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Navigating Inter-Team Competition: How Information Broker Teams Achieve Team Innovation

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Organizations are increasingly using teams to stimulate innovation. Often, these teams share knowledge and information with each other to help achieve their goals, while also competing for resources and striving to outperform each other. Importantly, based on their industry, the nature of work, or prior history, some teams may face more competition from peer teams than others. Our research examines how teams' competitive relations with other teams in the organization operate in tandem with their collaborative inter-team information exchange relations in impacting their innovation. Using two studies—a field study of 73 knowledge-intensive teams in high-tech engineering firms and a team-based network experimental study of 162 teams—we find that a high degree of overall competition with many peer teams reduces a focal team's ability to acquire and utilize diverse knowledge from these teams (i.e., inter-team knowledge integration), thereby hindering team innovation. However, applying insights from network structural hole theory, we find that when a focal team occupies a brokerage position in the inter-team information exchange network, this can help buffer the effects of competition in getting access to knowledge resources from other teams, thus enabling their innovation. Additionally, we find that focal broker teams' dealmaking and network obstruction behaviors explain these effects.

Keywords: team innovation, inter-team competition, brokerage, social networks

As innovation is crucial for organizational survival and competitiveness, organizations are increasingly using dedicated innovation teams to leverage the diversity of employees' skills and expertise (van Knippenberg, 2017; Wuchty et al., 2007). Given the interconnected nature of organizational work (Hackman & Katz, 2010), these teams often benefit a great deal from interacting with each other and informally exchanging new knowledge and ideas, which provide critical stimuli for innovation (Reagans & McEvily, 2003). At the same time, the practitioner literature also provides ample evidence of intense competition between innovation teams in organizations such as Tencent, Netflix, and Amazon where teams actively compete in outperforming one another (Rathi, 2014). Thus, organizational teams are often embedded in an ecosystem of collaborative and competitive between-team interactions (Tsai, 2002). This raises interesting questions: Can competitive relations among teams, while motivating them to innovate, also undermine the informal inter-team interactions that are crucial to exchange knowledge and innovate (C. Chen & Deng, 2018)? How then do teams navigate this tension to learn and benefit from new knowledge developed by peer teams?

In addressing these questions, we borrow from group social capital theory (Oh et al., 2006), which suggests that teams in organizations are embedded in networks of various types of interactions with other peer teams and that the nature and structure of

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these between-team dyadic interactions provide opportunities as well as exert constraints in influencing a focal team's outcomes (Borgatti et al., 2009; Oh et al., 2006). Guided by this perspective, we first examine the network of inter-team competition ties in organizations (e.g., To et al., 2020; Tsai, 2002) and how it affects teams' ability to innovate. Whether due to their prior history or nature of work, teams in organizations often develop unique competitive relations with some target teams more than others and specifically strive to outperform them (Garcia et al., 2013; To et al., 2020). As a result, even within the same organizational setting, teams can face varying degrees of overall inter-team competition, depending on how many other teams view a focal team as their competitor. Building on this premise, we demonstrate how teams facing a high degree of between-team dyadic competition are constrained in their innovation efforts because this competition undermines their ability to acquire and utilize diverse knowledge resources from peer teams (i.e., inter-team knowledge integration) that are critical for innovation.

That said, there is also significant "variation in competitive success" (Burt, 1992, p. 5), where some teams, despite the competition they face, manage to innovate successfully. Group social capital theory (Oh et al., 2006) offers a possible explanation and suggests that constraints imposed by one type of network can potentially be overcome by a team's advantage in another type of network. For example, in addition to having competitive ties, teams also have other types of ties with each other such as informal information exchange. Borrowing from structural hole theory, we argue that while competitive ties with specific teams might restrict the amount of knowledge a focal team receives from these teams directly, teams that occupy a strategic brokerage position in the overall network of information exchange (i.e., act as "bridges" between unconnected teams; Burt, 1992) can better overcome such competition to innovate. Bridging structural holes between teams in the critical flow of information allows a focal team to not only gain alterative means to access knowledge that might be cut off by competitors but also allows it to exert control over the flow of information to competitors (Burt, 1992; Soda et al., 2018).

In examining these relationships, we make several important contributions. At a broad level, we use a social network perspective to highlight that team innovation emerges within a broader ecosystem of informal competitive and collaborative network relations with other teams. Although prior work has examined factors such as team composition (Baer et al., 2014), team expertise diversity (van Knippenberg & Mell, 2016), psychological safety and authentic emotional climates (Edmondson, 1999; Parke et al., 2022), and internal team networks (e.g., Venkataramani & Tang, 2024), there is scant research on how different types of *inter-team* relations in organizations can impact team innovation. This is an important oversight because between-team ties serve as a crucial source for importing relevant ideas or information into the team domain (e.g., Hansen, 1999; Tsai, 2001) and facilitate innovation. At the same time, organizational teams also have competitive relations with each other (To et al., 2020) and are therefore motivated to thwart each other's progress in achieving goals as well. Without studying this ecosystem of between-team ties and how different types of inter-team interactions may jointly affect their outcomes, our understanding of team innovation would be incomplete (Labianca & Brass, 2006; Shipilov et al., 2014).

Second, and related to the above, the current article contributes to an important conversation in the inter-team competition literature. While previous work has provided valuable insights by identifying different types of structural interdependence (e.g., incentives such as zero-sum contests where the winner takes all or means-based interdependence; Stanne et al., 1999) as drivers of competition, this approach fails to recognize that competition is not just a response to common structural incentives but is also influenced by dynamics that are unique to specific pairs of teams (see To et al., 2020, for a review). For example, even if there is no structural incentive to compete, two teams may still compete intensely because of dyadic factors such as their prior history, psychology, or the unique nature of their work (Garcia et al., 2013; Porac & Thomas, 1990). Similarly, such dyadic factors can also lead teams to choose *not* to compete despite the existence of structural incentives (e.g., Jarzabkowski & Bednarek, 2018). Therefore, by examining competition dyadically between teams in terms of their overall striving to outperform specific target teams due to various reasons, rather than more narrowly due to the nature of their structural outcome or means interdependence (Stanne et al., 1999), the current research contributes to a more holistic understanding of the intricate competitive dynamics among organizational teams.

Third, we provide unique insights regarding the boundary conditions of inter-team competition. In this regard, we highlight that constraints posed by one type of between-team network interaction such as competition can be mitigated by advantages arising from other kinds of network interactions. We show how teams that occupy information brokerage positions effectively stave off the knowledge deficit brought on by inter-team competition and continue to integrate knowledge from peer teams and innovate. On the other hand, without bridging structural holes in the inter-team information network, teams that encounter a high degree of competition suffer a "double whammy"—not only do they already lack access to useful knowledge resources due to their nonbroker positions, but whatever knowledge supply is available to them is also significantly more vulnerable to the adverse effects of competition.

In exploring this, we offer valuable insights into the strategic choices and behaviors of broker teams when facing competition. When facing a high degree of competition, a focal team that has an information brokerage advantage engages more in behaviors such as dealmaking (creating quid pro quo bargains with alters) and obstruction (i.e., controlling or preventing information flow to certain alters in the network). Thus, our research contributes valuable microbehavioral evidence into how information brokerage motivates teams to engage in strategic behaviors to combat the adversity brought on by inter-team competition (Halevy et al., 2020; Tasselli et al., 2015).

Theoretical Development and Hypotheses

Organizational teams are embedded within a broader social structure of formal and informal interactions with other teams. Drawing on a network theoretic tradition of focusing on the configuration of such interactions, group social capital theory (Oh et al., 2004, 2006) proposes that teams' pattern of interactions with peer teams and their structural positions in the networks of such between-team interactions can provide important opportunities for, as well as impose constraints on, team outcomes (Ancona, 1990; Tsai, 2001). Guided by group social capital theory, we focus on two types of interactions that teams have with one another—competitive ties and collaborative information exchange ties—and examine how

the pattern of these ties and teams' position within these networks affects their ability to innovate. Specifically, we propose that while teams' competitive ties may constrain their ability to innovate, their strategic position in the between-team information sharing network can buffer such effects.

Inter-Team Competition: Dyadic Competition Between Teams

Historically, inter-team competition has been studied according to the lens of social interdependence theory (Deutsch, 1949; D. W. Johnson & Johnson, 2002). Social interdependence exists when individuals or teams share common goals and each team's outcomes are affected by the actions of other teams (D. Johnson & Johnson, 1989). The basic premise of social interdependence theory is that the way goals and rewards are structured determines how actors (i.e., individuals or teams) interact, and in turn, the outcomes of the situation. Accordingly, D. Johnson and Johnson (1989) identified types of competition based on outcome versus means interdependence. Outcome interdependence specifies how the goals and rewards that actors strive to achieve are related. Means interdependence specifies the actions required on the part of participants to achieve their goals, and it exists when a task is structured such that two or more actors are required to jointly complete it. Whereas some amount of negative outcome interdependence (e.g., where a goal such as a reward or promotion can only be achieved by one or few actors and where one actor's success reduces the chances of success of other actors) may exist in competitions, some competitions may also involve means interdependence (e.g., a chess game; D. W. Johnson & Johnson, 2002, p. 124). In this regard, Stanne et al. (1999) found in an individual-level meta-analysis that competition, operationalized as negative structural outcome interdependence, was positively related to individual performance on motor skill tasks only when there was no means interdependence. Sherif's (1956) anecdotal research on competition and conflict in boys' summer camps also suggested similar findings.[1]

The structural outcome interdependence perspective has been the most prevalent framework in existing work on competition (D. W. Johnson & Johnson, 2002; Kistruck et al., 2016). Therefore, extant work has predominantly operationalized competition between teams in terms of a "competitive social situation" in which a zero-sum outcome (e.g., a prize, bonus) can only be achieved by one or few teams (e.g., Baer et al., 2010, 2014; Boudreau et al., 2011). As a result, in a given situation (i.e., an organization), social interdependence theory presumes that all teams under the same structural competitive incentive compete equally with one another in winning the prize or reward. Yet, recent research has indicated that this structural conceptualization of competition may be insufficient to describe how organizational teams actually experience inter-team competition (Eisenkraft et al., 2017; To et al., 2020). Although organizations may have common structural incentives (e.g., annual performance ranking of teams for bonus allocations) that may give all teams a baseline motivation to achieve higher performance, teams often also develop highly differentiated competitive ties with peer teams wherein they experience greater competition with (i.e., strive to outperform) specific target teams but not others (Ku et al., 2005; Porac & Thomas, 1994; Shah, 1998).

Building on this work that highlights how competition can exist at the dyadic level, To et al. (2020) conceptualized competition as a focal actor's "striving to outperform a specific target." Thus, competition between two teams exists when "a focal team strives to outperform a specific target team" (p. 911). Such competition with specific peer teams could arise due to various factors such as a focal and target team vying for the same scarce resources (i.e., dyadic outcome interdependence), similarity in task domains (Tesser & Smith, 1980), past history and experiences with one another (Ku et al., 2005; Lount & Phillips, 2007), or a combination of these factors. Indeed, dyadic competition could well exist even when there is no structural competition, based on other factors such as shared history and similarity (Garcia et al., 2013; Porac & Thomas, 1994). Similarly, despite the existence of structural incentives, teams may well choose to not compete with each other due to unique dyadic reasons (Jarzabkowski & Bednarek, 2018).

