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Functional Leadership in Interteam Contexts:

Understanding ‘What’ in the Context of Why? Where? When? and Who?

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ABSTRACT

Research on team leadership has primarily focused on leadership processes targeted within teams, in support of team objectives. Yet, teams are open systems that interact with other teams to achieve proximal as well as distal goals. This review clarifies that defining ‘*what*’ constitutes functionally effective leadership in interteam contexts requires greater precision with regard to *where* (within teams, across teams) and *why* (team goals, system goals) leadership processes are enacted, as well as greater consideration of *when* and *among whom* leadership processes arise. We begin by synthesizing findings from empirical studies published over the past 30 years that shed light on questions of what, where, why, when, and who related to interteam leadership and end by providing three overarching recommendations for how research should proceed in order to provide a more comprehensive picture of leadership in interteam contexts.

Keywords. leadership; boundary spanning; group social capital; multiteam systems; intergroup relations

The use of teams¹ in organizations is ubiquitous (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017), and thus, a primary function of organizational leadership is to facilitate team success (Kozlowski, Mak, & Chao, 2016; Morgeson, DeRue & Karam, 2010). Prior research on team leadership has focused primarily on identifying functional (i.e., effective; McGrath, 1962) leadership processes and relationships *within* teams without considering the larger systems within which teams are embedded (c.f. Hogg, van Knippenberg, & Rast, 2012). However, no team is a ‘self-sufficient island’—teams must interact with and receive resources from their embedding environments in order to succeed (Ancona, 1990; Arrow, McGrath, & Berdahl, 2000; Kozlowski & Klein, 2000). Indeed, formal as well as informal team leaders often engage in boundary management activities to support their teams, such as acquiring external resources, promoting team interests, or interpreting the embedding environment (Ancona, 1990; Yukl, 2012; Roby, 1961; Zaccaro, Rittman, & Marks, 2001), and leadership is also needed to influence collaborative efforts across interdependent systems comprised of multiple teams pursuing shared goals (Carter & DeChurch, 2014; Ernst & Chrobot-Mason, 2011a; Pittinsky & Simon, 2007; Mathieu, Marks, & Zaccaro, 2001; Zaccaro, Marks, & DeChurch, 2012).

Despite many calls for researchers to adopt an ‘external’ perspective to the study of team leadership by conceptualizing teams as “open systems entailing complex interactions with people beyond their borders” (Ancona, 1990, p. 335), research on leadership in *interteam contexts* is relatively rare. For instance, studies based on the leadership theories that have received the most research attention in recent decades (i.e., Transformational Leadership Theory and Leader-Member Exchange Theory [LMX]; c.f. Dinh, Lord, Gardner, Meuser, Liden, & Hu, 2014),

¹ In this paper, the term “teams” is used interchangeably with the term “groups”. We acknowledge that there are often important distinctions between teams and groups in terms of the level of internal interdependence among members and the differentiation of members’ tasks (Kozlowski & Ilgen, 2006). However, in the context of organizations, the similarities between teams and work groups are more relevant to the content discussed (i.e., members of both work groups and teams interact, pursue shared goals, see each other as members of the same collective, and are seen by others as members of the same collective; Ancona, 1990).

typically investigate the role of *intragroup* leadership processes and relationships for individuals and small groups. These studies seldom consider how the multilayered interdependencies inherent to interteam situations (i.e., interdependencies within as well as between teams; Kirkman & Harris, 2017) coupled with differences in the priorities, identities, and capabilities of different teams need to be managed in order to minimize intergroup conflict and maximize positive outcomes for specific teams and the larger systems they operate within.

The relative lack of research attention paid toward leadership in interteam contexts is unfortunate given that such contexts present serious challenges and tensions for leaders that go beyond the demands of leadership within isolated teams. For instance, leaders operating in interteam contexts often face trade-offs and competing demands and may choose to promote intrateam relations and team goals at the expense of interteam relations and system goals, or vice versa (Pittinsky & Simon, 2007). Interteam contexts may also require that leaders facilitate appropriate patterns of interactions between interdependent teams (Cummings & Kiesler, 2005; Luciano, DeChurch, & Mathieu, 2018) while avoiding ‘over collaboration’ between teams which can result in inefficiencies, role overload and decreased motivation (Cross, Rebele, & Grant, 2016; Davison, Hollenbeck, Barnes, Slesman, & Ilgen, 2012; Marrone, Tesluk, & Carson, 2007). These tensions are not captured adequately by models of team leadership that focus primarily on leadership processes targeted within teams in support of team-level objectives.

We propose that defining ‘functional’ leadership becomes more complex when researchers shift from studying leadership within isolated teams to studying leadership in interteam contexts where teams are embedded in larger interdependent systems. As **Figure 1** illustrates, defining functional leadership in interteam contexts not only involves clarifying ‘*what*’ leaders are, or should be, doing (e.g., enacting specific leadership behaviors, facilitating

certain processes, relationships, and shared psychological states), ‘*who*’ is leading (e.g., formal leaders, formal leadership teams, informal leaders) and ‘*when*’ (i.e., under which circumstances), the multi-level nature of interteam contexts also demands more consideration of ‘*where*’ leadership processes are targeted (e.g., within teams, across team boundaries) and ‘*why*’ (e.g., to support team outcomes, to support system outcomes).

Using this framework to guide our review, we evaluate the degree to which empirical studies of leadership and/or the targets of leadership (e.g., interaction processes; psychological states) published over the past 30 years have addressed questions of *why*, *where*, *what*, *who*, and *when* related to leadership in interteam contexts. Although most leadership studies have taken an ‘internal’ perspective, several burgeoning streams of research in areas such as *group boundary spanning* (e.g., Ancona & Caldwell, 1990; Tushman & Scanlan, 1981), *group social capital* (e.g., Oh, Chung, & Labianca, 2004), *boundary spanning leadership* (e.g., Benoliel & Somech, 2015), *intergroup leadership* (Pittinsky & Simon, 2007), and *multiteam systems* (e.g., Mathieu et al., 2001; Zaccaro et al., 2012) are heeding calls to incorporate an external perspective by investigating leadership processes targeted across team boundaries. Indeed, our review reveals that researchers have provided many insightful answers to the five questions in Figure 1.

However, we also identified a number of limitations, assumptions, and divisions which pervade the extant literature on leadership in interteam contexts. Prior research has tended to progress in divergent directions, as evidenced by researchers’ use of different terminology (e.g., *intergroup leadership*; Pittinsky, 2009; *multiteam leadership*; Zaccaro & DeChurch, 2012), examination of different types of interteam interactions (e.g., *ambassadorial activities*; Ancona & Caldwell, 1992; *interteam coordination*; Davison et al., 2012), and focus on objectives at different collective levels of observation (e.g., *team-level*; Marrone et al., 2007; *system-level*;

DeChurch & Marks, 2006). Studies within disparate research streams are revealing different pieces of the larger puzzle of functional leadership in interteam contexts. Our review aims to bring these puzzle pieces together in order to provide a more comprehensive understanding of this important phenomenon. In closing, we offer three recommendations for how future integrative research might provide greater insight into how leaders (formal and informal) can navigate the tensions of interteam contexts and promote the success of *both* teams and the broader organizational systems teams operate within.

----- Insert Figure 1 Here -----

REVIEW APPROACH

The purpose of this review is to clarify the nature of functional leadership in interteam contexts, integrate and critically evaluate relevant findings from prior research, and identify promising areas for future inquiry. Broadly, leadership is defined as a “process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives” (Yukl, 2006, p. 8). Thus, leadership processes are situated in relation to specific individuals and/or collectives (*where is leadership targeted?*) and are enacted to facilitate specific objectives (*why is leadership enacted?*). As we depict in **Figure 2**, these two questions of *where* and *why* are useful for organizing studies of leadership processes in intergroup contexts into four categories.

As shown in the first quadrant (**Category 1**) of Figure 2, leadership processes might be targeted *within* teams (i.e., directly in relation to team members) in support of *team-level* objectives (e.g., team performance, viability, innovation). The vast majority of empirical studies of leadership fall within Category 1. Examples include studies of team leaders supporting team learning and adaptation (Edmondson, 1999; Kozlowski, Gully, McHugh, Salas, & Cannon-

Bowers, 1996; Wageman, 2001), shared team leadership and team performance (Zhu, Liao, Yam, & Johnson, 2018), the effects of transformational leaders on the effectiveness of individuals and teams (Jung, Yammarino & Lee, 2009), and the dynamic delegation of leadership responsibility within teams (Klein, Ziegert, Knight, & Xiao, 2006).

However, leadership processes targeted *across* team boundaries in support of team-level objectives (**Category 2**) as well as leadership processes targeted within (**Category 3**) and across (**Category 4**) team boundaries in support of *system-level* objectives are also critical to organizational success. Many scholars have emphasized that ‘*external*’ or ‘*cross-boundary*’ leadership behaviors that connect teams to entities and resources in their embedding environments represent a critical category of functional leadership behaviors for teams (Ancona & Caldwell, 1988; 1990; Balkundi & Harrison, 2006; Choi, 2002; Contractor et al., 2012; Elkins & Keller, 2003; Oh, Labianca, & Chung, 2006; Marrone, 2010; van Knippenberg, 2003; Yan & Louis, 1999; Yukl, 2012; Zaccaro et al., 2001). Further, many important objectives, including patient care (DiazGranados, Dow, Perry, & Palesis, 2014), disaster response (DeChurch, Burke, Shuffler, Lyons, Doty, & Salas, 2011), new product development (Marks & Luvison, 2012), and military operations (Davison et al., 2012), represent distal goals that require leadership processes to guide coordinated efforts within and across multiple teams (Mathieu et al., 2001).

----- Insert Figure 2 Here -----

Literature Search

We used the 2x2 framework shown in Figure 2 to guide our review of previous research on leadership in interteam contexts. In recent years, researchers have summarized studies of leadership processes targeted within teams in support of team objectives (Category 1) in multiple well-executed reviews of team leadership (e.g., Kozlowski et al., 2016; Mathieu et al., 2017;

Morgeson et al., 2010) and specific leadership theories (e.g., LMX; Martin, Guillaume, Thomas, Lee, & Epitropaki, 2016; Transformational Leadership; Banks, McCauley, Gardner, & Guler, 2016; Wang, Oh, Courtright, & Colbert, 2011; shared leadership within teams; Zhu et al., 2018). Therefore, we focused our review on studies falling within one or more of the *other* three categories shown in Figure 2.

The starting point for our literature search was 1990, corresponding with the appearance of articles calling for researchers to take an ‘external’ perspective to better understand the performance of teams (Ancona, 1990). To identify articles, we conducted a search across a variety of relevant online databases (Business Source Complete, ECONLit, E-Journals, Medline, PsycINFO, and Psychology and Behavioral Sciences Collection via the EBSCOhost research databases) for articles published between January 1990 and August 2019. We used this approach in order to ensure that we identified articles from a range of academic disciplines. We required that articles contain one or more of the following search terms in the abstract: inter-group or intergroup; inter-team or interteam; boundary spanning or boundary activity; multi-team or multiteam; and between team(s). Additionally, we manually searched the reference sections of key publications (e.g., review articles, meta-analyses, empirical papers with high citation rates) on the topics of teams, multiteam systems, boundary spanning, and intergroup relations in order to identify additional articles. We limited the results of our search to peer-reviewed academic journals published in English. Our initial search yielded 2,617 articles.

In the next step, we removed duplicate articles and conducted a *pre-screening process* of the articles’ titles and abstracts using the following inclusion criteria: (1) the research appeared to be an *empirical study* (i.e., qualitative/quantitative/mixed-methods); (2) the research investigated how *leaders* (formal and/or informal) (a) manage or engage in interaction processes across group

boundaries (excluding the boundary between employees and customers), (b) affect intergroup relations, and/or (c) facilitate superordinate (interteam/system-level) outcomes, and/or the research investigated processes or psychological states that could be *targets* of cross-boundary leadership for team goals (Category 2) or leadership in support of system goals (Categories 3 & 4); (3) the research was conducted within a workplace context or a laboratory simulation of a workplace context; (4) the research focused on variables at the individual-, team-, and/or system-level of analysis (but were not studies of entire firms); and (5) the publication outlet's impact factor was equal to or higher than 1.0 (based on the Journal Citation Reports, 2018). We chose this impact factor as an inclusion criterion to ensure that our review drew on studies that are generally representative of research in the field and met standardized criteria for research quality. Additionally, we excluded articles that did not consider outcomes at *collective* levels of analysis (e.g., studies showing that *individuals* who carry out boundary spanning activities gain personal benefits were excluded if they did not also discuss implications for collectives; e.g., Burt, 1992). Further, as the focus of this review is on cross-boundary leadership in the context of *work teams*, we followed the precedent of Hogg and colleagues (2012) and did not consider studies examining leadership across other demographic or social identity boundaries. This pre-screening process resulted in 407 articles of which 405 full texts were retrievable.

During the pre-screening process, we chose to err on the side of inclusion (based on information provided in the article title and abstract). In the final step of our process, the full text of each article was reviewed carefully by the authorship team to confirm its relevance to this review based on the inclusion criteria described previously. This vetting process resulted in a smaller subset of 160 articles. Table 1 provides a list of the journals and the numbers of articles within each journal included in our review. Notably, although many of the articles in this final

list did not reference ‘leadership’ explicitly, they highlighted intrateam or interteam processes, states, or other attributes that are potential targets of leadership in interteam contexts.

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Article Coding

The first four authors extracted and coded each of the 160 articles to identify the ways in which each article addressed the core elements of functional leadership in interteam contexts (*why? where? what? when? and who?*). We coded the answers to these five questions into emergent sets of categories (see Table 2 for category examples). As a quality check, every article was reviewed by at least two authors, and any inconsistencies were discussed until consensus was reached. We also identified characteristics of the research designs used in each study. As Table 3 summarizes, the majority of articles presented quantitative research (64%); among these was a predominance of quantitative field studies (53%), which were predominantly cross-sectional (87%) using samples of working adults (90%). Studies of leadership (or targets of leadership) for team goals were more likely to use quantitative (78%) rather than qualitative methods (12%), studies of leadership for system goals were more evenly split between quantitative (53%) and qualitative methods (39%). We were encouraged to see studies using experimental designs (still only 10% of the total studies reviewed here) and mixed method approaches (9%). Additionally, many studies incorporated best practices for addressing common-method bias including crisscross designs, temporal separation, and/or multi-source data (Podsakoff & Organ, 1986; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff, MacKenzie, & Podsakoff, 2012).

----- Insert Tables 2 and 3 Here -----

SYNTHESIS OF RESEARCH ON LEADERSHIP IN INTERTEAM CONTEXTS

Our review revealed that most empirical studies have answered the question of ‘why’ leadership is enacted (i.e., for what purpose), by emphasizing *one* of two levels of collective objectives: (1) leadership supports *team-level* objectives; or (2) leadership supports *system-level* objectives, with only a small subset of studies emphasizing both team- and system-level objectives simultaneously. We used the questions of ‘why’ and ‘where’ leadership occurs (internally-focused or cross-boundary) in interteam contexts to organize and synthesize findings from prior research (see online Appendix A² for key findings from each of the 160 articles). In the following sections, we clarify how the extant literature has addressed the remaining three questions needed to understand ‘functional’ leadership in interteam contexts (*what? when? and who?*) for each category.

Category 1: Internally-Focused Leadership for the Team

Although a comprehensive review of empirical studies focused solely on leadership targeted within teams in support of team objectives (Category 1) is beyond the scope of this review, we summarize and draw from Category 1 research in order to make comparisons between the ways in which researchers have addressed questions of ‘what,’ ‘when,’ and ‘who’ in Category 1 versus the other categories.

What? Identifying leadership processes targeted within groups has been a primary focus of leadership research for nearly a century. These studies typically leverage a functional perspective, arguing that team leadership is ‘effective’ if it ensures that all functions critical to task accomplishment and team maintenance are addressed (Fleishman et al., 1991; Hackman & Walton, 1986; McGrath, 1962; Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000).

