio, 1994; Burke et al., 2006; Judge & Piccolo, 2004; Zaccaro, Rittman, & Marks, 2001). We propose that leadership is also a key skill necessary for effective collaborations at any level of analysis. Leadership has been defined as a process of influence whereby others come to agreement about what needs to be done and how to proceed with accomplishing the goals as well as a process of facilitation in removing barriers to help accomplish the goal

(Yukl, 2006). In essence, leadership is the mechanism by which shared cognition, affect, and behavior is promoted within teams so that coordinated action can occur. Leadership behaviors include providing direction and structure for the task, providing support and coaching to the team, providing team norms, and addressing any barriers to effective collaboration (Hackman, 2002; Salas et al., 2005). Staffing collaborative entities with individuals and work units who possess the knowledge and ability to engage in leadership behaviors that facilitate collaboration are essential for effective collaborative performance outcomes.

6.4. Training and development

Managerial attitudes about strategic HRM have indicated that training and development is perceived as the most important HR practice implemented in organizations (Jennings, Cyr, & Moore, 1995). We suggest that training and development is a critical intervention to improving collaboration. Drawing on research by Moreland, Argote, and Krishnan (1998), we propose that two broad approaches can be used to train entities working together to achieve a joint goal. One approach is to offer generic training in which each entity learns required KSAs for effective collaboration. Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995) referred to this type of training as transportable training. Knowledge and skills that are generalizable across collaborations (i.e., across types of goals) would be the target of this form of HR intervention. For example, training and development interventions can focus on the relational collaborative behaviors necessary for effective collaboration depicted in the framework (e.g., extra-role, information processing, and leadership behaviors). Attitudinal competencies can also be targeted via this type of HRM intervention. Effective collaboration is contingent on the development of collective attitudes (e.g., mutual trust, group cohesion, group mood, and collective efficacy). By training entities engaged in collaboration to understand how critical it is to act and reciprocally engage in collaborative behaviors, it is more likely that entities will engage in collaborative behaviors.

The second approach involves training collaborating entities together. When training the entities in combination, parties involved will have an opportunity to learn what others know, what each party will be responsible for and how to coordinate with one another. The collective cognitions of those involved in collaboration are critical to their functioning and reaching their collaborative goals. One collective cognitive emergent state that is critical to collaboration is that of a transactive memory system (Wegner, 1987; 1995). Transactive memory systems combine what individual entities know with the shared awareness of who knows what. This collective cognition helps during collaboration when members need information but cannot recall it themselves, having this collective cognition allows members to turn to other members for help. Training collaborating entities in combination has been determined to impact the development of TMS (Liang, Moreland, & Argote, 1995; Moreland, 1999). Training entities together also improves their information processing behaviors (Moreland & Myaskovsky, 2000). Further investigation of the effect of training and development together and independently on collaborative performance at different levels of analysis is warranted. However, regardless of the approach, the knowledge, skills, and attitudes mentioned above are particularly critical for training entities to perform effectively when collaborating.

Given that much collaborative work occurs in dynamic environments, entities must be trained to be flexible and to engage in adaptive behaviors. Over time, contextual features may impact various aspects of the entities involved in collaboration. These contextual features (e.g., task, environmental, temporal, and structural characteristics) can change what the collaboration looks like and the dynamics of the collaboration. For example, changes can occur in the makeup of the entities who are engaged in the collaboration (e.g., turnover, replacement), frequency of interaction, mode of interaction (e.g., technology), and performance period duration. Research suggests that individuals who are only trained in, and thus only posses, routine expertise, have difficulties responding to changes (Devine & Kozlowski, 1995; Sternberg & Frensch, 1992). Adaptation of performance processes in dynamic situations is critical to understanding performance (see Burke, Stagl, Salas, Pierce, & Kendall, 2006).

