



# Integrating Formal and Shared Leadership: the Moderating Influence of Role Ambiguity on Innovation

Jonathan C. Ziegert<sup>1</sup> · Scott B. Dust<sup>2</sup>

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## Abstract

This research seeks to integrate traditional formal leadership structures and emerging shared leadership approaches to team leadership to examine how they jointly relate to innovative outcomes in teams. To reconcile contradictory theory and research that views formal leadership as both beneficial and detrimental to informal leadership, we take a contingency-based approach and hypothesize and find that a designated, nominal formal leader is positively related to shared leadership emergence when role ambiguity is high. Additionally, high role ambiguity enhances the indirect effect of designated formal leadership on team innovation via shared leadership. Alternatively, low ambiguity neutralizes the effect of designated formal leadership on shared leadership and the indirect effect on team innovation via shared leadership. These findings help to address conflicting perspectives regarding the linkage of formal leadership and shared leadership and their respective influence on team innovation.

**Keywords** Team leadership · Shared leadership · Formal leadership · Designated leader · Role ambiguity · Innovation

One of the primary benefits of a team is its heightened ability to innovate through members' synergy of ideas and information (West, 2002). Given the ubiquity of team-based arrangements in organizations (Mathieu, Maynard, Rapp, & Gilson, 2008; Maynard & Gilson, 2014) as well as the necessity for organizations to innovate to be competitive, scholars have examined how best to structure a team for innovation (Hülsheger, Anderson, & Salgado, 2009). We contribute to this line of work by focusing on the integration of traditional formal leadership structures of a designated leader with shared leadership structures, whereby multiple individuals within a team exert influence on each other while working toward a

common goal (Carson, Tesluk, & Marrone, 2007; DeRue, Nahrgang, & Ashford, 2015).

Teams engaging in shared leadership are thought to be high-performing because each member claims and grants leadership roles in ways that draw upon their unique knowledge, skills, and abilities (DeRue & Ashford, 2010). Indeed, research suggests a strong, positive relationship between shared leadership and team performance (D'Innocenzo, Mathieu, & Kukenberger, 2016; Nicolaidis et al., 2014; Wang, Waldman, & Zhang, 2014). While shared leadership is a promising team-based concept for enhancing team innovation (Davis & Eisenhardt, 2011; Hoch, 2013), it is unclear how and when a formal, nominal team leader impacts the beneficial processes associated with an informal, emergent leadership structure such as shared leadership (Morgeson, DeRue, & Karam, 2010). This lack of clarity is problematic as team structures often contain both a formal designated leader as well as emergent shared leadership (Ali, Wang, & Johnson, 2020; Hoch, 2013). As a result, understanding the relationship between these elements is important for a more complete picture of leadership in teams. Indeed, scholars have called for research to acknowledge the "coexistence of these two sources of leadership within a team" to "address the interplay of vertical and shared leadership" (Wang et al., 2014, p. 192).

Indeed, prior theory and research suggest contradictory effects of formal leadership on shared leadership and, in turn,

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✉ Jonathan C. Ziegert  
ziegert@drexel.edu

Scott B. Dust  
dustsb@miamioh.edu

<sup>1</sup> Department of Management, LeBow College of Business, Drexel University, 3220 Market Street, Philadelphia, PA 19104, USA

<sup>2</sup> Department of Management, Farmer School of Business, Miami University, 800 E. High St, Oxford, OH 45056, USA

innovation. These differing perspectives highlight a gap in the understanding of leader structures in teams (D’Innocenzo et al., 2016). On the one hand, when there is no formal leader, scholars suggest that shared leadership is limited as “someone has to have the final say” (Pearce, Conger, & Locke, 2008, p. 284). That is, when it is unclear who is ultimately responsible for a team, conflict or coordination issues could surface (Anderson & Willer, 2014; Ingvaldsen & Rolfsen, 2012), which thwarts the innovative capacities stemming from shared leadership (Dust & Ziegert, 2016). Complementing these propositions, research demonstrates that coaching leadership behaviors by a nominal leader is positively related to shared leadership (Carson et al., 2007). On the other hand, scholars suggest that designating a formal leader should be negatively associated with shared leadership (Pearce & Sims, 2002). A core feature of shared leadership is that team members enact leadership when their knowledge, skills, and abilities align with the demands of the current situation (Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009). Designating a team leader could stifle the development of shared leadership because the shared expectation for ongoing exchanges of leadership and followership is disrupted by the introduction of a formal hierarchy (Pearce & Sims, 2002). Research evaluating team communication supports these propositions, such that members are more likely to defer to the nominal leader and less likely to offer input or attempt to influence when a formal leader is present (Tost, Gino, & Larrick, 2013). Given these contradictory perspectives, our objective is to address this confusion by reconciling these prior findings. Scholars have encouraged research along these lines given the complex interplay of vertical and shared leadership as “the nature of shared leadership might be different in cases whether the formal leader is involved or not” (Zhu, Liao, Yam, & Johnson, 2018, p. 845). We specifically address these points through an examination of how the presence of a formal leader influences shared leadership.

In particular, we take a contingency approach (Donaldson, 2001) to integrate these opposing perspectives on the impact of a formal leader on shared leadership. We hypothesize that the impact of a formal leader on the amount of shared leadership, and ultimately team innovation, is dependent upon factors associated with the team (Mathieu et al., 2008); specifically, the extent to which roles are ambiguous (i.e., responsibilities and authority are unclear; Rizzo, House, & Lirtzman, 1970; Eys & Carron, 2001). More specifically, we propose that when role ambiguity is high, having a designated formal leader is beneficial; it helps team members overcome coordination issues and begin the efficient sharing of leadership roles, which eventuates in innovative outcomes. Alternatively, we propose that when role ambiguity is low, having a designated formal leader is detrimental as it can increase conflict and dampen motivation. Team members already feel comfortable with their level of responsibility and

authority, and imposing a hierarchy may disrupt shared leadership and in turn innovation.

Prior research illustrates that ambiguity limits individuals’ capacities to match appropriate behaviors with task-specific requirements, thereby lowering performance (e.g., Fisher & Gitelson, 1983; Jackson & Schuler, 1985; Tubre & Collins, 2000). Alternatively, role clarity (i.e., low role ambiguity) can substitute for leadership (Kerr & Jermier, 1978). We take a different direction and extend this body of work on role ambiguity by evaluating its impact on team leadership structures. That is, instead of focusing on the direct or substitution effects of ambiguity, we focus on role ambiguity as a moderator in terms of how it facilitates the impact of formal leadership on shared leadership emergence in terms of the overall leadership structure in the team. We believe that the focus of role ambiguity helps to address divergent findings regarding the relationship between formal and shared leadership.

By addressing existing discrepancies in theory and research on the relationship between formal and shared leadership, and the resulting team outcomes through the consideration of role ambiguity, we make several contributions to leadership and teams literature. First, we contribute to the leadership literature by addressing a fundamental question about leadership structures: *Are formal leaders helpful or harmful for shared leadership emergence?* (Locke, 2003; Morgeson et al., 2010). To do so, we take a contingency perspective (Donaldson, 2001), examining the influence of role ambiguity; a variable known for its strong, consistent influence on both team processes and team outcomes (Fisher & Gitelson, 1983; Jackson & Schuler, 1985). Second, prior work examining shared leadership rarely specifies whether a formal team leader is included or excluded from conceptualizations and/or operationalizations of the construct (Dust & Ziegert, 2016; Gronn, 2015). Extending prior work that either incorporates a formal leader (i.e., Carson et al., 2007) or does not appoint a leader (i.e., DeRue et al., 2015), we explicitly compare teams that designate versus do not designate a formal leader at the onset of team formation. In doing so, we extend prior work that has taken either approach in isolation to help clarify the interplay of these constructs; specifically, when and how formal leaders contribute to the potential innovative outcomes associated with shared leadership (Wang et al., 2014). Third, some studies pit formal leadership and shared leadership against each other, evaluating which form of leadership is more influential in team success (e.g., Hoch & Kozlowski, 2014; Morgeson et al., 2010; Pearce & Sims, 2002). Our work instead aims to integrate the two perspectives and suggests that they need not be mutually exclusive and can instead supplement each other under certain circumstances (i.e., high role ambiguity). Fourth, preliminary evidence suggests a connection between both formal leadership (Hülsheger et al., 2009) and shared leadership (Hoch, 2013) with team innovation. However, the extent to which these different leadership forms link together to influence

innovation is unclear (Pieterse, van Knippenberg, Schippers, & Stam, 2010). In particular, we extend the leadership and innovation literature by examining the conditions under which a formal leader impacts innovative outcomes through alternative leadership structures such as shared leadership (Gebert, Boerner, & Kearney, 2010).

## Formal Leadership and Shared Leadership

Formal leadership consists of a singular nominal leader that is designated within a unit (Bass & Bass, 2008). Complementing this traditional approach, scholars have conceptualized leadership from an informal perspective, examining how multiple individuals within a unit collectively provide goal-directed influence (Contractor, DeChurch, Carson, Carter, & Keegan, 2012; Denis, Langley, & Sergi, 2012; Dust & Ziegert, 2016; Wang, Han, Fisher, & Pang, 2017; Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012). As an informal form of leadership, we specifically focus on shared leadership, “an emergent team property of mutual influence and shared responsibility among team members, whereby they lead each other toward goal achievement” (Wang et al., 2014, p. 181). As an emergent property, shared leadership consists of an informal claiming and granting of leadership based on individuals’ knowledge, skills, and abilities (DeRue & Ashford, 2010). In this regard, we focus on the amount of shared leadership or the quantity of leadership that is displayed by team members other than the formal leader.