² https://osf.io/ahtyf/?view_only=1d6d631439724d68ae63b1a6e5e562b3

Early influential studies organized leadership behaviors within groups into two broad categories: *task-oriented behaviors* such as planning, defining and clarifying objectives, problem-solving, and monitoring goal progress; and *person-oriented* behaviors such as showing concern for followers and expressing confidence in followers' abilities (e.g., Stogdill, 1948; 1974; Stogdill & Coons, 1957; Katz, Maccoby, Gurin, & Floor, 1951). Additionally, with the rise of theories such as Charismatic Leadership (House, 1977; Weber, 1947), researchers began to emphasize *change-oriented* leadership behaviors (Yukl, 2012), which are aimed at spurring and/or inspiring change within organizations.

The core idea that effective leadership within groups involves task-, person-, and change-oriented behaviors has continued to pervade more recent theories of leadership, such as Transformational/Transactional leadership theory (e.g., Bass, 1985; 1990; Bass & Avolio, 1993; 1994); Servant Leadership theory (Greenleaf, 1970; 1977); and relational theories, including LMX (Dansereau, Graen, & Haga, 1975; Graen, 1976; Graen & Cashman, 1975). For example, person- and change-oriented behaviors are central to a transformational leadership style (e.g., providing individualized consideration; articulating an inspiring vision for the future; Bass, 1985). Servant leaders are thought to engage in both person-oriented behaviors (e.g., demonstrate empathy, develop and empower followers) and task-oriented behaviors (e.g., problem-solving, decision-making) guided by a deep understanding of the organization's mission (Liden, Panaccio, Hu & Meuser, 2014). Graen and Uhl-Bien (1991) argue that leaders should nurture high-quality LMX relationships with followers characterized by trust, liking, and respect and offer followers opportunities to develop through task-related roles and responsibilities. Moreover, less effective leadership styles, such as Laissez Faire leadership (Bass & Avolio, 1993) or Abusive Supervision (Tepper 2000; 2007; Mackey, Frieder, Brees, & Martinko, 2017)

are often depicted as the absence and/or opposite of task-, person-, and/or change-oriented leadership behaviors (e.g., a lack of structure; hostile rather than positive relationships).

Within teams, research suggests that task-oriented leadership behaviors can initiate structure for the team by (for example) clarifying team task requirements, establishing reward contingencies, specifying procedures, and providing feedback on task progress. Both task- and person-oriented leadership can help team members work effectively by facilitating the interpersonal interactions, cognitive architectures, feelings, and attitudes associated with effective teamwork (Burke et al., 2006). Research on teams has also emphasized the importance of change-oriented leader behaviors that support team innovation, creative performance (Gil et al., 2005; Spreitzer, De Janasz & Quinn, 1999), and processes of collective transformation and learning (Kozlowski et al., 1996). For instance, leaders who leverage after-action reviews (Villado & Arthur, 2013), establish a psychologically safe team climate (Edmondson, 1999), and/or facilitate a shared understanding of the task and team environment (e.g., through various task-oriented and relational-oriented behaviors), can help teams better recognize and learn from prior mistakes and prepare for future challenges (Garvin, Edmondson & Gino, 2008).

Indeed, meta-analytic evidence has demonstrated that task-, person-, and change-oriented leadership processes are positively associated with a variety of organizational outcomes, including group performance (Burke et al., 2006; DeRue, Nahrgang, Wellman, & Humphrey, 2011; Judge, Piccolo, & Ilies, 2004). DeRue et al. (2011) showed that initiating structure (i.e., an aspect of task-oriented leadership) represented the strongest predictor of group performance whereas change-oriented behaviors (e.g., transformational leadership) and person-oriented behaviors (e.g., consideration) accounted for sizeable but lesser portions of the total variance.

When? Like many other areas of organizational scholarship (Gardner, Harris, Li, Kirkman, & Mathieu, 2017) as research on leadership within teams has matured, many leadership scholars have moved beyond simple categorization schemas of ‘what leaders do’ (e.g., task-, person-, change-oriented leadership) to specify critical boundary conditions or moderator variables that determine *when* leadership behaviors and/or relational processes within teams are more or less effective. For instance, classic theories, including Fiedler’s (1967) contingency theory and House’s (1971) path-goal theory proposed a variety of situational factors—both *internal* (e.g., group structure, task demands, team member attributes, state of relations between leader and team) as well as *external to the team* (e.g., turbulence, uncertainty, leader positional power)—that determine the effectiveness of leadership behaviors within groups. Recent empirical studies in Category 1 have echoed these core ideas by investigating a variety of internal moderators, including leader attributes (Hu & Judge, 2017), task demands (Farh & Chen, 2018), task interdependence (Aubé & Rousseau, 2005), virtuality (Purvanova & Bono, 2009), and team diversity (Salazar, Feitosa, & Salas, 2017), and external moderators, such as environmental uncertainty (Sung & Choi, 2012), organizational norms (Newell, David, & Chand, 2007), top management support (Hurt, 2016), and national culture (Salk & Brannen, 2000).

Researchers have also begun to emphasize the role of *time* as a key determinant of what constitutes ‘functional’ leadership for teams. For example, Kozlowski and colleagues (1996) conceptualized leadership as involving dual roles that can operate simultaneously: “(1) a *developmental role*, linked to the process of team evolution, and (2) a *task contingent role* that shifts its functional emphasis in response to the dynamics of team task cycles” (p. 262). Whereas the developmental role involves a longer-term process through which leaders help team members meld into a cohesive, culturally unique entity, the task contingent role is a more dynamic process

which involves developing team goals, strategies, and expectations during phases of low intensity or routine task conditions, and intervening during higher intensity, stressful phases. Morgeson et al. (2010) connected these ideas with Marks and colleagues' (2001) argument that teams cycle through repeating phases of 'transition' and 'action' to identify functional leadership behaviors corresponding to these two task phases. Morgeson and colleagues argue that during transition phases, leadership should help compose the team, define the mission, establish expectations, structure and plan tasks, train and develop the team, and provide sensemaking and feedback. During action phases, leadership should monitor the team's progress toward goals, manage team boundaries, challenge the team, perform the team task, solve problems, provide resources, encourage team self-management, and support a positive social climate.

Who? Lastly, the question of '*who is leading?*' (i.e., claiming and/or being granted leadership influence; DeRue & Ashford, 2010) has become increasingly relevant as organizations have embraced flatter decentralized and team-based work structures (Mathieu et al., 2017) where *informal* leaders and leadership processes often operate alongside or in the absence of *formal* leaders (Zaccaro, Heinen, Shuffler, Salas, Goodwin, & Burke, 2009). Indeed, although most studies of team leadership have focused on the role, actions, and relationships of formal leaders (e.g., team managers), researchers often depict leadership as a dynamic and emergent social process of influence, which can occur up, down, and across the organizational hierarchy (Carter, DeChurch, Braun, & Contractor, 2015; Cullen-Lester, & Yammarino, 2016; Day, Gronn, & Salas, 2004; Follet, 1924; Hollander, & Julian, 1969; Pearce & Conger, 2003). For example, a growing stream of research argues that there are benefits for teams who engage in *shared* forms of leadership – “a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or

organizational goals or both” (Pearce & Conger, 2003, p. 1). Meta-analyses have found that shared leadership is positively associated with teamwork processes and emergent psychological states, and accounts for unique variance in team performance beyond that accounted for by vertical (formal) leadership (D’Innocenzo, Mathieu, & Kukenberger, 2016; Nicolaides et al., 2014; Wang, Waldman, & Zhang, 2014).

Recently, several studies have suggested that identifying ‘who’ is doing ‘what’ ‘when’ (in terms of *time*) holds the potential to advance the understanding of functional leadership within teams substantially (e.g., Aime, Humphrey, DeRue, & Paul, 2014; Contractor, DeChurch, Carson, Carter, & Keegan, 2012). For example, Morgeson et al. (2010) posited that team leadership (during transition and/or action phases) might originate from *formal* and/or *informal* sources who reside *inside* or *outside* the team. Further, they proposed that different sources of leadership might be better suited to fulfill different leadership functions depending on the *phase* (transition/action) of team performance. For example, an external/formal leader may be best positioned to compose and monitor the team, establish expectations and goals, manage team boundaries, provide resources, and encourage self-management. In contrast, internal/informal leaders may be best suited to structure, plan, and perform the team task, solve problems, and support the social climate. Some activities, like providing feedback can be effectively fulfilled by all sources of leadership. Although these propositions have yet to be fully tested, they suggest many interesting lines of inquiry for future research.

Category 2: Cross-boundary Leadership for the Team

We identified 73 articles investigating cross-boundary leadership processes enacted in support of *team* objectives (Category 2). A subset of these articles discussed leaders, managers, and/or leadership processes explicitly ($n = 17$ articles). These studies convincingly demonstrate

that (formal) leaders often play an active role in managing interaction processes and relationships with external entities. However, the majority of articles (76%) did not invoke the notion of leadership explicitly, but rather, identified cross-boundary interaction processes, states, and/or interventions that could be targets of leadership in interteam contexts (and/or enacted by informal leaders). In combination, Category 2 studies help clarify *what* cross-boundary leadership processes are relevant to team outcomes, point to important boundary conditions for cross-boundary leadership (*when*), and begin to identify the ways in which responsibility for cross-boundary leadership might be distributed across different people (*who*).

What? The literature on ‘boundary spanning’ has provided substantial insight into *what* ‘external’ team activities might constitute cross-boundary leadership processes and/or might serve as targets of leadership in interteam contexts (Ancona, 1990; Joshi, Pandey, & Han, 2009; Marrone, 2010). In particular, Ancona and Caldwell’s seminal program of research (1988; 1990; 1992a; 1992b) identified several broad categories of external functions that link a group to its external environment, with the external environment referring to “actors or other teams residing within or outside of the boundary spanning team’s host organization” (Marrone, 2010, p. 914). *Scouting* activities—what Marrone (2010) refers to as ‘*information search*’—include collecting information and resources from relevant outside parties, constructing a mental model of the external environment (e.g., who does/does not support the team), and seeking feedback from members of other groups. *Ambassadorial* activities (or ‘*representational activities*’ in Marrone, 2010) reflect attempts to: open up lines of communication with other groups (even without a specific purpose), inform others about the team’s progress, negotiate and coordinate details of intergroup interactions (e.g., establishing give-and-take in intergroup exchanges), advocate for team needs (e.g., to those with greater power), and influence or ‘mold’ the external environment

to suit the team's agenda. *Guarding or sentry* activities involve managing (e.g., delaying, delivering, denying) the flow of information and resources *from* the group to external entities and protecting the team's boundary by selectively allowing information to *enter* the team. Lastly, *task coordinator* activities involve synchronizing work efforts with other teams and monitoring joint progress and strategy toward the accomplishment of shared goals.

Although researchers have referred to external team activities in different ways and have offered different categorization schemes (e.g., compare Faraj & Yan, 2009; Somech & Khalaili, 2014; Marrone, 2010; Joshi et al., 2009; Ancona & Caldwell, 1998; 1992a), there is a clear consensus across prior research about the *relevance* of external activities for team outcomes (Ancona & Caldwell, 1992; Marrone, 2010). External activities can have direct effects on team outcomes by acting as conduits for information and resources that enable effectiveness and innovation (Ancona, 1993; Ancona & Caldwell, 1992; Choi, 2002; Marrone, 2010). For example, many studies have demonstrated positive relationships between external activities that support the acquisition of information, expertise, and resources with outcomes such as team creativity and innovation (e.g., Andersen & Kragh, 2015; Büchel, Nieminen, Armbruster-Domeyer, & Denison, 2013; Tippmann, Scott, & Parker, 2017). External activities can also have *indirect* effects on team outcomes by impacting processes and psychological states within teams (see Figure 1). For instance, Henttonen, Johanson, and Janhonen (2014) found that team identity strength mediates the relationships between both bonding (i.e., within teams) and bridging (i.e., with external entities) social network ties and team performance. They argue that whereas bonding ties support team identity by enabling similar attitudes and perceptions (and hence liking) within teams, bridging ties support team identity by offering team members information about 'outgroups' and thereby afford more elaborated intergroup social comparisons.

Notably, cross-boundary processes are not always *beneficial* for all team outcomes. For example, Ancona (1990) distinguished different ‘types’ of teams based on the degree to which they leveraged cross-boundary processes. ‘Informing’ teams remained isolated until they were ready to inform outsiders of their progress; ‘parading’ teams emphasized team building and achieving visibility while passively observing other teams; and ‘probing’ teams actively engaged outsiders, revised their knowledge through external contacts, initiated programs with outsiders, and promoted their teams’ achievements within their organizations. Although ‘probing’ teams were rated as the highest performers, these teams also suffered *short-term* decrements in member satisfaction and team cohesion. Other studies have shown that cross-boundary processes can have negative implications for team performance. For instance, in a study of the communication networks of 31 interdisciplinary hospital teams, Grippa and colleagues (2018) found that more effective teams were more inwardly focused and less connected to outside members as compared to less effective teams. Similarly, a study of inter-university project teams found that the degree to which team leaders and team members bridged structural holes (i.e., connected disconnected others; Burt, 1992) was negatively associated with team performance (Susskind, Odom-Reed, & Viccari, 2011). Indeed, promoting an external focus and encouraging team members to engage in cross-boundary processes may deplete limited resources (Choi, 2002), distract attention from critical internal processes, and ultimately diminish the cohesiveness of the team (Oh et al., 2006).

In fact, there is growing consensus that there are *trade-offs* inherent to cross-boundary processes for teams, and thus, functional leadership involves helping teams strike an appropriate balance of internal and cross-boundary interactions and team permeability. On the one hand, when team boundaries are *highly* permeable, team cohesiveness and coordination are likely to suffer. Effective team functioning may depend on members differentiating themselves as a

coherent unit, separate from the broader environment, by establishing a workspace, rules for operating, and goals specific to the team (Choi, 2002; Sundstrom, DeMeuse, & Futrell, 1990). Actions by leaders that *reinforce* team boundaries and affirm teams' unique identities can decrease the likelihood that members will experience identity threat when they interact with other teams (Connaughton, Williams, & Shuffler, 2012; Ernst & Chrobot-Mason, 2011a; Hogg et al., 2012). On the other hand, if team boundaries are not *sufficiently* permeable, teams can experience isolation and may not benefit from the knowledge and expertise of other teams. For instance, several studies we reviewed referenced the '*not-invented-here*' syndrome (Katz & Allen, 1982), which refers to a tendency for teams who have had success in the *past* to become insular, believe they have a monopoly on the field, and thus, reject new ideas and influence from outside sources. The not-invented-here syndrome can be a major barrier to the inflow of new knowledge and thus, can stifle continued team learning and creative performance (Chen & Wang, 2008). Therefore, leadership is needed to manage the permeability of team boundaries by both protecting and insulating teams from negative outside influences and additionally, by allowing resources and information to flow both into and out of the team as required by team task demands (e.g., Benoliel & Somech, 2015).

Indeed, the extant literature emphasizes that leaders and leadership processes play a primary role in managing (or enacting) external team activities. Leaders can support their teams by assuming responsibility for external activities. In this case, the external activities constitute 'external' or 'cross-boundary' leadership processes. For example, Takanashi and Lee (2019) found that leaders of research and development (R&D) teams who engaged in boundary spanning behaviors were better able to mobilize external resources and enable their teams to achieve greater commercial success. The importance of leaders' participation in external

activities is further supported by meta-analytic evidence showing that higher performing teams tend to have leaders who are well-connected in social networks, both internal and external to the team (Balkundi & Harrison, 2006) and studies showing that projects led by formal leaders who actively engage in external project championing receive more support from the organization and are more successful (Markham, Green, & Basu, 1991; Waldman & Atwater, 1994). Evidence also suggests that leaders who have strong network ties can gather political support and scan for ideas, and team leaders with many structural holes in their networks (i.e., indicating brokerage between contacts who are not connected to one another; Burt, 1992) tend to be better able to protect their teams from outside interference (Brion, Chauvet, Chollet, & Mothe, 2012).

Leadership processes can also help set up conditions *within* teams that facilitate connections between team members and outsiders. Research shows that leaders influence the strategies teams use to interact with their environments, and in turn, differences in teams' strategies help explain outcomes such as team performance and team member satisfaction (Ancona, 1990). Edmondson (2003) showed that effective team leaders not only use their positional status to reach out to other high-status individuals in the organization (i.e., span the team boundary), they also encourage team members to engage in boundary-spanning behaviors themselves by signaling the desirability of an external focus. Research has also shown that *empowering* (Chuang, Jackson, & Jiang, 2016) and *charismatic* (Knipfer, Schreiner, Schmid, & Peus, 2018) leadership behaviors within teams are linked to team external knowledge acquisition and the overall amount of team boundary-spanning behavior, respectively. Similarly, Cha, Kim, Lee, and Bachrach (2015) showed that teams with transformational leaders had higher internal teamwork quality and were perceived as more collaborative by members of *other* teams, suggesting cross-boundary processes may be smoother for teams with transformational leaders.

