Unpacking Team Task Performance: The Role of Positive and Negative Network Ties

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To accomplish key objectives, organizations frequently rely on work teams. This study of social networks and team performance sought to make two distinct contributions to theory: simultaneously researching positive and negative networks and integrating a more interdisciplinary research perspective. I investigated how the closure of instrumental and expressive networks combined to predict team intellective and judgmental task performance. A total of 386 participants in 66 teams participated, with 33 teams in each of the two task performance conditions. I found that an expressive (social identification) network had no relationship with intellective task performance, and that the relationship of the instrumental networks (shared leadership and advice) to intellective task performance was dependent upon the density of the task conflict network. I also found that instrumental networks (shared leadership and advice) were unrelated to judgmental task performance, and that the relationship of an expressive network (identification) to judgmental task performance was dependent upon the density of the social loafing network. While the findings from the present study provide a solid foundation for future research, much work remains before we fully understand the complex relationship between social networks and team performance.

Keywords: social networks, positive and negative ties, team task performance

INTRODUCTION

To accomplish key objectives, organizations frequently rely on work teams. As organizations implement flatter and more distributed organizational structures, they must utilize teams heavily for their ability to handle complex and ambiguous tasks (Mathieu, Maynard, Rapp, & Gilson, 2008). One important predictor of strong team performance is the set of connections or ties that team members share with one another (Oh, Chung, & Labianca, 2004; Oh, Labianca, & Chung, 2006). In particular, *social networks*, or the patterns of informal ties among individuals, have the potential to facilitate and constrain the flow of resources within teams and thus, have important team performance implications (Brass, 1984). This study of social networks and team performance seeks to make two distinct contributions to theory: a simultaneous consideration of positive and negative network ties and an integration of psychological and sociological theory in predicting team performance.

Social ledger theory suggests that a greater focus is needed on the simultaneous impact of different types of positive and negative ties on important organizational outcomes (Labianca & Brass, 2006). Network scholars often theorize and test each type of network relation separately, rather than combining them. However, discrete relations is not the reality employees experience in the workplace (e.g., Borgatti, Mehra, Brass, & Labianca, 2009). Network researchers are beginning to consider how different types of

relationships work together (LePine, Methot, Crawford, & Buckman, 2012; Venkataramani, Labianca, & Grosser, 2013); but, this approach is still relatively uncommon. Additionally, in studies considering network relations separately, positive networks in organizations have received more attention from scholars than have their negative counterparts (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). This study's first contribution is to begin to answer this call by considering positive and negative networks simultaneously. For example, I investigate how the structure of a social loafing network impacts the relationships between friendship ties, social identification ties, and team task performance.

Recently, scholars suggest that a much greater level of understanding regarding organizational phenomena, such as team performance, is to be gained by applying a more interdisciplinary lens to organizational research. Specifically, a greater focus on integrating the sociological perspective of social networks with psychological, micro-level phenomena may help us to better illuminate the complexities inherent in organizations (Casciaro et al., 2015). This study's second contribution is to respond to this call for a more interdisciplinary perspective in two ways. First, I consider how the structure and content of networks predicts team task performance. This psychological outcome variable has received much attention over the years and has been examined in a variety of ways (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005). However, despite a focus on team performance in organizational literature, there is still much variability left to be explained. Secondly, in this study I take traditional psychological variables such as task conflict and social loafing and apply a social network lens to them. I then consider how they interact with more traditional social network relations such as friendship and advice in predicting team performance.

Based on these gaps identified in current literature, the purpose of this study is twofold: I consider the simultaneous impact of different types of positive and negative ties on team performance, and I offer an interdisciplinary perspective, integrating theory from sociology and psychology, to predict team performance. I now outline the relevant theoretical arguments that underlie the study and develop hypotheses for testing. I begin by describing the types of task performance investigated in this study.

TASK TYPE

The demands of any given group task vary across a continuum of demonstrability (Laughlin, 1980). At one end are tasks with high demonstrability, sometimes referred to as *intellective tasks* or solve tasks. These tasks have a demonstratively correct solution or right answer. At the other end of the continuum are tasks with low demonstrability, often referred to as *judgmental tasks*. Judgmental tasks require groups to reach consensus on a problem with no demonstrably correct solution.