One strategy which HRM practitioners can draw from in order to improve adaptation in collaboration is to develop pre-briefing and debriefing skills of employees (Lorenzet, Salas, & Tannenbaum, 2005; Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008). Other validated efforts that can be utilized to train and develop employees' abilities to collaborate effectively are approaches such as exploratory learning and error framing (Bell & Kozlowski, 2002). Training professionals should draw upon these validated approaches to prepare their employees for collaborative work in dynamic contexts. Successful collaborative outcomes often depend on rapid changes to an existing course of action, especially if there is a change to a task demand or an environmental cue that could affect success of the effort if ignored. Therefore, in order to improve collaboration, HR practitioners should consider providing training that can enhance the ability of entities engaged in collaborative efforts to adapt to various changes.

6.5. Appraisal

Performance appraisal is another critical component of any strategic HRM effort. According to motivation theory, employees will engage in actions that lead to organizationally desired results as long as those results are effectively appraised (Pritchard & Ashwood, 2008). Essentially, theory suggests improving collaboration within an organization requires HR practitioners to first clearly identify the behaviors that comprise collaboration. In our framework, we outline the collaborative behaviors that affect performance. HR professionals can now use existing measures of these behaviors to evaluate whether entities involved in collaborative efforts are displaying these behaviors. These evaluations can be used as part of the annual performance appraisal, or provide the baseline level at which employees are operating to monitor improvements in collaborative performance over time.

Although a comprehensive review of performance management is not warranted in this effort, for maximum effectiveness, researchers suggest that specific performance goals need to be clearly outlined for employees (e.g., Locke & Latham, 1990).

Furthermore, each of these individual performance goals need to be linked to the organizations objectives, which are derived from organizational values—the foundation of an effective performance management plan (e.g., Dransfield, 2000). By providing a foundation for what constitutes collaboration, practitioners can now draw upon years of research to effectively evaluate collaborative performance and provide feedback to both individuals and collectives involved in collaborative efforts.

6.6. Reward and compensation

Motivation theory also suggests that the best way to encourage a target behavior is to tie rewards to the results of performance evaluations (Pritchard & Ashwood, 2008). Therefore, reward structures that encourage collaboration must be put in place. Research in teams suggests that the degree to which individual rewards are tied to team level outcomes (i.e., shared fate—Pettigrew, 1998; or positive outcome interdependence—Kelley & Thibaut, 1978; Tjosvold, 1984; Wageman, 1995), can improve collaborative performance (Harrison et al., 2002). In fact, team reward contingencies have been found to be the strongest predictor of collaborative success. Regardless of the level of collaboration, to encourage the behaviors, attitudes, and cognitions required for collaborative success, they must be measured and rewarded.

Drawing on prior research, we suggest that rewards for collaboration need to be tied to the success of all entities involved, not to the performance of one particular entity alone. In particular, a superordinate, or shared identity, is most likely to be fostered under conditions of outcome, or reward interdependence (Gaertner & Dovido, 2000; Gaertner, Mann, Murrell, & Dovido, 1989). A shared identity has been found to foster improved performance outcomes in a variety of team contexts (Gaertner et al., 1989). Specifically, when entities perceive that they share a common fate, they are more likely to work collaboratively together to achieve a common end, despite their differences (see also, Sherif, Harvey, White, Hood, & Sherif, 1961).

Organizations with a collaborative environment had greater levels of employee engagement (Towers Perrin, 2003). Just as compensation based on employees engaging in desired behaviors is one method to motivate, developing an organizational culture where collaboration is valued and promoted, enhances employee engagement as well.

7. Implications for theory and research: driving scientific inquiry

The definition outlined above is intended to specify what is meant by collaboration and what is not, with the aim of unifying research efforts. The goal of this paper was to provide a synthesis of the literature to make future research on collaboration comparable across disciplines and to reduce the conceptual confusion that is currently pervasive across fields. Currently in the literature, the range of what researchers mean by collaboration is vast, and at times overlapping with other constructs. The sample definitions chosen from various disciplines (Table 1) illustrate how disjointed and varied the use of this construct has been. Without shared understanding of the collaboration construct, it is difficult to theorize and empirically test antecedents, moderators, mediators and outcomes associated with collaboration. To clarify this construct of collaboration and foster more systematic research, we identified overlapping features of collaboration and derived a definition. From the presented definition and framework, we consider several implications for future research and for understanding current collaborative literature.