Researchers have also identified a number of interventions leaders might use to increase teams' engagement in cross-boundary processes. For example, Chuang et al. (2016) examined the effect of human resource management (HRM) systems in a sample of R&D teams. They find that when HRM systems support knowledge intensive teamwork, R&D teams have higher levels of external knowledge acquisition and internal knowledge sharing, and these effects are strongest when knowledge is less tacit and in the absence of 'empowering' leaders. Foss and Rogers (2011) showed that assigning managers to cross-unit initiatives was associated positively with their ability to use new information from other units. Further, studies in Category 2 have identified attributes at both individual- and team-levels that might be targets of leadership influence, such as individuals' task experience (Dahl & Pedersen, 2005), depth of functional expertise (de Vries, Walter, Van der Vegt, & Essens, 2014), and focus on goals with a 'global impact' (Pedersen, Soda, & Stea, 2019), and team's functional diversity (Ancona & Caldwell, 1992b), interdependence (Benoliel & Somech, 2015) and climate (Shin, Kim, & Hur, 2019).

When? With the awareness that cross-boundary processes can have positive, negative, null, and/or mixed effects on team outcomes, researchers are seeking to better understand the boundary-conditions or moderators that determine *when* cross-boundary interactions are most beneficial for teams. Paralleling research on leadership within teams (Category 1) studies in Category 2 have suggested that aspects of both the *internal* team environment and the broader *embedding* environment can determine the effectiveness of cross-boundary processes for teams. These studies are beginning to uncover how leaders might 'strike the right balance' by capitalizing on the benefits of cross-boundary processes for teams while mitigating the costs.

With regard to the *internal* state of the team, some researchers have considered how team properties, such as team task demands, or the levels of task interdependence determine the

necessity of cross-boundary interactions. For example, Chung and Jackson (2013) found that the relationship between external work relationships on team performance depends on the *routineness* of the tasks that are performed. When teams performed higher novelty tasks, the density of *both* internal and external networks were predictive of team performance; whereas performance on highly routine tasks did not benefit from dense external network connections.

The internal psychological state of the team can also determine the effectiveness of cross-boundary processes. For instance, psychological properties associated with the ‘not-invented-here’ syndrome can reduce the effectiveness of cross-boundary processes by leading teams to discount the influence and ideas offered by outsiders. In support of this argument, Carbonell and Rodríguez Escudero (2019) found the level of team *cohesion* moderated the effect of boundary spanning such that boundary spanning was less beneficial for highly cohesive teams. Likewise, Dokko, Kane, and Tortoriello (2014) showed that R&D teams with strong *team identification* are less able to recombine knowledge from the external environment and generate creative ideas. In contrast, strong identification with an overarching superordinate group (e.g., a division) enhanced team creative generativity. Suggesting that the relationship between internal team psychological states and the benefits of cross-boundary processes is complex and non-linear, Bullinger, Neyer, Rass, and Moeslein (2010) showed that in a competitive environment, teams with *either* very high or very low orientations towards cooperation with other teams (but not moderate) were most innovative.

In contrast to Category 1, very few Category 2 studies have considered how the *timing* of cross-boundary processes might impact their utility. Ancona and Caldwell (1990) found that ambassadorial activities appeared to be most relevant during the creation and diffusion phases of a team project. They suggest that a strategy that works early in the life of a group may not

support positive performance over time. Yet, the vast majority of studies we reviewed did not consider the types of temporal elements (e.g., phase of team performance, current task demands, developmental stage, team history) that have been the focus of recent leadership within teams (e.g., Aime et al., 2014; Kozlowski et al., 1996; Morgeson et al., 2010).

The nature of a team's external environment can also shape the effectiveness of cross-boundary processes for teams. For example, Faraj and Yan (2009) found that under organizational conditions of high resource scarcity and task uncertainty, teams engaged in *increased* boundary activities—such as spanning, buffering, and reinforcing—in order to secure resources and develop psychological safety amongst team members. In another socio-structural study, Gleibs and Haslam (2016) found that team members' willingness to support a leader's strategy for intergroup relations was dependent upon the current social context (i.e., social relations), and the team's status. When social relations were unstable, low status groups were more likely to support competitive leaders, but high-status groups were more likely to support cooperative leaders. Their findings underscore that leader effectiveness is contingent upon the social environment surrounding the team, as this alters how leaders are perceived internally.

Who? An equally important factor influencing the effectiveness of cross-boundary leadership may be *who* is assuming (or is granted) responsibility for cross-boundary leadership. Empirical research supports the active role that formal leaders play in cross-boundary leadership by directly engaging in cross-boundary activities on behalf of their team (e.g., Ancona, 1990; Liu, Schuler, & Zhang, 2013; Prysor & Henley, 2018). For example, Ancona and Caldwell (1990) found that leaders engaged more frequently in ambassadorial, scouting, coordinating, and guarding activities than other members of the team. Further, Hirst and Mann (2004) showed that

boundary spanning behaviors performed by formal leaders had a *stronger* relationship with team performance than those performed by team members.

However, a number of other studies have suggested benefits of distributing responsibility for boundary spanning across multiple members of the team (Ancona, Bresman, & Kaeufer, 2002; Contractor et al., 2012; Elkins & Keller, 2003). Marrone et al. (2007) demonstrated that teams are more effective when *more* team members are engaged in boundary spanning. The authors posit that the presence of multiple boundary spanners may reduce the demands placed on individual team members, increase the amount of resources brought into the team, reduce task uncertainty, and improve team member mental models regarding the external environment. Likewise, Ferguson and Blackman (2019) found that boundary spanning was related to team cohesion and performance in top management teams and this relationship was magnified as an increasing number of team members—aside from the CEO—participated in boundary spanning activities. Currently, however, both the extent to which formal versus informal leaders should engage in cross-boundary leadership and the extent to which ‘boundary-spanning’ behaviors reflect the phenomenon of ‘leadership’ remain poorly understood.

The effectiveness of teams’ external activities may also depend on the specific *patterns* of relationships that leaders (formal/informal) have with people in the external environment (Balkundi & Harrison, 2006; Tushman & Scanlan, 1981). For example, Büchel and colleagues (2013) found that new product development teams were most innovative when team members had trusting relationships with external ‘project champions,’ and broad (nonredundant) knowledge relationships. Oh et al. (2004) advanced the concept of *group social capital* in order to explain the importance of patterns of cross-boundary connections for team performance. Their results suggest that groups were most effective when group members had a moderate level of

internal informal socializing relationships and a large number of ties to the leaders of other teams. Continuing this line of inquiry may prove invaluable to understanding the patterns of cross-boundary leadership relationships that promote team functioning.

Categories 3 and 4: Internally-focused and Cross-boundary Leadership for the System

In contrast to most studies within Category 1, studies of leadership in support of system goals rarely investigated and/or theorized about leadership (or targets of leadership) processes targeted *within* teams (Category 3) without *also* considering how these processes impact cross-boundary processes or states (Category 4). Therefore, reflecting the literature, we present findings from Categories 3 and 4 within a single section. We identified 86 articles that emphasized the achievement of superordinate *system-level* objectives requiring interdependent interactions across *multiple* teams. Thirty of these articles (35%) discussed leaders or leadership processes explicitly, and a small subset ($n = 7$ articles) evaluated both team- and system-level objectives simultaneously. Scholars have long recognized the importance of collaboration across multiple groups (e.g., teams, organizational units) for organizational success (Blake, Shepard, & Mouton, 1964; Brett & Rognes, 1986; Thompson, 1967). However, the majority (72%) of the studies we identified that focused on system-level objectives were published during the last decade, suggesting an increasing interest in the drivers and outcomes of interteam collaboration in interdependent systems.

What? Three separate, but conceptually related, areas of research have emerged over the past two decades which clarify *what* leaders and leadership processes need to accomplish in order to support superordinate goals. The first two areas, which we refer to as ‘*intergroup leadership*’ research (Pittinsky & Simon, 2007; Pittinsky, 2009; Hogg et al., 2012) and ‘*boundary spanning leadership*’ research (Ernst & Chrobot-Mason, 2011a), respectively, have

origins within social psychological theories of intergroup relations (Tajfel & Turner, 1979; Turner, 1985). These two domains focus explicitly on leaders and leadership processes in intergroup contexts and highlight the psychological challenges leaders are likely to face when leading multiple differentiated groups (e.g., identity threat, anxieties, misaligned goals, questions regarding the leaders' priorities and loyalties). The third area, '*multiteam system functioning*' (Mathieu et al., 2001; Shuffler, Jiménez-Rodríguez, & Kramer, 2015; Zaccaro et al., 2012), has its origins within industrial/organizational psychology and organizational behavior and draws heavily from theories of team functioning (Hackman & Morris, 1975; McGrath, 1964) and organizational design (e.g., Thompson, 1967). Although leadership is not always the primary focus of multiteam system research, most multiteam system studies explicitly or implicitly investigate leadership (in the functional sense) as a factor contributing to system functioning.

Studies of intergroup leadership, boundary spanning leadership, and multiteam systems all have in common an emphasis on conveying the *difficulties* associated with facilitating collaboration in interdependent systems comprised of multiple groups or teams. It is not uncommon for teams to succeed individually but fail collectively as a system due to critical misalignment and collaboration problems between teams (Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005). Indeed, numerous studies began by highlighting interteam collaboration challenges. One recurring theme reflects the challenges associated with collaboration across teams with very *different* characteristics (e.g., geographic locations, norms, goals, priorities, areas of expertise; Luciano et al., 2018). For example, Alter (1990) found that functional differentiation between teams in an interorganizational service delivery context created conflict and inhibited coordination. Likewise, Gerber et al. (2016) illustrated how clinical research systems struggled to coordinate due to a lack of collective identity, low cohesion, and differing

goals between teams which ultimately bred competition. Similarly, in a study of university-firm R&D teams, Takanashi and Lee (2019), found that teams struggled to overcome differences in culture, goals, and values, resulting in tensions that constructed barriers to collaboration.

Many studies also highlighted collaboration difficulties associated with *change* either within the system or external to the system. For example, in a study of multi-agency emergency management systems, Curnin, Owen, and Trist (2014) described how dynamics inherent to the operating environment placed demands on teams to share information and make decisions quickly, hindering collaboration. Problems associated with dynamism have also been observed during crisis response as emergency medical services and emergency department teams must coordinate their efforts in a rapidly changing environment. Accordingly, Reddy and colleagues (2009) highlight how environmental dynamism in emergency response can make it difficult for geographically distributed teams to provide context during their between-team communications, negatively impacting system-wide collaboration. Likewise, Taneva, Grote, Easty, and Plattner (2010), found that one of the most common causes of breakdowns in perioperative patient care was interteam coordination failures stemming from rapidly changing environments.

Luciano and colleagues (2018) theorize that the *reason* why differences between teams and excessive dynamism (e.g., uncertainty, fluidity, change) make interteam collaboration challenging is that these forces enhance the boundaries between teams and cause disruptions for system functioning. In turn, strong team boundaries and system disruptions can lead constituent members to orient their interactions toward fellow teammates and away from members of other teams, thus limiting the development of the *interteam* behavioral processes (e.g., coordination) and affective/motivational and cognitive psychological states (e.g., psychological safety, shared mental models) needed to achieve shared goals. However, as Luciano et al. emphasize, “this is

not to suggest that low differentiation is the solution” (p. 1087). The differences between teams and the dynamic nature of complex environments are often the very reason multiteam systems are established in the first place. Thus, leadership and other boundary-related coordination mechanisms (i.e., potential targets of leadership) are needed in order to manage behavioral processes and psychological states within and across teams. Echoing Luciano and colleagues’ argument that differences between teams should not be minimized, but instead, should be encouraged, Lanaj, Foulk, and Hollenbeck (2018) found that multiteam systems perform most effectively when lower level component teams hold different preferences for risk-taking from their formal leadership teams. When component teams are allowed to hold and express differences in opinion from formal leaders the system may be more likely to learn and evaluate ideas during interteam communication and less likely to fall prey to ‘groupthink’ (Janis, 1971).

Interteam states and processes as targets of leadership. Paralleling research on leadership within teams in support of team objectives (Category 1) many of the studies we reviewed in Categories 3 and 4 highlighted behavioral processes and psychological states within, and especially across, component team boundaries as key targets of leadership influence. For example, a few articles explored how ‘boundary spanning’ activities, defined broadly, are relevant to system objectives. Floyd and Wooldrige (1997) found that middle managers’ boundary spanning was related to their own strategic influence as well as the performance of the system as a whole. Glaser, Fourné, and Elfring (2015) highlight how overlapping boundary spanning ties between middle managers and top management team members facilitates innovation across a multi-group business unit. Further, in a study of innovation in science and technology parks, Corsaro, Ramos, Henneberg, and Naudé (2012) illustrate how boundary spanning drives resource transfer in interorganizational collaboration, supporting innovation.

Several studies emphasized the importance of interteam communication quality and quantity to system performance. For instance, Arnett and Wittmann (2014) found that communication quality was positively associated with knowledge exchange between groups. Kratzer, Gemünden, and Lettl (2008) examined the quantity of informal communication between teams. Interestingly, they found that there was an *inverted U-shaped* relationship between informal interteam communication and the creativity of multi-team R&D projects. The authors posit that although frequent interteam communication may lead to improved transfer of information, extremely high levels of interteam communication may prove to be a distraction, reducing individual autonomy and creativity, as well as overall efficiency.

However, the majority of studies in Categories 3 and 4 depict *interteam coordination* (i.e., synchronization of actions across teams; Marks et al., 2005) as the most critical behavioral process associated with system outcomes, particularly within research on multiteam systems. Moreover, research on multiteam systems emphasizes that *leaders* and leadership processes play a primary role in facilitating interteam coordination. The majority of studies of leadership in multiteam system contexts have investigated leadership originating from a *formal leadership team* (i.e., an ‘integration’ team) that is situated hierarchically above other component teams.

For example, DeChurch and Marks’ (2006) experimental study showed that training formal leadership teams on how to develop strategy as well as monitor and communicate information related to the multiteam task across teams fostered interteam coordination and system performance. Using the same simulation, Murase, Carter, DeChurch, and Marks (2014), demonstrated that the development of system-wide shared mental models about interteam coordination is a key mechanism linking leadership teams’ communication about strategy to interteam coordination and performance. Bick, Spohrer, Hoda, Scheerer, and Heinzl (2018) also

discuss the importance of shared mental models in multiteam contexts. The authors found that team processes such as planning led to mental model convergence and a lack of similar mental models prohibited effective coordination between teams. Findings from Firth, Hollenbeck, Miles, Ilgen, and Barnes (2015) also emphasize the importance of shared mental models across teams. Their work showed that frame-of-reference training (i.e., training that reduced inconsistencies across teams regarding how shared problems are conceptualized) benefited within-team coordination, between-team coordination and multiteam system performance.

Formal leadership teams (or other formal boundary spanning mechanisms) are thought to be particularly critical in multiteam system contexts given the large size and complex processing demands of these systems (Davison et al., 2012). Indeed, Davison and colleagues demonstrated that unbridled coordination through mutual adjustment (operationalized as attending to the same element of a simulation at the same time) between lower level component teams was negatively associated with system performance. However, mutual adjustment processes between formal boundary spanners and leadership team members benefited system performance. Similarly, a study by de Vries, Hollenbeck, Davison, Walter, and van der Vegt (2016) demonstrated that intrapersonal functional diversity (i.e., breadth of intraindividual knowledge) facilitates horizontal coordination but inhibits aspirational behavior. However, this effect is moderated by vertical coordination, such that the negative effects of intrapersonal functional diversity are not realized in the presence of vertical coordination between component teams and the formal leadership team. Lanaj, Hollenbeck, Ilgen, Barnes, and Harmon (2013) also found that decentralized planning structures (i.e., where plans are developed within lower level component teams first before being passed to the leadership team) had some benefit for system performance

attributable to enhanced proactivity and aspiration levels, but also resulted in an overall negative effect attributable to risk taking and coordination failures.