Prior research into task types suggests that intellective and judgmental tasks place different demands on groups and their members. For example, Campbell and Stasser (2006) found that greater information sharing between team members is typically needed for intellective tasks than for judgmental ones. Additionally, Cornelius and Boos (2003) suggest that judgmental tasks require more extensive coordination efforts than do intellective tasks. Thus, performance across the two task types may vary based on the social network structures and content present in the groups working on the tasks.

SOCIAL NETWORK STRUCTURE AND CONTENT

Two important concepts in social network theory are the structure and content of *ties*, which are the connections between individuals in a social group (Balkundi & Harrison, 2006). In studies of networks and teams, the social group is typically defined as the members of the team under consideration. Ties between team members are important since they serve as conduits for the flow of information and resources throughout the team.

The *structure* of a social network is evidenced by the pattern of ties among individuals in the network (Scott, 2000). This concept has received much attention in sociological literature. A significant debate exists around the value of two primary network structures in predicting organizational phenomena: specifically, closure and structural holes (Burt, 2000). *Closure* is about the level of interconnectedness within a network while *structural holes* focuses on individuals who connect otherwise disconnected segments of a network

(Burt, 2000). In this paper, I focus on closure. This pattern of connections is an important determinate of how networks function. Networks with more connections permit a greater flow of resources than do those with fewer connections. For example, in a friendship network where everyone knows and likes everyone, members tend to share the same information, trust each other, and have similar attitudes (Krackhardt, 1999). One common way of thinking about the closure of a social network is to consider its *density*. Scott (2000) defines density as the ratio of existing ties between members when compared to the maximum possible number of ties in a specific network. The level of density in a social network positively relates to several important team outcomes, including satisfaction (Baldwin, Bedell, & Johnson, 1997), group effectiveness (Oh et al., 2004) and group performance (Sparrowe, Liden, Wayne, & Kraimer, 2001). Additionally, teams with few connections between members may be unable or unwilling to exchange vital, job-related ideas and tacit knowledge with one another (Hansen, 1999).

Another important network concept drawn from sociology is *tie content*, or the nature of the resources flowing through a network connection (Balkundi & Harrison, 2006). A common way to classify the content of ties is to distinguish them as either instrumental or expressive (Lincoln & Miller, 1979). *Instrumental ties*, such as those in an advice network, are frequently linked to work performance and often involve the exchange of information or knowledge relevant to completing a task (Ibarra, 1993). In contrast, *expressive ties*, such as those in a friendship network, are affect-laden and typically carry social support or values (Ibarra, 1993). Instrumental and expressive ties are not mutually exclusive as there is often overlap in the two types of connections (Borgatti & Foster, 2003).

Additionally, tie content can be positive or negative. Social ledger theory suggests that social relationships offer both benefits and liabilities to the individuals involved (Labianca & Brass, 2006). The approach also proposes that positive and negative ties should be studied together as these ties may interact with one another in predicting organizational outcomes (Venkataramani et al., 2013). Positive ties are laden with positive emotion and/or an intention to help others, while negative ties contain negative emotion and/or an intention to harm others. In the following sections, I consider how network structure and tie content are differentially associated with intellective and judgmental tasks.

Structure, Content, and Intellective Task Performance

Prior research suggests that both instrumental and expressive network structures are related to team task performance. However, the findings are quite varied. For example, in their meta-analysis including network density and team performance, Balkundi and Harrison (2006) found that both instrumental and expressive network density is positively related to team task performance. Additionally, Hansen (1999) found that teams with low density of interunit ties, defined as an instrumental network reflecting work ties across departments in a large organization, were unable or unwilling to exchange tacit information, thereby leading to lower team task performance, suggesting that a higher level of density is more advantageous.

Not all researchers agree that higher levels of density are beneficial to team performance. For example, Burt's work (1997, 2000) advocates that ties take a great deal of energy to develop and maintain, which can lead to team process losses. These losses are more problematic in expressive networks than in instrumental ones, as ties based in socializing can draw team members away from task performance (Balkundi & Harrison, 2006).