To illustrate, Kilduff et al. (2010) studied teams within the Pac-10 National Collegiate Athletic Association basketball division and found that even under the same structural competitive situation, specific pairs of teams had unique competitive relationships, which were predicted by their idiosyncratic histories with one another, while others did not. For example, whereas Oregon State and University of Oregon had a fierce competition with each other and were motivated to specifically outperform one another, Oregon State had comparatively lesser competition with the other eight teams. In fact, these authors found that 50% of variance in the competition ratings among these teams were attributed to between-team dyadic differences. Similarly, Hansen et al. (2005) showed that research and development teams within the same firm had competitive ties with some teams but not others.

This is the starting point of our article—the prevalence of dyadically differentiated competition ties between specific teams in organizations and, as group social capital theory posits (Oh et al., 2006), the inter-team competition network comprising of such teams and the ties (or lack thereof) between them. As a result of the difference in the number and intensity of dyadic competitive ties that each team encounters in the network, there is significant variation in the aggregate, overall degree of inter-team competition experienced by each team, despite being part of the same context. For instance, in the Pac-10 example above, University of Arizona encountered a much higher overall degree of competition from peer teams (an average rating of 7.47 from the other nine teams on a scale of 1–10 of competitive intensity) than Oregon State (average rating of 3.38; Kilduff et al., 2010). This overall degree of competition experienced by a focal team—defined as the number and intensity of dyadic competitive ties that a focal team has with other peer teams, aggregated across these teams—is the focus of our research.

[1] It is important to note that in this study, we focus on teams that have well-defined team membership and strive autonomously toward their own innovation-focused goals. In other words, while they may often interact informally to exchange resources and knowledge, there is no formal means interdependence between these teams where a team's own work requires input from another team without which it cannot be completed (Stanne et al., 1999). Examples of such autonomous teams include software development teams, creative design teams (e.g. advertising teams), and professional service teams (e.g. consultant teams; Oh et al., 2006). In this sense, we do not focus on multiteam systems, such as a military strike unit where a number of teams are *formally* designated to coordinate (i.e., have means interdependence) to achieve a superordinate goal (e.g. Davison et al., 2012). In such cases, formal means interdependence among teams might play a role in qualifying our proposed relationships.

Degree of Overall Inter-Team Competition and Team Innovation

Experiencing competition can significantly influence focal teams' psychology and actions (M. Chen et al., 2007; Garcia et al., 2013). For example, prior research finds that inter-team competition acts as an external threat and creates a stronger bond among team members internally (Halevy et al., 2008), enhances members' intrinsic motivation (Cikara et al., 2011), reduces inefficiency and free-riding (Erev et al., 1993), and facilitates intrateam collaboration and coordination (Baer et al., 2010). However, this work, predominantly conducted in lab settings and focusing mainly on *within-team* processes, invariably treats teams as standalone, independent entities, thus overlooking the crucial *between-team* interactions that also occur (see Sherif, 1956; Tsai, 2001, for notable exceptions).

Organizational teams, while operating autonomously toward their own goals, often interact with one another informally to gather unique information and resources, as well as learn and benefit from new ideas developed by each other (Ancona & Cladwell, 1992b; Oh et al., 2006; Reagans & Zuckerman, 2001). Thus, such interactions help teams achieve *inter-team knowledge integration*, defined as a focal team's acquisition of knowledge from peer teams in the organization (Gupta & Govindarajan, 2000), and the utilization of this knowledge in its own work (Reagans & McEvily, 2003). Because it often provides nonredundant knowledge and perspectives beyond the internal knowledge base available to the focal team, inter-team knowledge integration is particularly beneficial for innovation (Anderson et al., 2014; Phelps et al., 2012; van Knippenberg, 2017). However, competition between teams is likely to affect it.

We suggest that when a focal team faces a high degree of inter-team competition (i.e., has a large number of between-team dyadic competitive ties), it adversely impacts the focal team's ability to acquire and utilize knowledge from them. First, it is likely to acquire lesser amounts of overall information directly from competing peer teams due to their reluctance to facilitate the focal team's progress. Second, even when competing teams share some knowledge, this knowledge might be incomplete, inaccurate, or even misleading. As prior studies (albeit at the individual level of analysis) suggest, actors are motivated to withhold, conceal, and misrepresent valuable knowledge from each other if this knowledge can help their competitors' performance (Connelly et al., 2012; Garcia et al., 2010; Reh et al., 2018; Steinel & De Dreu, 2004). In fact, such antagonistic tendencies have been shown to be more pronounced at the team level as compared to the individual level (Wildschut et al., 2003). Along these lines, Hansen et al. (2005) found that competition made focal teams' knowledge search more difficult and time-consuming.

Finally, even if competing peer teams provide some knowledge, the effective utilization of this knowledge by the focal team is likely to be compromised. Competition has been shown to lead to suspicion about the underlying motivation of the knowledge provider and the potential truthfulness and quality of the knowledge in question, which in turn diminishes a focal team's motivation to utilize this knowledge (Menon et al., 2006). Also, a focal team might be reluctant to utilize knowledge acquired from a competitor because doing so might indicate an admission of incompetence (Gupta & Govindarajan, 2000). Thus, we hypothesize:

Hypothesis 1: The degree of inter-team competition encountered by a focal team is negatively associated with its inter-team knowledge integration (i.e., its acquisition and utilization of knowledge from peer teams in the organization).

Next, we propose that a focal team's inter-team knowledge integration is positively associated with team innovation. Team innovation is defined as the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things within the team (Anderson et al., 2014). Thus, innovation consists of two aspects, idea generation as well as its implementation, and a focal team's ability to acquire and utilize knowledge from peer teams in the organization is particularly important for both. First, knowledge acquired from external sources tends to be different or nonredundant from what the focal team already knows and thus especially likely to facilitate new perspectives, challenge the status quo, and increase the likelihood of developing novel solutions (Phelps et al., 2012; van Knippenberg, 2017). Ancona and Caldwell (1992a) showed that performance of consulting teams benefited significantly when they could acquire knowledge from outside sources. Similarly, other research has found that knowledge acquired from external sources tends to be diverse and novel and, when used in the focal team's work, tends to challenge its existing cognitive schemas, prompting them to think differently and stimulating innovation (Hargadon & Sutton, 1997; Reagans & Zuckerman, 2001).

Second, innovation occurs not only when a focal team integrates ideas and information from diverse peer teams to create new products and services but also when it recognizes analogies between its own situation and those experienced by others and adapts their solutions to the current situation. Thus, access to information about potential constraints, problems, and challenges that peer teams experience is also important for the implementation of these new ideas. Taking these arguments together, we propose that teams that are capable of inter-team knowledge integration are more likely to be more innovative (van Knippenberg, 2017).

Hypothesis 2: A focal team's inter-team knowledge integration is positively associated with team innovation.

Hypothesis 3: inter-team knowledge integration mediates the negative relationship between the degree of inter-team competition faced by a focal team and team innovation.

Variations in Competitive Success: The Role of Inter-Team Information Brokerage

Although facing a high degree of inter-team competition can adversely impact a focal team's ability to integrate knowledge and, thus, its innovation, some teams are still able to overcome the negative effects of competition to innovate successfully. Prior work on moderators of competition has examined task characteristics such as means interdependence (albeit at the individual level; Stanne et al., 1999) and within-team characteristics such as gender composition (Baer et al., 2014) and team regulatory focus (Beersma et al., 2013). However, team studies, while focusing on internal team processes such as coordination and cohesion, are unable to shed

light on the between-team knowledge integration processes affected by inter-team competition.

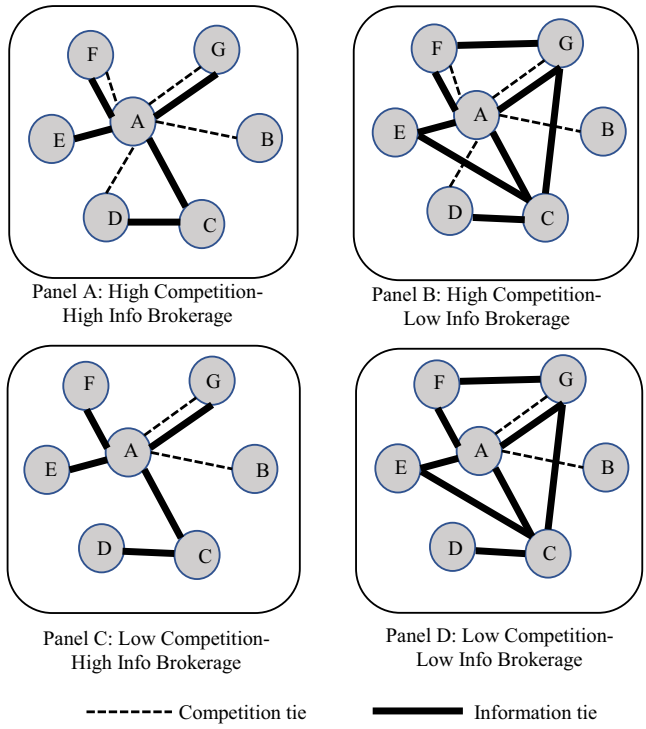
Group social capital theory (Oh et al., 2006) suggests that one explanation may lie in the fact that teams are embedded in different types of networks and that the structural position that a focal team occupies in one type of network can provide unique benefits that might offset the disadvantages in another (e.g., Venkataramani et al., 2013). For example, beyond competitive ties, teams are also connected via informal ties of communication and information exchange with each other. While having a competitive tie with a target team might suggest a lack of information exchange tie with that team, this is not necessarily the case (Labianca, 2014). In fact, competing teams can and sometimes do also have positive interactions with one another (Tsai, 2001, 2002) but may differ in the strength of these interactions, such as the amount and type of knowledge they share or the extent to which they collaborate. Thus, two competing teams could have an information exchange tie, but only exchange minimal knowledge or low-value information (or even misleading information; Garcia et al., 2010; Steinel & De Dreu, 2004). Important in this context, however, is that these teams have ties with other teams in the network as well. We argue that the broader *pattern* of information exchange ties that a focal team has with these *other* teams has crucial implications for its success in overcoming competition.

Structural hole theory (Burt, 1992; Kwon et al., 2020) is a natural fit to shed light on these issues because it was originally formulated to explain variations in actors' performance success, particularly in competitive, knowledge-intensive contexts. It argues that actors that bridge structural holes—that is, act as a broker in connecting otherwise disconnected nodes in a network (Burt, 1992)—have unique advantages that can translate to important outcomes such as performance and innovation (Burt, 2001, 2004; Fleming & Waguespack, 2007). Connecting with different actors that do not interact with each other provides access to distant social worlds and, thus, to a wider variety of, as well as less redundant, knowledge. Moreover, because they are the lone "bridge" between their alters, brokers have control over when and what knowledge gets transferred between them, thus providing unique first-mover advantages and discretionary control. Accordingly, we propose that occupying brokerage positions in the information exchange network among peer teams would especially benefit a focal team that is facing a high degree of competition.

It is important to note that experiencing a high degree of competition from many other teams and being an information broker are theoretically and empirically distinct constructs. Given that competition and information sharing are two different types of ties that connect teams (e.g., Labianca & Brass, 2006; Venkataramani & Dalal, 2007), two teams experiencing the same degree of competition can still have differing patterns of information exchange ties with other peer teams, thereby occupying information brokerage positions to varying degrees. Thus, even if a focal team does not receive needed information from directly competing teams, its brokerage position can offer strategic advantages. Figure 1 illustrates these possibilities for a focal Team A.