For definitions of constructs to be useful, they should address multiple units of analysis (Kozlowski & Klein, 2000). We feel it is especially important to convey that collaboration is not limited to a process involving two or more people (i.e., the traditional definition of a team). The word entity was specifically selected to cover the domain of individuals, teams, departments, multiteam systems, alliances, etc. While it may be possible for three people to come together to address a need, they often may each represent a larger interest (Keyton et al., 2008). Future research should focus on the multilevel aspect of collaboration to determine if collaborative processes look different at different levels of analysis. Are different processes more important at the team level than at higher levels of analysis where entities may be representing other organizations or operations? Work has begun in this area with investigation into the construct of multiteam systems, or teams of teams (e.g., Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005). However, we need to more fully articulate process and performance differences as the complexity of interactions increases through greater participation by more and more entities, differing levels of interdependence, or the presence of competing sub-goals.

Second, this definition does not restrict collaboration to a particular form, strategy, or outcome but focuses instead on the *process*. We have provided distinctions between various constructs and collaboration, noting that we conceptualize collaboration as a macro-level process that encompasses such sub-processes as teamwork and aspects of coordination, depending on the particular context. In essence, as the context changes, the collaboration can look different. However, we do not feel it is appropriate to conceptualize these processes as antecedents to collaboration. This would diminish the construct to an outcome and could therefore make it useless to other domains interested in understanding how to make collaborations successful. This is evident in the collaboration framework. Specifically, the *outcome* of collaboration is the achievement of the shared goal while *collaborative performance* is comprised of emergent states and behaviors. By providing an input-process-output type framework, research can more easily examine the factors that foster or hinder effective collaboration.

Third, the need for future research will require the creation of adequate measures. We have distinguished collaboration from other constructs, which we consider to be part of successful collaboration. As noted above, we have very clearly defined collaboration as a behavioral process, and not as an antecedent or outcome. Therefore, future research should be careful to create measures that adhere to this understanding. There are established criteria for related process construct measures such as teamwork (e.g., Baker & Salas, 1992; Salas & Cannon-Bowers, 2000) that could be used as a starting point for the development of appropriate

collaboration process measures. With a clear definition that provides information on not only the requirements (two or more entities) and a framework that outlines the characteristic behaviors (adaptation, citizenship, information processes, leadership, sensemaking, and task execution), as well as the resulting outcomes (mutually shared goals) of collaboration, we hope to provide the research community with the theoretical foundation upon which to build psychometrically sound and practically useful measures of collaboration.

With regard to continued refinement of our proposed framework, a significant contribution to the understanding of collaboration is examining the contextual issues that affect collaborations. Our framework begins to touch on several that have been found to impact team performance and thus, are likely to affect collaboration at other levels of analysis as well. The literature abounds with characteristics and guidelines for creating effective teams (e.g., Hackman, 1990; Salas et al., 2005; Wageman, 1997); yet, there are still examples of collaboration at the team level that have failed miserably (e.g., the medical community, Beckmann, Baldwin, Hart, & Runciman, 1996; Baggs, Ryan, Phelps, Richeson, & Johnson, 1992). This could be the indicator of additional variables that affect the process of collaboration, which are not currently included in our current conceptualization. Therefore, it is essential for researchers to begin to unravel the complexities of situational context to provide HR personnel with a more complete understanding of the phenomena of collaboration to help drive efforts aimed at improving collaborative performance.

Finally, the goal of understanding an organizationally relevant construct is to provide meaningful, yet practical, advice to practitioners on how best to achieve optimal levels of the desired behavior or outcome. In this regard, future research should draw upon existing work with teams to identify pitfalls and facilitators to collaboration at higher levels of analysis and begin to address those issues through either selection or development. If, as indicated in the collaboration framework, adaptation is crucial to collaborative performance in dynamic conditions, what strategies can we use to train people to be more adaptive? We offered several possibilities within our implications section, but much work is needed in terms of empirical testing before any definitive conclusions can be made. In other types of collaboration, other behaviors may be more important. An understanding of which behaviors are most critical to successful collaboration is necessary to allocate resources to selection and training efforts effectively.