In addition to behavioral processes and shared cognitions, many of the studies we reviewed emphasized the need for leadership processes to relieve *affective* and/or *motivational* barriers associated with interteam collaboration. For example, intergroup leadership theory (Pittinski & Simon, 2007) suggests that leaders need to be mindful of the anxieties group members may experience when working with other groups and emphasizes that intergroup collaboration can threaten the distinctiveness of group identities and/or lead group members to feel that the value of their own group's identity is diminished (Hewstone & Brown, 1986). Pittinsky and Simon proposed that leaders may improve intergroup relations by encouraging contact between members of different groups, managing resources and interdependencies to reduce or prevent competition and conflict, promoting shared 'superordinate identities' as well as 'dual identities' to meet members' needs for distinctiveness and belonging, and fostering positive intergroup attitudes.

Several studies provide support for this idea. Richter, West, van Dick, and Dawson (2006) demonstrated that the relationship between group identity and effective intergroup relations was positive at high levels of system identification but not at low levels. Likewise, Gumusluoglu, Karakitapoğlu-Aygün, and Scandura (2017), found that benevolent leaders fostered team identification to the benefit of team innovative behavior, and simultaneously, fostered a cross-team identity positively influencing interteam innovative behavior. Cuijpers, Uitdewilligen, and Guenter (2016) further illustrated that system identity was more important for multiteam system processes and performance than team identity. Similarly, Porck et al. (2018) showed that organizational identification supported intergroup strategic consensus whereas team

identification can overpower it. In contrast, Porck et al. (2019) argued that superordinate identification develops feelings of uncertainty that deplete team members' cognitive resources. Supporting their hypotheses they find (using the same laboratory simulation context as several other multiteam system studies; e.g., Davison et al., 2012; Firth, Hollenbeck, Miles, Ilgen, & Barnes, 2015; Lanaj et al., 2013) that team identification was positively associated with system performance, whereas system identification was negatively associated with system performance. Moreover, these effects were stronger under conditions of high task complexity and weaker under conditions of low task complexity. These mixed results suggest there are both downsides as well as upsides to team and system identification and begs the question of what role leadership should play in helping to balance and/or alleviate the apparent tensions in order to ensure optimal team and system functioning.

Hogg and colleagues (2012) also questioned the benefits of creating a *superordinate* identity and proposed that intergroup leaders should instead help groups develop *intergroup relational identities* (i.e., identities defined by the relationships between one's own team and other teams). They argue that intergroup relational identities can allow teams to maintain their distinctiveness, while also promoting effective collaboration. Empirical studies have not verified how leaders might facilitate the development of intergroup relational identities. However, theoretical work suggests that leaders can promote these identities through their *rhetoric* (e.g., by communicating about what resources the different teams might bring to and receive from intergroup interactions), by *modeling* positive intergroup relations through their own cross-boundary processes, and by *facilitating* interactions among members of different teams (Ernst & Chrobot-Mason, 2011a; Hogg et al. 2012). By forming positive interpersonal relationships with members of each group, a leader may role-model desired intergroup relations and foster

intergroup trust. However, leaders also need to be aware of and manage group members' perceptions of their intergroup behaviors. On the one hand, leaders may be perceived as less effective within their own groups if they are seen as being overly supportive of another group's goals, identity, or status (Hogg et al., 2012). On the other hand, a leader who exhibits an over-emphasis on activities within teams can undermine the team's ability to collaborate effectively with others (Pittinsky & Simon, 2007).

Similarly, Ernst and Chrobot-Mason's work on boundary spanning leadership (2011a; 2011b) proposed that leaders can use a series of interrelated strategies to promote collaborative psychological relationships between groups. The first strategy, 'managing boundaries,' begins *within* teams and consists of two steps: buffering and reflecting. The goal of buffering is to protect a team from undue outside influences, affirm the team's identity, and promote a sense of safety and security among team members. Teams then engage in reflecting by clarifying their own values, priorities, expertise, roles, and needs and prepare to share this information with members of other teams. Ernst and Chrobot-Mason argue that these *internally focused* leadership behaviors prepare teams to effectively engage with other entities within and beyond their organization as collaborative partners and help team members avoid identity threat. Second, they propose that it is important to have members of different groups connect on a personal level (i.e., without a focus on intergroup differences) to foster interpersonal trust.

In addition to (team, system, and/or intergroup relational) identities, several studies have identified other affective and motivational constructs within and across teams that might be targets of leadership influence in support of superordinate goals. For example, emerging research highlights the impact of states such as anxiety and psychological safety on system effectiveness. Park and Deshon (2018) for example, studied how the quality of group discussions influences

competition, fear, and greed between groups. Notably they find that groups who engaged in structured discussions were more likely to have high quality discussions, which in turn reduced greed and fear, and decreased the likelihood of competing with outsiders. In a study of ad hoc multiteam system aircrews, Bienefeld and Grote (2014a) found that psychological safety *within* teams mediated the effects of leader inclusiveness on team members' speaking up behavior within teams and boundary-spanners' speaking up across team boundaries. Interestingly, team boundary-spanners' perceptions of leader inclusiveness and psychological safety between teams had no effect on speaking up between teams; rather, it was the boundary spanners' perceptions of within team psychological safety that mattered most. Fleştea, Curşeu, and Fodor (2017) also investigated psychological safety, exploring the influence of power disparity. The authors find that high power disparity positively influences system performance by engaging team members in a higher level of information processing, but also has negative effects on performance as it stifles perceptions of psychological safety and fosters a negative affective climate.

A subset of studies has explored the effects of motivational constructs such as goals, priorities, and collective efficacy. In a study of a semiconductor plant, Millikin, Hom, and Manz (2010) illustrated that systems comprised of highly cohesive component teams that engaged in *self-management* (i.e., setting goals, focusing on intrinsic rewards, engaging in positive self-talk) were the most productive. In a case study of the response to the space shuttle Columbia disaster, Beck and Plowman (2013) found that establishing, communicating, and monitoring shared superordinate goals was pivotal for the emergence of collaboration between teams. *Goal alignment* both within and between teams appears to be another important motivational factor. For instance, Meth, Lawless, and Hawryluck (2009) found that one of the greatest sources of conflict in intensive care units is the presence of incompatible and/or inconsistent goals

regarding patient care across the various healthcare teams that comprise the unit, ultimately resulting in reductions in quality of care. Unfortunately, some research has shown that different teams are not necessarily *aware* of the fact that their goals are misaligned. For instance, Power and Alison (2017) observed that different agencies in an emergency response system prioritized different goals (i.e., approach goals vs. avoid goals). Despite the observed goal conflicts, however, participants *believed* that their interagency goals were aligned with one another, (according to their ratings of goal alignment) suggesting that members of different teams may be unaware of goal conflicts.

When? Studies in Categories 3 and 4 suggest that many factors can act as boundary conditions determining the effectiveness of specific leadership processes within and across teams. These factors may originate within teams (e.g., strength of team identification, Gumusluoglu et al., 2017), across teams (e.g., level of interteam interdependence), and in the embedding environment (e.g., system dynamism; Uitdewilligen & Waller, 2018).

For instance, several studies have emphasized that the nature of *interteam interdependence* can play an influential role for various functions and outcomes both within and across teams. Marks et al. (2005) showed that interteam processes were more critical at high levels of interteam interdependence than at lower levels where teams functioned under greater autonomy. In another study by Glynn, Kazanjian, and Drazin (2010), team identification and team members' perceptions of interteam interdependence interacted to predict intentions to innovate such that individuals with high team identification *and* high interteam interdependence perceptions had *lower* intentions to innovate.

Recent work by Kennedy, Sommer, and Nguyen (2017) utilized computational modeling and virtual experiments to investigate how leaders facilitate multiteam system communication

across differing levels of team interdependence and project complexity. Their results show that the level of interdependence between teams influences the frequency with which leaders must make changes to communication plans in response to changing project complexity. Specifically, whereas systems with low to moderate interteam interdependence may rely on similar paths of communication for tasks of varying complexity (i.e., e-mail, video conferencing, sharing information indirectly through leadership), multiteam systems with high interteam interdependence must adapt their mix of communication tools depending on task complexity to prevent communication channels from becoming overburdened.

A number of Studies in Categories 3 and 4 have also begun to explore how leadership processes need to shift depending on the *timing* or *phase* of task performance. For example, DeChurch and Marks (2006) evaluated leadership teams' use of strategizing behaviors during transition phases (e.g., gathering information, establishing roles and responsibilities, planning), and coordination behaviors during action phases (e.g., orchestrating actions, adapting roles and responsibilities to meet changing task demands, managing the flow of information). Other research has examined the critical role of leader planning during transition phases (Lanaj et al., 2013) and the importance of effective team boundary management, especially in the *early* conceptual phases of a collaborative project to prevent teams from falling behind schedule (Hoegl & Weinkauff, 2005).

Further, Park and DeShon (2018) found that discussion leaders who advocate for cooperation between teams are better able to influence team members *early* in the formation of a group when members are receptive to normative power. However, over time, high-quality internal discussions were more important for decreasing team members' feelings of greed and fear, and therefore their desire to compete with outsiders. In another recent study Quiroz,

Brunson, and Bigras (2017) present an in-depth case study of the dynamic processes of mutual adjustment that occurred between two professional teams participating in a multicomponent community-based intervention (CBI). During the initial stages of collaboration, mutual adjustment involved division of roles and responsibilities based on areas of expertise, withdrawal from partner's area of expertise, and a relative paucity of direct interaction between groups. Interestingly, after a shock to the system, these rules transformed. Rather than dividing work based on expertise, the teams worked together directly to find a solution; new links were created to enhance intergroup communication; and groups came to function with a coherent joint approach to intervention. In combination, these studies exemplify the growing acknowledgement that the timing of leadership is a critical determinant of leadership effectiveness.

Who? A few studies have begun to illustrate the potential importance of *informal* leadership influence processes in the context of superordinate goals. For example, Kratzer, Gemünden, and Lettl, (2008) study of multi-team R&D projects found that there are benefits to a moderate overlap in formal and informal communication structures. A case study of subsea operations in the oil industry, found that when formal leaders were inaccessible, individual team members would respond by performing leadership functions without explicit delegation by the formal leader (Johannessen, McArthur, & Jonassen, 2015). Whereas another a case study found that formal and informal leadership structures were put in place both within and between teams to ensure the success of school reform in complex environments, which require cross-sector collaboration and leadership structures that leverage the expertise of the functional groups (Malin & Hackmann, 2019). These studies illustrate the often-complementary relationship between formal and informal leadership.

However, informal leadership processes are not always effective in the context of system goals. For instance, supporting the implementation of a formal leadership team (Davison et al., 2012), Ingvaldsen and Rolfsen (2012) examined how shared leadership and rotating group spokespersons can be used as alternatives to hierarchical control in autonomous work groups using a qualitative case study of a manufacturing firm. They found that the two alternatives tend to under-perform as they weakened the system's ability to regulate non-routine situations and evaluate integral processes. Their findings underscore the need for further research clarifying why informal leadership emerges, as in some circumstances informal leadership may prove to be detrimental. Another example comes from Newell and Swan (2000), who conducted a case study of a multi-disciplinary research system. They argued that high levels of trust were necessary to facilitate the levels of communication needed to generate scientific innovation; however, the system experienced a severe distrust, power struggles, a lack of accountability across sites, and a high level of ambiguity for lower-level group members. These findings suggest that even in the presence of formal authority structures, power struggles and informal influence processes might disrupt system functioning.

THREE RECOMMENDATIONS FOR ADVANCING INTEGRATIVE RESEARCH ON LEADERSHIP IN INTERTEAM CONTEXTS

Our review demonstrates that leadership scholars are increasingly answering calls (e.g., Ancona, 1990; Hogg et al., 2012; Pittinsky & Simon, 2007) to adopt an external perspective by examining how team members and leaders reach beyond team boundaries to support team outcomes (e.g., Marrone, 2010; Oh et al. 2004; 2006) and coordinate with other teams as part of interdependent systems (e.g., Davison et al., 2012; DeChurch & Marks, 2006; DeChurch et al., 2011). Researchers have made great strides in terms of clarifying *what* interaction processes,

states, and leadership behaviors comprise ‘functional’ leadership in interteam contexts, as well as *why* and *where* leadership is enacted. However, our review also revealed that research is far from offering a complete picture of leadership in interteam contexts as studies have progressed within separate siloed literatures that emphasize leadership processes needed to support team or system objectives, but not both. Further, our review identified critical limits to our current understanding of *when* certain leadership processes are most appropriate and *who* (i.e., which people) should assume responsibility for leadership. Therefore, in the following, we build on these limitations to offer three overarching recommendations for future research that aims to move the field from collecting pieces of a jumbled puzzle to completing a coherent picture of leadership in interdependent organizational systems.

#1 - Clarify How Leaders Balance ‘What’ Across Levels of ‘Why’ and ‘Where’

The studies we reviewed convincingly demonstrate that leadership processes within and across team boundaries are relevant to the achievement of both team- and system-level collective goals. However, the extant literature hints at the idea that the leadership processes that support team goals might *not* always support system goals, or vice versa. For example, whereas the literature on boundary management emphasizes that leaders enable team success by securing external resources that support team objectives and by protecting the team from outside demands (Ancona & Caldwell, 1988; 1992a; Choi, 2002), the literature on multiteam systems has argued that leadership processes need to ensure that all component teams in the system act in pursuit of shared superordinate goals, regardless of whether teams ‘win’ individually (Lanaj et al., 2013). Examining team or system success in isolation makes it challenging for researchers to provide practically relevant guidance for how leadership can support success across *both* collective levels. Thus, our first recommendation is for future research to integrate across research areas in

order to better clarify how leaders *balance* the competing demands of interteam contexts. In order to do so, we propose four key advancements.

First, and most obviously, we believe that it is imperative for studies of leadership in interdependent systems to measure and theorize about performance at *multiple* levels of observation. The failure of most studies of cross-boundary processes to examine both team and system outcomes in the same research study is especially problematic given arguments made repeatedly in studies falling within Categories 2, 3, and 4 that what is 'good for the team' and what is 'good for the system' may be at odds with each other. Leaders at all levels in organizations have to navigate inherent tensions which result from multilevel goal hierarchies, multilayered goal and task interdependencies (Kirkman & Harris, 2017), and political and relational dynamics that knit together organizational systems. It is impossible to evaluate empirically how leaders balance these competing demands without evaluating outcomes at multiple collective levels.

Second, we identified many discrepancies across the different categories of research in terms of *what* leadership processes are emphasized most often. We suggest that developing a comprehensive understanding of how leaders balance the demands of interteam contexts may require more integration of the ideas about 'what leaders do' in these siloed areas of research. For example, in Category 1, researchers emphasize the importance of *task-*, *person-* and *change-oriented* leadership behaviors for team performance (Burke et al. 2006; DeRue et al., 2011; Judge et al., 2004). However, examining the behaviors discussed in Categories 2, 3, and 4, reveals an overwhelming emphasis on *task-oriented* behaviors (e.g., information search/scouting, guarding/sentry, task coordination, strategy development). The lack of attention toward person- and change-oriented behaviors is an important oversight as leveraging person-oriented and

change-oriented leadership behaviors might be imperative in intergroup contexts characterized by competing priorities. For example, change-oriented leadership behaviors (e.g., offering an inspiring vision) might allow the leader of one team to reduce his or her own goal conflicts by shifting the goals *others* prioritize to better align with his or her own priorities. Studies of leadership in the context of superordinate goals (Categories 3 and 4) may also benefit from leveraging more of the nuances of ‘boundary management’ activities identified in Category 2. For example, although task coordination is heavily emphasized in studies of multiteam systems, other interteam processes that have been shown to support team performance, such as the degree to which teams scout information, represent their work to others, and guard/protect their borders (Ancona & Caldwell, 1992a) are largely ignored. Again, skill in these more ‘politically-oriented’ behaviors may be essential to leaders’ abilities to navigate the tensions of interteam contexts.