Theory and research examining the relationship between formal and informal leadership have been mixed. Broadly, two general perspectives have emerged in the hierarchy literature that extoll either the benefits or the detriments of a single hierarchical individual (Anderson & Brown, 2010; Anderson & Willer, 2014; Greer, Van Bunderen, & Yu, 2017). On the one hand, leadership scholars suggest that leadership cascades from a formal leader to team members (Bass, Waldman, Avolio, & Bebb, 1987; Margolis & Ziegert, 2016), while on the other hand suggesting that a formal leader stifles the emergence of collective forms of leadership (DeRue & Ashford, 2010; Pearce et al., 2008). We explore both these positive and negative effects of formal leadership on shared leadership and suggest that they can be integrated through the consideration of role ambiguity.

## Benefits of Formal Leadership for Shared Leadership

Designating a formal leader creates a sense of hierarchy, “an implicit or explicit rank order of individuals or groups with respect to a valued social dimension” (Magee & Galinsky, 2008, p. 354). Hierarchy acts as a powerful differentiator because formal rank is a highly valued social dimension (Tarakci, Greer, & Groenen, 2016). This formalized

leadership hierarchy is a salient reference point in teams as group members instinctively rank order the degree to which each member influences others (Anderson & Brown, 2010). Prior studies have examined the naming of a designated leader as the primary form of hierarchical differentiation (e.g., Blinder & Morgan, 2008; Roby, Nicol, & Farrell, 1963; Tarakci et al., 2016).

The benefit of hierarchical differentiation through formal leader designation is increased coordination within the team (Anderson & Willer, 2014; Halevy, Chou, & Galinsky, 2011; Magee & Galinsky, 2008). When teams are without a clear formal leader, members can compete with one another through status contests, which inhibit proper team functioning (Anderson & Willer, 2014; Bendersky & Hays, 2012). Alternatively, designating a formal leader reduces hyper-competitive behaviors among team members stemming from status contests (Bernstein, 1981). Specific to shared leadership emergence, instead of team members expending psychological resources for status, they can immediately begin focusing on contributing to the goals of the team through mutual and reciprocal influence.

The presence of a designated formal leader also facilitates increased order and stability within the team (Magee & Galinsky, 2008). In particular, formal leaders have the final say when the team reaches a stalemate and the authority to reconcile team members’ task conflicts. Such order mitigates problematic communication, coordination, and decision-making issues, which is central to the development of shared leadership (Dust & Ziegert, 2012, 2016; Ingvaldsen & Rolfsen, 2012). Such an environment is critical for shared leadership (Denis et al., 2012; DeRue et al., 2015), as it engenders team members’ receptivity to the claiming, granting, and sharing of leadership roles among team members (DeRue & Ashford, 2010).

This environment is also ideal for initiating a cascading process whereby leadership flows from the designated leader to other team members (Bass et al., 1987; Chun, Yammarino, Dionne, Sosik, & Moon, 2009; Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009). Social learning theory (Bandura, 1977; 1986) helps explain this cascading leadership process (Bass et al., 1987). A key feature of social learning theory is role modeling, whereby individuals emulate the behaviors of an individual that holds an attractive position, such as a formal, designated leadership role. Given that “leaders often serve as role models for determining acceptable and appropriate behavior” (Mayer et al., 2009, p. 3), the designated leader is likely to become the focal point for team member social learning. This perspective provides a linkage between structured and emergent elements of leadership, thereby illustrating the benefits of both formal and informal approaches (Denis et al., 2012).

Seeing a proximal team member engage in leadership behaviors is especially influential in increasing individuals’

beliefs in their abilities (Bandura, 1986). As the designated leader models productive leader behaviors, it increases team members' efficacy and motivation to be leaders themselves (Chan & Drasgow, 2001). Thus, as designated leaders engage in leadership behaviors, through social learning processes, team members are more likely to eventually display and exhibit their own leadership behaviors (Bass et al., 1987). In support of this social learning perspective, prior research illustrates that followers eventually engage in collective action after interpreting and reacting to the cues of their leader (Hoch, 2013; Margolis & Ziegert, 2016).

Leadership research has demonstrated this beneficial effect of formal leadership on informal leadership structures. Carson et al. (2007) found that an external leader's coaching was positively related to shared leadership. Research has also demonstrated that the quality of a formal leader's relationship with subordinates (i.e., leader-member exchange) relates to team members' informal leader emergence (Zhang, Waldman, & Wang, 2012). Finally, work has generally illustrated a positive correlation between formal leadership and shared leadership (Hoch & Kozlowski, 2014; Pearce & Sims, 2002).

### Detriments of Formal Leadership for Shared Leadership

Theory and research also exist suggesting that formal leadership will reduce the likelihood of teams engaging in informal, shared leadership. Formal leaders can hinder the claiming and granting of leadership roles by team members (DeRue & Ashford, 2010). An individual designated with a formal leader title will be more likely to enact leadership behaviors compared to team members without this formal title. Additionally, when teams have a formal leader, they focus on authority cues for determining leadership behaviors (Wellman, 2017). As team members defer to formal leaders, and in turn such leaders dominate communication, team members hesitate to speak up and provide their ideas or influence (Tost et al., 2013). Thus, increased hierarchy through a formalized leader can dampen team members' participation within the team, thereby lowering the opportunity for their leadership to emerge (Wellman, 2017). Indeed, DeRue and Ashford (2010) conclude that "for any given formal relationship in an organization, the person in the supervisory position is more likely to claim a leader identity and grant a follower identity to the subordinate. In parallel, the subordinate is more likely to claim a follower identity and grant a leader identity" (p. 640).

Research on hierarchies also illustrates that inequalities in status or power relate to team conflict (e.g., Greer et al., 2017), which in turn, reduces the likelihood of shared leadership (Dust & Ziegert, 2016). Imposed team hierarchies perpetuate power struggles, with the formal leader attempting to retain power at the expense of team members (Van Bunderen, Greer, & Van Knippenberg, *in press*). Similarly, formal leaders may

attempt to protect their high-power position by hoarding information or insight (Bunderson & Reagans, 2011) which reduces intra-team communication or collaboration (Greer et al., 2017). Indeed, a recent meta-analysis illustrated that hierarchy negatively impacts team performance due to increased levels of conflict (Greer, de Jong, Schouten, & Dannals, 2018). In summary, formalized leadership structures that reflect these hierarchical arrangements should reduce the likelihood of informal shared leadership emergence among team members (DeRue & Ashford, 2010).

### The Moderating Impact of Role Ambiguity

Ambiguous roles can impact the effect of hierarchy on team functioning (Greer et al., 2018). Given evidence indicating that formal leadership can both be beneficial and detrimental to informal shared leadership of team members, we take a contingency approach and suggest role ambiguity moderates the relationship between formal leadership and shared leadership (Donaldson, 2001). When members are unclear about the responsibilities and authority within the team, the positive coordination and modeling effects of a formal leader are especially useful. However, when ambiguity is low such that members know their roles, the presence of a formal leader can become problematic. That is, we suggest that formal leadership is beneficial and positively related to shared leadership when role ambiguity is high and formal leadership is detrimental and negatively related to shared leadership when role ambiguity is low.

Role ambiguity focuses on uncertainty about duties and behavioral requirements (Rizzo et al., 1970). More specifically, role ambiguity entails the extent to which individuals are unclear about their responsibilities and job-related information and requirements (Breaugh & Colihan, 1994; King & King, 1990). When role ambiguity is high, team members are unsure who does what in the team, how functions should be completed, and how to prioritize responsibilities (Eys & Carron, 2001; Rizzo et al., 1970). The lack of shared understanding associated with high role ambiguity makes it difficult for team members to identify and leverage each other's expertise (Espinosa, Slaughter, Kraut, & Herbsleb, 2007). When team members are unfamiliar with each other, there is a reduced understanding of team members' skills, styles, and perspectives (Littlepage, Robison, & Reddington, 1997). Furthermore, individuals are typically less committed and less involved when roles are ambiguous (Jackson & Schuler, 1985). Research suggests that formal leadership addresses these team-based challenges that role ambiguity presents (Rizzo et al., 1970). In particular, the coordination function fulfilled by a formal leader "provides a psychologically appealing kind of order" (Magee & Galinsky, 2008, p. 358). The authority and direction of formal leaders



ensure there is a suitable underlying social structure for efficient communication and coordination (Anderson & Willer, 2014).

Helping behavior among team members is lower when role ambiguity is high (Eatough, Chang, Miloslavic, & Johnson, 2011). Formal leadership can overcome this challenge by fostering helping behaviors, which is central to shared leadership structures (Wang et al., 2014). Additionally, when role ambiguity is high, directive leadership behaviors by a formal leader are more salient and positively impact subordinates' behavior (Newman, Allen, & Miao, 2015). Given that role ambiguity is a stressor (Gilboa, Shirom, Fried, & Cooper, 2008), formal leadership can reduce this stress by clarifying information and, in turn, allowing individuals to focus their efforts on sharing leadership.