8. Conclusion

As scholars and practitioners increasingly study and manage collaborations across a wide variety of disciplines, it is necessary to reduce construct confusion about collaboration to systematically and collectively advance knowledge. D'Abate et al. (2003) noted two significant levels at which construct confusion occurs. First, authors use the same term and define it differently. Second, there is a lack of differentiation among similar constructs. They specifically suggest one way to address these issues is through construct meaning clarification and generation of an overarching framework. To address the lack of construct clarity associated with the term collaboration and stimulate more comparable and combinable research efforts, we have developed a definition of collaboration, based on a comprehensive multidisciplinary literature review. Additionally we have presented an overarching framework, depicting the collaborative process, to guide future research.

By precisely conceptualizing collaboration, we provide a point of departure for more rigorous discernment of the differences between collaboration and other related, yet distinct, constructs. In particular, we posit that these distinctions provide opportunities to more precisely align HRM systems with task and personnel requirements associated with collaboration. As noted above, recruitment, selection, and placement decisions will determine the individuals available to participate in collaborative activities and is the only way to ensure that entities involved in the collaborative effort have relevant characteristics that are difficult to train but important in collaboration (e.g., intrinsic desire to help others or citizenship behaviors). Effective evaluation leads to identification of KSAOs, outlined in the framework, required for successful engagement in the joint activities that lead to effective collaborative performance and this achievement of desired collaborative outcomes. Training can then be designed to help employees develop those necessary KSAOs as well as implementation of a knowledge management system to provide employees access to the wealth of available information in an organization, potentially valuable to any collaborative effort. Evaluations, which are effectively linked to entity-level rewards, will drive the amount of effort that employees exert toward any collaborative activity. Finally, the conceptualization of collaboration as evolving provides managers with the flexibility to adapt their human resource strategies as collaboration processes change over time.

We end by returning to one assumption that we suggest is foundational to the definition and framework: collaboration is a higher-level process that encompasses many frequently studied constructs such as, cooperation, teamwork, and coordination. These lower level constructs are utilized by many disciplines and the findings are important for all researchers to consider. By conceptualizing collaboration as a superordinate process that overlaps with many other constructs (but is more than just the sum of their respective overlapping parts), researchers who engage in teams research can begin to foster interdisciplinary efforts. With a common conceptualization that is flexible enough to apply to multiple domains, researchers across fields can begin to conduct multisite investigations into collaboration that draw upon a variety of contexts and with multiple levels of analysis, to fully develop understanding. The point of science is not to recreate the wheel, but improve the design. We hope our efforts have not only clarified a construct, but also provided avenues for future multidisciplinary scientific investigation from which validity efforts and the creation of a nomological network can stem. Collaboration is increasingly utilized in practice; therefore, science needs to thoroughly understand what it is and what it is not in order to help practitioners maximize its effectiveness and usefulness.