Figure 1

Illustration of Competition–Information Brokerage Combinations for Focal Team



Note. See the online article for the color version of this figure.

Panel A illustrates Team A, which encounters a high degree of competition from multiple teams (Teams B, D, F, G; denoted by dashed lines), but at the same time, also has information exchange ties with some of these and other teams (Teams C, E, F, G; denoted by thickened lines) that are not connected to each other via information exchange ties. As such, Team A is the only liaison connecting Team F with Teams G, C, and E; Team G with F, C, and E; and Team E with F, G, and C, thereby occupying a significant information brokerage position. In contrast, Panel B illustrates the case where the focal team (Team A) has the same degree of competition as in Panel A (i.e., four competitors), but most of its information exchange partners are also connected with each other, thereby reducing its brokerage opportunities.

We propose that when encountering a high degree of competition, being an information broker provides several distinct advantages to the focal team. First, because they connect otherwise disconnected teams in the information sharing network, broker teams enjoy rich information availability (Burt, 1992; Oh et al., 2006). This advantage is not only manifested in the amount of knowledge that flows to these teams but also in its novelty and diversity, which are crucial to innovation (Burt, 2001; van Knippenberg, 2017). Thus, if a focal team (e.g., Team A in Figure 1, Panel A) is confronted with competition from other teams, thereby reducing its *direct* access to knowledge available from these specific teams, being a broker in the information network could buffer such effects by providing alternative sources of knowledge from other alters (e.g., from Teams E and C as well as being a conduit between them and others). Similarly, although Team A does not have a direct information tie with its competitor Team D, it can leverage its brokerage position to receive such information through Team C, which has a tie with Team D. On the other hand, when teams do not possess such positional advantages, inter-team competition is likely to severely diminish their ability to access knowledge from other teams.

Second, in addition to information access benefits, brokers also wield substantial control over knowledge dissemination (i.e., "traffic controller;" Burt, 1992). Because they serve as the bridge between disconnected alters, information broker teams can substantially influence the quantity and quality of information received by themselves and their alters, which can be a crucial advantage when facing strong competition. For example, in Panel A, by gaining access to information that its competitors (say, F and G) may not have access to, Team A, by virtue of being the broker between them and other teams such as E, C, or G, may be able to use it as leverage in trading valued resources from other teams or in getting a first-user advantage. Furthermore, information broker teams can exploit the information diversity in their network to make deals with their information alters (even reluctant ones) to acquire useful knowledge (e.g., "arbitrage" Soda et al., 2018). For example, Team A can trade information that it has secured from Team E but only if Team F provides specific knowledge. Broker teams can also obstruct knowledge flow to their competitors. Such a subversive form of network control has received less scholarly attention due to its subtlety (for exception, see "divisive behavior," Halevy et al., 2020), yet it is likely to occur when the focal team encounters intense competition. For example, Team A (Panel A), which acts as the bridge between Team E and a competing Team G, can acquire knowledge from Team E and choose to withhold it from Team G to deter its progress.

In addition to knowledge acquisition, brokerage also helps teams to utilize external knowledge more effectively. Brokers, due to their role as knowledge flow controllers, are responsible for relaying information between different domains and, therefore, are likely more experienced and skilled in framing and communicating new knowledge (Burt, 2004). As such, occupying a brokerage position equips teams with a "vision advantage" to appraise and translate knowledge into innovation outcomes (Lingo & O'Mahony, 2010; Reagans & McEvily, 2003). This ability is likely to be particularly advantageous when faced with competition wherein the motivation of certain knowledge providers may not be apparent (Garcia et al., 2010; Menon et al., 2006). Without the ability to contextualize or evaluate the heterogenous knowledge they may have access to, nonbroker teams facing intense competition are especially likely to be less effective in utilizing their resources in being innovative. Importantly, broker teams can not only identify their value but can also build shared vision and consensus around them to translate them into tangible outcomes (Hülsheger et al., 2009). In summary, we suggest that while facing a higher degree of inter-team competition could hinder a focal team's ability to effectively integrate knowledge from peer teams, the focal team's information brokerage position may mitigate these negative consequences. Accordingly, we propose,

Hypothesis 4: A focal team's brokerage in the inter-team knowledge sharing network moderates the relationship between inter-team competition and inter-team knowledge integration such that when brokerage is high, the relationship is less negative.

Hypothesis 5: The indirect effect (mediation) of inter-team competition on team innovation via inter-team knowledge integration (Hypothesis 3) is moderated by the focal team's brokerage such that when brokerage is higher, the indirect effect is less negative.

Overview of Studies

We tested our full theoretical model in two studies. Study 1 was a network field study sampling 73 engineering teams (employee $N = 689$) working in technology-related industries in China. Study 2 was a team-based interactive social network experiment (focal team $N = 162$, total individual $N = 972$) where participants engaged in a team innovation task. By independently manipulating between-team dyadic competition and the brokerage position of specific teams in the inter-team information exchange network, this study provides causal evidence for the relationships proposed, as well as rich insights into the focal team's behavioral strategies.

Transparency and Openness

We describe our sampling plan, all data exclusions (if any), manipulations, and measures in adherence to the *Journal of Applied Psychology* methodological checklist. All analysis codes and materials are available upon request. Data were analyzed using UCINET software Version 6.662 (Borgatti et al., 2002), SPSS Version 27, and Mplus Version 8.4 (Muthén & Muthén, 1998/2017). We did not preregister these studies' design and analyses. All studies were approved by the institutional review board at University of Maryland, College Park (Protocol numbers #1666940;

#1666940-2). Study 2 data and an additional online material and the appendix are hosted at the Open Science Framework available at https://tinyurl.com/u7nn9bc4.

Study 1: Method

Sample and Procedures

Guided by past teams research (e.g., Bunderson et al., 2016), we approached organizations with a set of team research criteria and received commitments from four engineering firms with a total of 103 project teams.[2] However, due to unexpected work demands, one of the firms with 26 teams was unable to continue participating midway. As a result, we could not collect data on our team-level dependent variable (DV) and thus removed this firm from our analyses. Among the remaining 77 teams from three organizations, four teams had missing responses on our dependent variable. Our final sample thus consisted of 689 employees from 73 engineering teams nested in three firms. Details such as ownership structure and technological focus are provided in the additional online material and the appendix. Given that engineering teams can have multiple performance goals (e.g., maintenance, troubleshooting), we confirmed with firm management that innovation was a salient outcome for these teams. For instance, the official mission statements of all these firms prominently featured language related to "innovation."

In our interactions with firm management, we discovered some "natural boundaries" (Borgatti et al., 2018) within the second firm (pseudonymized "Umbrella Tech," see additional online material, Table A1). Specifically, the 37 Umbrella Tech teams were organized in five different product divisions that worked at different locations and in unrelated industries (e.g., enterprise cloud storage vs. employee relationship software development). Because of these natural boundaries, these teams very rarely interacted or competed with others from another division and firm management advised us to treat each division as a smaller yet distinct organization and conduct our survey rollout separately. Therefore, we labeled each of the five divisions as a "data site" and viewed them as separate "networks of teams." Overall, along with the other two firms, there are in total seven data sites or seven "networks of teams" in our sample.

All surveys were administered in Mandarin, after following standard translation and back translation procedures (Brislin, 1976). Translation from English to Mandarin was undertaken by the first author, and the back translation was undertaken by the third author. Discrepancies were resolved by the two authors with input from our HR liaisons to ensure contextual fit. We then conducted a survey pretest (Schaffer & Riordan, 2003) with project managers (PMs) and employees to incorporate any feedback; we administered separate surveys to team members and project managers at two time points. At Time 1, employees and project managers provided responses on our explanatory and control variables. Four weeks later, at Time 2, project managers rated teams' innovation. To ensure confidentiality, surveys were distributed to respondents via sealed envelopes and collected back by the researchers. The average number of teams per data site was 10.43 ($SD = 7.7$), and the average size of teams was 9.4 members ($SD = 2.2$). Among employees, the average age was 31.3 years ($SD = 5.4$), and 70.0% were male; among project managers, the average age was 34.1 years ($SD = 5.1$), and 81.7% were male. All participants had a bachelor's degree or higher.

Preliminary Interviews

We conducted several interviews with our organizational liaisons to gather facts about teams' internal operations and between-team interactions, as well as solicit feedback about our survey design. Our liaisons include several frontline employees, project managers, as well as the CEO and head of HR of each company. First, we wanted to ascertain that organizational teams did in fact experience between-team dyadic competition with peer teams in a differentiated manner. To this end, interviews with project managers and the head of HR first indicated that all teams experienced common structural incentives such as an end-of-year review and ranking all teams for allotment of performance bonuses. Thus, this baseline structural incentive was commonly experienced by all teams. More importantly, interviews indicated that teams indeed experienced more competition with specific peer teams than others. For instance, some managers spoke about their team being competitive against a specific target team because they perceived the two teams to be fighting for a funding opportunity or because they perceived each other operating in similar markets. Other managers spoke of their team competing against another team because many team members of these two teams graduated from rival universities or because of prior interaction history where the two teams had competed for the same new hires. Oftentimes, respondents also mentioned how a combination of such factors were at play. These findings affirmed that teams indeed experienced competition at the dyadic level, and as a result, some teams encountered a higher overall degree of inter-team competition than others.

Additionally, we confirmed from our interviewees that teams were designed to work autonomously to meet respective client demands. In other words, there was no formal, organizationally designed means interdependence between teams and they did not need to coordinate with each other in completing their goals. However, these teams did engage in informal interactions with one another (albeit to varying degrees) in sharing information and other resources. Thus, these interviews ascertained the relevance of this context for our study.

We also used these interviews to solicit suggestions about which sources were best suited to provide responses on specific variables. Given our interest in studying inter-team interactions, both managers and employees in these interviews indicated that project managers would be best suited to report their team's competitive ties and information exchange ties with peer teams as they were most "in the thick of things" and were often the ambassador interfacing with peer teams (Ancona & Caldwell, 1992a). Thus, and also in line with prior research (Gladstein, 1984; Hansen, 1999; Porac & Thomas, 1994), we used managers as a key informant to measure a focal team's competitive ties and information exchange ties. In contrast, in capturing our mediator (i.e., the extent to which a focal team acquires and utilizes knowledge from other teams), both suggested that it was team members who communicated with and acquired knowledge from members in other teams and were the "end users" that converted acquired knowledge to tangible innovation outputs. Hence, we asked all team members to report the team's inter-team knowledge integration and aggregated them to the team level. Finally, our interviews suggested that team managers typically

[2] The present research is the first publication from a large data set involved in a broader research project.

oversee a number of projects and thus have the ability to discern different levels of innovativeness. Thus, we used project managers to measure team innovation, which is also supported by prior work (e.g., Carnabuci & Dioszegi, 2015).

Measures

We used a network-based approach to measure the extent of between-team dyadic competition and the extent of information sharing among teams (e.g., Hansen et al., 2005; Kilduff et al., 2010; Oh et al., 2004). Consistent with a whole network measurement approach, project managers were provided with a list of names of all project teams and their managers in the data site and were asked to respond to specific questions about them (e.g., Marsden, 1990).

The Degree of Inter-Team Competition Encountered by the Focal Team (Time 1)

Guided by prior work (e.g., Eisenkraft et al., 2017; Hansen et al., 2005; To et al., 2020), we measured between-team dyadic competition ties by asking project managers to respond to the question,

> To what extent is your team in competition with this team? Competition could include situations where you and this team compete for the same resources, outcomes and support, and where you strive to do better than this team in terms of your performance and assignments.