Third, many studies in Categories 2 and 4 suggest that certain cross-boundary processes might have *non-linear* effects for team or system objectives. For example, the literature on boundary spanning emphasizes that team leaders should help their teams strike an appropriate balance of team permeability (Benoliel & Somech, 2015). Likewise, the literature on multiteam systems suggests that although coordination between teams through direct mutual adjustment is often necessary, inefficient patterns of interteam coordination that are not well-matched to task demands can be harmful (Davison et al., 2012; Marks et al., 2005). These previous investigations which have uncovered non-linear effects of ‘beneficial’ team interteam phenomena point to a need for future research to continue this line of inquiry, particularly in light of mounting evidence that many phenomena exhibit a ‘too much of a good thing’ effect (Pierce & Aguinis, 2013). We also encourage research to identify specific recommendations for leaders about how to establish the ‘optimal’ levels of team and interteam states and processes.

Finally, we emphasize that, as researchers, we cannot assume that it is clear *which* goals will take priority. Leadership, in this review, has been functionally defined as meeting the needs of the team and/or the system to enable goal-fulfillment. However, this is the functional ideal—in reality it is less clear which ‘needs’ leaders will focus on meeting. One specific pathway to understand how leaders may navigate tensions created by conflicting team/team or team/system goals is to consider leaders’ accountability. Accountability refers to the “perceived expectation that one’s decisions or actions will be evaluated by a salient audience and that rewards or sanctions are believed to be contingent on this expected evaluation” (Hall & Ferris, 2011, p. 134). Notably, rewards and sanctions do not need to be material in nature (e.g., pay or performance evaluations), but rather, can come in the form of implications for one’s social reputation (see review by Hall, Frink, & Buckley, 2017).

We expect personal and professional dynamics in many workplaces to produce accountability structures that differ widely from what one might expect based on formal hierarchies or workflow processes. Individuals’ are driven to maintain good standing in the eyes of those they deem to be key constituents (Tetlock, 1999), thus, how individuals prioritize team and system goals may be governed by their perceived accountability to different actors or groups in the organization. For example, leaders may need to give an account of their actions to not only superiors, but also peers, and subordinates. Relatedly, a key ‘role’ of leadership may be to communicate what is important and to whom members are accountable. Organizations might assume certain ‘prescribed’ objectives are also ‘perceived,’ but that is not always the case, and leaders (formal and informal) can significantly impact local perceptions of what is important (e.g., within teams). Despite being described as “the adhesive that binds social systems

together” (Frink & Klimoski, 1998, p. 3), our review found that discussions of accountability are absent from studies of leadership in interteam contexts.

#2 - Elaborate ‘What’ in the Context of ‘When’

Many of the studies we reviewed demonstrated the growing maturity of the leadership field by exploring critical boundary conditions of leadership processes which originate within teams, between teams, and/or in the embedding environment. However, we also identified significant opportunities to advance knowledge about leadership in interteam contexts by examining additional moderators—particularly with regard to leadership processes spanning team boundaries. Therefore, our second recommendation is to better elaborate ‘what’ leaders do in the context of ‘when.’ We highlight a few examples below.

First, like most areas of organizational research, there is an obvious need to better understand how leadership processes within and across teams play out across *time*. We found almost no research in Category 2 investigating how the timing of cross-boundary activities might impact team outcomes. In contrast, research on multiteam systems has begun to consider how interteam leadership processes might need to be matched to the phase of system task performance (DeChurch & Marks, 2006; DeChurch et al., 2011; Lanaj et al., 2013). However, across all categories of our framework, we found a preponderance of short-term and cross-sectional studies (see Table 3). It is difficult to make firm recommendations for leaders based on short-term studies of leadership and collaboration given evidence suggesting teams and systems change in meaningful ways over time (Gersick, 1991; Kozlowski et al., 1996). In fact, in one of the few studies of cross-boundary processes across time, Ancona (1990) showed teams that use ‘probing’ strategies suffered *short term* decrements in team satisfaction but performed the best in the long term.

Notably, cross-sectional designs can also severely undermine the ability to assess causality and *endogeneity* concerns. Briefly, endogeneity concerns exist when the effect of x on y cannot be interpreted because it includes omitted causes and results due to a variety of study design flaws, including omitted variables, omitted selection, simultaneity, common-method variance, and measurement error (for an in-depth review of endogeneity see Antonakis, Bendahan, Jacquart, & Lalive, 2010; Antonakis & House, 2014). Although it appears (see Table 3) that researchers often address one potential source of endogeneity (i.e., by using multi-source data), there are additional recommendations that can help address other sources. First, increased use of appropriate control variables, which Antonakis et al. (2010) defined as “exogenous sources of variance that do not correlate with the error term” (p. 1099), can help address omitted variable bias. Second, increasing the use of experimental or quasi-experimental designs could allow researchers to disentangle causal effects (Stone-Romero, 2008). Further, none of the studies we reviewed utilized *field experiments*. Field experiments have been used in other disciplines, including economics, for a considerable period of time (some would argue since the 1920s; Levitt & List, 2009). Although the use of field experiments is less prevalent in the realm of leadership research (with notable exceptions e.g., Dvir, Eden, Avolio, & Shamir, 2002), there are substantial benefits of using field experiments that could reduce potential concerns regarding causality and endogeneity and might be a fertile ground for testing theory central to leadership in intergroup contexts in a controlled and rigorous way.

Second, although qualitative studies of multiteam systems often emphasize that task demands and system memberships can shift dynamically over time, quantitative studies, especially those conducted in laboratory settings, have tended to model multiteam systems with extremely stable memberships and task demands that operate on relatively short (3-4 hours) time

frames. Thus, we identified a need for quantitative studies of interdependent systems to consider how leadership processes might support major *changes* in task demands and system memberships. Important questions include: What leadership processes allow high functioning systems to remain so when power dynamics shift as teams that were more central to system task demands become less central? What leadership processes are most effective in dynamic interdependent systems where team membership is highly fluid (i.e., teams are aggregating and disaggregating as a system in response to environmental changes)?

Third, additional research is warranted that evaluates how the *types* of system tasks might determine the most effective patterns of leadership and teamwork processes. Teams and systems tackle a variety of types of tasks ranging from more conceptual (e.g., intellectual tasks, decision-making tasks, creativity tasks, cognitive conflict tasks) to more behavioral (e.g., planning, resolving mixed motives, competitions, psycho-motor tasks; McGrath, 1984). However, whereas the qualitative (e.g., case studies) of multiteam systems we reviewed considered both highly conceptual (e.g., innovation) as well as highly behavioral (e.g., disaster response) system demands, the majority of the quantitative empirical studies we reviewed focused exclusively on behavioral tasks (e.g., military simulations; Davison et al., 2012; DeChurch & Marks, 2006; de Vries et al., 2016; Marks et al., 2005; Murase et al., 2014; Lanaj et al., 2013; Firth et al., 2015; Lanaj et al., 2018; Porck et al., 2019). Interestingly, an overarching conclusion from these studies appears to be that a multiteam system will function best when team identification is strong, teams are rather insular, and interteam coordination processes are handled almost exclusively by a select set of boundary spanners and members of formal leadership teams. However, in the context of creativity tasks, studies from Category 2 have suggested that when teams are overly insular and believe they have a monopoly on a particular domain, they may be unwilling to be

influenced by the contributions offered by ‘outsiders’ and consequently, may suffer creativity decrements (Dokko et al., 2014; Carbonell et al., 2019). Further, whereas studies of team boundary spanning have suggested that teams engage in *more* boundary activities during times of task uncertainty (Faraj & Yan, 2009), theoretical work on multiteam systems suggests that team members may engage in *less* interteam interaction under situations of high task uncertainty (Luciano et al., 2018). Clearly more research is needed to disentangle these inconsistencies and provide more targeted recommendations for leaders.

Relatedly, we believe that exploring how leadership processes should be matched to the nature of *interteam interdependence* (driven by task demands) is a promising avenue for future research. Pairs of interdependent teams in organizational systems might be engaged in *pooled* (additive), *sequential*, *reciprocal*, and/or *intensive* forms of interdependence at certain points in time (Kennedy et al., 2017; Mathieu et al., 2001; Marks et al., 2005). These different forms of interteam interdependence may be used as a preliminary guide for structuring leadership processes between teams (e.g., determining ‘*who*’ should enact leadership and ‘*what*’ processes are most critical) and for helping leaders understand how to prioritize goals (establish ‘*why*’ for the team) when they face potential trade-offs across levels of a multiteam goal hierarchy. That is, when teams are pursuing shared goals that require pooled forms of interdependence, they work separately, but may benefit from an *awareness* of what other teams are doing. Under these circumstances, emphasizing *team* level goals is a top priority and external leadership processes (and/or boundary activities) may be kept to a minimum. However, as pairs of teams move toward highly *intensive* forms of interdependence driven by superordinate goals, leadership processes may need to shift toward enhancing collaborative psychological states between teams that support joint problem solving and integration of ideas without also losing sight of team-level

goal accomplishment, and may need to involve more (formal and informal) leaders.

Unfortunately, only a small subset of the studies we reviewed described the nature of interteam interdependencies in great detail, particularly within Category 2. Thus, in order to build an evidence base related to these propositions, we strongly suggest that future research *specify* the nature of the interteam interdependencies between pairs of teams when examining team and leadership processes.

#3 - Evaluate ‘Who’ Should (or is Likely to) Enact ‘What’ ‘Where’

Quantitative studies of leadership within teams in support of team goals (Category 1) are finding that informal leadership (provided by members of the group) is important and often, augments formal leadership to improve team effectiveness (e.g., Aime et al., 2014; Carson, Tesluck, & Marrone, 2007; D’Innocenzo et al., 2014; Klein et al., 2006; Nicolaides et al., 2014; Wang et al., 2014). However, across the other three categories of research, we found a paucity of quantitative investigations of informal leadership. This is unfortunate because qualitative case studies across all three areas have often found that informal leadership processes do, in fact, exist in interteam contexts (Bienefeld, & Grote, 2014b; Johannessen et al., 2015; Malin & Hackmann, 2019), and may not always support team or system objectives (Ingvaldsen & Rolfsen, 2012). Therefore, our third recommendation is for future research to more carefully evaluate the *antecedents* and *outcomes* of informal leadership influence in interteam contexts.

For example, in the context of studies within Category 2, researchers have depicted cross-boundary processes as functions that formal leaders might enact and additionally, as functions that can be distributed among multiple team members (Marrone et al., 2007). However, the studies we reviewed typically measured the overall ‘amount’ of team boundary spanning without considering *which* team members are enacting those processes (Ancona et al., 2002; Elkins &

Keller, 2003; Ferguson & Blackman, 2019). The few exceptions to this trend suggest that there are meaningful effects when the *patterning* of team members' boundary spanning behavior is taken into account (Oh et al., 2004; Büchel et al., 2013). Given the complex, multifaceted nature of most modern workplaces, targeted, purposeful, and coordinated patterns of boundary spanning efforts are likely to yield more positive results than unstructured activities, left solely to chance. Leadership in interteam contexts should work to ensure that the right people within the team are connecting with the right *other* people external to the team and that the cross-boundary actions of team members are not unnecessarily duplicated or working at cross-purposes. Research is needed to provide more targeted guidance about how teams can best distribute responsibility for cross-boundary processes to support collective goals.

The vast majority of quantitative studies in Categories 3 and 4 have investigated leadership influence *after* a formal leadership team has been established. There are certainly numerous benefits to having a formal leadership team that is devoted to achieving the shared superordinate goal of the system and is focused exclusively on managing all interteam coordination demands (Davison et al., 2012; DeChurch & Marks, 2006; Firth et al., 2015). Unfortunately, not all systems contain a formal leadership team, at least not during the initial stages of system performance. Moreover, even when formal leadership teams are established, there may be power dynamics at play and disagreements about which goals should be prioritized (Newall & Swan, 2000). Indeed, Lanaj and colleagues' (2018) findings that formal leadership teams and lower level component teams can hold (and express) different preferences for risk taking hint at the possibility that 'leadership' influence can emanate from formal as well as informal sources.

Therefore, we strongly suggest that future research should seek to better understand *why* informal leadership influence processes arise within and across teams—particularly in the context of interdependent teams whose joint efforts *could* be used to achieve important societal or organizational goals. Doing so could help illuminate whether the patterns of leadership influence that are associated with high levels of system performance under certain circumstances are also the patterns that are *likely* to arise. Moreover, should researchers find that the patterns of leadership that are likely to emerge are *not* the patterns of leadership that are most effective, understanding the antecedents of these social systems could help point toward organizational interventions.

For example, the design of organizational structures and workflows as well as decisions regarding goals, reward systems, and personnel (e.g., new hires or inter-unit transfers) are often not made with the explicit purpose of influencing how employees interact with each other; nevertheless, these decisions by formal leaders shape how networks of relationships (including informal leadership) develop in the workplace (Antonakis & House, 2014; Brass, 2001; Brass & Krackhardt, 1999). These decisions “fundamentally alter the internal social structure of organizations by fluctuating the pool of human capital (i.e., composition), altering employee interaction patterns (i.e., configuration), and changing the nature of employee relationships (i.e., content)” (Methot, Rosado-Solomon, & Allen, 2018; p. 726). Thus, formal leaders should include in their calculus how decisions regarding personnel assignments, work design, goals, and performance evaluations might shape the development of relationships among employees that impact the achievement of collective goals (Cullen-Lester, Maupin, & Carter, 2017).

Notably, simply *prescribing* patterns of cross-boundary activities needed to achieve team and system goals may not be sufficient and could even be detrimental (e.g., employees may

respond negatively if they feel the organization is trying to control or prescribe whom they should talk to, develop friendships with, or try to influence). Thus, we argue that leaders would be better served to focus on understanding how they can set up the ‘facilitating conditions’ (Hackman, 2012) that support the emergence of beneficial networks of informal influence in interdependent systems (i.e., conditions that allow groups to chart their own course in support of both team and system goals) as opposed to attempting to prescribe formalized structures in their entirety. For instance, research suggests that actions of formal leaders’ signal whether it is advisable for members of their team to form cross-boundary relationships. Leaders encourage cooperation or, conversely, competition with their rhetoric and the goals and structures they emphasize (Kaiser, Hogan, & Craig, 2008). For example, leaders who emphasize intra-organizational comparisons may improve performance for their team by increasing motivation, but this decision may also evoke feelings of rivalry with others (Kilduff, Elfenbein, & Staw, 2010; Kilduff, 2014) and lead to destructive competitive emotions (e.g., envy; Nickerson & Zenger, 2008) and behaviors (e.g., dishonesty; Charness, Masclet, & Villeval, 2013; Chan, Li, & Pierce, 2014; excessive risk taking; Kacperczyk, Beckman, & Moliterno, 2015).

Future research might also draw inspiration from the fields of economics (e.g., retirement savings), healthcare (e.g., exercise or food choices), and marketing (e.g., product purchases) to learn how leaders might ‘nudge’ employees toward making decisions that will help their team and the broader organizational system in which the team is embedded when developing, maintaining, and altering their workplace relationships. Recently, Tawse, Patrick, and Vera (2019) proposed that nudges (i.e., “any aspect of the choice architecture that alters people’s behavior in a predictable way”, Thaler & Sunstein, 2008, p. 6) might be used to encourage strategic leaders to shift their attention from planning activities to the hard work of strategy

implementation. They proposed that nudges may be used to create an implementation mindset by removing planning distractions and using verbal framing to strengthen managers' willpower. Future research might focus on identifying nudges that leaders might use to encourage desirable cross-boundary behaviors. Although the aim is not to 'prescribe' the development of specific relationships, formal leaders still need to have a clear picture of what types and patterns of cross-boundary connections are needed in order to achieve collective goals across levels so that they might create conditions that encourage employees to form these relationships themselves.

Conclusion

Enacting leadership in interteam contexts is often a balancing act and a moving target—and so is the *study* of leadership in interteam contexts. We applaud previous researchers who have taken on the immensely complex challenge of delineating the nature of 'functional' leadership in interteam contexts. We hope this review serves as a foundation for future research that connects ideas and perspectives across disparate areas of inquiry in order to further clarify how formal and informal leaders and leadership processes within and across teams support organizational objectives across team and system levels.