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References

Allee, W. C. (1951). *Cooperation among animals, with human implications: A revised and amplified edition of the social life of animals.* New York: Schuman.
Appley, D. G., & Winder, A. E. (1977). An evolving definition of collaboration and some implications for the world of work. *The Journal of Applied Behavioral Science*, *13*(3), 279–291.
Baggs, J., Ryan, S., Phelps, C., Richeson, J., & Johnson, J. (1992). The association between interdisciplinary collaboration and patient outcomes in a medical intensive care unit. *Heart Lung*, *21*, 18–24.
Baker, D. P., & Salas, E. (1992). Principles for measuring teamwork skills. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, *34*, 469–475.
Barnard, C. I. (1938). *The functions of the executive.* Cambridge, MA: Harvard University Press.
Bass, B. M., & Avolio, B. J. (1994). *Transformational leadership: Improving organizational effectiveness.* Thousand Oaks, CA: Sage.
Becker, B. E., & Huselid, M. A. (2006). Strategic human resources management: Where do we go from here? *Journal of Management*, *32*, 898–925.
Beckmann, U., Baldwin, I., Hart, G., & Runciman, W. B. (1996). The Australian incident monitoring study in intensive care: AIMS-ICU. An analysis of the first year of reporting. *Anaesth Intensive Care*, *24*(3), 320–329.
Bell, B. S., & Kozlowski, S. W. J. (2002). A typology of virtual teams: Implications for effective leadership. *Group Organization Management*, *27*, 14–49.
Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin*, *86*, 307–324.
Brewer, M. B., & Brown, R. J. (1998). Intergroup relations. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), (4th ed). *Handbook of social psychology, Vol. 2.* (pp. 554–594). New York: McGraw Hill.
Burke, C. S., Stagl, K. C., Klein, C., Goodwin, G. F., Salas, E., & Halpin, S. M. (2006). Does leadership in teams matter? A meta-analytic investigation of leadership behavior, team characteristics, and team performance. In F. P. Morgeson, & D. S. Derue (Eds.), *Team leaders: Who are they and what do they do. Symposium conducted at the 21st annual conference of the Society for Industrial and Organizational Psychology, Dallas, TX* May.
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*, 1189–1207.
Byrne, D. (1971). *The attraction paradigm.* Orlando, FL: Academic Press.
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, & Asso-ciates (Eds.), *Team effectiveness and decision making in organizations* (pp. 333–380). San Francisco: Jossey-Bass.
Cronbach, L. J., & Meehl, P. E. (1955). Construct validity. *Psychological Bulletin*, *52*, 281–302.
Cronin, M. A., & Weingart, L. R. (2007). Representational gaps, information processing, and conflict in functionally diverse teams. *Academy of Management Journal*, *32*, 761–773.
D'Abate, C. P., Eddy, E. R., & Tannenbaum, S. I. (2003). What's in a name? A literature-based approach to understanding mento9ring, coaching, and other constructs that describe developmental interactions. *Human Resource Development Review*, *2*, 360–384.
Dailey, R. C. (1977). The effects of cohesiveness and collaboration on work groups: A theoretical model. *Group & Organizational Studies*, *2*(4), 461–469.
D'Amour, D., Ferrada-Videla, M., Rodriguez, L. S. M., & Beaulieu, M. D. (2005). The conceptual basis for interprofessional collaboration: Core concepts and theoretical frameworks. *Journal of interprofessional care*, *1*(5), 116–131 "supplement".
Denise, L. (1999). Collaboration vs. c-three (cooperation, coordination, and communication). *Innovating*, *7*, 25–35.
Devine, D. J., & Kozlowski, S. W. J. (1995). Expertise and task characteristics in decision making. *Organizational Behavior and Human Decision Processes*, *64*, 294–306.
Dransfield, R. (2000). *Human resource management.* Oxford: Harcourt Heinemann.
Dyer, J. C. (1984). Team research and team training: State-of-the-art review. In F. A. Muckler (Ed.), *Human Factors Review* (pp. 285–323). Santa Monica, CA: Human Factors Society.
Gaertner, S. L., & Dovido, J. F. (1986). The aversive form of racism. In J. F. Dovido, & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 61–89). Orlando, FL: Academic Press.
Gaertner, S. L., & Dovido, J. F. (2000). *Reducing intergroup bias: The common ingroup identity model.* Philadelphia, PA: Psychology Press.
Gaertner, S. L., Mann, J., Murrell, A., & Dovido, J. F. (1989). Reducing intergroup bias: The benefits of recategorization. *Journal of Personality and Social Psychology*, *57*, 239–249.
Gallant, M. H., Beaulieu, M. C., & Carnevale, F. A. (2002). Partnership: An analysis of the concept within the nurse–client relationship. *Journal of Advanced Nursing*, *40*(2), 149–157.
Graham, J. R., & Barter, K. (1999). Collaboration: A social work practice method. *Families in Society*, 6–13.
Gray, B. (1985). Conditions facilitating interorganizational collaboration. *Human Relations*, *38*, 911–936.
Gray, B. (1989). *Collaborating: Finding common ground for multiparty problems.* San Francisco, CA: Jossey-Bass.
Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: Positive behavior in uncertain and interdependent contexts. *Academy of Management Journal*, *50*, 327–347.
Griffiths, A., & Zammuto, R. F. (2005). Institutional governance systems and variations in national competitive advantage: An integrative framework. *The Academy of Management Review*, *30*, 823–842.
Hackman, J. R. (1990). *Groups that work (and those that don't): Creating conditions for effective teamwork.* San Francisco, CA: Jossey-Bass.
Hackman, J. R. (2002). *Leading teams: Setting the stage for great performances.* Boston: Harvard Business School Press.
Hansen, M. T. (2009). *Collaboration: How leaders avoid the traps, create unity, and reap big results.* Boston, MA: Harvard Business Press.
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*, 1029–1045.
Henneman, E. A., Lee, J. L., & Cohen, J. I. (1995). Collaboration: A concept analysis. *Journal of Advanced Nursing*, *21*(1), 103–109.
Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processors. *Psychological Bulletin*, *121*, 43–64.
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*, 517–543.
Jennings, P. D., Cyr, D., & Moore, L. F. (1995). Human resource management on the Pacific Rim: An integration. In L. F. Moore, & P. D. Jennings (Eds.), *Human resource management on the Pacific Rim: Institutions, practices, and attitudes* (pp. 351–379). New York: DeGruyter.
Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology*, *89*, 755–768.
Kahn, K. B., & McDonough, E. F. (1997). An empirical study of the relationships among co-location, integration, performance, and satisfaction. *Journal of Product Innovation Management*, *14*, 161–178.
Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence.* New York: Wiley.
Kelly, M. J., Schaan, J., & Joncas, H. (2002). Managing alliance relationships: Key challenges in the early stages of collaboration. *R& D Management*, *32*(1), 11–22.