Respondents used a 5-point scale (0 = *no competition at all* to 4 = *very intense competition*) to answer the question about every other team in their data site.

Thus, seven inter-team competition network matrices were constructed, one for each data site. Using the UCINET software (Version 6.662; Borgatti et al., 2002), we calculated inter-team competition in-degree centrality. Mathematically, the in-degree centrality is calculated by sums of the weights of incoming (i.e., rated by peer teams) competition ties to the focal team (Freeman, 1978). Thus, high scores on this measure indicate that the focal team encounters a high degree of competition from peer teams in each data site. Scores ranged from 0 (i.e., no team competes against the focal team) to larger positive values as more teams nominated the focal team as their competitor.

Focal Team's Inter-Team Information Brokerage (Time 1)

For each data site, an inter-team information exchange network was constructed by asking project managers to respond to the question (adapted from Reinholt et al., 2011), "How frequently does your project team receive technical knowledge or project-related information from this team?" using a 5-point Likert scale from 0 (*not at all*) to 4 (*always*). Because the calculation of brokerage requires binary data input, we dichotomized our information network based on recommendations by Borgatti and Quintane (2018) such that it retained the most amount of information from the original weighted network. Compared to alternative options, a cutoff value of 2 (*occasionally*) consistently retained the most amount of variance between the weighted network and the dichotomized network (average $r = .85$) across the seven data sites. Therefore, values greater than or equal to 2 were recoded as 1 and others were coded as 0. We then used these dichotomized ties to construct seven inter-team information network matrices, one for each site.

We measured team brokerage using the constraint measure (Burt, 1992). Constraint scores typically range between 0 and 1, though it can slightly exceed 1 for small networks (Everett & Borgatti, 2020). In our data, the constraint scores ranged from 0 to 1.125. High constraint scores mean ego's access to few structural holes, therefore lower brokerage. Thus, we report the negative of constraint as brokerage.

Focal Team's Inter-Team Knowledge Integration (Time 1)

We measured inter-team knowledge integration by asking all team members to respond to the following two questions about their team's interaction with other teams in general (adapted from Reinholt et al., 2011):

> Please indicate the extent to which your team (a) receives knowledge or information from team members working in other project teams in your organization, and (b) uses knowledge or information acquired from team members working in other project teams in your organization.

Respondents used a 5-point scale ranging from 1 (*no or very little extent*) to 5 (*a very large extent*). This measure had adequate reliability ($\alpha = .81$) and aggregation statistics, median $R_{wg} = .77$; intraclass correlation coefficient (ICC, 1) = .13, ICC(2) = .57, $F = 2.32$, $p < .01$. Although a higher ICC(2) would be ideal, a lower value does not prevent aggregation if R_{wg} is high and group variance is significant (LeBreton & Senter, 2008). Thus, we aggregated member ratings in each team to operationalize this construct.

Team Innovation (Time 2)

At Time 2, project managers evaluated team innovation by responding to a four-item measure from De Dreu and West (2001), using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item is, "team members often implement new ideas to improve the quality of our products and services" ($\alpha = .90$).

Control Variables

First, we controlled[3] for the size of each inter-team network because network size covaries with both the centrality-based competition measure and structural holes in the network (Burt, 1992; Freeman, 1978) and can affect our results. Second, we controlled for team size as larger teams tend to have more diverse expertise among its members and thus are likely to be more innovative (Stewart, 2006). Third, because teams' knowledge integration and innovative behavior could change with stage of the project (Gersick, 1988), we controlled for teams' current state of project completion (reported by project managers, 1 = 25% *or below,* 4 = 75% *and above*). Next, given consistent evidence supporting a gender difference in competitiveness (Niederle & Vesterlund, 2011), we controlled for project managers' gender as this could potentially impact their reported competition ties. Similarly, because more experienced managers might face more competition (Gerber et al., 2017) and might have more expertise in guiding the team's innovative direction (Wu et al., 2005), we also

[3] Our results are robust without control variables, except for network size because it covaries with centrality-based and structural hole based measures (e.g. Burt, 2004).

Table 1
Study 1 Means, Standard Deviation, and Bivariate Correlations

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Data site (inter-team network) size	10.43	7.70	—											
2. Team size	9.40	2.20	.26*	—										
3. Project completion rate	3.12	0.88	−.07	−.20	—									
4. PM gender[a]	0.82	0.38	−.03	−.01	−.03	—								
5. PM tenure	2.26	1.43	−.05	.09	.24*	.16	—							
6. Task interdependence	3.74	0.71	.23*	.21	.13	.17	.22	(.66)						
7. Task complexity	3.98	0.67	.28*	.20	.11	.16	.32*	.54**	(.66)					
8. Team identification	3.73	0.37	−.39*	−.20	.38*	−.16	.21	−.14	.02	(.75)				
9. Competition in-degree centrality	6.67	3.91	.59**	.38**	−.02	−.08	.24	.08	.09	−.21*	—			
10. Information brokerage[b]	−0.48	0.28	.79**	.21	−.01	−.09	.14	.17	.17	−.32**	.55**	—		
11. Inter-team knowledge integration	3.54	0.29	−.34*	−.01	.14	.12	.11	.00	.08	.37**	−.30*	.21	(.80)	
12. Team innovation	4.13	0.60	.08	.17	.22	.11	.17**	.37**	.40**	.08	−.08	.08	.24*	(.84)

Note. $n = 73$. Reliabilities are provided in parentheses. PM = project manager.
[a] 0 = female, 1 = male. [b] Brokerage is the negative of constraint.
* $p < .05$. ** $p < .01$.

controlled for project manager's tenure. As prior work has shown that competition can positively affect within-team cohesion in facilitating innovation (Baer et al., 2010), we controlled for members' team identification using a five-item scale by Mael and Ashforth (1992). Finally, because team task characteristics might impact teams' reliance on external knowledge (van Knippenberg, 2017), we controlled for task complexity (three-item scale from Campion et al., 1993) and team task interdependence (three-item scale from Dean & Snell, 1991), both reported by project managers.

Analytical Strategy

While our data is characterized by a four-level structure (i.e., individual, team, data site, organizations), our hypotheses are focused on between-team differences. Given that the number of data sites (i.e., clusters in the data) was quite low (i.e., seven), in order to still account for nonindependence between teams in a given data site, we conducted our analysis with cluster-robust standard errors (McNeish & Stapleton, 2016) in Mplus Version 7.4 (Muthén & Muthén, 1998/2017). To account for potential differences due to organizations and data sites, we also created two firm dummy variables (for three firms) and six data site dummy variables (for seven data sites) and entered them as fixed effects. However, this did not affect our results in any way. Following convention, all explanatory variables were grand-mean centered (Enders & Tofighi, 2007).

Study 1: Results

Table 1 reports descriptive statistics and correlations among all study variables. When examining responses of *slight competition* and above, the average density of inter-team competition networks across the seven data sites was .34, indicating that inter-team competition was a tangible phenomenon. Similarly, the average density of the inter-team information networks was .46, indicating that inter-team information exchange was frequent.[4] The between-team dyadic correlation between competitive ties and information sharing ties was modest ($r = .17$), suggesting that competing teams do still share some information with one another (Table 2).

Hypothesis 1, which proposed that the extent of inter-team competition experienced by a focal team would be negatively related to its inter-team knowledge integration, was supported ($b = -.03$, $\beta = -.43$, $p < .01$). As predicted by Hypothesis 2, inter-team knowledge integration was positively associated with team innovation ($b = .37$, $\beta = .18$, $p < .01$). Supporting Hypothesis 3, our mediation analysis using a Monte Carlo method with 20,000 iterations (Slig & Preacher, 2008) showed a significant unconditional indirect effect of inter-team competition on team innovation via inter-team knowledge integration (estimate = −.01, 95% CI [−.02, −.01]).

Hypothesis 4 posited that a focal team's information brokerage would weaken the negative relationship between inter-team competition and its inter-team knowledge integration. There was a significant main effect of brokerage on inter-team knowledge integration ($b = .55$, $\beta = .53$, $p < .01$). Furthermore, results showed a significant interaction between inter-team competition and information network brokerage ($b = .12$, $\beta = .39$, $p < .01$). A simple slopes test (Cohen et al., 2003) indicated that the negative slope between inter-team competition and inter-team knowledge integration was weaker when brokerage was higher (+1 *SD*; $b = -.01$, *n.s.*) as compared to when it was lower (−1 *SD*; $b = -.06$, $p < .01$). The difference between these slopes was also significant ($p < .01$), thus supporting Hypothesis 4. This interaction is illustrated in Figure 2 below.

Finally, in testing Hypothesis 5, we examined if the indirect effect of inter-team competition on team innovation via knowledge integration varied with the extent of the focal team's brokerage. This indirect effect was not significant when brokerage was higher, +1 *SD*; estimate = −.004, 95% confidence interval (CI) [−.01, .01], as compared to when it was lower, −1 *SD*; estimate = −.03, 95% CI [−.03, −.02]. These effects provided support for our overall model.

Supplementary Analyses

First, we tested our hypotheses using alternative operationalizations of focal variables. For inter-team competition, these included

[4] At the team level, there was also a moderately strong raw correlation between inter-team competition in-degree centrality and information brokerage ($r = .55$), raising concerns of potential multicollinearity. To understand the impact of this on our results, we took several steps and found our results to be robust. Details are available in the additional online material and appendix.

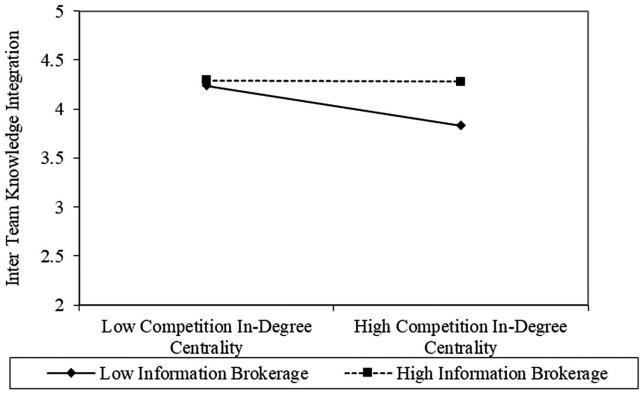
Table 2
Study 1 Results of Regression Analysis

Variable	Inter-team knowledge integration		Team innovation	
	Unstandardized coefficient *b*	Standardized coefficient β	Unstandardized coefficient *b*	Standardized coefficient β
Control variables				
Inter-team network size	−.01 (.01)**	−.51 (.20)**	.01 (.01)	.12 (.09)
Team size	.01 (.01)	.02 (.12)	.04 (.03)	.15 (.11)
Project team completion rate	−.02 (.04)	−.07 (.14)	.10 (.06)	.14 (.10)
Project manager gender[a]	.14 (.11)	.19 (.14)	.02 (.10)	.01 (.06)
Project manager tenure	−.01 (.01)	−.04 (.10)	−.01 (.02)	−.02 (.11)
Task interdependence	−.02 (.04)	−.04 (.10)	.25 (.12)*	.28 (.14)*
Task complexity	.07 (.04)	.16 (.10)	.18 (.15)	.20 (.17)
Team identification	.16 (.04)**	.20 (.04)**	.05 (.15)	.03 (.09)
Independent variable				
Inter-team competition in-degree centrality	−.03 (.01)**	−.43 (.14)**	−.03 (.01)**	−.17 (.06)**
Moderator				
Inter-team information brokerage/structural hole	.55 (.20)**	.53 (.14)**		
Interaction terms				
Competition in-degree Centrality × Information Brokerage	.12 (.04)**	.39 (.13)**		
Mediator				
Inter-team knowledge integration			.37 (.07)**	.18 (.03)**
R^2		.36**		.33**