When role ambiguity is low, however, the designation of a formal leader is likely to have a detrimental impact on the development of shared leadership. Teams with low role ambiguity have a clear understanding of what needs to be done, how others will receive their actions, and who has the responsibility to complete certain responsibilities (Eys & Carron, 2001; Rizzo et al., 1970). As a result, no designated leader is needed as the sharing of leadership can facilitate coordination (Guenter, Gardner, Davis McCauley, Randolph-Seng, & Prabhu, 2017). Indeed, role clarity is a substitute for leadership (Kerr & Jermier, 1978), so additional formal leadership becomes redundant. Thus, when role ambiguity is low, team members already have clarity regarding objectives and expectations and are already prepared to begin engaging as leaders when their knowledge, skills, and abilities align with situational needs. A formal hierarchy can, therefore, increase conflict and in turn decrease the motivation among team members to engage in leadership behaviors (Greer et al., 2018). The mutual and reciprocal influence inherent in shared leadership flourishes when team members embrace the collective understanding that everyone can contribute as a leader (DeRue & Ashford, 2010). Designating a formal leader may signal to team members that they are not expected to act as a leader, but fall in line as a follower (Connelly, Certo, Ireland, & Reutzel, 2011; DeRue & Ashford, 2010). Pairing such a signal of authority with a relatively unambiguous work situation creates normative expectations that structure and order are paramount and that emergent leadership is unsanctioned (Carnabuci, Emery, & Brinberg, 2018). Furthermore, team members engaging in shared leadership manifest feelings of empowerment as they leverage knowledge, skills, and abilities to influence others (Margolis & Ziegert, 2016). Thus, incorporating formal leadership will be viewed with scrutiny and skepticism, as team members will be particularly attuned to the fact that such hierarchy takes away from the fulfilling nature of self-directed work. As a result, increased conflict is likely with a formal leader when role ambiguity is low (Greer et al., 2018). As such, we propose that:

Hypothesis 1: Role ambiguity moderates the effect of designated formal leadership on the amount of shared leadership, such that the effect will be positive when role ambiguity is high (H1A) and negative when role ambiguity is low (H1B).

## Leadership Structure and Team Innovation

The ability to draw from the diverse backgrounds and perspectives of team members stimulates innovation (Gebert et al., 2010; Hülshager et al., 2009; West, 2002). Shared leadership enables teams to leverage this form of human capital, making it more likely that a team member succeeds at the task at hand (Friedrich et al., 2009). Katz and Kahn (1978) supported this assertion and noted that "the group utilizing its informational and experiential resources most fully will be most effective... the sharing out of the leadership function means using more fully the resources of the organization" (p. 571).

Extending this line of reasoning, the law of the situation (Follett, 1924) suggests that when shared leadership is high, individuals with the most requisite knowledge and skills for a given situation lead the team. Indeed, this idea of expertise is at the core of shared leadership, as Friedrich et al. (2009) note that, "team members typically bring diverse skills and expertise to the table, which is an important precondition to the selective emergence of different individuals in the leadership role" (p. 934). This enactment of leadership among those who are the most competent in a particular situation ensures that teams can best utilize their human capital, particularly for innovative tasks that require diverse perspectives (Tarakci et al., 2016).

Members are more likely to leverage their diverse backgrounds and contribute to the innovation process when team norms encourage participative decision-making (West, 2002). Shared leadership embraces this participative action because members consistently engage in mutual influence by proposing ideas and offering opinions (Denis et al., 2012; Gebert et al., 2010). As a result, shared leadership can foster information elaboration (van Ginkel & van Knippenberg, 2008) in terms of improved integration of diverse information and perspectives (Hoch, 2013; Hoch, Pearce, & Welzel, 2010). This elaboration of information is a key predictor of innovation (van Knippenberg, 2017).

Additionally, shared leadership reduces the likelihood that a single member's perspective will be disproportionately valued (Carson et al., 2007). Instead, shared leadership ensures diversity of thought, whereby many members' opinions and ideas are given consideration (Dust & Ziegert, 2012, 2016). This ability for all members to influence one another should increase positive attitudes associated with information sharing (Wang et al., 2014) and better leverage the uniqueness of each member's human

capital (Yammarino et al., 2012). Scholars have noted the connection between shared leadership and creativity (Ali et al., 2020; Mainemelis, Kark, & Epitropaki, 2015), and research has demonstrated that shared leadership is related to innovation (Davis & Eisenhardt, 2011; Hoch, 2013). As such, we propose that:

Hypothesis 2: The amount of shared leadership is positively related to team innovation.

Prior research on the relationship between formal leadership and team innovation has been somewhat inconclusive as some research demonstrates positive effects and other research demonstrates negative effects (Pieterse et al., 2010). Indeed, meta-analytic evidence reports significant heterogeneity in the relationship between leadership and innovation (Rosing, Frese, & Bausch, 2011). This variability in the results of this relationship suggests that moderating and/or mediating factors may play a role. Furthermore, scholars have called for research on the extent to which shared leadership mediates the impact of formal leadership on outcomes, suggesting the need to simultaneously examine hierarchical and shared leadership in relation to team functioning (Gebert et al., 2010; Wang et al., 2014). To address these issues, we integrate our prior hypotheses and propose that role ambiguity conditionally moderates the indirect effect of designated leadership on team innovation via shared leadership.

We build from Gebert et al.'s (2010) call for examining opposing action strategies coupling directive and delegative leadership to foster innovation. If a team has undefined and uncertain roles, a formal leader provides the essential coordination and stability necessary to overcome the ambiguity (Anderson & Brown, 2010). This coordination facilitates the enactment of shared leadership, which then fosters collaborative team processes (D'Innocenzo et al., 2016). Specifically, shared leadership empowers team members, allowing them to take control and make a difference, which are key factors for generating innovative behaviors (Burpitt & Bigoness, 1997; Pieterse et al., 2010). Alternatively, when role ambiguity is low, team members are less likely to benefit from the leadership structure imposed by designating a formal team leader. That is, a designated formal leader may disrupt the team members' ability to self-organize in ways that facilitate mutually beneficial claiming and granting of leadership, which in turn, reduces the likelihood of innovation (DeRue & Ashford, 2010; Donaldson, 2001). As such, we propose that:

Hypothesis 3: Role ambiguity conditionally moderates the indirect effect of designated formal leadership on team innovation via shared leadership; the indirect effect will be positive when role ambiguity is high (H3A) and negative when it is low (H3B).

## Method

### Sample and Procedure

We examined our hypotheses in a sample of engineering student teams at a large Northeastern university in the USA. Over a 10-week term, the student teams completed a course project focused on formulating a design solution to an open-ended engineering problem of their choosing (with the approval of their instructor). Examples of projects include developing an automatic pet feeder, monitoring sound pollution, and evaluating a concussion mouth guard. Students worked as a team to evaluate existing solutions to the problem, develop design constraints, and design and implement an engineering design solution. This design project was structured as a team experience whereby members worked through an open-ended problem and developed a solution throughout the entirety of the term. To solve the design problem, team members needed to work together to gather information, communicate this information to each other, negotiate a method for a solution, and implement the solution.

This sample is beneficial as it enables team members to work closely throughout the 10 weeks for the duration of the project task, which is similar to a project team in organizational settings. Furthermore, this sample allowed individuals to focus their time and effort on a single team, rather than multiple teams as is common in many organizations. This single team focus created an environment where everyone had the opportunity to demonstrate leadership given an equal time commitment and a single, specific deliverable. Furthermore, the deliverables associated with this team project (e.g., proposal, final report, presentation) accounted for 75% of the final course grade. Thus, the sample participants were significantly invested in producing high-quality deliverable. The students chose their team members but were limited to a maximum team size of five members. This is an introductory course of an ongoing thematic sequence for engineering students. Thus, familiarity among team members is relatively low compared to more senior students. Students completed an online survey at the beginning (2 weeks), middle (5 weeks), and end (10 weeks) of the project.

A total of 828 students were enrolled in the course. We removed participants for several reasons: (1) 22 participants were removed because they did not remain with the same team throughout the term; (2) 270 participants were removed who did not respond correctly to an attention check question at all three time points (Huang, Liu, & Bowling, 2015; Meade & Craig, 2012); (3) 78 participants were removed because they did not complete the surveys at one of the three time points; and (4) 34 participants were removed who were members of two-person teams. After these removals, 424 participants (51.2%) remained to comprise 120 teams. These 120 teams consisted of 480 members (team size: average = 4.0; min = 3;

max = 5; SD = .70) representing a within team response rate of 88.33%. This high response rate is critical, as we used a density score to measure collective leadership (Wasserman & Faust, 1994). Participants were predominately male (74%) with a mean age of 18.73. Participants represented a variety of ethnic backgrounds (56.7% White, 28.5% Asian, 7.1% Hispanic/Latino, 4% Black/African-American, 3.1% Native American, and 0.6% other/not identified).

## Measures

All measures utilized a seven-point Likert scale ranging from strongly disagree to strongly agree, except for the instructors' rating of innovation, which utilized a five-point scale.

### Designated Leader

Teams formed during the first week of the project and were given general project instructions. Teams in half of the course sections received instructions similar to previous studies (i.e., Tarakci et al., 2016) to choose a designated leader. The instructions indicated that the designated team leader would be responsible for delegating and assigning tasks, setting the structure and direction of the team, planning deadlines, coordinating tasks among team members, and fostering a supportive climate. Furthermore, the instructions noted that while the designated leader would oversee the success of the project and team needs, she/he would not make all of the decisions on the project. Furthermore, several examples of team leaders' potential roles were provided, including coordinating the project proposal with the team to meet the course requirements, making sure team members felt comfortable sharing ideas, and meeting project deadlines.

Teams in the other half of the course sections did not receive any instructions regarding designating a team leader. The sections were randomly assigned to either the designated leader or no leader conditions and all of the teams within each section received the same manipulation (i.e., to either have a designated leader or no instruction). Teams were not randomly assigned within section given concerns about contamination of the manipulation, such that participants would be able to observe other teams who may or may not have a designated leader. By keeping the random assignment at the section level, individuals could only observe other teams within the same condition. As the teams are nested within section for this manipulation, we examined the impact of this non-independence as described in our analytical approach.