Kenis, P., & Knoke, D. (2002). How organizational field networks shape interorganizational tie-formation rates. *Academy of Management Review*, *27*, 275–293.
Keyton, J., Ford, D. J., & Smith, F. I. (2008). A mesolevel communicative model of collaboration. *Communication Theory*, *18*, 376–406.
Kozlowski, S. W. J., Gully, S. M., Nason, E. R., & Smith, E. M. (1999). Developing adaptive teams: A theory of compilation and performance across levels and time. In D. R. Ilgen, & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 240–292). San Francisco: Jossey-Bass.
Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein, & S. W. J. Kozlowski (Eds.), *Multilevel theory, research and methods in organizations: Foundations, extensions, and new directions* (pp. 3–90). San Francisco, CA: Jossey-Bass.
Kramer, R. M. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology*, *50*, 569–598.
Leinonen, P., Jarvela, S., & Hakkinen, P. (2005). Conceptualizing the awareness of collaboration: A qualitative study of a global virtual team. *Computer Supported Cooperative Work*, *14*, 301–322.
Lewis, L. K. (2006). Collaborative interaction: Review of communication scholarship and a research agenda. In C. S. Beck (Ed.), *Communication yearbook*, *Vol. 30*. (pp. 197–247). Mahwah, NJ: Erlbaum.
Liang, D. W., Moreland, R., & Argote, L. (1995). Group versus individual training and group performance: The mediating role of transactive memory. *Personality and Social Psychology*, *21*, 384–393.
Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice Hall.
Longoria, R. A. (2005). Is inter-organizational collaboration always a good thing? *Journal of Sociology and Social Welfare*, *32*(3), 123–138.
Lorenzet, S. J., Salas, E., & Tannenbaum, S. I. (2005). Benefiting from mistakes: The impact of guided errors on learning, performance, and self-efficacy. *Human Resource Development Quarterly*, *16*, 301–322.
Marks, M. A., DeChurch, L. A., Mathieu, J. E., Panzer, F. J., & Alonso, A. (2005). Teamwork in multiteam systems. *Journal of Applied Psychology*, *90*, 964–971.
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.
Marttiin, P., Lehto, J. A., & Nyman, G. (2002). Understanding and evaluating collaborative work in multi-site software projects – A framework proposal and preliminary results. *Proceedings of the 35th Hawaii Conference on System Sciences*.
Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E., & Cannon-Bowers, J. A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, *85*, 273–283.
Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997–2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, *34*, 410–476.
McGrath, J. E. (1984). *Groups: Interaction and performance.* Englewood Cliffs, NJ: Prentice Hall.
McGrath, J. E. (1991). Time, interaction, and performance (TIP): A theory of groups. *Small Group Research*, *22*, 147–174.
McLaughlin, C., & Ponte, P. (1997). The emotional aspects of cross-cultural collaboration: Assumptions and challenges. *Journal of In-Service Education*, *23*(1), 101–111.
Mickan, S., & Rodger, S. (2000). Characteristics of effective teams: A literature review. *Australian Health Review*, *23*(3), 201–208.
Moreland, R. L. (1999). Transactive memory: Learning who knows what in work groups and organizations. In L. Thompson, D. Messick, & J. Levine (Eds.), *Shared cognition in organizations: The management of knowledge* (pp. 3–31). Mahwah, NJ: Erlbaum.
Moreland, R. L., Argote, L., & Krishnan, R. (1998). Training people to do work in groups. In R. S. Tindale, & L. Heath (Eds.), *Theory and research on small groups: Social psychological applications to social issues* (pp. 37–60). New York: Plenum Press.
Moreland, R. L., & Myaskovsky, L. (2000). Exploring the performance benefits of group training: Transactive memory or improved communication? *Organizational Behavior and Human Decision Processes*, *82*, 117–133.
Morgeson, F. P., Lindoerfer, D., & Loring, D. J. (2010). Developing team leadership capability. In E. V. Velsor, C. D. McCauley, & M. N. Ruderman (Eds.), *The Center for Creative Leadership Handbook of Leadership Development* (pp. 285–312). New York: Jossey-Bass.