Note. Both unstandardized and standardized coefficients are reported; standard errors in parentheses; *n* (individual) = 689; *n* (teams) = 73. Controlling for the firm or data sites (using two and six dummy variables, respectively) did not alter any of these findings. For the sake of brevity, we have not included them in this table.
[a] Project manager gender, 0 = female, 1 = male.
* $p < .05$. ** $p < .01$.

unweighted degree centrality and degree centrality using reciprocated ties (where a competitive tie only exists if both teams report each other); for brokerage, we ran models with effective size (e.g., Soda et al., 2018). All results using these alternative measures were consistent with our main analysis. Next, we tested if it might be strength of network closure, where a team's alters are densely connected to each other (e.g., Ahuja, 2000), that may buffer the adverse effects of competition. Analysis using a focal team's information ego network density confirmed that it was brokerage and not closure that helped teams counter the knowledge deficit caused by inter-team competition. Finally, we inspected the degree of network overlap between a focal team's competition and information networks by dividing the number of overlapping ties by the total number of information ties. The overlap median was 26.2%, indicating that the two networks, while overlapping to a small extent, are largely distinct. Analysis controlling for this overlap variable, or subsample analysis after excluding a small number of teams with high overlap did not change our results. Details of these analyses are available in the additional online material and appendix.

Figure 2
Interaction Between the Degree of Inter-Team Competition and Information Brokerage on Inter-Team Knowledge Integration



Study 1: Discussion

Results from engineering teams showed that a high degree of competition experienced by a focal team reduced innovation by impeding its ability to acquire and utilize knowledge from the network. However, occupying a brokerage position in the inter-team information exchange network counteracted competition's adverse effects. Although Study 1 has strong external validity, it also has important limitations. First, as a field study, it is unable to fully address endogeneity concerns and, thus, is limited in terms of providing causal inference. Second, it lacks insights into the "microprocesses" of how a focal team utilized information brokerage to combat the negative effect of inter-team competition (e.g., Grosser et al., 2019). Furthermore, managerial ratings of team innovation may not be entirely objective. To address these limitations, we conducted Study 2, a team-based network experiment requiring teams to develop innovative proposals, which in turn, were objectively coded for innovation by trained and independent judges.

Study 2: Method

Study Design

Study 2 was a team-based lab experiment conducted using an online simulation. In each trial, groups of three teams comprising two members each entered our experimental platform synchronously to engage in a knowledge-intensive innovation simulation (these three teams thus formed an inter-team network). In each inter-team network, our focus was on one focal team (Team Red) that received all our study manipulations and whose outcomes we were interested in. We manipulated our independent variable—the degree of inter-team competition faced by this focal team in the three-team network—and our moderator, the focal team's information brokerage position. Teams then had the opportunity to interact with each other to engage in the full spectrum of knowledge exchange activities, such as making inquiries, sending and receiving knowledge, making deals and even obstructing knowledge flow. Finally, using the knowledge they were given and that they acquired during the simulation, each team created an innovation proposal, which was coded by independent judges to derive our dependent variable.

We created a 2 (high-competition condition: focal team facing many competition ties vs. control condition: focal team faces zero competition ties) × 2 (focal team as broker in the inter-team information network vs. focal team as nonbroker) factorial design using Empirica, a web-based multiplayer interactive experimental platform (Almaatouq et al., 2021). For the main task, we adapted materials from the Windy City Theatre paradigm for open-ended tasks such as team creativity and innovation (Hoever et al., 2012, 2018; Parke et al., 2022). In this paradigm, teams are tasked to create an innovative solution to improve business at a historic yet struggling theatre. Each team received some common knowledge (shared among the three teams) and some unique knowledge that was only accessible to each team individually. While not necessary to complete their proposals, it would be helpful if the teams interacted with one another and shared/acquired different types of knowledge from each other in developing their solutions. Overall, this paradigm simulates interactions like those among real organizational teams (such as teams in Study 1), wherein teams tend to have both shared and unique knowledge and where informal access to more diverse information provides distinct advantages in tackling open-ended problems and creating innovation (Anderson et al., 2014; van Knippenberg, 2017).

Data and Sample

972 individuals (51.5% female, 47% male, and 1.5% other) were recruited from Prolific. Their average age was 36.8 years; 64.9% were Caucasian, 15.1% were Asian/Pacific Islander, 7.3% were of African descent, 2.6% were Hispanic or Latino, and 10.1% identified as mixed or chose not to report. We recruited English-proficient, working adults (average working experience of 12.5 years) who received $13 in compensation. Human subjects research approval was obtained at the second author's institution (Protocol #1666940-2).

Task and Procedure

Each trial of the simulation required six participants to enter the experimental platform synchronously. Participants were randomly assigned to one of three 2-member teams denoted as Team Red, Team Blue, and Team Green. Thus, the six participants comprised an "inter-team network" of three teams, each with two members. Our sample consists of 162 such inter-team networks, with one of these teams (randomly chosen to be Team Red) being the focus of all our manipulations and main analyses. It is thus important to note here that each simulation run with six participants in three teams yielded one data point (i.e., of Team Red) in our sample.

Participants were informed that they were special project teams at Riverside Theatre, a historic yet struggling theater in Chicago. Participants read that due to declining interests in conventional theatre, the managing director had tasked these three teams to conduct independent research and propose innovative solutions to improve the theatre. They were told that innovative solutions were those that were novel and original, as well as useful and implementable, and that based on their performance, teams could earn a monetary reward. Participants read that each team had some unique pieces of knowledge but that, to develop a comprehensive solution, it would be helpful if teams gathered and utilized knowledge from the other two teams as well.

To create their proposal, each team was presented with: (a) general background knowledge about the theatre that was available to all teams (e.g., theater layout, last year's ticket sales), and (b) four pieces of unique knowledge from their own research. We conducted a pretest with 120 Prolific participants to ensure that each team was given unique knowledge of equal value (please see additional online material and appendix, p. 4). For instance, Team Red had knowledge about the bars and restaurants near the theatre and that the theatre could benefit from establishing local partnership relationships with these hospitality venues; Team Blue had knowledge about which type of shows had the highest and lowest profit margins; Team Green had knowledge about a local high school and senior care home that could potentially be beneficial for the theatre's outreach program. After reading the information available to their respective teams, participants read that the managing director had proposed a meeting among the three teams. Teams then read about rules for the interaction phase, where we inserted manipulations of inter-team competition and information brokerage. Next, the three teams interacted for about 14 min where they could discuss and negotiate to send and/or receive information. After discussion, each team was given 12 min to write their proposal. On average, the simulation lasted 60 min.

Our theory focuses on how a focal team's knowledge integration and innovation are affected by the degree of competition it faces from peer teams and how it is mitigated by being an information broker between teams. Hence, out of the three teams in each trial, we randomly chose Team Red to be the target of all our manipulations. Thus, Team Red received one of the four manipulations based on our 2 × 2 design.

Manipulation of Team Red's Information Brokerage

We manipulated information brokerage using the communication structure among the three teams in the between-team discussion section (Brands & Mehra, 2019; Greenberg, 2021). In the *focal team as information broker* condition, Team Red members read that the managing director had chosen them to be the discussion coordinator

among the three teams and was presented with a network diagram that visualized their brokerage position. They read, "As this picture illustrates, your team is the 'bridge' that connects the other two teams, Team Blue and Team Green. Only your team can communicate directly with them, and they cannot communicate with each other without going through your team." Team Blue and Team Green participants in this condition were shown the same diagram but read that "As this picture illustrates, Team Red is the 'bridge' that connects your team with the other team. You can directly communicate with Team Red but not with Team Green [Blue]. In other words, if you want to communicate with Team Green [Blue], you will have to do so indirectly via Team Red." Therefore, in the discussion phase of the simulation, Team Red had two chat boxes to communicate with both Team Blue and Team Green, whereas Team Blue and Team Green had only one chat box—that is, to communicate with Team Red.

In the *focal team as nonbroker* condition, all three teams read that the managing director had chosen an open discussion format. They were shown a diagram of a fully connected communication structure and read that, "As this picture illustrates, every team will be connected with each other, and your team can freely communicate with the other two teams." Accordingly, every team had two chat boxes to directly communicate with the other two teams.

Manipulation of Team Red's Degree of Inter-Team Competition

Consistent with our conceptualization of competition as occurring dyadically between teams and our centrality-based (i.e., aggregated number of incoming competition ties) operationalization in Study 1, we manipulated the degree of competition faced by Team Red by varying the *number* of between-team dyadic competitive ties it had. Specifically, given that our inter-team networks in each simulation consisted of three teams each, the highest and lowest possible number of competitive ties Team Red could have were two and zero, respectively. Thus, we maximized the separation between the conditions such that Team Reds faced the maximum possible competitive ties (i.e., two, with both Team Blue and Team Green) in the high competition condition or the least possible competition ties (zero; with none of the other two teams) in the no-competition condition.

In designing our competition manipulation, we were guided by prior work on the antecedents of dyadic competition. This research suggests that between-team dyadic competition, where one team *strives to outperform* another team (To et al., 2020), can be the result of multiple factors. For example, it could be induced by dyadic outcome interdependence (e.g., two teams competing for economic incentives or scarce resources), other socio-relational factors such as dyadic performance history (Kilduff et al., 2016), emotional arousal specific to a pair of teams (Ku et al., 2005), or a *combination* of these factors (Garcia et al., 2013, 2019). Accordingly, in providing an effective manipulation, we induced competitive ties by providing Team Reds with information about their between-team dyadic history with Teams Blue or Team Green as well as dyadically structured incentives to outperform specific target teams. No such information about the history or incentives were provided to teams in the no-competition condition.

In the focal team facing *high degree of inter-team competition* condition, Team Red faced the maximum degree of competition—that is, two competitive ties, with both peer teams in their three-team network. Team Red participants read that,

> Your team, Team Red, has a competitive relationship with both Team Blue and Team Green, separately. In the past, the Managing Director has organized similar special projects, and your team has experienced very intense competition with both Team Blue and Team Green. Hence, in this special project, your team is very motivated to outperform each of them.