There were several three-person teams in the designated leader condition. These teams were excluded from the analyses given that our shared leadership density score (described below) required a minimum of three team members (not including the designated leader). Thus, there were fewer teams in the designated leader condition ( $N = 44$ ) compared to teams

in the no leader condition ( $N = 76$ ). For the analyses, we coded the designated leader condition as "1" and the no leader condition as "0" (mean = .37, SD = .48). As a check of the manipulation, we examined the average leadership rating of the designated leader ( $m = 5.98$ ; SD = .71) compared to the leadership rating of other team members ( $m = 5.58$ ; SD = .57) based on the round-robin leadership ratings by team members (see the shared leadership measure described below). As expected, the designated leader was rated higher in leadership than other members of the team (mean difference = .40,  $p = .003$ ; Cohen's  $d = .62$ ).

### Role Ambiguity

Near the beginning of the team project (week two), participants indicated perceptions of role ambiguity using a slightly modified version of Rizzo et al.'s (1970) six-item scale ( $\alpha = .89$ ). The six items were reverse coded: "I feel certain about how much authority I have," "There are clear, planned goals and objectives for my role," "I know that I have divided my time properly," "I know what my responsibilities are," "I know exactly what is expected of me," and "Explanation is clear of what has to be done."

### Shared Leadership

Similar to prior research (Carson et al., 2007; Mehra, Smith, Dixon, & Robertson, 2006), we measured shared leadership using a social network approach (Mayo, Meindl, & Pastor, 2003). Specifically, we examined density to align with our focus on the quantity of leadership behaviors by team members (D'Innocenzo et al., 2016). During the middle of the team project (week five), participants were asked to consider the leadership of each team member (Carson et al., 2007) and rate the extent to which: "This individual is a Leader – S/he influences the team in order to reach its goals." This item is ideal for measuring shared leadership as it aligns with definitions of leadership (i.e., influence toward goal-directed behavior) and allows for an emergent, multi-level understanding of leadership (Carson et al., 2007). We created the density measure of shared leadership by calculating the proportion of reported tie strengths to the total possible tie strengths among team members (Oh, Chung, & Labianca, 2004). The density score proportion range was between .51 and 1 in our sample, where increasing scores reflect when more team members rate other team members as exhibiting leadership, which represents higher amounts of shared leadership (Sparrowe, Liden, Wayne, & Kraimer, 2001). For teams in the designated leader condition, the ratings of the designated leader were excluded from the density calculation. This approach ensures that the teams' density scores are not artificially inflated by the designated leader. As a robustness check, we also examined density

scores that included ratings of the designated leader, and the results remained the same.

### Team Innovation

We employed two team innovation measures, one internally rated based on team members' ratings, and the other externally rated based on instructors' ratings. For the internal team member version, at the end of the project (week 10), participants indicated perceptions of team innovation using a four-item scale ( $\alpha = .92$ ) that was slightly modified from De Dreu and West's (2001) measure. The items included "Team members often implement new ideas to improve the quality of our product," "This team gives little consideration to new and alternative methods and procedures for doing our work," (reverse coded) "Team members often produce new methods and procedures," and "This is an innovative team." Cronbach's alpha for the measure was relatively low ( $\alpha = .61$ ) due to the inclusion of the reverse-coded item. Thus, we dropped the reverse-coded item and used a three-item scale with improved reliability ( $\alpha = .92$ ). As a robustness check, we repeated the analysis to ensure that dropping this item did not alter the hypothesized results. Findings using the four-item scale were the same as using the three-item scale.

After the projects concluded (week 11), course section instructors scored the design project using a standardized grading rubric. The instructors also rated the innovativeness of the team's design solution deliverable using three items that were not included as part of the team's overall grade. The three items were derived from Im and Workman's (2004) six-item new product novelty and creativity scale and include the following: "This project is really out of the ordinary," "This project shows an unconventional way of solving problems," and "This project provides radical differences from norms." The scale demonstrated appropriate reliability ( $\alpha = .87$ ).

### Team Size

We controlled for the number of team members on each team. Team size may influence the extent to which information can be shared (Haleblian & Finkelstein, 1993), which may impact perceptions of leadership influence or role ambiguity.

### Analytical Approach

Our hypotheses are at the team level, thus, we calculated  $r_{wg(j)}$ , ICC(1) and ICC(2) values for the variables. The results provided justification for aggregation for role ambiguity (median  $r_{wg(j)} = .78$ , ICC(1) = .08, and ICC(2) = .19), leadership ratings (median  $r_{wg(j)} = .80$ , ICC(1) = .15, and ICC(2) = .34), and team innovation (median  $r_{wg(j)} = .72$ , ICC(1) = .19, and ICC(2) = .40). While the ICC(1) was significant based on a one-way ANOVA for all variables, the low ICC(2) values are

a function of the small size of the teams (Bliese, 2000). Overall, the results provide justification for aggregating to the team level given that the values suggest "very strong agreement" (LeBreton & Senter, 2007).

We used hierarchical regression within PROCESS version 2 (Hayes, 2013, 2015) to test the relationships between shared leadership and team innovation. To test the moderating effect of role ambiguity, we used hierarchical regression within PROCESS and also conducted a simple slopes analysis. To test the overall moderated mediation model, we used Hayes (2013, 2015) PROCESS bootstrapping macro. We calculated bias-corrected confidence intervals on the conditional indirect effect of role ambiguity on the indirect effect of designated leadership on team innovation through shared leadership using 5000 bootstrap re-samples. The effect is considered significant when the 95% confidence interval excludes zero.

Teams were nested within section for both the manipulation as well as instructors for the external innovation rating (each section instructor rated an average of 5.71 teams). We therefore tested for the impact of this nesting by conducting a multi-level analysis using HLM. The null model of external innovation ratings by instructor did not explain a significant amount of variance ( $\sigma^2 = 00$ ,  $p = 1.00$ ). Given that instructors did not account for a significant amount of variance in innovation ratings, we proceeded to examine the results using hierarchical regression. As an additional check, we also ran the analyses using HLM and the results were consistent.

## Results

The zero-order correlations among the study variables are summarized in Table 1, and the results of the regression analyses (based on PROCESS) to test hypothesis 1 are summarized in Table 2. The mean levels of role ambiguity were not significantly different (difference = .07,  $p = .452$ ) between teams with a designated leader (mean = 2.65) and teams without one (mean = 2.72). Hypothesis 1 proposed that role ambiguity would moderate the relationship between designated formal leader and shared leadership, and this interaction was significant ( $b = .10$ ,  $p = .004$ ). To interpret the interaction effect, we conducted a simple slopes analysis. As depicted in Fig. 1, the slope became steeper and remained significant as role ambiguity changed from the mean ( $b = .04$ ,  $p < .001$ ) to high levels (+ 1 SD:  $b = .09$ ,  $p < .001$ ) and became flatter and non-significant as role ambiguity changed from the mean to low levels (− 1 SD:  $b = -.01$ ,  $p = .464$ ). Hypothesis 1a was therefore supported, as the designated leader condition was positively related to shared leadership when role ambiguity was high. However, hypothesis 1b was not supported. Instead of low ambiguity fostering a negative relationship, it neutralized the positive relationship between designated leadership and shared leadership.



**Table 1** Zero-order correlations and descriptive statistics

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Number of team members	4.01	.70	--					
2. Designated leader condition	0.37	.48	.19*	–				
3. Shared leadership	0.76	.10	–.12	.16	--			
4. Role ambiguity	2.68	.52	–.04	–.06	–.20*	(.89)		
5. Internally rated innovation	5.08	.57	–.04	–.05	.30**	–.20*	(.92)	
6. Externally rated innovation	3.42	.78	.00	.17	.31**	.02	–.05	(.87)

Note: *N* = 120. \**p* < .05 (two-tailed). \*\**p* < .01 (two-tailed). Cronbach's alpha listed along the diagonal. For the designated leader condition, 1 = designated leader and 0 = no designated leader

Hypothesis 2 proposed that shared leadership would be positively related to team innovation. This hypothesis was supported (see Table 2), as shared leadership explained a statistically significant amount of variance in both internally rated innovation ( $b = 2.96$ ,  $p < .001$ ) and externally rated innovation ( $b = 2.44$ ,  $p = .001$ ).

As an omnibus test, hypothesis 3 proposed that role ambiguity acts as a conditional moderator of the indirect effects of designated leadership on internally rated and externally rated team innovation through shared leadership. There was a positive indirect effect of designated leadership on innovation at mean levels of role ambiguity (internally rated: point estimate = .108;  $SE = .059$ , 95% CI [.005, .247]; externally rated: point estimate = .89;  $SE = .057$ , 95% CI [.008, .240]), and the effects increased and remained significant as role ambiguity increased (internally rated: + 1 SD: point estimate = .256;  $SE = .091$ , 95% CI [.111, .483]; externally rated: + 1 SD: point estimate = .211;  $SE = .090$ , 95% CI [.068, .441]). Therefore, hypothesis 3a was supported. Alternatively, as role ambiguity decreased, the indirect effects of designated leadership on innovation were negative, but not statistically significant (internally rated: – 1 SD: point estimate = –.041,  $SE = .077$ , 95% CI [–.207, .097]; externally rated: – 1 SD: point estimate = –.034,  $SE = .064$ , 95% CI [–.178, .087]). Therefore, hypothesis 3b was not supported as it only neutralizes the positive relationship between designated leadership and team innovation via shared leadership.