One possible explanation for these divergent findings is the way in which team performance is operationalized in these studies. Some studies utilize a general measure of team performance, such as team satisfaction (Mehra, Smith, Dixon, & Robertson, 2006) or overall quality of team output (Balkundi, Kilduff, & Harrison, 2011). Others use a distal measure of performance, such as team sales (Zhang & Peterson, 2011). While the various measures have been appropriate in the specific studies where they were used, drawing conclusions about the value of dense networks to team performance is not straightforward due to this variation in measures. Within this study, I want to begin the process of taking a more nuanced look at the relationship between network density and team performance by investigating how the density of different networks relates to two specific types of team performance: intellective and judgmental tasks. I will consider intellective tasks first.

Task type has a significant impact on the interactions that are most useful in driving effective team performance (Hackman & Morris, 1975). I already know that intellective tasks require team members to participate in extensive information sharing to be successful. The information sharing required for these tasks is three-fold. Team members must ensure that sufficient discussion takes place for appropriate information to come to light, incorrect members must be able to recognize the correct response if proposed, and correct members must be sufficiently able and motivated to demonstrate the correct response to incorrect members (Laughlin, 1996). This intensive information sharing is most effectively accomplished through instrumental networks, which typically convey work-relevant information (Guzzo & Shea, 1992). Expressive networks are less effective for intellective tasks since they facilitate cohesion, which leads to consensus-building rather than information exchange. Thus, I propose that:

Hypothesis 1a & b: *Expressive network density (friendship and identification) will have no relationship with intellective task performance.*

I posit that there are two specific instrumental networks where higher levels of density will help teams achieve stronger intellective task performance. The first of these is a shared leadership network. *Shared leadership* is a dynamic, network-based view of leadership occurring within teams separate from formal appointed leadership (Pearce & Conger, 2003; Pearce & Sims Jr., 2002; Yukl, 1998). Individual team members assume leadership roles at different times, dependent upon their personal skills and expertise. Sharing leadership helps add breadth and depth to team approaches, allowing teams to more easily develop alternative solutions to problems (Carson, Tesluk, & Marrone, 2007). Teams with high levels of shared leadership demonstrate a willingness to engage in constructive collaboration and share information more freely than do teams with lower levels of shared leadership (Ensley, Pearson, & Pearce, 2003). Thus, I expect higher levels of shared leadership to be associated with stronger intellective task performance.

I do not, however, expect the shared leadership-intellective task relationship to be a direct one. Instead, I think that the effects of the shared leadership network will combine with the effects of the task conflict network to promote intellective task performance. *Task conflict* is disagreement between team members about ideas and differences of opinion about the task at hand (Jehn, 1995). Prior research on task conflict has found that task-related disagreements can stimulate critical thinking, thereby improving group decision making and performance (e.g., Amason, 1996; Jehn, 1995). This improvement is especially true for non-routine tasks as task conflict increases the number of ideas and opinions circulating in a group (Jehn, 1995) and thus helps with complex problem-solving. Additionally, low levels of task conflict are associated with team member behaviors such as conformity and complacency (Jehn, 1995), which are not helpful for intellective tasks requiring intensive information sharing.

The content of the task conflict network has the potential to be either positive or negative in nature since the relationship between task conflict and performance varies. In addition to the positive associations described above, De Dreu and Weingart's (2003) meta-analysis of conflict and performance found an overall negative association, while a more recent meta-analysis demonstrated no linear relationship (de Wit, Greer, & Jehn, 2012). The most current understanding suggests that the association between task conflict and group performance depends on moderating factors (de Wit, Jehn, & Scheepers, 2013). In this case, I expect the task conflict network to act as the moderator in the relationship between the shared leadership network and intellective task performance. In teams with high shared leadership, different team members will take a leadership role when they believe their skills are most likely to be useful to the team. More task conflict will ensure the highest possible levels of information sharing as team members engage in ongoing, productive task-related discussion around the ideas raised by the internal leaders. Thus, I predict that:

Hypothesis 2: *Task conflict network density moderates the relationship between shared leadership network density and intellective task performance such that leadership network density is more strongly related to intellective task performance for teams with greater task conflict network density.*