They were informed that to outperform the other teams, they needed to have a more innovative proposal than the other teams, as well as gather more pieces of relevant information that would be helpful for the proposal. Accordingly, they read that,

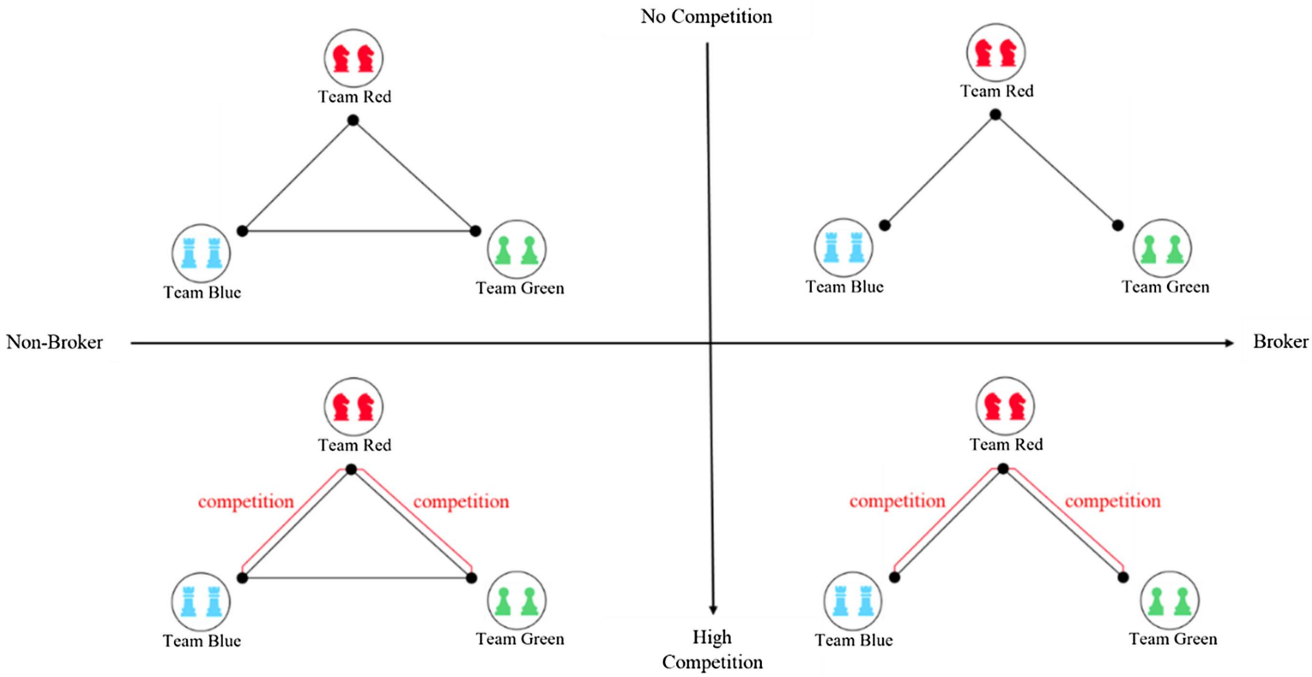
> The proposal your team creates will be rated on innovativeness by the researchers on a 7-point scale. In addition, for every piece of knowledge your team acquires *more* than Team Blue and Team Green respectively, your team will be awarded 3 points, which will be added to your team's final score, and will be used to determine your monetary bonus at the end of the study.

Thus, if Team Red secured more overall points than Teams Blue and/or Green, it could receive a higher bonus than each team, respectively. Therefore, in line with prior research on between-team dyadic competition, our competition manipulation provided information about the past competitive history between Team Red and the other teams individually *and* offered dyad-specific economic incentives for Team Red to outperform the other two teams separately.[5]

In the focal team facing *zero degree of inter-team competition* condition (i.e., the no-competition or control condition), all three teams read that their teams had been set up anew by the managing director and that their team was working hard to build up its reputation and credibility. Participants were informed that they needed to have an innovative proposal and that it would be helpful to acquire knowledge from the other two teams in the discussions. Similar to the competition condition, they were informed that their team's proposal would be rated on innovativeness by the researchers on a 7-point scale. However, different from the competition condition, where they would be awarded for every piece of information they collected *more* than their competing teams, participants in the control or no-competition condition were told that they would be awarded 2 points per piece of knowledge they acquired, which would be added to the final score. All teams would then have the opportunity to receive a monetary bonus at the end of the simulation based on their overall score. Thus, the no-competition condition had a similar setup but did not mention or contain any language related to "outperforming" or competing with the other teams. By having a similar point-based system

[5] To ensure the strength of our manipulation, we conducted a supplementary study with online participants from Prolific Academic ($n = 120$). Results showed that compared to only dyadic economic incentives or only competitive history, our combination approach indeed created the strongest dyadic competitive desires and striving to outperform a target (details available in additional online material and the appendix, p. 5). Therefore, we used this combination approach in our manipulation. We also pretested the language to ensure that Team Red participants understood that they had two between-team dyadic competitive ties with Team Blue and Team Green, separately. Team Blue and Team Green participants in this condition read similar instructions except that their team only had one competitive relationship, i.e., with Team Red. We thank an anonymous reviewer for this suggestion.

Figure 3
Study 2 Experimental Conditions (Focal Team Red)



Note. All manipulations are directed only at Team Red in all conditions. Red lines denote competitive ties and black lines denote communication ties. Each icon represents a participant such that each team is comprised of two members. Top left: control/no-competition and nonbroker condition; top right: control/no-competition and information broker condition; bottom left: high competition and nonbroker; bottom right: high competition and information broker. See the online article for the color version of this figure.

and chance to receive a monetary bonus, we kept the competition and control conditions broadly comparable to avoid any potential confounds. Figure 3 shows the diagrams presented to participants across the four conditions.

Inter-Team Discussion and Knowledge Exchange

After participants read both the manipulations, the three teams entered a virtual chatroom interface for 14 mins where they used dedicated chat boxes to communicate with another specific team depending on the brokerage condition. Aside from the between-team chat boxes, each team also had an additional chat box to allow team members to communicate and strategize internally. On this interface, participants also had access the knowledge available to them, a diagram that illustrated their communication structure and competitive relationships (as shown in Figure 3) and a spreadsheet that allowed them to keep track of all the information. Figure 4 presents a snapshot of this interface.

Team Innovation Proposal

After the inter-team discussion, each team was provided a collaborative text editor (similar to a Google Doc) for the two members to create their final team proposal. To facilitate their writing, they had a chat box where they could communicate ideas.

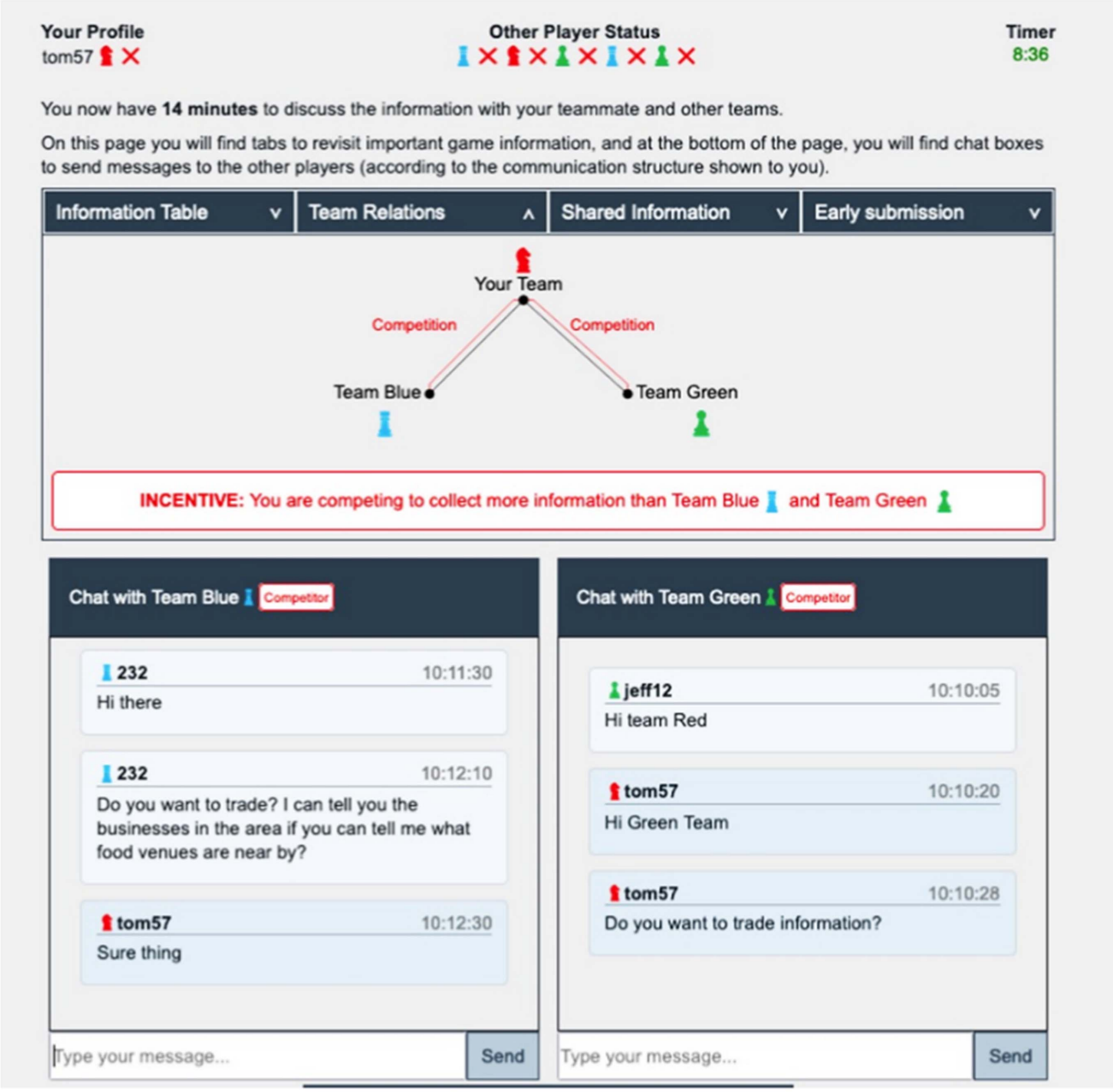
Measures

Inter-Team Knowledge Integration

Across the 162 trials of the simulation, teams sent a total of 7,822 messages ($M = 48.28$, $SD = 14.48$). Two research assistants (RAs) blind to the hypotheses coded the messages between teams to create our mediator, the focal team's inter-team knowledge integration. We calculated *the number of pieces of true knowledge acquired by each team*, with the logic being that when teams acquire a true piece of knowledge (as opposed to partially true or an outright false one), they are most likely to also utilize it.[6] Hence, RAs identified all the messages through which the focal Team Red received a true piece of knowledge from another team and calculated the total number of pieces of such knowledge acquired. The RAs were given detailed information about the different pieces of knowledge and first coded a subset of the chat data together ($n = 30$) to establish a consensual coding standard. They then coded all remaining messages independently and achieved very good interrater agreement (minimum $R_{wg} = .90$). Hence, we took the average score of the two RAs.

[6] We also analyzed our data with an alternative operationalization of inter-team knowledge integration by adding independent RA coding of teams' *utilization* of the knowledge acquired in their team's proposals, and team's self-reported degree of inter-team knowledge integration. Results are substantively the same, showing that the interaction applies robustly to both the acquisition and utilization aspects of knowledge integration. We thank an anonymous reviewer for this suggestion, and details and discussion of this analysis can be found in additional online material and appendix (p. 6).

Figure 4
Study 2 Inter-Team Discussion Illustration for Team Red



Note. Illustration of Team Red's interface in the high-competition and information brokerage condition. See the online article for the color version of this figure.

Team Innovation

To measure team innovation, we used a consensual assessment approach (Amabile, 1983). Two independent judges blind to the hypotheses rated the proposals on team innovation using the items adapted from De Dreu and West (2001), using a 7-point rating scale. A sample item is, "If implemented, this proposal will produce new services, products, or management procedures at Riverside Theatre" (Cronbach's $\alpha = .92$). Because team innovation involves idea implementation, our instructions to the judges emphasized the creativity as well as implementability of solutions. The two judges first resolved any discrepancies in their ratings on 20 initial proposals and then independently rated the remaining proposals, achieving adequate agreement and reliability, ICC(1) = .80, $p < .01$, ICC(2) = .82, median $R_{wg} = .75$. Hence, we took the average score of both RAs' ratings on this scale to use as our dependent variable, team innovation (see additional online material and appendix for sample proposals).