## Discussion

### Theoretical Implications

Our study contributes to leadership literature by helping reconcile conflicting perspectives regarding the relationship between formal leadership and shared leadership. On the one hand, formal leadership should facilitate superior coordination, allowing team members to more clearly understand their work environment so that they can exhibit leadership when it is appropriate to do so (Anderson & Brown, 2010; Anderson

& Willer, 2014). On the other hand, injecting formal leadership sends strong signals regarding status and order, which can increase conflict within the team, and can disrupt team members' understandings regarding the importance of engaging in leadership themselves (DeRue & Ashford, 2010). To reconcile these contrasting perspectives, we offer a contingency-based approach (Donaldson, 2001), illustrating that formal leadership facilitates shared leadership when there is ambiguity surrounding members' respective roles and responsibilities (Anderson & Willer, 2014). These findings also build on recent work that integrates the benefits and detriments of formalized leadership and hierarchy (Greer et al., 2017, 2018). We illustrate the importance of ambiguity for understanding the positive and negative effects of hierarchical structures (Greer et al., 2018). Specifically, we extend prior work by manipulating the presence or absence of a formal leader to illustrate how hierarchical structures influence shared leadership (Tarakci et al., 2016).

This finding also helps to reframe the focus of role ambiguity with regard to leadership in teams. While prior work has demonstrated that low role ambiguity (i.e., role clarity) can substitute for formal leadership (Kerr & Jermier, 1978) and how formal leadership can reduce role ambiguity (House, 1996), the current study highlights how role ambiguity can influence team-based leadership structures as a moderator. That is, the results suggest that low role ambiguity can be a mitigating factor such that it neutralizes the relationship between formal leadership and shared leadership. These findings further highlight the importance of understanding team member role clarity, as it impacts the potential leadership behaviors of all members, not just the formal leader.

Building on this contribution, another implication of the study is the complementarity of two seemingly disparate team leadership structures: a hierarchical leadership structure through formal leadership designation, and a collectivistic leadership structure through shared, mutual leadership influence among team members (Gebert et al., 2010). Simultaneously investigating these structures is important for two reasons. First, research on multi-leader teams typically ignores the role of a designated leader (Morgeson et al., 2010;

**Table 2** Results of the moderated mediation analyses (PROCESS: Model 7)

Model	Coeff.	SE	<i>t</i>	<i>p</i>	LCI	UCI	<i>R</i> <sup>2</sup>
Mediator variable model: shared leadership							
Constant	1.03**	.07	14.56	.000	0.887	1.166	0.15
Number of team members	-.02	.01	-1.74	.084	-0.398	-0.047	
Designated leader condition	-0.22*	.09	-2.51	.014	-0.112	-0.032	
Role ambiguity	-0.07**	.02	-3.54	.001	0.032	0.161	
Designated leader condition × role ambiguity	0.10**	.03	2.96	.004	-0.043	0.003	
Dependent variable model: internally rated innovation							
Constant	2.91**	.62	4.69	.000	1.618	4.143	0.16
Number of team members	0.11	.08	1.29	.201	1.716	4.197	
Designated leader condition	-0.15	.13	-1.22	.224	-0.402	0.095	
Shared leadership	2.96**	.63	4.72	.000	-0.058	0.274	
Dependent variable model: externally rated innovation							
Constant	1.40	.73	1.92	.058	-0.046	2.842	0.11
Number of team members	0.02	.10	.24	.809	0.980	3.892	
Designated leader condition	0.19	.15	1.30	.200	-0.100	0.483	
Shared leadership	2.44**	.74	3.31	.001	-0.171	0.219	
Conditional indirect effect on internally rated innovation via shared leadership							
Role ambiguity (-1 SD)	-0.041	.077	-0.53	.597	-0.207	0.097	0.15
Role ambiguity (+1 SD)	0.256	.091	2.81	.006	0.111	0.483	
Conditional indirect effect on externally rated innovation via shared leadership							
Role ambiguity (-1 SD)	-0.034	.064	-0.53	.597	-0.178	0.087	0.15
Role ambiguity (+1 SD)	0.211	.090	2.34	.021	0.068	0.441	

Note: *N* = 120. \**p* < .05 (two-tailed). \*\**p* < .01 (two-tailed). *Coeff.*, unstandardized regression coefficient; *SE*, standard error; 95% bias-corrected confidence intervals are reported: *LCI*, lower bound of the confidence interval; *UCI*, upper bound of the confidence interval. Results are based on 5000 bootstrapped re-samples. The conditional indirect effect includes the number of team members as a control

Wang et al., 2014) or examines the relative effect of formal leadership versus shared leadership (Pearce & Sims, 2002). Prior research does link external team leadership (Carson et al., 2007) and the empowering behaviors of internal team leaders (Hoch, 2013; Margolis & Ziegert, 2016) to collective leadership behaviors. However, existing research does not specifically address the impact of an internally designated leader within the team on collective leadership emergence. Indeed, scholars have called for more formal examination and integration of formal and shared leadership (Wang et al., 2014; Zhu et al., 2018). Our research provides specific integration of formal and shared forms of leadership through understanding the effects of a designated leader and further extends it through the integration of contingency factors in terms of role ambiguity.

Furthermore, research suggests that eventually, based upon a variety of individual and/or team characteristics, one or more team members will attempt to emerge as a team leader (Morgeson et al., 2010). However, this process can be time-consuming and inefficient (Katz & Kahn, 1978). Our findings highlight that in some circumstances, such as when role ambiguity is high, designating a formal leader at the onset of team formation may indeed be beneficial in that it affects team innovation through shared leadership. Given that formal leadership of a nominal individual can beget shared leadership in certain circumstances, it is valuable to examine them in conjunction. These findings answer calls in team leadership research to “consider all of the sources of team leadership” to develop “a complete understanding of team leadership processes and the leadership capacity within the team” (Morgeson et al., 2010, p. 27).

The findings of this study also help resolve a discrepancy regarding the relationship between leadership and team innovation (Gebert et al., 2010; Mainemelis et al., 2015; Pieterse et al., 2010). The functional theories of hierarchy literature extoll the benefits of a clear hierarchical structure with a single leader (Halevy et al., 2011), while the shared leadership literature champions the benefits of sharing leadership (Yammarino et al., 2012). Our findings illustrate that both perspectives have merit. Similar to prior work (Hoch, 2013), our results illustrate that innovation increases when multiple team members influence each other. At the same time, formal leadership can contribute to team innovation through shared leadership. The coordination benefits of formal leadership (Anicich, Swaab, & Galinsky, 2015) ensures that team members grappling with role ambiguity can engage in mutual influence processes (Contractor et al., 2012). This perspective is consistent with Gebert et al.’s (2010) recommendation for coupling opposing action strategies for innovation through both directive and delegative leadership. Thus, by investigating shared leadership as a mediating mechanism, our study offers one perspective that links the positive relationship between nominal leadership and team innovation.

## Practical Implications

Our findings suggest that teams striving for innovation should consider having a designated leader. One organizational trend has been to institute self-managed team structures to facilitate shared leadership (Pearce & Manz, 2005). Our findings suggest that designating a leader can also allow team members’ mutual influence (Yammarino et al., 2012), particularly when roles are ambiguous. As such, organizations should consider the nature of the team’s objectives and its interpersonal dynamics to determine whether team members’ roles will be clear. In uncertain environments, a designated leader can immediately engage as a coordinator, ensuring that team members understand how they can best contribute to and influence the direction of the team (Halevy et al., 2011).

Another practical implication is that organizations should seek to reduce role ambiguity among team members. Prior research commonly illustrates utility in establishing roles (including team leadership roles) at the onset of team formation. For example, organizations commonly employ team charters as a means for clarifying goals, roles, and decision-making processes before work begins (Harris & Harris, 1996). There is evidence of similar benefits from leaderless group discussions (Borteyrou, Lievens, Bruchon-Schweitzer, Congard, & Rasclé, 2015). These approaches highlight the criticality of reducing role ambiguity during the formative stage of team development; in particular, immediately establishing consensus regarding the task and relational expectations increases the likelihood of team success. Our research suggests that reducing role ambiguity along these lines may ensure that teams are prepared to overcome the difficulties associated with newly formed project teams.

## Limitations and Future Directions

Our study has several limitations, which provide opportunities for future research. We only examined outcomes of innovation, and therefore, our findings are limited to contexts focusing on innovation. Along these lines, scholars suggest that hierarchical structures may be more effective for simple or routine tasks (Anderson & Brown, 2010) and that shared leadership might be counterproductive in routine environments (Dust & Ziegert, 2016). Additionally, although the pattern of results was the same, our internal and external measures of innovation were not significantly related. As such, future research should examine additional outcomes to extend the generalizability of the findings. In terms of the timing of the measures, we assessed role ambiguity 1 week after a leader was designated in the team. The presence of a leader may impact the resulting role ambiguity. Notably, there was no significant correlation between the presence or absence of a designated leader and role ambiguity in our study. Furthermore, shared leadership may influence role ambiguity. Thus, it would be

useful for future research to measure role ambiguity at multiple time points.

An additional limitation is that we only focused on a general form of leadership. Our study aligns with prior research on shared leadership (e.g., Carson et al., 2007), providing a broad and holistic account of designated leader behaviors and shared leadership behaviors. However, this approach masks role-specific forms of leadership (Contractor et al., 2012; Dust & Ziegert, 2016), making it unclear whether team members are fulfilling distinct or overlapping leadership roles. Future research should consider examining team members' specific leadership roles to evaluate the implications of multi-leader teams that leverage division of labor through distinct roles rather than backup behaviors through role sharing (Dust & Ziegert, 2016).