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Table 1. *Journal Titles and Numbers of Articles Organized by Disciplinary Area*

<u>Applied Psychology, Management, Human Resource Mgt., Org. Studies (94)</u>	Int. J. of Operations & Production Mgt. (1)
Academy of Mgt. J. (20)	J. of High Technology Mgt. Research (1)
Org. Science (6)	J. of Technology Mgt. Research (1)
Human Relations (5)	Research Policy (1)
J. of Applied Psych. (5)	Technology Analysis & Strategic Mgt. (1)
J. of Mgt. (5)	<u>Health & Medicine (9)</u>
J. of Mgt. Studies (5)	Int. J. of Medical Informatics (2)
Small Group Research (5)	J. of Oncology Practice (2)
Administrative Science Quarterly (4)	Health & Social Care in the Community (1)
J. of Org. Beh. (4)	Health Promotion Int. (1)
Leadership Quarterly (4)	Health Services Research (1)
Group & Org. Mgt. (3)	Int. J. of Environmental Research & Public Health (1)
J. of Occupational & Org. Psych. (3)	Intensive Care Medicine (1)
Mgt. Decision (3)	<u>Other Disciplines (e.g., Int. Business, Education, Cognition, Information Systems, Human Factors, Accounting, etc.) (30)</u>
European J. of Work & Org. Psych. (3)	Human Factors (2)
J. of Business Research (2)	Industrial Marketing Mgt. (2)
Org. Studies (2)	J. of Service Research (2)
American J. of Community Psych (1)	Accounting Review (1)
Applied Psychology: An Int. Review (1)	ACM Trans. on Mgt. Information Systems (1)
British J. of Industrial Relations (1)	Cognition, Technology & Work (1)
British J. of Mgt. (1)	Communication Research (1)
Frontiers in Psych. (1)	Cross Cultural Mgt. (1)
Int. J. of Human Resource Mgt. (1)	Educational Administration Quarterly (1)
J. of Mgt. & Org. (1)	European J. of Marketing (1)
J. of Leadership & Org. Studies (1)	IEEE Trans. on Software Engineering (1)
J. of Managerial Psych. (1)	Information Systems J. (1)
J. of Small Business Mgt. (1)	Int. J. of Business Communication (1)
Org. Beh. & Human Decision Processes (1)	J. of Information Technology (1)
Personnel Psychology (1)	J. of Int. Mgt. (1)
Personnel Review (1)	J. of Knowledge Mgt. (1)
Scandinavian J. of Mgt. (1)	J. of Mgt. in Engineering (1)
Team Performance Mgt. (1)	J. of Mgt. Information Systems (1)
<u>Innovation, Mgt. Science, Operations, Strategy & Technology Mgt. (27)</u>	J. of Marketing Mgt. (1)
Creativity & Innovation Mgt. (3)	J. of Public Administration Research & Theory (1)
Int. J. of Project Mgt. (3)	J. of World Business (1)
J. of Engineering & Technology Mgt. (3)	Network Science (1)
J. of Product Innovation Mgt. (3)	Public Administration (1)
R & D Mgt. (3)	Public Mgt. Review (1)
European J. of Innovation Mgt. (2)	Small Business Economics (1)
Information & Software Technology (2)	Social Networks (1)
Project Mgt. J. (2)	Sociological Focus (1)
European J. of Operational Research (1)	

Note: $n = 160$ articles; Beh. = Behavior; Int. = International; J. = Journal; Mgt. = Management; Org. = Organizational, Organization; Psych. = Psychology; Trans. = Transactions.

Table 2. *Five Core Questions Specifying the Nature of Functional Leadership in Intergroup Contexts*

Core Questions Clarifying Functional Leadership in Intergroup Contexts	Exemplar Answers Derived from Extant Literature
1. <i>Why is leadership enacted? (i.e., for what objective(s)?)</i>	<i>Team goals without mention of interteam interdependence</i> (Carroll et al., 2016; Ferguson et al., 2019; Keller, 2001); <i>team goals in intergroup competitions or coopetitions</i> (Bullinger et al., 2010; Carbonell et al., 2019; van Bunderen et al., 2018); <i>team goals in collaborative interteam contexts</i> (Brion et al., 2012; Cha et al., 2015; Drach-Zahavy, 2011; Grippa et al., 2018; Somech & Khalaili, 2014; Tasselli & Caimo, 2019); <i>system goals</i> (Curnin et al., 2014; Millikin, Hom, & Manz, 2010; Schotter & Beamish, 2011; Zolper et al., 2013); <i>both team and system goals</i> (Friedman et al., 1992; Lee & Sawang, 2016; Lanaj et al., 2013; Susskind et al., 2011)
2. <i>Where is leadership targeted?</i>	<i>Within teams</i> (Birkinshaw et al., 2017; Tippmann et al., 2017; Zhang et al., 2015); <i>across team boundaries</i> (Cuijpers et al., 2016; Kratzer et al., 2008; Uitdewilligen & Waller, 2018)
3. <i>What processes and states are targeted by leadership?</i>	<i>Communication</i> (Bearman et al., 2010), <i>collaboration</i> (Beck & Plowman, 2013), <i>learning</i> (Chan et al., 2003), <i>coordination</i> (Newell & Swan), <i>identity</i> (Gray et al., 2019), <i>cohesion</i> (Ferguson & Blackman, 2019), <i>trust</i> (Chen & Wang, 2008)
4. <i>When is leadership occurring? (i.e., under what circumstances?)</i>	<i>During changes in organizational structure</i> (Birkinshaw et al., 2017); <i>when performing non-routine tasks</i> (Chung & Jackson, 2013); <i>while working in complex and dynamic environments</i> (Curnin et al., 2014; DeChurch et al., 2011; Gerber et al., 2016; Kellogg et al., 2006); <i>during initial project phases</i> (Hoegl et al., 2004); <i>when new resources are needed</i> (Waldman & Atwater, 1992); <i>given certain levels of interteam interdependence</i> (Benoliel & Somech, 2015; Glynn et al., 2010; Kennedy et al., 2017; Litchfield et al., 2018; Widmann & Mulder, 2018)
4. <i>Who is leading?</i>	<i>Formal team leader</i> (de O. Melo et al., 2013); <i>multiple formal leaders of different teams</i> (Gasson, 2005); <i>formal leadership team</i> (DeChurch & Marks, 2006; De Vries et al., 2016); <i>team members without formal positions of authority</i> (Ingvaldsen & Rolfsen, 2012; Johannessen et al., 2015; Marrone et al., 2007)

Table 3. *Summary of Methodological Approaches in Reviewed Studies*

	Team Objective(s) Emphasized	System Objective(s) Emphasized	Overall
<i>No. of Studies</i>	<i>n</i> = 73	<i>n</i> = 87	<i>n</i> = 160
<i>Analytic Approach</i>	12% (9) qualitative methods 78% (57) quantitative methods 10% (7) mixed methods	39% (34) qualitative methods 53% (46) quantitative methods 8% (7) mixed methods	27% (43) qualitative methods 64% (103) quantitative methods 9% (14) mixed methods
<i>Sample</i>	92% (67) working adults 7% (5) student samples 1% (1) other	89% (77) working adults 9% (8) student samples 2% (2) other	90% (144) working adults 8% (13) student samples 2% (3) other
<i>Study Design</i>	4% (3) experiments 70% (51) field/quasi-field 11% (8) case studies 15% (11) combination of designs	15% (13) experiments 38% (33) field/quasi-field 29% (25) case studies 9% (8) combination of designs 3% (3) simulations 3% (3) archival 2% (2) secondary data	10% (16) experiments 53% (84) field/quasi-field 21% (33) case studies 12% (19) combination of designs 2% (3) simulations 2% (3) archival 1% (2) secondary data
<i>Temporal Design*</i>	90% (46) cross-sectional 10% (5) longitudinal	82% (27) cross-sectional 18% (6) longitudinal	87% (73) cross-sectional 13% (12) longitudinal
<i>Common Methods Bias*</i>	37% (19) mention explicitly 27% (14) addressed through design elements 14% (7) statistical tests	30% (10) mention explicitly 21% (7) addressed through design elements 15% (5) statistical tests	35% (29) mention explicitly 25% (21) addressed through design elements 14% (12) statistical tests
<i>Endogeneity*</i>	6% (3) mention explicitly 2% (1) statistical tests	3% (1) mention explicitly 3% (1) statistical tests	5% (4) mention explicitly 2% (2) statistical tests

Note. * indicates calculations based on quantitative field studies.

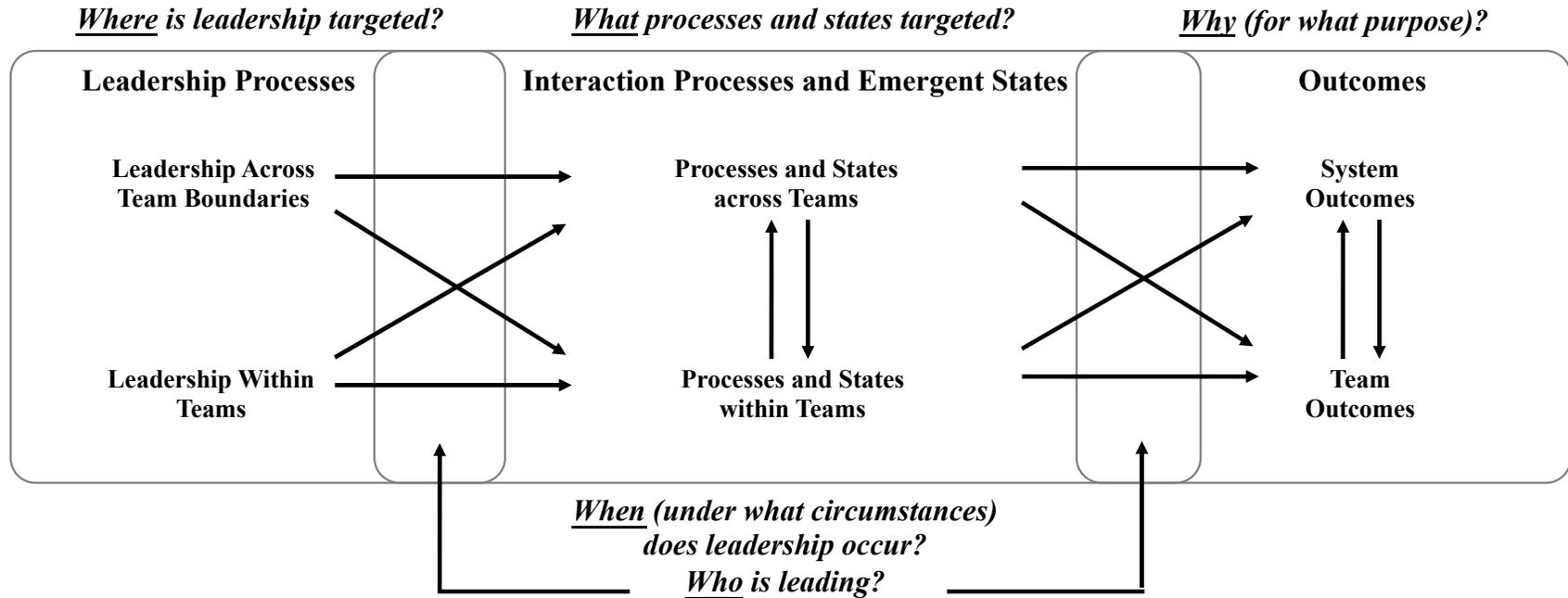


Figure 1. Multi-level View of Functional Leadership in Interdependent Systems

		<i>Where?</i>	
		Within Teams	Across Teams
<i>Why?</i>	Team Outcomes	<p><i>Category 1: Internally-focused leadership for the team</i></p> <p>Influencing processes and states within teams to support team-level outcomes</p>	<p><i>Category 2: Cross-boundary leadership for the team</i></p> <p>Influencing processes and states across team boundaries to support team-level outcomes</p>
	System Outcomes	<p><i>Category 3: Internally-focused leadership for the system</i></p> <p>Influencing processes and states within teams to support system-level outcomes</p>	<p><i>Category 4: Cross-boundary leadership for the system</i></p> <p>Influencing processes and states across team boundaries to support system-level outcomes</p>

Figure 2. An Organizing Framework for Studies of Functional Leadership in Interteam Contexts

Note. Shaded boxes are the focus of the current review.

ONLINE APPENDIX A

Summary of Articles Included in Review

Author (Year)	Analytic Approach	Goal Level Emphasized	Key Findings
Adler et al. (2009)	Qualitative	System	Adler and colleagues identified managerial challenges in cross-boundary projects including: securing sustained funding, securing resources for administration, dual demands on personnel time, difficulties in informal social influence, and differences in priorities across teams.
Alexander et al. (2016)	Qualitative	System	Through representational and informational boundary spanning activities with various external stakeholders, store managers may improve system performance and the organizational environment.
Alter (1990)	Mixed Methods	System	Conflict and coordination had a curvilinear association with the performance of interorganizational service delivery systems in two states, a relationship that was intensified when groups were differentiated by function and service mix.
Ambrosini et al. (2007)	Qualitative	System	Compared to less effective systems, more effective systems had greater levels of interteam communication, leaders who played a boundary spanning role, and regular cross-departmental meetings to encourage interteam communication.
Ancona (1990)	Qualitative	Team	Teams utilizing more active 'probing strategies' that directly engage outsiders were rated as the highest performing teams, but also suffered short-term decrements due to team member satisfaction and cohesiveness.
Ancona & Caldwell (1990)	Mixed Methods	Team	The authors developed a taxonomy of boundary spanning behavior and found that formal team leaders engaged all types of boundary spanning behaviors with higher frequency than individuals who did not occupy a formal leader role.
Ancona & Caldwell (1992a)	Quantitative	Team	The pattern of boundary spanning behavior was more predictive of team internal processes and performance than the frequency of boundary spanning behavior.
Ancona & Caldwell (1992b)	Quantitative	Team	Team functional diversity was found to be positively related to external communication while team tenure diversity was positively related to internal team processes such as planning and taskwork. Both forms of diversity were negatively related to team innovation indicating that diversity hindered team performance overall.
Andersen & Kragh (2015)	Qualitative	Team	Problems associated with cross-boundary creative projects can be addressed through managerial practices such as: (a) acquiring support and resources; (b) fostering a shared team identity, and (c) integrating team member contributions.

Arnett & Wittmann (2014)	Quantitative	Team and System	The exchange of tacit knowledge between salespeople and marketing personnel was supported by opportunities to socialize, greater trust between groups, and top management support for intergroup communication.
Balkundi & Harrison (2006)	Quantitative	Team	Teams with more densely connected internal networks were more likely to achieve their goals and stay together as a team. Further, the leaders of higher performing teams tended to be well-connected in both the internal team network as well as network external to the team.
Balkundi et al. (2019)	Quantitative	Team	Whereas intrateam brokerage was negatively associated with tie decay outside of the team, it was positively associated with tie decay inside of the team and negatively associated with the formation of new ties both within and external to the team.
Balogun et al. (2005)	Qualitative	System	The authors advanced the concept of 'boundary-shaking' which refers to individuals' use of their knowledge of social networks within and between organizations to create new networks and/or redefine old ones in order to gain support for their change initiatives.
Bearman et al. (2010)	Qualitative	System	Differences in the distribution and interpretation of information led to incongruent mental models and levels of situation awareness between groups. This in turn led to breakdowns in planning and errors in coordinated decision making.
Beck, & Plowman (2013)	Qualitative	System	Actions focused on enhancing interteam collaboration, such as establishing superordinate goals, allowed a task force to quickly self-organize, develop trust, and create a collective identity.
Benoliel, & Somech (2015)	Quantitative	Team	Leader internal networking activities mediated the relationship between team functional heterogeneity and interteam goal interdependence on team performance. Leader external networking activities mediated the relationship between interteam goal interdependence and team innovation.
Bick et al. (2018)	Qualitative	Team and System	Lack of alignment between planning activities at the within and between team levels led to a lack of awareness about interteam dependencies and decreased coordination effectiveness.
Bienefeld & Grote (2014a)	Quantitative	System	Within teams, psychological safety mediated both the relationship between status and speaking up and between perceived leader inclusiveness and speaking up. Across teams, boundary spanners' within-team perceptions of psychological safety mediated the relationship between status and speaking up across boundaries.
Bienefeld & Grote (2014b)	Quantitative	Team and System	In successful MTS aircrews (i.e., lower-level component teams), formal leaders and team members displayed significantly more leadership behaviors, shared leadership by team members attendants predicted team performance, and boundary spanners' shared leadership across team boundaries predicted cross-team goal attainment. In cockpit crews, leadership was not shared and vertical leadership predicted team performance regardless of MTS success.