Mullen, P. B. (2000). A word of introduction: Collaborative research in context. *Journal of Folklore Research*, *37*, 119–122.
Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change.* Cambridge, MA: Belknap.
Organ, D. W. (1997). Organizational citizenship behavior: It's construct clean-up time. *Human Performance*, *10*, 85–97.
Pettigrew, T. F. (1998). Intergroup contact theory. *Annual Review of Psychology*, *49*, 65–85.
Pinto, M. B., Pinto, J. K., & Prescott, J. E. (1993). Antecedents and consequences of project team cross-functional cooperation. *Management Science*, *39*, 1281–1297.
Plummer, R., & Fennell, D. (2007). Exploring co-management theory: Prospects for sociobiology and reciprocal altruism. *Journal of Environmental Management*, *85*, 944–955.
Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management*, *26*, 513–563.
Postrel, S. (2002). Islands of shared knowledge: Specialization and mutual understanding in problem-solving teams. *Organization Science*, *13*, 303–320.
Pritchard, R. D., & Ashwood, E. L. (2008). *Managing motivation: A manager's guide to diagnosing and improving motivation.* New York: LEA/Psychology Press.
Rahim, M. A., & Magner, N. R. (1995). Confirmatory factor analysis of the styles of handling interpersonal conflict: First-order factor model and its invariance across groups. *Journal of Applied Psychology*, *80*, 122–132.
Roschelle, J., & Teasley, S. D. (1995). The construction of shared knowledge in collaborative problem solving. In C. E. O'Malley (Ed.), *Computer-supportive collaborative learning* (pp. 169–197). Berlin: Springer.
Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *The Academy of Management Review*, *23*, 393–404.
Salas, E., Burke, C. S., & Cannon-Bowers, J. A. (2000). Teamwork: Emerging principles. *International Journal of Management Reviews*, *2*, 339–356.
Salas, E., & Cannon-Bowers, J. A. (2000). The anatomy of team training. In L. Tobias, & D. Fletcher (Eds.), *Handbook on research in training* (pp. 312–335). New York: Macmillan Reference.
Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there "big five" in teamwork? *Small Group Research*, *36*(5), 555–599.
Sawyer, R. K. (2007). *Group genius: The creative power of collaboration.* New York, NY: Basic Books.
Schein, E. H. (1992). *Organizational culture and leadership* (2nd Ed). San Francisco: Jossey-Bass.
Schmidt, K. (1991). Cooperative work: A conceptual framework. In J. Rasmussen, B. Brehmer, & J. Leplat (Eds.), *Distributed decision making: Cognitive models for cooperative work* (pp. 75–110). New York: Wiley.
Schrage, M. (1990). *Shared minds: The new technologies of collaboration.* New York, NY: Random House.
Schuler, R. S., & Jackson, S. E. (2005). *Managing human resources through strategic partnerships.* Mason, OH: South Western Publishing Company.
Selin, S., & Chavez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental Management*, *19*(2), 189–195.
Sherif, M., Harvey, O. J., White, B. J., Hood, W. R., & Sherif, C. W. (1961). *Intergroup cooperation and competition: The robbers cave experiment.* Norman, OK: University Book Exchange.
Sigmund, K. (2007). Punish or perish? Retaliation and collaboration among humans. *TRENDS in Ecology and Evolution*, *22*(11), 593–600.
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*, 303–327.
Sternberg, R. J., & Frensch, P. A. (1992). On being an expert: A cost–benefit analysis. In R. Hoffman (Ed.), *The psychology of expertise: Cognitive research and empirical AI.* New York: Springer Verlag.
Sundaramurthy, C., & Lewis, M. (2003). Control and collaboration: Paradoxes of governance. *Academy of Management Review*, *28*, 397–415.
Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, & S. Worchel (Eds.), *The social psychology of intergroup relations.* Monterey, CA: Brooks-Cole.
Teece, D. J., & Sherry, E. F. (2002). Standards setting and antitrust. *Minnesota Legal Review*, *87*, 1913.