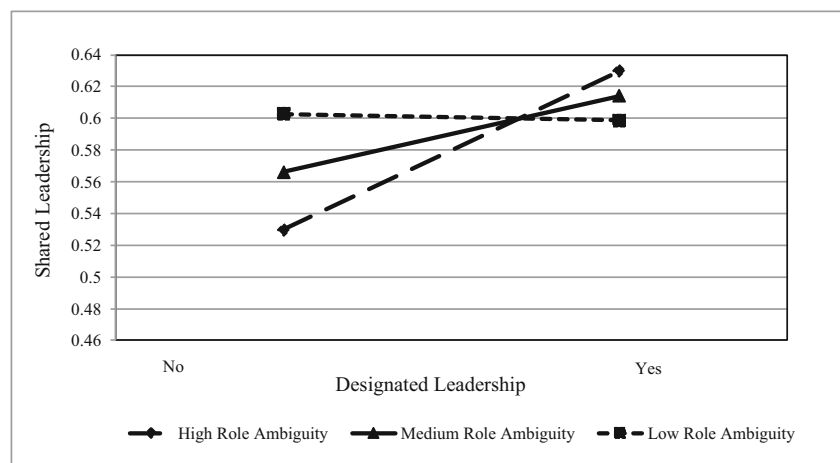
Aligning with our focus on the quantity or amount of shared leadership displayed by team members, we examined the density of shared leadership (D'Innocenzo et al., 2016). In addition to density metrics, another network approach to shared leadership is centralization. While studies have shown differential effects of density and centralization (i.e., DeRue et al., 2015), we choose to focus on density given that our theory focuses on the amount of leadership displayed by members, rather than the distribution or dispersion of that leadership (i.e., centralization). That is, we were interested in whether the presence or absence of a formal leader influenced the overall level to which team members displayed leadership. While centralization provides information about the structure or distribution of leadership, it does not capture the amount of leadership displayed by team members. As an example, a completely decentralized network (which is often equated as high shared leadership) could result from no one exhibiting leadership in the team, thereby reflecting a lack of leadership (D'Innocenzo et al., 2016).

We used a density measurement approach to align with our theory and hypotheses; however, we also ran supplemental analyses with centralization in place of density to examine the dispersion of shared leadership, and the results were not

significant. These findings are not surprising as DeRue et al. (2015) illustrate that different antecedents are associated with the emergence of shared leadership density and centralization. Furthermore, similar to DeRue et al.'s (2015) findings ( $r = -.40$ ), leadership density and centralization were only moderately correlated in our sample ( $r = -.33$ ). To further explore the differences between density and centralization, we reran our analyses while controlling for centralization. That is, we examined our findings of the amount of shared leadership (density) while controlling for the dispersion of shared leadership (centralization). As expected, the results remain the same. This pattern of results suggests that future research should examine alternative contingency factors in combination with different antecedents of the distribution (i.e., centralization) of shared leadership.

An additional limitation concerns our operationalization of the designated leader. We utilized this approach because it allows for the identification of a nominal, designated leader, which aligns with the conceptualization of formal leadership (Bass & Bass, 2008). Additionally, the instructions given to the teams regarding the designation of a leader mimic the approach used in prior research (Tarakci et al., 2016). While this approach is clear and straightforward, enabling broader generalizability of findings, we were unable to evaluate mechanisms associated with the choice of the designated leader and the particular leadership role that she/he fulfilled. Research has demonstrated differing effects for random versus systematic selection of a designated leader within a team (Haslam et al., 1998). However, because individuals tend to have a prototypical conceptualization of a leader (Epitropaki & Martin, 2005), the teams' selection of a leader may have conformed to this preconceived standard, resulting in a more "leader-like" designated leader. Nonetheless, future research should consider examining other forms of designated leader appointments and manipulate the types of leadership roles the designated leader performs (Contractor et al., 2012).

**Fig. 1** Plot of the relationship between designated leadership and shared leadership at high, medium, and low levels of role ambiguity





Finally, our sample and task could also be perceived as limitations. Our use of student teams allowed for multiple critical study features. In particular, it allowed for delineated start and end points, with surveys administered at three key time points: the designation of a formal leader at the group formation stage; shared leadership at the mid-point of the work cycle; and the externally rated assessment of innovation at the conclusion of the work cycle. These factors aided the research design by reducing common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and enabling tighter controls (Locke, 1986). Although laboratory studies within this content domain have high external validity with field research (Mitchell, 2012), the generalizability to “real-world” teams remains unclear. Additionally, this current sample would most closely generalize to project teams with a specific deadline and a clear objective or goal. Thus, future research should reexamine our proposed relationships in field settings with multiple, competing goals, and with more fluid team member relationships.

The extent to which the participants were familiar with one another is unclear in our sample as we did not include a measure of familiarity. The students in our sample selected their team members and may have chosen individuals they had interacted with in the past. The team project was embedded in an introductory course of an ongoing thematic sequence for engineering students predominantly made up of freshmen or first-year transfer students, suggesting that across the sample, team familiarity should be relatively low. Furthermore, familiarity may be more personal than professional. The effect of team familiarity on team processes and outcomes is complex (Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003). On the one hand, prior research suggests that team familiarity is related to team performance through enhanced coordination (e.g., Reagans, Argote, & Brooks, 2005). On the other hand, prior research also suggests that team familiarity is negatively related to team performance through diminished flexibility and adaptability (Gorman, Amazeen, & Cooke, 2010). Prior studies also illustrate a curvilinear effect, such that moderate levels of team familiarity were associated with the highest levels of team effectiveness (Sieweke & Zhao, 2015) and that team familiarity is only beneficial when team members are engaged in complex tasks (Espinosa et al., 2007). Overall, future research should evaluate the extent to which team familiarity affects the emergence and effectiveness of team leadership structures within the context of role ambiguity.

## Conclusion

This research contributes to team leadership literature by offering a contingency-based perspective on team leadership.

This study highlights that it is important for scholars and practitioners to understand key team factors, in this case, role ambiguity, to fully understand whether formal leadership has utility in fostering shared leadership and team innovation. Our hope is that this study motivates future research to more clearly establish the potential complementarity of formal leadership and shared leadership.

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## References

- Ali, A., Wang, H., & Johnson, R. E. (2020). Empirical analysis of shared leadership promotion and team creativity: An adaptive leadership perspective. *Journal of Organizational Behavior*, 41(5), 405–423. <https://doi.org/10.1002/job.2437>.
- Anderson, C. J., & Brown, C. (2010). The functions and dysfunctions of hierarchy. *Research in Organizational Behavior*, 30, 55–89. <https://doi.org/10.1016/j.riob.2010.08.002>.
- Anderson, C. J., & Willer, R. (2014). Do status hierarchies benefit groups? A bounded functionalist account of status. In J. Cheng (Ed.), *The psychology of social status* (pp. 47–70). New York: Springer.
- Anicich, E. M., Swaab, R. I., & Galinsky, A. D. (2015). Hierarchical cultural values predict success and mortality in teams. *Proceedings of the National Academy of Sciences*, 112, 1338–1343. <https://doi.org/10.1073/pnas.1408800112>.
- Bandura, A. (1986). The Explanatory and Predictive Scope of Self-Efficacy Theory. *Journal of Social and Clinical Psychology*, 4, 359–373. <https://doi.org/10.1521/jscp.1986.4.3.359>.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>.
- Bass, B. M., & Bass, R. (2008). *The Bass handbook of leadership: Theory, research and managerial implications*. New York: Free Press.
- Bass, B. M., Waldman, D. A., Avolio, B. J., & Bebb, M. (1987). Transformational leadership and the falling dominoes effect. *Group & Organization Management*, 12, 73–87. <https://doi.org/10.1177/105960118701200106>.
- Bendersky, C., & Hays, N. A. (2012). Status conflict in groups. *Organization Science*, 23, 323–340. <https://doi.org/10.1287/orsc.1110.0734>.
- Bernstein, I. S. (1981). Dominance: The baby and the bathwater. *The Behavioral and Brain Sciences*, 4, 419–457. <https://doi.org/10.1017/S0140525X0000964X>.
- Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analyses. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349–381). San Francisco: Jossey-Bass.
- Blinder, A. S., & Morgan, J. (2008). Do monetary policy committees need leaders? A report on an experiment. *The American Economic Review*, 98, 224–229. <https://doi.org/10.1257/aer.98.2.224>.