Study 2: Results

Manipulation Checks

Participants completed a three-item competition manipulation check scale (1 = *strongly disagree*; 5 = s*trongly agree*). A sample item includes "my team was in direct dyadic competition with two other teams." Team Red participants in the high competition condition reported significantly higher degree of inter-team competition ($M_{\text{high competition}} = 4.36$, $SD = .95$) than those in the no-competition control condition, $M_{\text{no competition}} = 2.04$, $SD = 1.23$, $F(1, 159) = 217.66$, $p < .01$. Participants also completed a brokerage manipulation check that asked them to select a network diagram that matched the communication structure they experienced in the simulation. Eighty-seven percent of Team Red participants selected the correct diagram. Hence, both our manipulations were effective. On average, the three teams sent 48.28 messages during the interaction phase; teams' innovation proposals had an average length of 180 words (first quartile = 122 words, 3rd quartile = 236 words), indicating that overall participant attentiveness and engagement was high.

Hypothesis Testing

Hypothesis 1 posited that a high degree of competition encountered by a focal team (i.e., Team Red) would have a negative effect on its inter-team knowledge integration. Supporting Hypothesis 1, an independent sample t test indicated that Team Red acquired significantly fewer pieces of knowledge in the high-inter-team competition condition ($M_{\text{high competition}} = 3.28$, $SD = 1.84$), compared to the control condition, $M_{\text{no competition}} = 5.69$, $SD = 2.00$, $t(160) = 7.99$, $p < .01$. Hypothesis 2 posited that the focal team's inter-team knowledge integration would be positively associated with team innovation. Linear regression showed that the number of pieces of true knowledge acquired by focal Team Red significantly predicted the innovation ratings of their team proposal ($b = .19$, $SE = .05$, $p < .01$), supporting Hypothesis 2. Hypothesis 3 posited that inter-team knowledge integration would mediate the relationship between the degree of inter-team competition and team innovation. Results of bootstrapped mediation analysis ($n = 5{,}000$) showed that the degree of inter-team competition faced by Team Red had a significant indirect effect on team innovation via inter-team knowledge integration (indirect effect = −.56, 95% CI [−.82, −.33]), supporting Hypothesis 3.

Hypothesis 4 proposed that the negative effect of the high inter-team competition faced by a focal team on its knowledge integration would be attenuated when it also held an information broker position. A two-way analysis of variance showed a significant interaction between the competition and brokerage conditions, $F(1, 158) = 6.16$, $p < .05$. A planned contrast showed that in the high competition condition, being in the brokerage position significantly helped Team Red acquire more knowledge, $M_{\text{high competition and information broker}} = 3.98$, $SD = 1.65$; $M_{\text{high competition and nonbroker}} = 2.60$, $SD = 1.77$; diff = 1.38, $t(158) = 3.32$, $p < .01$; Cohen's $d = .74$. However, when there was no competition, Team Red's brokerage did not provide a significant advantage ($M_{\text{no competition and information broker}} = 5.65$, $SD = 1.87$; $M_{\text{no competition and nonbroker}} = 5.73$, $SD = 2.14$, diff = .08, *n.s.*). Overall, these results supported Hypothesis 4. Figure 5 illustrates Team Red's performance across conditions.

Hypothesis 5 posited that the indirect effect of the degree of inter-team competition faced by a focal team on its team innovation via inter-team knowledge integration would be moderated by the focal team's information brokerage. Results of a bootstrapped moderated mediation analysis indicated that when Team Red was an information broker between Team Blue and Team Green, it was able to mitigate the negative indirect effect of high competition on team innovation (indirect effect = −.41, 95% CI [−.66, −.19]). In contrast, when Team Red was a nonbroker, it was significantly more vulnerable to competition's adverse effects (indirect effect = −.72, 95% CI [−1.08, −.40]). We also found a significant index of moderated mediation (i.e., the difference between the two indirect effects; index = .31, 95% CI [.04, .64]), thus supporting Hypothesis 5.

Supplementary Analyses: Focal Team Reds' Behavioral Strategies

Our theory suggests that brokering teams can overcome the negative effects of inter-team competition because it allows them to engage in specific behaviors such as dealmaking and network obstruction. Using data coded from the teams' chat transcripts, we investigated whether Team Reds' information brokerage versus nonbrokerage positions influenced such behaviors and, in turn, if they explained any differences in the outcomes experienced by these teams when faced with a high degree of competition from other teams.

Dealmaking

Dealmaking refers to exchange behaviors (e.g., our team will give you X if your team give us Y) that brokering Team Reds could engage in with competing teams. For instance, if Team Blue was reluctant to share knowledge, Team Red could leverage its brokerage position to make deals with Team Green and secure information to trade with Team Blue because otherwise, Team Blue would have no means to acquire any knowledge. Thus, RAs identified instances where two teams explicitly proposed and agreed to a quid pro quo trade agreement (e.g., "do you want to trade the information about profit margins? We can tell you about local businesses around the theatre"), and we calculated the total number of deals/trades made by each team.

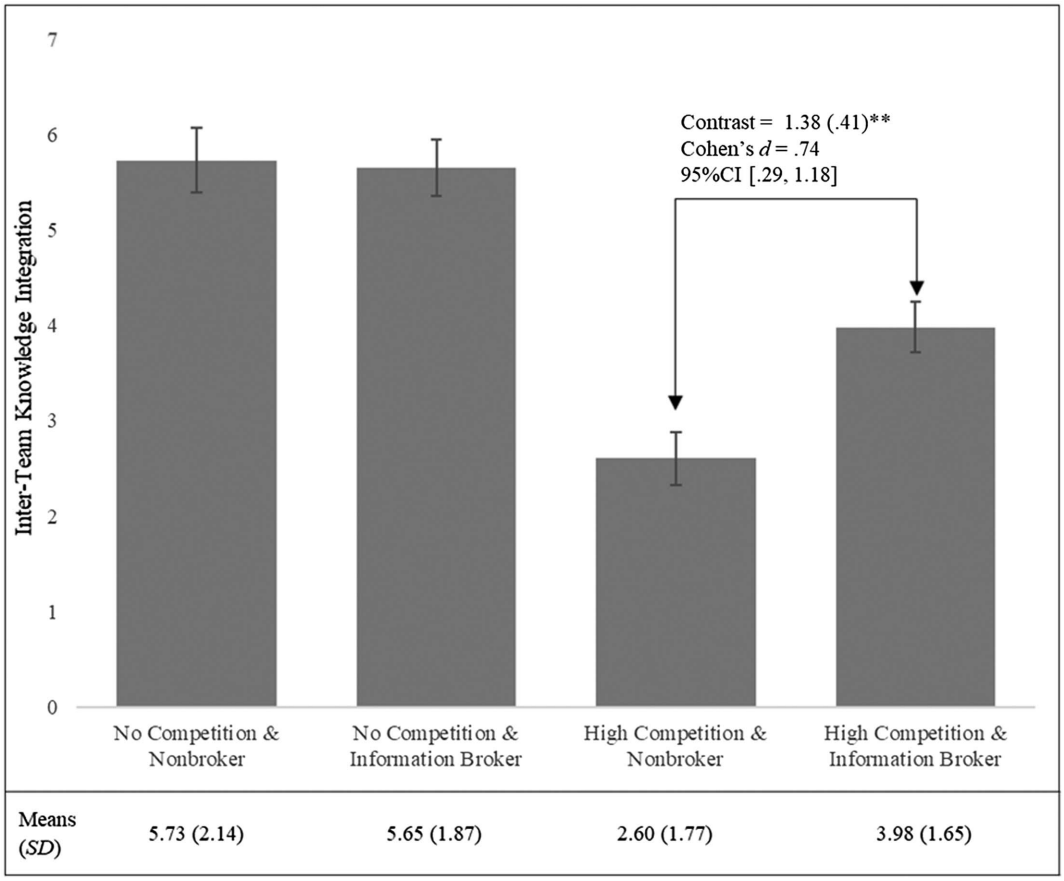
Network Obstruction

Brokers can also respond to competition by imposing control over the network to limit knowledge flow toward their competitors (Halevy et al., 2020). RAs coded for two types of obstructive behaviors: (a) when a team directly sent outright false knowledge to another team (e.g., saying the theatre's primary challenge was corporate debt when in reality, it needed to market to new demographic groups) or (b) when a team told another team not to send knowledge to another team (e.g., "Hey Team Blue, do not send this information to Team Green"). We calculated the total number of times that the focal team engaged in such behaviors.

Results

First, we found that when facing a high degree of competition, Team Red engaged in significantly more dealmaking behavior when it was the information broker ($M_{\text{high competition and information broker}} = 4.55$, $SD = 2.72$) than when it was a nonbroker ($M_{\text{high competition and nonbroker}} = 3.01$, $SD = 2.48$; $p < .05$;

Figure 5
Focal Team Red Inter-Team Knowledge Integration Means by Condition



Note. Error bars indicate 1 *SE* above and below the mean. In the table, means are presented with standard deviation in the parentheses. CI = confidence interval; *SE* = standard error.
** $p < .01$.

Cohen's $d = .47$), representing a 51% increase. Although obstruction behavior occurred much less frequently than dealmaking, we found similar results: when encountering intense competition, Team Red engaged in significantly more obstruction as an information broker ($M_{\text{high competition and information broker}} = .53$, $SD = .1.22$) than as a nonbroker ($M_{\text{high competition and nonbroker}} = .16$, $SD = .32$; $p < .05$; Cohen's $d = .56$). Next, we conducted mediation analysis to see if these unique brokerage behaviors could explain the difference in the number of true knowledge pieces Team Red acquired in the high competition and information brokerage condition versus the high competition and nonbroker condition (third vs. fourth bar in Figure 5). We found a significant indirect effect for dealmaking behavior (indirect effect = .30, 95% CI [.06, .60]) but not for obstruction behavior (indirect effect = .06, 95% CI [−.14, .27]), potentially because obstruction behavior occurred less frequently.

Study 2: Discussion

Study 2 was a team-based, social network experiment testing our full model in a controlled experimental setting with strong internal validity. A high degree of inter-team competition had a negative effect on the focal team's knowledge integration and team innovation (Hypotheses 1–3); yet, when the focal team occupied an information brokerage position, it was able to mitigate competition's adverse effects (Hypotheses 4–5). In addition, we found behavioral mechanism evidence including dealmaking behavior that allows teams to extract knowledge from unwilling parties and, to a lesser extent, network obstruction that constrained their competitors.

General Discussion

In two studies—a field study of engineering teams and a team-based interactive social network experiment—the present article demonstrated that a high degree of inter-team competition hampers a focal team's innovation by curtailing its ability to acquire and utilize knowledge from peer teams. Furthermore, we demonstrated that occupying brokerage positions in the inter-team information sharing network helps the focal team alleviate the negative effects of such competition. Taken together, these findings make several important contributions to the literatures on team innovation, inter-team competition, and group social capital.