Birkinshaw et al. (2017)	Mixed Methods	Team	Executives utilized different forms of boundary spanning over time in accordance with the organization's current stage in the process of changing the location of the global headquarters. In so doing, executives were able to improve the team's internal and external network effectiveness.
Brion et al. (2012)	Quantitative	Team	Leaders with more structural holes in their network were more capable of protecting their teams, but team protection did not impact the success of team projects. Project leaders with strong ties in their networks were better at gathering political support and scanning for ideas, thereby fostering project performance.
Buchel et al. (2013)	Mixed Methods	Team	New product development teams were most successful when constituent members had diverse knowledge ties to external stakeholders and a small number of non-redundant trust ties with "project champions" external to the team.
Bullinger et al. (2010)	Quantitative	Team	In a competitive intergroup context, very high levels of cooperative orientation (high boundary spanning) and very low levels of cooperative orientation (low levels of boundary spanning) were positively associated with team innovation, whereas moderate levels were associated with low levels of team innovation.
Caimo & Lomi (2015)	Quantitative	Team	Advice relations across team boundaries were driven by reciprocity and hierarchical formal structures.
Callister & Wall (2001)	Mixed Methods	System	A history of negative interactions between managed care organizations and healthcare providers — as well as differences in power and status — were predictive of both negative affect and behavioral conflict between teams.
Carbonell & Rodríguez Escudero (2019)	Quantitative	Team	Team boundary spanning was positively associated with new product competitive advantage; team cohesion moderated this effect such that the positive effect of team boundary spanning on new product competitive advantage was weaker for teams with high levels of cohesion.
Cha et al. (2015)	Quantitative	Team	Teams with transformational leaders had higher internal teamwork quality and were perceived as more collaborative by members of <i>other</i> teams.
Chakkol et al. (2018)	Qualitative	System	Boundary-spanners engaged in an assortment of boundary spanning functions (depending on their role and the nature of the project in their respective organization) in order to connect organizational groups, facilitate learning, and develop innovative solutions.
Chan et al. (2003)	Quantitative	Team	Both within (i.e., team performance monitoring) and external (i.e., seeking individuals outside the team for feedback) team learning were positively associated with team performance.
Chang et al. (2011)	Quantitative	Team	Horizontal (i.e., connections to other lateral units), vertical (i.e., connections to higher ups), and external (i.e., connections to third parties) forms of social capital each uniquely predicted team flexibility and project performance.

Chen (2009)	Quantitative	Team	Guanxi relationships (i.e., very close personal relationships) within teams and across group boundaries with members of external groups supported team innovation.
Chen & Wang (2008)	Quantitative	Team	Teams' internal and external network ties were positively associated with team innovation; however, a high level of team trust reduced the benefits of external social network ties for team innovation due to a "not invented here" syndrome whereby people in dominant teams tend to discount contributions of other groups.
Chen et al. (2012)	Quantitative	Team	Group pay based on intergroup tournament performance increased group cohesion, group collaboration, and group creativity more than group piece-rate pay structures.
Chuang et al. (2016)	Quantitative	Team	Human resource management systems that supported knowledge intensive teamwork were positively associated with external team knowledge acquisition and internal team knowledge sharing. These effects were strongest when knowledge was less tacit and in the absence of empowering leaders.
Chung & Jackson (2013)	Quantitative	Team	When teams performed tasks that were low in routineness (i.e., higher in novelty), the density of both internal and external networks were predictive of team performance.
Corsaro et al. (2012)	Qualitative	System	Different innovation network configurations (i.e., interorganizational relationships) interact through boundary spanners to combine diverse resources and create value for constituent organizations.
Cramm et al. (2013)	Quantitative	System	Program performance was enhanced when synergy was created between groups from different partner organizations, and leadership (task and relational) supported inter-group synergy.
Cross et al. (2000)	Mixed Methods	Team	As the organization transitioned from a functional structure to a team-based structure, the type and amount of boundary-spanning behavior also changed. Namely, the transition to a team-based structure shifted boundary behavior (i.e., spanning, buffering, bringing up boundaries) to lower-level units and involved more organizational members, increased within and between organization boundary behaviors, increased the creation of boundaries, and shifted boundary buffering to team leaders.
Cuijpers et al. (2016)	Quantitative	System	MTS identification was associated positively with MTS performance as mediated by interteam task and relationship conflict. Although team identification influenced interteam conflict initially, this effect decreased over time.
Curnin et al. (2014)	Qualitative	System	Boundary spanners working in complex and dynamic environments relied on capabilities such as legitimate authority, ability to work under pressure, ability to analyze information, networking, understanding own and others' roles and intentions, and knowledge and/or experience with different facilities to facilitate multi-agency coordination.
Dahl & Pedersen (2005)	Quantitative	Team	More experienced engineers were not more likely than less experienced engineers to have contacts outside of their organizational groups, however, more experienced engineers were more likely to acquire valuable knowledge through their external contacts.

Davison et al. (2012)	Quantitative	System	This study depicted a MTS structure comprised of a formal leadership (coordination) team, a 'point team' whose contributions were most central to the MTS goal, and a 'support team' whose contributions were less central to the MTS goal. Findings indicated that MTS performance in this context was highest when a formal boundary spanner for the point team engaged in mutual adjustment (i.e., direct coordination) with: (a) other members of the point team; (b) the boundary spanner from the support team, and (c) the leadership team.
De Vries et al. (2016)	Quantitative	System	MTS members' intrapersonal functional diversity (breadth of functional experience) supported horizontal coordination (across teams at the same hierarchical level) but detracted from aspirational behavior (activities that push MTS performance). Vertical coordination (between direct reports and higher-level organizational members) moderated these effects such that the benefits of intrapersonal functional diversity for MTS performance were increased and the costs were decreased when vertical coordination was higher.
De Vries et al. (2014)	Quantitative	Team	Team members' breadth of functional expertise was positively associated with interpersonal cognitive complexity (the ability to interpret different social situations). The effect of interpersonal cognitive complexity on team members' interteam coordination behavior was positive when individuals were strongly identified with the organization but negative when individuals were weakly identified with the organization.
DeChurch & Marks (2006)	Quantitative	System	Training leaders in MTS strategy and coordination increased leaders' use of functional leadership behaviors during transition and action phases of MTS performance, which improved interteam behavioral synchronization, and ultimately, MTS performance.
DeChurch et al. (2011)	Qualitative	System	During disaster response events, successful leaders engaged in two key categories of functional leadership behaviors: strategy (i.e., ensuring the MTS is properly designed and has plans to accomplish goals) and coordination (i.e., directing efforts within, between, and across the MTS). Leaders exerted influence at different levels including within component teams, between component teams, and between the MTS and its embedding environment.
Dietrich et al. (2013)	Mixed Methods	System	Teams in multi-team projects engaged in different forms of coordination (i.e., centralized, decentralized, balanced) depending on contextual (i.e., team interdependence) and task (i.e., task analyzability) related factors, leading to different levels of inter-team interactions.
Dokko et al. (2014)	Quantitative	Team	Stronger social identity within teams rendered interactions with colleagues on other work teams less generative of new ideas; identification with an overarching superordinate goal (e.g., a division) enhanced team creativity.

Drach-Zahavy (2011)	Quantitative	Team	Scouting and ambassadorial boundary spanning activities mediated the positive relationship between team informational diversity, team boundedness, and extra-team links; boundary spanning coordination activities mediated the relationship between team boundedness and team effectiveness.
Druskat & Kayes (2000)	Quantitative	Team	The authors found that building relationships with other teams was not predictive of team learning in short-term project teams.
Druskat, & Wheeler (2003)	Mixed Methods	Team	Effective boundary spanners alternated between organization-focused and team-focused behaviors. Broadly, effective boundary spanners exhibited social and political awareness, sought out relevant information, obtained external support, and empowered their teams.
Edmondson, (2003)	Mixed Methods	Team	Team leader coaching, ease of speaking up, and team boundary spanning were positively associated with technology implementation for action teams in hospital operating rooms.
Faems et al. (2010)	Qualitative	System	Cooperation among different groups in R&D alliance systems was enhanced by (a) adopting boundary spanning behaviors; (b) installing similar technical equipment across groups; and (c) specifying: task domains, knowledge-domains, and commercial domains for different groups.
Faraj & Yan (2009)	Quantitative	Team	Boundary management activities such as boundary spanning (i.e., reaching out), boundary buffering, and boundary reinforcement fostered feelings of psychological safety within teams, which improved team performance.
Ferguson et al. (2019)	Quantitative	Team	Top management team (TMT) members' boundary spanning was found to benefit firm performance (synonymous with team performance in this case) when team cohesion was high; however, when team cohesion was low, TMT boundary spanning was negatively associated with firm performance.
Ferguson, & Blackman (2019)	Qualitative	Team	Team boundary spanning fostered innovation by disseminating information between teams. Innovation was facilitated by team members' networks.
Firth et al. (2015)	Quantitative	System	Frame-of-reference training reduced knowledge gaps between component teams and facilitated MTS coordination and performance. Coordination within 'point teams' whose contributions were most central to the MTS goal enhanced the positive effect of frame-of-reference training.
Fleștea et al. (2017)	Quantitative	System	Power disparity in collaborative systems (i.e., MTSs) was associated with both positive i.e., (increased information processing) and negative (i.e., task conflict, decreased psychological safety) between-team outcomes.

Floyd & Wooldridge (1997)	Quantitative	System	Differences in the opportunities for boundary spanning afforded by managers' memberships in different organizational units was associated with their strategic influence. Organizational (system) performance was stronger when the degree of upward influence of middle managers was more varied and the degree of downward strategic influence was more consistent. These findings suggest the need for more dynamic upward influence by different middle managers to spark strategic renewal, but broad downward influence to facilitate strategic implementation.
Foss & Rodgers (2011)	Quantitative	Team	Tasks that incorporated cross-unit involvement increased managers' willingness to use information from other units, improving decision-making throughout the system.
Friedman & Podolny (1992)	Quantitative	Team & System	Boundary spanning roles were differentiated (i.e., accomplished by different group members) during labor negotiations.
Geletkanycz & Hambrick (1997)	Quantitative	Team	TMT members' intra-industry external ties were related to strategic conformity within industry. In combination, greater levels of strategic conformity and intra-industry ties positively predicted firm performance (synonymous with team performance in this case).
Gerber et al. (2016)	Qualitative	System	The authors identified challenges for medical multiteam systems (in comparison to single teams) such as: increased demands for communication, collaboration, cohesion, and coordination among members; physical dispersion of teams, lack of interteam interaction, misaligned goals and competing priorities; low collective identity and system cohesion; and limited knowledge of the roles and responsibilities of other teams.
Gillispie & Chrispeels (2008)	Qualitative	System	Conflict arose between groups when: (a) groups characterized problems in terms of group memberships; and (b) utilized pronouns to distinguish themselves from the other groups. Both of these practices were further found to inhibit collaboration.
Glaser et al. (2015)	Quantitative	System	Whereas boundary spanning behaviors by top and middle managers were positively associated with exploratory innovation, TMT members' boundary spanning also caused role conflict for middle managerial units. The degree to which top and middle manager boundary spanning ties overlapped seemed to reduce this effect.
Gleibs & Haslam (2016)	Quantitative	Team	Support for a leader who advocated a strategy of intergroup competition or cooperation varied as an interactive function of the status of the ingroup and the perceived stability of intergroup relations.
Glynn et al. (2010)	Quantitative	System	Team identification and team members' perceptions of interteam interdependence in larger systems interacted to predict intentions to innovate such that individuals with high team identification and high interteam interdependence perceptions had lower intentions to innovate.

Gray et al. (2019)	Quantitative	System	Structural links were most effective at fostering cross-unit ties when organizational identification was high and unit-level identification was low; lateral transfers (i.e., shifting employees between hierarchically equivalent units) were more likely to foster cross-unit ties when both organizational and unit identification were high.
Grippa et al. (2018)	Quantitative	Team	Highly effective teams were more inwardly focused (i.e., more internal communication ties) and less outwardly focused (i.e., less external communication ties) as compared to less effective teams.
Gumusluoglu et al. (2017)	Quantitative	Team & System	When research and development (R&D) teams were highly identified with the R&D department as a whole, benevolent leadership improved cross-boundary innovative behavior. Further, when individuals were highly identified with their team, benevolent leadership was positively related to innovative behaviors within the team as well across team boundaries.
Hansen (1999)	Quantitative	System	Optimal inter-unit tie strength was determined by the complexity of the knowledge that must be transferred, with more complex knowledge requiring stronger ties.
Hansen (2002)	Quantitative	System	Shorter relational paths (i.e., relatively few intermediaries between teams) between units possessing similar knowledge improved the ability to obtain knowledge and reduced project completion time.
Harvey et al. (2014)	Qualitative	Team	Vertical and horizontal boundary spanning activities were positively associated with internal team processes.
Hennessy & West (1999)	Quantitative	Team & System	Work group identification was positively associated with feelings of in-group favoritism; organizational identification was negatively associated with discriminatory in-group favoritism.
Henttonen et al. (2014)	Quantitative	Team	Both bonding (i.e., ties within teams) and bridging (i.e., external ties) ties were positively associated with team performance; team identity mediated both of these relationships.
Hirst & Mann (2004)	Quantitative	Team	Boundary spanning behaviors performed by team leaders had a stronger positive relationship with team performance than boundary spanning performed by members of the team.
Hoegl & Weinkauff (2005)	Quantitative	Team & System	In a sample of new product development systems in the European automotive industry, managers enabled better project performance by providing structure and support while allowing for team autonomy and creativity, especially in the early conceptual phase. Further, team boundary management was found to be important for preventing teams from falling behind schedule in the concept phase of the project.
Hoegl et al. (2004)	Quantitative	System	Interteam coordination, MTS commitment, and teamwork quality at the end of the concept development phase (i.e., 12 months into the project) were significantly correlated with system performance at the end of the project (36 months into the project).

Huang et al. (2016)	Quantitative	System	Strong ties between boundary spanners at both higher organizational levels (top executives) and lower levels (salespeople and individual buyers in partner organizations) benefited the relationship quality of the buyer-supplier relationship; however the lower level ties had a stronger relationship than the higher level ties.
Ingvaldsen & Rolfsen (2012)	Qualitative	System	Shared leadership and the rotation of group spokespersons were found to be ineffective at facilitating inter-group coordination between autonomous work groups resulting in decrements in system performance.
Jain et al. (2014)	Qualitative	System	Boundary spanning behaviors between groups supported product family development performance in interdependent engineering systems.
Johannessen et al. (2015)	Qualitative	System	When the formal leader could not respond to disruptive events, individuals responded by performing leadership functions without explicit delegation, enacting what the authors referred to as informal leadership redundancy.
Jones et al. (2019)	Quantitative	System	Implementing an interprofessional coordinating team comprised of staff from different areas (e.g., nursing, pharmacy, therapy, patient safety) and different authority levels supported the implementation and coordination of fall-risk reduction in hospital systems comprised of multiple groups.
Keller (2001)	Quantitative	Team	Functional diversity fostered team performance because it supported increased external communication with individuals from varied areas of expertise and different groups.
Kellogg et al. (2006)	Qualitative	System	In a context characterized by high speed, uncertainty, and rapid change, members of different groups in a post-bureaucratic organizational system engaged in cross-boundary coordination practices to make their work visible and legible to each other and enable ongoing revision and alignment.
Kennedy et al. (2017)	Quantitative	System	The ideal form of MTS communication depended on characteristics of the project such as the level of interdependence between teams and project complexity.
Kislov (2018)	Qualitative	Team	Knowledge brokering teams relied on different forms of boundary management — such as spanning, reinforcing and buffering — to alter boundary permeability over time based on the needs of the team project.
Knipfer et al. (2018)	Quantitative	Team	Charismatic leadership predicted individual and team performance, both of which were mediated by team reflexivity. Charismatic leadership was also related to team member boundary spanning behavior.
Kratzer et al. (2008)	Quantitative	System	The density of informal communication network ties between teams in MTSs was significantly higher than pattern of formal communication interfaces would predict. MTS creativity was inversely U-shaped related to the amount of informal interteam communication in the system.