The second instrumental network, where I expect that higher levels of density will help teams achieve stronger intellective task performance, is the advice network. An *advice network* permits the flow of information within and between organizations (Stevenson & Gilly, 1991). Prior research suggests that dense advice networks are positively related to leader-rated group performance (Sparrowe et al., 2001), performance quality and team productivity (Wang, Tjosvold, Chen, & Luo, 2014), and decreased turnover intentions (Soltis, Agneessens, Sasovova, & Labianca, 2013). A dense advice network is important for teams performing intellective tasks due to the information sharing necessary in these tasks. Advice is a specific type of information that can help teams reach the solution to an intellective problem. A dense advice network suggests that many team members are asking one another for guidance about how to proceed on the task. This discussion will help team members ensure that the first condition for effective information sharing is met: sufficient discussion must take place for appropriate information to surface (Laughlin, 1996).

Similar to the argument for shared leadership network density, I do not expect the advice network-intellective task relationship to be a direct one. Instead, I expect that the effects of the advice network will combine with the effects of the task conflict network to promote intellective task performance. As advice suggestions are generated by the team, task conflict regarding those suggestions will generate further discussion. Teams will accept some advice suggestions and reject others based on what the team perceives as the relationship between the suggestion and the correct solution to the intellective task. Given the need to reach a correct solution, additional task conflict and ensuing discussion will help the team consider, then adopt or reject, a variety of options for proceeding through the task. Thus, I posit that:

Hypothesis 3: *Task conflict network density moderates the relationship between advice network density and intellective task performance such that advice network density is more strongly related to intellective task performance for teams with greater task conflict network density.*

Structure, Content, and Judgmental Task Performance

While instrumental networks are highly useful for intellective task performance, I do not expect these networks to have similar positive impact on judgmental tasks. Just as information sharing is the primary process necessary for intellective tasks, coordination is the primary process necessary for judgmental tasks (Cornelius & Boos, 2003). Well-coordinated teams use strategies and behaviors to integrate and align their members' actions, knowledge, and objectives in order to achieve more effective performance (Rico, Sánchez-Manzanares, Gil, & Gibson, 2008). When team coordination is poor, the ensuing process losses have a negative impact on valuable team outcomes (Steiner, 1972). Team coordination is most effectively accomplished through expressive networks, which are based in personal feelings and facilitate cohesion. Instrumental networks are less effective for judgmental tasks since they enable information exchange, which leads to extensive debate and discussion rather than consensus. Thus, I propose that:

Hypothesis 4a & b: *Instrumental network density (shared leadership and advice) will have no relationship with judgmental task performance.*

I posit that there are two specific expressive networks where higher levels of density will help teams achieve stronger judgmental task performance. The first expressive network is a friendship network. *Friendship* is a broad construct that encompasses feelings such as liking, trust and closeness (Kilduff & Brass, 2010). Workplace friendships facilitate the exchange of interpersonal resources such as affect, values, and trust (Roberson & Williamson, 2012). Thus, dense friendship networks contain many reciprocal channels through which members garner social support from each other (Roberson & Williamson, 2012). Judgmental tasks require team members to reach a consensus on an appropriate solution to a problem with no discernable 'right' answer. Similar to tasks requiring team creativity, knowledge integration is a form of collaboration which helps teams working on judgmental tasks reach a consensus. Knowledge integration is a form of social construction where team members negotiate, achieve, and refine a shared understanding through interaction, sense-making, and collective learning (Newell, Tansley, & Huang, 2004). A dense

friendship network provides the crucial social conditions for such knowledge integration activities among team members (Han, Han, & Brass, 2014). Thus, I expect higher levels of friendship network density to be associated with stronger judgmental task performance.

I do not, however, expect the friendship network-judgmental task relationship to be a direct one. Instead, I think that the effects of the friendship network will be attenuated by the effects of the social loafing network in promoting judgmental task performance. *Social loafing* is a reduction in task performance when participants work collectively (Price, Harrison, & Gavin, 2006). Social loafing has two primary contributing factors. First, when task responsibility is shared, it is often difficult to identify the contributions of individual team members to the final work product (Latané, Williams, & Harkins, 1979), giving members the opportunity to free-ride on the contributions of others. Secondly, team members may feel their contributions are dispensable, or unimportant to team performance (Harkins & Petty, 1982), causing members to withhold input, thinking their silence will make the team product better. Regardless of motivation, social loafing is an example of a negative content network that damages both team processes and performance (George, 1992; Price et al., 2006). In dense friendship groups, social loafing will reduce judgmental task performance since loafing will interfere with the knowledge integration process described above. When all team members are not putting forth their best effort, it is more difficult to negotiate and refine a shared understanding of the problem presented by the task and potential problem solutions. Therefore, I posit that:

Hypothesis 5: *Social loafing network density moderates the relationship between friendship network density and judgmental task performance such that friendship network density is more strongly related to judgmental task performance for teams with lower social loafing network density.*

The second expressive network where I expect that higher levels of density will help teams achieve stronger judgmental task performance is the identification network. *Social identification* is a perception of oneness with a group of others (Ashforth & Mael, 1989). Individuals categorize themselves and others based upon a variety of surface- and deep-level diversity characteristics such as age, gender, and value systems (Ashforth & Mael, 1989). When individuals identify with a group, they tend to engage in supportive activities, thereby increasing their commitment to the group. Additionally, groups with high levels of identification have higher levels of cohesion and cooperation than their low-identification counterparts (Turner, 1984). I have already established that cooperation is fundamental for reaching a consensus necessary for strong judgmental task performance. Thus, I expect higher levels of identification network density to be associated with stronger judgmental task performance.

Similar to the argument for friendship network density, I do not expect the identification network-judgmental task relationship to be a direct one. Instead, I expect that the effects of the identification network will be attenuated by the effects of the social loafing network in promoting judgmental task performance. In dense identification networks, social loafing will reduce judgmental task performance since the loafing will interfere with consensus-building. Loafing team members may be apathetic to the team's need for a 'best' solution to the judgmental problem. Only a subset of team members will be actively engaged in the process, so idea generation and solution selection will be sub-optimal. Additionally, in groups with high levels of identification and social loafing, members may feel that they must wrap up the decision process prematurely to end the dissonant situation, leading again to sub-par solution choices. Thus, I propose that:

Hypothesis 6: *Social loafing network density moderates the relationship between identification network density and judgmental task performance such that identification network density is more strongly related to judgmental task performance for teams with lower social loafing network density.*

METHODS

Participants and Procedures

I chose to test the study hypotheses using student participants rather than employees in an organizational setting. This choice was necessary due to the need to control the tasks measured as the dependent variable, which organizations were unlikely to permit. Thus, study participants were advanced undergraduate students taking a sociology course at a university in the Midlands region of the United Kingdom. Participants were randomly assigned to groups of between 5 and 9 members in either the intellective or judgmental task condition. A total of 386 participants in 66 teams participated across the two conditions, with 33 teams in each of the two task conditions.

Participant groups completed their task during a 90-minute session. Each group worked in a separate room to prevent collusion between groups. I was not affiliated with the sociology course so participants would not feel that their performance in the session would impact their course grade. For each condition, I provided a set of instructions appropriate to the task to each group. Once groups began working, I remained seated outside the room. Groups were advised when they had 10 minutes of time remaining to complete their task. I stopped groups who were still working at the 90-minute mark. Groups were then given instructions to complete a survey measuring the independent variables. Average survey completion time was 11 minutes. Participants were told that (1) survey completion was voluntary, (2) the survey data would be managed by me and not shared with anyone affiliated with the sociology course, (3) the course instructor would only have access to the data once it was anonymized and, (4) all participant feedback would only be in aggregate form to improve confidentiality. A total of 372 participants completed their survey for an overall response rate of 96%. Consistent with other research on networks in groups (Oh et al., 2004; Sparrowe et al., 2001), I adopted an 80% response requirement for all sociometric measures. None of the teams fell below this threshold, enabling me to analyze data from all 66 teams.

Measures

Friendship Network Density

Using a five-point Likert scale (1=prefer to avoid, 2=no feeling, 3=acquaintance, 4=friend, 5=close friend), participants rated their team members on the following single item: *How do you generally feel about this person?* This single-item roster method is a frequently used and acceptable method of data collection in network studies (Marsden, 1990).