Theoretical Contributions

First, at a broad level, this article advocated and found support for a group social capital perspective in explaining team innovation by demonstrating that innovation happens within a broader ecosystem of informal network interactions that teams in an organization have with one another. As prior work has indicated, organizational teams are rarely standalone units working independently "behind closed doors" (Hackman & Katz, 2010) but are "embedded within a larger organizational social structure [network]" (Oh et al., 2006: p. 1). They not only informally interact with each other in exchanging ideas and information that aids their respective goals (Phelps et al., 2012) but also have competitive relations with each other (To et al., 2022), where they strive to outperform one another and are therefore motivated to thwart each other's progress in achieving goals (Tsai, 2002). As prior research on relational pluralism (Shipilov et al., 2014; Tsai, 2002) suggests, it is important to incorporate such plurality of between-team interactions when trying to understand how social network ties may impact a focal team's outcomes. In this regard, our article is one of the few (see Casciaro et al., 2015; Venkataramani et al., 2013, for exceptions at the individual level) that examine the interactive effects of different types of between-team network interactions and demonstrates how the constraints provided by one network (e.g., competition) can be offset by a team's positional advantages in another (e.g., information exchange). Thus, studying the interplay between teams' competition and collaboration ties provides a more complete understanding of team outcomes such as innovation.

In examining the effects of such between-team interactions, we also contribute in several ways to the competition literature. First, we shed light on a crucial yet understudied process through which competition impacts team innovation. While extant research suggests that inter-team competition can stimulate team innovation by increasing within-team cohesion (e.g., Baer et al., 2010; Bornstein et al., 2002), we propose that such an intrateam perspective only provides a partial view of innovation in organizations. In this regard, we argue that competition can curtail the crucial inter-team exchanges relevant for innovation, which often rely on informal norms and goodwill between teams. Across both studies, we find that facing a high degree of inter-team competition adversely affects teams' innovation because it inhibits their ability to access and utilize diverse knowledge resources from peer teams that are crucial for innovation (van Knippenberg, 2017). Such negative between-team effects prevail even after controlling for the positive within-team interactions that competition facilitates (Study 1). Thus, by highlighting the deleterious between-team effects of competition on inter-team knowledge integration and team innovation, this article provides a complementary perspective identifying the costs of such competition previously unaccounted for. Future research would be well-served to consider both within- and between-team implications of competitions in organizations.

Next, our research contributes to the emerging body of work advocating for a dyadic conceptualization of competition as a focal team's *striving to outperform* another team (e.g., Kilduff et al., 2010; To et al., 2020). Supporting this work, our results offer a complementary perspective to the dominant "structural social situation" conceptualization of competition (Deutsch, 1949; D. W. Johnson & Johnson, 2005), which presumes that all teams in a given structural competition experience the same degree of competition with each other. However, in line with recent research (e.g., Kilduff et al., 2010; To et al., 2020), findings from our preliminary interviews with managers and employees suggest that, despite experiencing common competitive organizational incentive systems such as end-of-year team ranking for bonus allocations, teams also selectively strove to outperform specific target teams based on factors such as vying for the same clients and hires, or prior interaction history. Thus, even in the presence or absence of structural reasons such as outcome interdependence (Stanne et al., 1999), teams may compete (or not) due to various dyadic reasons. For instance, Jarzabkowski and Bednarek (2018) studied insurance sales agents and, showed that in some cases, they consciously chose to not compete with specific others due to their history and interpersonal familiarity, despite the presence of strong structural outcome interdependence. Thus, studying competition as types of structural interdependence (outcome or means) alone may mask the unique reasons why competition may (or not) actually exist between teams. On the other hand, conceptualizing competition broadly as the extent to which a focal team strives to outperform another team (To et al., 2020) allows us to acknowledge that it could arise due to diverse reasons (including outcome interdependence) and thus provides a more realistic and holistic understanding of competitive dynamics in organizational teams. Importantly, studying competition more generally as the "desire to outperform" more directly captures actors' agency in attaining competitive goals (i.e., achieve relative superiority), thus allowing us to examine specific competitive intentions and behaviors they engage in. Studying differentiation in inter-team competition at the dyadic level also opens up interesting avenues for future research. For example, it would be informative to examine the configuration of a team's dyadic competitive ties such as their density (Crawford & Lepine, 2013) or how the specific characteristics of one's competitors may affect performance outcomes (e.g., Grosser et al., 2017).

Next, our research speaks to the issue of "who succeeds versus fails under competition." While existing work on the effects of inter-team competition has focused on intrateam factors such as gender composition (Baer et al., 2014), regulatory focus (Beersma et al., 2013), and internal hierarchy (Doyle et al., 2023), this work is unable to address between-team strategies that can deal with restricted knowledge access from peer teams and its utilization. In addressing this, we show that the effects of inter-team competition on team innovation are contingent on the degree to which teams occupy strategic brokerage positions in the inter-team information exchange network. Nonbroker teams were dealt a severe blow when they encountered a high degree of competition without having any means to mitigate its adverse effects. On the other hand, broker teams, by leveraging their position as the bridge connecting otherwise disconnected teams, were successful in counteracting the adverse effects of competition. Thus, our work highlights how between-team interactions are crucial in mitigating the effects of competition.

Our research also contributes to the network brokerage literature. Importantly, we offer valuable insights into the underlying behavioral mechanisms through which broker teams succeed. In fact, recent reviews have lamented that "the actual theoretical mechanism underlying structural holes remain unmeasured" (Brass, 2022, p. 252). Directly addressing this, our experimental results provide compelling evidence that when a focal team faces intense competition and simultaneously occupies information brokerage

positions, they engage in tactical dealmaking behavior to extract knowledge from even unwilling peer teams while creating resource blockades for their opponents.

Finally, our research joins an important emerging conversation in the structural hole literature focused on the "return to brokerage"—whether the mere occupancy of brokerage positions automatically translates to favorable outcomes (e.g., Brands & Mehra, 2019; Soda et al., 2018). Across both studies, our results suggest that when a focal team did not face competition, the brokerage advantage seemed to remain somewhat "dormant" or underutilized but that it became fully unlocked when the focal team encountered a high degree of competition. Building on and extending recent research (Burt, 2021; Lee et al., 2023), we highlight that although brokerage gives its occupant team unique opportunities for strategic actions, competition provides the necessary motivation to capitalize on them. These findings are especially important when seen in light of the dyadic differentiation in competition ties between teams. While a structural competition perspective implies that all teams experience the same level of competition with all other teams in the competition, a dyadic conceptualization helps highlight the unique benefits that occupying a brokerage position offers. It is because teams have differentiated dyadic competitive ties with other teams that broker teams are able to leverage their positions even better (e.g., playing one team against another) in securing the knowledge resources they need for innovation. If all teams equally competed with every other team in the organization, perhaps broker teams may not be able to use all the tools in their arsenal to maximum effect. This would be an interesting avenue for future research.

Limitations and Directions for Future Research

While our research has notable strengths such as external validity from using real-world engineering teams (Study 1) and strong evidence of causality and internal validity from a team-based network experiment (Study 2), it also has some important limitations that need to be acknowledged. First, our conceptualization and operationalization of competition as a focal team's overall striving to outperform a specific target (To et al., 2020) does not distinguish between potentially different forms of competition arising from outcome/means interdependence or relational/social reasons. However, it is possible that the nature of competition may be different or that teams may engage in different competitive actions when competing for scarce resources versus competing for intangible social rewards or due to competitive history (e.g., Ku et al., 2005). Future research would benefit from developing theory to examine specific subcategories of dyadic competition. For instance, scholars can measure dyadic social competition (Kilduff et al., 2010) and dyadic resource competition (Kramer, 1991) separately to investigate whether they result in different downstream outcomes and the underlying reasons for such effects.

Second, prior work has indicated that means interdependence between teams is an important qualifier of the effects of competition (Stanne et al., 1999). In Study 1, although our interactions with organizational liaisons assured us that teams were autonomous and did not have any formal means interdependence, we could not fully rule out the possibility that there might be some *informal* means interdependence that might have impacted our results. Although these teams were not part of a multiteam system requiring formal coordination, it is possible, for instance, that a focal team, due to task domain similarity or client demands, was reliant on specific teams to complete their goals. The ideal solution would have been to take a round-robin approach and ask each team to indicate their interdependence with every other team (e.g., Richter et al., 2006). However, given our already lengthy network survey, we were unable to do this. Future research would be well-served to address this issue.

Third, in Study 1, we measured innovation using project manager ratings. While it would have been preferable to use objective indicators such as patents or technical reports, it was unfortunately not possible to obtain these measures in our sample. Future research might replicate these findings with more objective indicators. That said, in Study 2, we used objective ratings of innovation as coded by independent raters, potentially alleviating such concerns.

Fourth, in Study 2, our inter-team networks were comprised of only three nodes (i.e., three teams, a triad). While the triad is considered to be the fundamental building block of larger networks (Simmel, 1950; Sytch & Tatarynowicz, 2014), it would be helpful to use larger sized networks. Next, we explicitly instructed teams that in order to outperform their target competitor, they also needed to gather more knowledge. It would have been preferable to design a manipulation that created a general striving to outperform a target team. We included dyadic incentives related to information exchange as part of the competition manipulation because our pilot tests indicated that without more concrete and tangible indicators of progress, our simulation's complexity tended to overwhelm participants and leave them unsure as to *how* to best outperform their competitors. Hence, we tied competition with specific knowledge exchange outcomes that could be monitored and measured. Because the control condition also had similar instructions about knowledge exchange (but without the outperforming aspect), we believe that our findings were not unduly affected by this design. Nonetheless, we acknowledge this as a limitation and urge future research to use simpler, yet strong manipulations.

Finally, team innovation in Study 2 was based on the proposals that teams created. The experimental task paradigm itself has limitations in terms of fully capturing team innovation where the proposals would be implemented and become tangible actions or products (Anderson et al., 2014). While these proposals could not be actually implemented in a lab, we took care to emphasize the implementability aspect of team proposals in our instructions to participants as well as the independent coders. In further ensuring the credibility of our task, we created an immersive task environment (i.e., business consulting teams), including giving participants materials with high complexity and realism (see additional online material and appendix for full details) and providing real-time between-team communication channels and a collaborative editor platform to create team proposals. Although there is a natural limit to experimental paradigms, the proposals created by participating teams did include extensive actionable suggestions that could be rated on implementability, potentially alleviating concerns that Study 2 did not include actual implementation (sample proposals are available in the additional online material and appendix, p. 8).

Managerial Implications

Our findings together suggest that managers should think holistically about the consequences of inter-team competition.

Although competition can act as an external threat in bringing team members together, our results suggest that it can be detrimental to the access and utilization of vital informational resources from peer teams. Unless teams have alternative capabilities and knowledge resources, competition may adversely affect outcomes such as innovation that are heavily dependent on such external resources. Moreover, our finding indicates that nonbroker teams are especially likely to suffer from the knowledge deficit caused by inter-team competition. This is crucial because teams often bring distinct competencies and capabilities in creating unique value for their organizations. Hence, intense competition may stifle nonbroker teams' innovation regardless of their internal capabilities because of limited resource access engendered by their (often serendipitous) structural positions. This could lead to the unfortunate situation of demotivating such teams and precluding the organization from capturing their unique value. In addressing this, managers need to be cognizant of the especially harmful consequences of competition for teams that are already at a structural disadvantage and identify other avenues through which teams can continue to learn from each other, such as instituting formal knowledge sharing and coordination mechanisms (Tsai, 2002).

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