- Borteyrou, X., Lievens, F., Bruchon-Schweitzer, M., Congard, A., & Rasle, N. (2015). Incremental validity of leaderless group discussion ratings over and above general mental ability and personality in predicting promotion. *International Journal of Selection and Assessment*, 23(4), 373–381. <https://doi.org/10.1111/ijssa.12121>.
- Breaugh, J. A., & Colihan, J. P. (1994). Measuring facets of job ambiguity: Construct validity evidence. *The Journal of Applied Psychology*, 79(2), 191–202. <https://doi.org/10.1037/0021-9010.79.2.191>.
- Bunderson, J. S., & Reagans, R. E. (2011). Power, status, and learning in organizations. *Organization Science*, 22, 1182–1194. <https://doi.org/10.1287/orsc.1100.0590>.
- Burpitt, W. J., & Bigoness, W. J. (1997). Leadership and innovation among teams: The impact of empowerment. *Small Group Research*, 28, 414–423. <https://doi.org/10.1177/1046496497283005>.
- Carnabuci, G., Emery, C., & Brinberg, D. (2018). Emergent leadership structures in informal groups: A dynamic, cognitively informed network model. *Organization Science*, 29, 118–133. <https://doi.org/10.1287/orsc.2017.1171>.
- Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. *The Academy of Management Journal*, 50, 1217–1234. <https://doi.org/10.2307/20159921>.
- Chan, K. Y., & Drasgow, F. (2001). Toward a theory of individual differences and leadership: Understanding the motivation to lead. *Journal of Applied Psychology*, 86, 481–498.
- Chun, J. U., Yammarino, F. J., Dionne, S. D., Sosik, J. J., & Moon, H. K. (2009). Leadership across hierarchical levels: Multiple levels of management and multiple levels of analysis. *The Leadership Quarterly*, 20, 689–707. <https://doi.org/10.1016/j.leaqua.2009.06.003>.
- Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, 37(1), 39–67. <https://doi.org/10.1177/0149206310388419>.
- Contractor, N. S., DeChurch, L. A., Carson, J., Carter, D. R., & Keegan, B. (2012). The topology of collective leadership. *The Leadership Quarterly*, 23, 994–1011. <https://doi.org/10.1016/j.leaqua.2012.10.010>.
- D’Innocenzo, L., Mathieu, J. E., & Kukenberger, M. R. (2016). A meta-analysis of different forms of shared leadership–team performance relations. *Journal of Management*, 42(7), 1964–1991. <https://doi.org/10.1177/0149206314525205>.
- Davis, J. P., & Eisenhardt, K. M. (2011). Rotating leadership & collaborative innovation: Recombination processes in symbiotic relationships. *Administrative Science Quarterly*, 56, 159–201. <https://doi.org/10.1177/0001839211428131>.
- De Dreu, C. K., & West, M. A. (2001). Minority dissent and team innovation: The importance of participation in decision making. *The Journal of Applied Psychology*, 86, 1191–1201. <https://doi.org/10.1037/0021-9010.86.6.1191>.
- Denis, J. L., Langley, A., & Sergi, V. (2012). Leadership in the plural. *The Academy of Management Annals*, 6, 211–283. <https://doi.org/10.5465/19416520.2012.667612>.
- DeRue, D. S., & Ashford, S. J. (2010). Who will lead and who will follow? A social process of leadership identity construction in organizations. *The Academy of Management Review*, 35, 627–647. <https://doi.org/10.5465/amr.35.4.zok627>.
- DeRue, D. S., Nahrgang, J. D., & Ashford, S. J. (2015). Interpersonal perceptions and the emergence of leadership structures in groups: A network perspective. *Organization Science*, 26(4), 1192–1209. <https://doi.org/10.1287/orsc.2014.0963>.
- Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks: Sage.
- Dust, S. B., & Ziegert, J. C. (2012). When and how are multiple leaders most effective? It’s complex. *Industrial and Organizational Psychology*, 5, 421–424. <https://doi.org/10.1111/j.1754-9434.2012.01473.x>.
- Dust, S. B., & Ziegert, J. C. (2016). Multi-leader teams in review: A contingent-configuration perspective of effectiveness. *International Journal of Management Reviews*, 18(4), 518–541. <https://doi.org/10.1111/ijmr.12073>.
- Eatough, E. M., Chang, C.-H., Miloslavic, S. A., & Johnson, R. E. (2011). Relationships of role stressors with organizational citizenship behavior: A meta-analysis. *The Journal of Applied Psychology*, 96(3), 619–632. <https://doi.org/10.1037/a0021887>.
- Epitropaki, O., & Martin, R. (2005). From ideal to real: A longitudinal study of the role of implicit leadership theories on leader-member exchanges and employee outcomes. *The Journal of Applied Psychology*, 90, 659–676. <https://doi.org/10.1037/0021-9010.90.4.659>.
- Espinosa, J. A., Slaughter, S. A., Kraut, R. E., & Herbsleb, J. D. (2007). Familiarity, complexity, and team performance in distributed software development. *Organization Science*, 18, 613–630. <https://doi.org/10.1287/orsc.1070.0297>.
- Eys, M. A., & Carron, A. V. (2001). Role ambiguity, task cohesion, and task self-efficacy. *Small Group Research*, 32, 356–373. <https://doi.org/10.1177/104649640103200305>.
- Fisher, C. D., & Gitelson, R. (1983). A meta-analysis of the correlates of role conflict and ambiguity. *The Journal of Applied Psychology*, 68(2), 320–333. <https://doi.org/10.1037/0021-9010.68.2.320>.
- Follett, M. P. (1924). *Creative experience*. New York: Longmans Green.
- Friedrich, T. L., Vessey, W. B., Schuelke, M. J., Ruark, G. A., & Mumford, M. D. (2009). A framework for understanding collective leadership: The selective utilization of leader and team expertise within networks. *The Leadership Quarterly*, 20, 933–958. <https://doi.org/10.1016/j.leaqua.2009.09.008>.
- Gebert, D., Boerner, S., & Kearney, E. (2010). Fostering team innovation: Why is it important to combine opposing action strategies? *Organization Science*, 21(3), 593–608. <https://doi.org/10.1287/orsc.1090.0485>.
- Gilboa, S., Shirom, A., Fried, Y., & Cooper, C. (2008). A meta-analysis of work demand stressors and job performance: Examining main and moderating effects. *Personnel Psychology*, 61(2), 227–271. <https://doi.org/10.1111/j.1744-6570.2008.00113>.
- Gorman, J. C., Amazeen, P. G., & Cooke, N. J. (2010). Team coordination dynamics. *Nonlinear Dynamics, Psychology, and Life Sciences*, 14(3), 265–289.
- Greer, L. L., de Jong, B. A., Schouten, M. E., & Dannals, J. E. (2018). Why and when hierarchy impacts team effectiveness: A meta-analytic examination. *The Journal of Applied Psychology*, 103, 591–613. <https://doi.org/10.1037/apl0000291>.
- Greer, L. L., Van Bunderen, L., & Yu, S. (2017). The dysfunctions of power in teams: A review and emergent conflict perspective. *Research in Organizational Behavior*, 37, 103–124. <https://doi.org/10.1016/j.riob.2017.10.005>.
- Gronn, P. (2015). The view from inside leadership configurations. *Human Relations: Studies Towards the Integration of the Social Sciences*, 68(4), 545–560. <https://doi.org/10.1177/0018726714563811>.
- Guenther, H., Gardner, W. L., Davis McCauley, K., Randolph-Seng, B., & Prabhu, V. P. (2017). Shared authentic leadership in research teams: Testing a multiple mediation model. *Small Group Research*, 48, 719–765. <https://doi.org/10.1177/1046496417732403>.
- Halebian, J., & Finkelstein, S. (1993). Top management team size, CEO dominance, and firm performance: The moderating roles of environmental turbulence and discretion. *The Academy of Management Journal*, 36, 844–863. <https://doi.org/10.5465/256761>.
- Halevy, N., Chou, E. Y., & Galinsky, A. D. (2011). A functional model of hierarchy: Why, how, and when vertical differentiation enhances performance. *Organizational Psychology Review*, 1, 32–52. <https://doi.org/10.1177/2041386610380991>.