Thomson, A. M. (2001). Collaboration: Meaning and measurement. Ph.D. diss., Bloomington: Indiana University.
Thomson, A. M., & Perry, J. L. (1998). Can AmeriCorps build communities? *Nonprofit and Voluntary Sector Quarterly*, *27*, 399–420.
Thomson, A. M., Perry, J. L., & Miller, T. K. (2009). Conceptualizing and measuring collaboration. *Journal of Public Administration Research and Theory*, *19*, 23–56.
Tjosvold, D. (1984). Cooperation theory and organizations. *Human Relations*, *37*, 743–767.
Towers Perrin (2003). *Working today: Understanding what drives employee engagement*. The 2003 Towers Perrin Talent Report. http://www.towersperrin.com/tp/getwebcachedoc?webc=hrs/usa/2003/200309/talent_2003.pdf Accessed July 16, 2010.
Tucker, J. B. (1991). Partners and rivals: A model of international collaboration in advanced technology. *International Organization*, *45*, 83–120.
Van de Ven, A. H., Delbacq, A. L., & Koenig, R., Jr. (1976). Determinants of coordination modes within organizations. *American Sociological Review*, *41*, 322–338.
Van Dyne, L., & LePine, J. A. (1998). Helping and voice extra-role behaviors: Evidence of construct and predictive validity. *Academy of Management Journal*, *41*, 108–119.
Van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology*, *58*, 515–541.
Wageman, R. (1995). Interdependence and group effectiveness. *Administrative Science Quarterly*, *40*, 145–180.
Wageman, R. (1997). Critical success factors for creating superb self-managing teams. *Organizational Dynamics*, *26*, 49–61.
Wegner, D. M. (1987). Transactive memory: A contemporary analysis of the group mind. In B. Mullen, & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 185–205). New York: Springer–Verlag.
Wegner, D. M. (1995). A computer network model of human transactive memory. *Social Cognition*, *13*, 319–339.
Whetton, D. A. (1989). What constitutes a theoretical contribution? *Academy of Management Review*, *14*, 490–495.
Wilson, J. M., Goodman, P. S., & Cronin, M. A. (2007). Group learning. *Academy of Management Review*, *32*, 1041–1059.
Winer, M., & Ray, K. (1994). *Collaboration handbook: Creating sustaining, and enjoying the journey*. Saint Paul, MN: Amherst H. Wilder Foundation.
Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *Journal of Applied Behavioral Science*, *27*(2), 139–162.
Yukl, G. (2006). *Leadership in Organizations (2nd* (custom ed.). Upper Saddle River, NJ: Prentice-Hall.
Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *The Leadership Quarterly*, *12*, 451–483.