Labianca et al. (1998)	Quantitative	Team	Perceptions of intergroup conflict were positively associated with negative intergroup relationships and indirect friendships. Low intragroup cohesiveness was also related to perceptions of intergroup conflict.
Lanaj et al. (2018)	Quantitative	System	The amount of difference between the risk-taking preferences of component teams in a MTS and the risk-taking preferences of a formal leadership team was positively associated with system members' aspirational behavior and MTS performance and negatively associated with unwarranted risk-taking.
Lanaj et al. (2013)	Quantitative	System	Decentralized planning structures - whereby lower-level component teams develop plans <i>first</i> which are then passed to a formal leadership team - were positively associated with MTS performance via increased proactivity and aspiration levels; however, the benefits of decentralized planning structures were offset by the downsides, which included increased risk-seeking and interteam coordination failures.
Lee & Sawang (2016)	Quantitative	Team	Team members who experienced group attachment anxiety were more likely to perceive intergroup competition, and thus, were more likely to engage in the use of boundary spanning for competitive purposes. In contrast, a tendency to distrust one's project team generated members' negative construal of their team's external image, and thus, was associated negatively with efforts at operating external linkages.
Lee et al. (2016)	Qualitative	System	Cancer care requires high levels of interteam coordination between different provider teams in interdependent systems.
Lievens & Moenaert (2000)	Quantitative	Team	This field study investigated the antecedents of project communication within and across team boundaries; Findings indicated that organizational complexity, formalization, centrality, and project climate were all related to both intra-project and extra-project communication. Communication fostered cross-functional cooperation and uncertainty reduction.
Lievens & Moenaert (2000)	Quantitative	Team	In a team focused on providing new services to customers, intra-project and boundary-spanning communication was associated with reduced uncertainty about customers, competitors, resources, and technologies and this effect is moderated by the level of informational intangibility and heterogeneity. Team financial performance was positively associated with uncertainty reduction about customers.
Lievens et al. (1999)	Quantitative	Team	Boundary spanning communication facilitated learning within the team during new service innovation.
Lindgren et al. (2008)	Qualitative	Team	IT-enabled boundary spanning support, such as sensor technology, altered boundary spanners' understanding of their environments and organizations' abilities to control boundary spanning practices, and blurred the boundaries between groups and organizations.
Litchfield et al. (2018)	Quantitative	Team	Team identity predicted intrateam innovative behavior in teams with high reflexivity; the relationship between team identity and interteam innovative behavior was dependent upon reflexivity and team interdependence.

Liu et al. (2013)	Quantitative	Team	Team external learning (i.e., learning through individuals external to the group) was found to be positively related to employee creativity; and team internal learning (i.e., learning through group members) moderated the relationship between team external learning and employee creativity.
Liu et al. (2018)	Quantitative	Team	Informal leader emergence mediated the relationship between an individual's boundary spanning behaviors and their individual performance within a team. Group-level power distance moderated this relationship such that the relationship between boundary spanning behavior and task performance via informal leader emergence was stronger for teams with less power distance.
Magni et al. (2012)	Mixed Methods	Team	Team advice network density had a U-shaped relationship with team adoption of new information technology; the U-shaped effect of closure was dominant when external bridging ties were high, but assumed an inverted U-shaped pattern when external bridging ties were low.
Malin & Hackmann (2019)	Qualitative	System	Cross-sector collaboration on a large-scale project was fostered by restructuring leadership roles both within and between groups in order to focus on integrative leadership (i.e., bringing together different people and groups, sometimes from across boundaries to address complex problems).
Manev & Stevenson (2001)	Quantitative	Team	Boundary spanning behavior connecting with people in other organizations was associated with people's centrality in the organization and their influence over decisions affecting their workgroup. Those individuals who were most influential balanced both internal and external ties.
Markham et al. (1991)	Quantitative	System	Project champions (i.e., individuals who promote, advocate for, or work on behalf of a project during its development) emerged within the organization across different functional areas as well as outside of the organization, in effect transferring necessary resources across boundaries. Projects associated with champions were significantly related to resource bolstering and investment.
Marks et al. (2005)	Quantitative	System	Cross-team action processes were more predictive of MTS performance than within-team action processes. This relationship was further moderated by team interdependence, such that cross-team processes were more important for MTS performance in situations with high interdependence demands.
Marrone et al. (2007)	Quantitative	Team	The extent to which team members assume a boundary spanning role and have high self-efficacy for boundary spanning positively relates to their boundary spanning behavior as does the extent to which their teams' have an external focus.
Martin & Eisenhardt (2010)	Qualitative	System	Existing social networks between managers of different business units made it easier for cross-business unit collaborations to adapt, leading to high-performing collaborations.
Mathieu et al. (2007)	Quantitative	Team	Team-level interdependence and organizational district-level openness climate were positively associated with team performance via teamwork processes. Multi-team coordination negatively interacted with team processes to impact team performance such that the relationship between team processes and team performance was stronger in systems with low levels of team coordination.

McCarthy (2019)	Qualitative	Team	Leaders who engaged in boundary spanning activities were able to provide their constituents with valuable external resources. However, the positive effects of leader boundary spanning were moderated by contextual factors such as norms.
Mell et al. (2019)	Mixed Methods	System	MTS component teams that were primarily system-focused (i.e., used the system to define ingroup and outgroup membership) shared information with all teams equally, whereas teams that were team-focused (i.e., used the team to define in-group and outgroup membership) shared more information with other teams that were also team-focused than teams that were system-focused. The performance of a system-focused team on interdependent tasks was dependent upon the identity focus of the <i>other</i> teams; there is a U-shaped relationship between the number of teams within the MTS with a system-focus and MTS performance.
Melo et al. (2013)	Qualitative	Team	Interteam coordination and intrateam design supported 'agile' team performance.
Meth et al. (2009)	Qualitative	System	Boundary spanning may be an effective strategy to reduce conflict both within intensive care unit (ICU) teams, across ICU teams, and with external stakeholders as it may facilitate communication, resource allocation, and goal alignment.
Millikin et al. (2010)	Quantitative	System	MTSs were most productive when comprised of highly cohesive teams with team members who engaged in self-management.
Mueller (2015)	Qualitative	Team	In project-based organizations, learning was enhanced through formal (i.e., project report databases) and informal knowledge sharing practices (i.e., co-location). It was further demonstrated that characteristics of organizational culture such as trust and team orientation influenced knowledge sharing between project teams.
Murase et al. (2014)	Quantitative	System	The accuracy of leadership team members' cognitions about appropriate interteam coordination patterns (i.e., their multiteam interaction mental models) was positively associated with MTS coordination and performance; this effect was mediated by strategic communication from leadership teams to component teams and the accuracy of component teams' multiteam interaction mental models.
Nakauchi et al. (2017)	Quantitative	Team	The factors influencing knowledge transfer differed depending on whether knowledge transfer was occurring between or within organizational boundaries.
Newell & Swan (2000)	Qualitative	System	Trust was related to knowledge sharing and knowledge creation in interdisciplinary research networks. The authors suggest that the best way to develop trust in these systems is through informal mechanisms (i.e., communication).
O'Sullivan (2003)	Qualitative	System	In a multi-organization multiteam system, the lead organization imposed strict administrative standards for tasks and scheduling, allowing teams to adapt to task interdependencies and develop effective work patterns.

Oh et al. (2004)	Quantitative	Team	Group performance was highest when groups had a moderate level of network closure internally, greater diversity in their connections to other groups, and more connections to the leaders of other groups.
Park & DeShon (2018)	Quantitative	Team	A lack of quality group discussion (i.e., low integrative complexity) can heighten group members' sense of greed and fear toward other groups and increase the likelihood of intergroup competition. Participation in a structured group discussion prompting participants to discuss both cooperative and competitive decisions increased integrative complexity, and decreased greed and fear and intergroup competition. A cooperative discussion leader was only helpful initially – cooperative discussion leaders did not enhance integrative complexity and thus, failed to motivate cooperation over time.
Pedersen et al. (2019)	Quantitative	Team	Employees that had mandates with a global impact, high levels of expertise, and a collaborative orientation in their networking behaviors were more likely to be intra-organizational boundary spanners.
Pendergraft et al. (2019)	Qualitative	System	NASA addressed the evolving demands of MTS collaboration in space exploration in three previous eras of spaceflight by enhancing 1) technical expertise, 2) internal collaborations, and 3) inter-organizational collaborations, placing different emphasis on each adaptation depending on the demands of that era.
Poleacovschi & Javernick-Will (2016)	Quantitative	Team	Individual performance ratings were positively associated with individuals' boundary spanning behaviors outside of their groups.
Porck et al. (2019)	Quantitative	System	Team identification was positively, and MTS identification negatively, associated with system performance. Task complexity moderated these effects such the effects were stronger under conditions of high task complexity and weaker under conditions of low task complexity.
Porck et al. (2018)	Quantitative	System	Organizational identification was positively related to intergroup strategic consensus, whereas team identification was negatively related to intergroup consensus. Team identification also tempered the positive effect of system-identification such that system-identification only facilitated intergroup consensus at low levels of team identification.
Power & Alison (2017)	Qualitative	System	Different agencies in an emergency response MTS prioritized different goal types, however, despite the observed goal conflicts, participants perceived that their interagency goals were aligned with one another.
Qiu (2012)	Quantitative	System	Boundary spanning behaviors enacted by marketing managers improved supply chain (i.e., system) efficiency primarily through the collection and distribution of knowledge.

Quiroz Saavedra et al. (2017)	Qualitative	System	Three regularities were observed with regard to mutual adjustment processes in the initial stages of interteam collaboration: (1) division of roles and responsibilities based on areas of expertise; (2) withdrawal from partner's area of expertise; (3) a relative paucity of direct interaction between groups. However, after a shock to the system, these rules transformed: (1) rather than dividing work based on expertise, the teams worked together directly to find a solution; (2) new links were created to enhance intergroup communication; (3) groups came to function with a coherent joint approach to intervention.
Reddy et al. (2009)	Qualitative	System	A lack of common ground and breakdowns in the transfer of information between teams led to breakdowns in coordination between emergency department and emergency medical services teams.
Richter et al. (2006)	Quantitative	System	Intergroup productivity was higher when boundary spanners identified strongly with their group.
Robertson (1995)	Quantitative	Team	Boundary spanners behaviors may be driven more by goals than by their managers behavior; as boundary spanning behavior increases the impact of the internal work environment on individuals' behavior decreases.
Roussy et al. (2019)	Qualitative	System	Boundary activities such as aligning goals and objectives, boundary spanning, and enhancing boundary permeability (e.g., transmitting information) supported intergroup collaboration.
Salem et al. (2018)	Quantitative	System	Boundary spanning behavior was positively associated with intergroup collaboration between groups which in turn, was positively associated with system learning and creativity.
Schierjott et al. (2018)	Quantitative	Team	Managers' boundary spanning behaviors were positively associated with their entrepreneurial attitudes (i.e., innovation orientation, perceived personal control, need for achievement, and self-esteem).
Schotter & Beamish (2011)	Qualitative	System	Boundary spanning mitigated conflict between headquarters' and subsidiaries in multinational corporations.
Schulz (2001)	Quantitative	Team	New knowledge was found to flow horizontally (i.e., knowledge transfers to peer sub-units), whereas incremental knowledge flowed vertically (i.e., knowledge flows to supervising units). These flows were determined by the amount of uncertainty involved.
Shin et al. (2019)	Quantitative	Team	Team goal orientation (i.e., perception that the team is pursuing team member development) mediated the relationship between team climate and individual boundary spanning behaviors.
Somech & Khalaili (2014)	Quantitative	Team	Boundary-loosening activities (e.g., scouting, intergroup coordinating) and boundary-tightening activities (e.g., buffering, bringing up borders) were both positively associated with team innovation.
Song & Sun (2018)	Quantitative	System	Network structure predicted knowledge management effectiveness at the intergroup level; the task environment (i.e., task variety and task analyzability) predicted knowledge management effectiveness at the intrateam level.

Sullivan et al.,	Quantitative	System	Results of virtual experiments combined with agent-based-modeling (ABM) demonstrate that leadership relationships between pairs of teams in MTSs are negatively impacted by geographic distance (space); although space increases the concentration of divergent leadership ties, space decreases the concentration of convergent leadership ties.
Suprpto et al. (2015)	Quantitative	System	Interteam collaborative processes mediated the relationships between relational attitudes (relational norms, senior management commitment), collaborative practices (team integration and joint working procedures), and the teams' joint capabilities (overall competence and experience) and overall project performance of interdependent systems.
Susskind et al. (2011)	Quantitative	Team	Leaders were more likely to bridge structural holes than team members, yet bridging these structural holes had no effect on individual performance and had a negative impact on team performance.
Takanashi & Lee (2019)	Quantitative	System	Leaders who engaged in boundary spanning practices effectively were better able to mobilize resources that supported R&D system performance.
Taneva et al. (2010)	Mixed Methods	System	Breakdowns in communication and coordination in operating room systems were found to occur at the interteam level rather than the intrateam level.
Tasselli & Caimo (2019)	Quantitative	System	In organizational networks with low hierarchical-differentiation, triadic cyclic closure was associated with transfer of advice across organizational sub-units. In organizational networks with high hierarchical-differentiation, networks defined by triadic transitive closure was associated with the transfer of advice across organizational sub-units.
Thye & Yoon (2015)	Quantitative	System	Perceived organizational support operated as a mechanism that helped employees expand their identity to include the larger organization and enhanced their willingness to engage in interteam activities.
Tippmann et al. (2017)	Quantitative	Team	Boundary spanning across business functional groups led to creative problem solving when collaborators used the expertise of others in new and innovative ways.
Tortoriello et al. (2012)	Quantitative	System	Knowledge acquisition was lower in cross-unit knowledge transfers; however, the negative association between cross-unit transfer and knowledge acquisition became weaker as tie strength, network cohesion, and network range increased.
Uitdewilligen & Waller (2018)	Quantitative	System	High performing MTSs engaged in more collective sensemaking, longer information sharing phases, and more collective information processing. Through these processes the MTSs were able to leverage team members' diverse expertise from various functional groups and act quickly and effectively.
van Bunderen et al. (2018)	Quantitative	Team	Teams with egalitarian power structures were more likely to be united by interteam resource conflicts; whereas teams with hierarchical power structures were more likely to experience intrateam conflict in the face of interteam resource conflict, which decreased team performance.

van der Haar et al. (2015)	Quantitative	System	MTSs that converged their team situation models (i.e., understanding of the current situation) quickly, were better able to adapt to the demands of complex and dynamic performance environments.
van Meerkerk & Edelenbos (2018)	Quantitative	System	A facilitative management style and support from executive-level leaders fostered boundary spanning activities at lower hierarchical levels in a governance network.
Waldman & Atwater (1992)	Mixed Methods	System	Active transformational leadership behavior internally and championing behavior externally — especially by higher level leaders — was critical to R&D project effectiveness in interdependent systems.
Waring et al. (2018)	Qualitative	System	Interteam information sharing was often delayed by limited situation awareness and poor articulation. However, adopting behaviors that promote common frames for understanding interteam capabilities and information requirements improved information sharing and potentially, reduced the cognitive effort required to process information.
Widmann & Mulder (2018)	Quantitative	Team	Intrateam knowledge sharing, team reflexivity, team boundary spanning, and team information storage and retrieval processes were positively associated with team innovative work behavior, and team structure, task interdependence, and potency promoted these effective behavioral processes.
Wijnmaalen et al. (2019)	Qualitative	System	MTS intergroup behavior (i.e., interacting individually or collectively with members of another team in terms of team identity) developed due to (a) boundary spoilers (i.e., those who amplify team boundaries); (b) team-building prior to task performance, and 3) MTS leadership. MTS intergroup behavior ultimately negatively impacted MTS effectiveness.
Wombacher & Felfe (2017)	Quantitative	System	Employees' team and organizational commitment interacted to predict their preference for interteam conflict handling strategies. Moreover, a high commitment to one entity was found to lead to the adoption of dysfunctional conflict handling strategies when interacting with the other entity; integrating conflict handling strategies was most likely when team and organizational commitment were high.
Zhang et al. (2015)	Quantitative	Team	Boundary spanners leveraged communication skills and technical expertise to support communication with external stakeholders. Communication subsequently developed trust and improved opportunities for team project investment.
Zolper et al. (2013)	Mixed Methods	System	Formal and informal boundary spanning roles were more likely to be consistent when formally appointed boundary spanners (a) were legitimate participants of both fields with at least peripheral knowledge of both fields; (b) had the legitimacy to negotiate for both fields; and (c) had an inclination (motivation) to span the boundary.