- Harris, P. R., & Harris, K. G. (1996). Managing effectively through teams. *Team Performance Management*, 2, 23–36. <https://doi.org/10.1108/13527599610126247>.
- Harrison, D. A., Mohammed, S., McGrath, J. E., Florey, A. T., & Vanderstoep, S. W. (2003). Time matters in team performance: Effects of member familiarity, entrainment, and task discontinuity on speed and quality. *Personnel Psychology*, 56(3), 633–669. <https://doi.org/10.1111/j.1744-6570.2003.tb00753.x>.
- Haslam, S. A., McGarty, C., Brown, P. M., Eggins, R. A., Morrison, B. E., & Reynolds, K. J. (1998). Inspecting the emperor's clothes: Evidence that randomly-selected leaders can enhance group performance. *Group Dynamics: Theory, Research, and Practice*, 2, 168–184. <https://doi.org/10.1037/1089-2699.2.3.168>.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hayes, A. F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research*, 50, 1–22. <https://doi.org/10.1080/00273171.2014.962683>.
- Hoch, J. E. (2013). Shared leadership and innovation: The role of vertical leadership and employee integrity. *Journal of Business and Psychology*, 28, 159–174. <https://doi.org/10.1007/s10869-012-9273-6>.
- Hoch, J. E., & Kozlowski, S. W. (2014). Leading virtual teams: Hierarchical leadership, structural supports, and shared team leadership. *The Journal of Applied Psychology*, 99(3), 390–403. <https://doi.org/10.1037/a0030264>.
- Hoch, J. E., Pearce, C. L., & Welzel, L. (2010). Is the most effective team leadership shared? The impact of shared leadership, age diversity, and coordination on team performance. *Journal of Personnel Psychology*, 9, 105–116. <https://doi.org/10.1027/1866-5888/a000020>.
- House, R. J. (1996). Path-goal theory of leadership: Lessons, legacy, and a reformulated theory. *The Leadership Quarterly*, 7(3), 323–352. [https://doi.org/10.1016/S1048-9843\(96\)90024-7](https://doi.org/10.1016/S1048-9843(96)90024-7).
- Huang, J. L., Liu, M., & Bowling, N. A. (2015). Insufficient effort responding: Examining an insidious confound in survey data. *The Journal of Applied Psychology*, 100(3), 828–845. <https://doi.org/10.1037/a0038510>.
- Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *The Journal of Applied Psychology*, 94, 1128–1145. <https://doi.org/10.1037/a0015978>.
- Im, S., & Workman, J. P. (2004). Market orientation, creativity, and new product performance in high-technology firms. *Journal of Marketing*, 68, 114–132. <https://doi.org/10.1509/jmkg.68.2.114.27788>.
- Ingvaldsen, J. A., & Rolfsen, M. (2012). Autonomous work groups and the challenge of inter-group coordination. *Human Relations; Studies Towards the Integration of the Social Sciences*, 65(7), 861–881. <https://doi.org/10.1177/0018726712448203>.
- Jackson, S. E., & Schuler, R. S. (1985). A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings. *Organizational Behavior and Human Decision Processes*, 36, 16–78. [https://doi.org/10.1016/0749-5978\(85\)90020-2](https://doi.org/10.1016/0749-5978(85)90020-2).
- Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations*. New York: Wiley.
- Kerr, S., & Jermier, J. M. (1978). Substitutes for leadership: Their meaning and measurement. *Organizational Behavior and Human Performance*, 22(3), 375–403. [https://doi.org/10.1016/0030-5073\(78\)90023-5](https://doi.org/10.1016/0030-5073(78)90023-5).
- King, L. A., & King, D. W. (1990). Role conflict and role ambiguity: A critical assessment of construct validity. *Psychological Bulletin*, 107(1), 48–64. <https://doi.org/10.1037/0033-2909.107.1.48>.
- Kirkman, B. L., & Chen, G. (2011). Maximizing your data or data slicing? Recommendations for managing multiple submissions from the same dataset. *Management and Organization Review*, 7, 433–446. <https://doi.org/10.1111/j.1740-8784.2011.00228.x>.
- LeBreton, J. M., & Senter, J. L. (2007). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11, 815–852. <https://doi.org/10.1177/1094428106296642>.
- Littlepage, G., Robison, W., & Reddington, K. (1997). Effects of task experience and group experience on group performance, member ability, and recognition of expertise. *Organizational Behavior and Human Decision Processes*, 69, 133–147. <https://doi.org/10.1006/obhd.1997.2677>.
- Locke, E. A. (1986). *Generalizing from laboratory to field studies*. Lexington: Lexington.
- Locke, E. A. (2003). Leadership: Starting at the top. In C. L. Pearce & J. A. Conger (Eds.), *Shared leadership: Reframing the hows and whys of leadership* (pp. 271–284). Thousand Oaks: Sage.
- Magee, J. C., & Galinsky, A. D. (2008). Social hierarchy: The self-reinforcing nature of power and status. *The Academy of Management Annals*, 2, 351–398. <https://doi.org/10.5465/19416520802211628>.
- Mainemelis, C., Kark, R., & Epitropaki, O. (2015). Creative leadership: A multi-context conceptualization. *The Academy of Management Annals*, 9, 393–382. <https://doi.org/10.1080/19416520.2015.1024502>.
- Margolis, J. A., & Ziegert, J. C. (2016). Vertical flow of collectivistic leadership: An examination of the cascade of visionary leadership across levels. *The Leadership Quarterly*, 27(2), 334–348. <https://doi.org/10.1016/j.leaqua.2016.01.005>.
- Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997–2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34(3), 410–476. <https://doi.org/10.1177/0149206308316061>.
- Mayer, D. M., Kuenzi, M., Greenbaum, R., Bardes, M., & Salvador, R. B. (2009). How low does ethical leadership flow? Test of a trickle-down model. *Organizational Behavior and Human Decision Processes*, 108, 1–13. <https://doi.org/10.1016/j.obhdp.2008.04.002>.
- Maynard, M. T., & Gilson, L. L. (2014). The role of shared mental model development in understanding virtual team effectiveness. *Group & Organization Management*, 39(1), 3–32. <https://doi.org/10.1177/1059601113475361>.
- Mayo, M., Meindl, J. R., & Pastor, J. C. (2003). Shared leadership in work teams: A social network approach. In C. L. Pearce & J. A. Conger (Eds.), *Shared leadership: Reframing the hows and whys of leadership* (pp. 193–214). Thousand Oaks: Sage.
- Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437–455. <https://doi.org/10.1037/a0028085>.
- Mehra, A., Smith, B. R., Dixon, A. L., & Robertson, B. (2006). Distributed leadership in teams: The network of leadership perceptions and team performance. *The Leadership Quarterly*, 17(3), 232–245. <https://doi.org/10.1016/j.leaqua.2006.02.003>.
- Mitchell, G. (2012). Revisiting truth or triviality: The external validity of research in the psychological laboratory. *Perspectives on Psychological Science*, 7(2), 109–117. <https://doi.org/10.1177/1745691611432343>.
- Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2010). Leadership in teams: A functional approach to understanding leadership structures and processes. *Journal of Management*, 36, 5–39. <https://doi.org/10.1177/0149206309347376>.
- Newman, A., Allen, B., & Miao, Q. (2015). I can see clearly now. *Personnel Review*, 44(4), 611–628. <https://doi.org/10.1108/PR-11-2013-0200>.
- Nicolaides, V. C., LaPort, K. A., Chen, T. R., Tomassetti, A. J., Weis, E. J., Zaccaro, S. J., & Cortina, J. M. (2014). The shared leadership of teams: A meta-analysis of proximal, distal, and moderating



- relationships. *The Leadership Quarterly*, 25, 923–942. <https://doi.org/10.1016/j.leaqua.2014.06.006>.
- Oh, H. S., Chung, M. H., & Labianca, G. (2004). Group social capital and group effectiveness: The role of informal socializing ties. *The Academy of Management Journal*, 47(6), 860–875. <https://doi.org/10.5465/20159627>.
- Pearce, C. L., Conger, J. A., & Locke, E. A. (2008). Shared leadership theory. *The Leadership Quarterly*, 19(5), 622–628. <https://doi.org/10.1016/j.leaqua.2008.07.005>.
- Pearce, C. L., & Manz, C. C. (2005). The new silver bullets of leadership: The importance of self- and shared leadership in knowledge work. *Organizational Dynamics*, 34(2), 130–140. <https://doi.org/10.1016/j.orgdyn.2005.03.003>.
- Pearce, C. L., & Sims, J. P. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group Dynamics: Theory, Research, and Practice*, 6, 172–197. <https://doi.org/10.1037/1089-2699.6.2.172>.
- Pieterse, A. N., Van Knippenberg, D., Schippers, M., & Stam, D. (2010). Transformational and transactional leadership and innovative behavior: The moderating role of psychological empowerment. *Journal of Organizational Behavior*, 31, 609–623. <https://doi.org/10.1002/job.650>.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, 88, 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>.
- Reagans, R., Argote, L., & Brooks, D. (2005). Individual experience and experience working together: Predicting learning rates from knowing who knows what and knowing how to work together. *Management Science*, 51(6), 869–881. <https://doi.org/10.1287/mnsc.1050.0366>.
- Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly*, 15, 150–163. <https://doi.org/10.2307/2391486>.
- Roby, T. B., Nicol, E. H., & Farrell, F. M. (1963). Group problem solving under two types of executive structure. *Journal of Abnormal and Social Psychology*, 67, 550–556. <https://doi.org/10.1037/h0047285>.
- Rosing, K., Frese, M., & Bausch, A. (2011). Explaining the heterogeneity of the leadership-innovation relationship: Ambidextrous leadership. *The Leadership Quarterly*, 22(5), 956–974. <https://doi.org/10.1016/j.leaqua.2011.07.014>.
- Sieweke, J., & Zhao, B. (2015). The impact of team familiarity and team leader experience on team coordination errors: A panel analysis of professional basketball teams. *Journal of Organizational Behavior*, 36(3), 382–402. <https://doi.org/10.1002/job.1993>.
- Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social networks and the performance of individuals and groups. *The Academy of Management Journal*, 44(2), 316–325. <https://doi.org/10.5465/3069458>.
- Tarakci, M., Greer, L. L., & Groenen, P. J. F. (2016). When does power disparity help or hurt group performance? *The Journal of Applied Psychology*, 101, 415–429. <https://doi.org/10.1037/apl0000056>.
- Tost, L. P., Gino, F., & Larrick, R. P. (2013). When power makes others speechless: The negative impact of leader power on team performance. *The Academy of Management Journal*, 56, 1465–1486. <https://doi.org/10.5465/amj.2011.0180>.
- Tubre, T. C., & Collins, J. M. (2000). Jackson and Schuler (1985) Revisited: A meta-analysis of the relationships between role ambiguity, role conflict, and job performance. *Journal of Management*, 26(1), 155–169. <https://doi.org/10.1177/014920630002600104>.
- van Bunderen, L., Greer, L., & van Knippenberg, D. (In Press). When inter-team conflict spirals into intra-team power struggles: The pivotal role of team power structures. *The Academy of Management Journal*. <https://doi.org/10.5465/amj.2016.0182>.
- van Ginkel, W. P., & van Knippenberg, D. (2008). Group information elaboration and group decision making: The role of shared task representations. *Organizational Behavior and Human Decision Processes*, 105, 82–97. <https://doi.org/10.1016/j.obhdp.2007.08.005>.
- van Knippenberg, D. (2017). Team innovation. *Annual Review of Organizational Psychology and Organizational Behavior*, 4(1), 211–233. <https://doi.org/10.1146/annurev-orgpsych-032516-113240>.
- Wang, D., Waldman, D. A., & Zhang, Z. (2014). A meta-analysis of shared leadership and team effectiveness. *The Journal of Applied Psychology*, 99, 181–198. <https://doi.org/10.1037/a0034531>.
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge: Cambridge University Press.
- Wellman, N. (2017). Authority or community? A group-level theory of leadership emergence. *The Academy of Management Review*, 42(4), 596–617. <https://doi.org/10.5465/amr.2015.0375>.
- West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation in work groups. *Applied Psychology: An International Review*, 51, 355–424. <https://doi.org/10.1111/1464-0597.00951>.
- Yammarino, F. J., Salas, E., Serban, A., Shirreffs, K., & Shuffler, M. L. (2012). Collectivistic leadership approaches: Putting the “we” in leadership science and practice. *Industrial and Organizational Psychology*, 5, 382–402. <https://doi.org/10.1111/j.1754-9434.2012.01467.x>.
- Zhang, Z., Waldman, D. A., & Wang, Z. (2012). A multilevel investigation of leader–member exchange, informal leader emergence, and individual and team performance. *Personnel Psychology*, 65(1), 49–78. <https://doi.org/10.1111/j.1744-6570.2011.01238.x>.
- Zhu, J., Liao, Z., Yam, K. C., & Johnson, R. E. (2018). Shared leadership: A state-of-the-art review and future research agenda. *Journal of Organizational Behavior*, 39(7), 834–852. <https://doi.org/10.1002/job.2296>.

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