I calculated the density of each team's friendship network. Density is typically expressed as a percentage of ties present between individuals versus the number of ties possible between individuals in a given network. The density function in UCINet 6.581 appropriate for valued, rather than dichotomous, data was used to calculate a density statistic for each network (Borgatti, Everett, & Freeman, 2002). Consistent with other studies that included network density (e.g., Reagans, Zuckerman, & McEvily, 2004), higher density scores were obtained for teams whose members indicated that they had friendship relations with many of their teammates as opposed to teams whose members had few friendship relations with their teammates. Density was calculated for all networks in the same way.

Identification Network Density

Using a five-point Likert scale (1=not at all, 2=a little, 3=moderately, 4=to a great extent, 5=to a very great extent), participants rated their team members on the following single item: *To what extent do you perceive yourself and this person as belonging to the same social groupings or categories of people?*

Shared Leadership Network Density

Using a five-point Likert scale (1=not at all, 2=a little, 3=moderately, 4=to a great extent, 5=to a very great extent), participants rated their team members on the following single item: *To what extent did this person take a leadership role on the group project?*

Advice Network Density

Using a five-point Likert scale (1=not at all, 2=a little, 3=moderately, 4=to a great extent, 5=to a very great extent), participants rated their team members on the following single item: *To what extent do you rely on this person for advice or guidance while working on your group project?*

Task Conflict Network Density

Using a five-point Likert scale (1=not at all, 2=a little, 3=moderately, 4=to a great extent, 5=to a very great extent), participants rated their team members on the following single item: *To what extent did you and this person have conflicts of ideas, disagree about the task you were working on, or have conflicting opinions about your group project?*

Social Loafing Network Density

Using a five-point Likert scale (1=significantly more effort, 2=somewhat more effort, 3=same level of effort, 4=somewhat less effort, 5=significantly less effort), participants rated their team members on the following single item: *Compared to other members of your group, how much effort did this group member put forth?*

Intellective Task Performance

I chose the Lego Man assembly activity to measure intellective task performance (for a complete description, please see Reddy & Byrnes, 1972). In this activity, teams were asked to assemble 48 Lego bricks into the shape of a man. A model demonstrating the correct solution was provided outside the room for participant's reference. Teams were advised that they could spend as much of their 90-minute timeslot planning their assembly as they liked. They were asked to begin timing themselves once the team began assembly of the Lego bricks. When groups thought they were finished, I verified that assemblage was correct and assembly time were recorded. Incorrect teams were asked to continue working, thereby adding onto their assembly time. Lower assemblage times were indicative of stronger intellective team performance (Reddy & Byrnes, 1972). The Lego Man activity was an appropriate intellective task since it had a single correct solution (Laughlin, 1980).

Judgmental Task Performance

For the second task, I chose a slogan-generation activity to measure judgmental task performance (for a complete description, please see Jones & Kelly, 2009). Participants were asked to do the following:

> *For this task, imagine that you are part of the creative team for a respected advertising company. Your job is to work together as a group and generate slogans that can be used for advertising campaigns. For this task, you will be generating slogans for a travel agency that specializes in "around-the-world" vacation packages (Jones & Kelly, 2009, p. 80).*

Participants were advised that the travel agency sought a slogan that was creative, simple, memorable, and communicated an important message about their service. Teams could spend their entire 90-minute timeslot brainstorming and discussing slogan ideas. At the end of the 90-minute session, teams were asked to record and submit their three best slogans to me. Consistent with Amabile's (1982) Consensual Assessment Technique, the creativity of each slogan was evaluated independently by two observers. Amabile (1982) considers observers to be appropriate for this task if they are familiar with the domain in which the product was created, which was the case with this study's observers. Creativity was defined as input which is both novel and useful to the task at hand (Amabile, 1983). Using this definition, the slogans were rank-ordered against one another by the observers according to the slogan's creativity. The observers then conferred to resolve any discrepancies and reach agreement on ratings. Each team's score for the task was the sum of their three slogan scores. The slogan-generation activity was an appropriate judgmental task as it required groups to reach consensus on a problem with no demonstrably correct solution (Laughlin, 1980).

Control Variable – Team Experience

Participants' familiarity working in teams could influence the proposed relationships. Therefore, participants indicated their level of experience working in teams. Respondents chose one of five categories (1=none, 2=1-3 times, 3=4-6 times, 4=7-10 times, 5=more than 10 times).

RESULTS

I used standardized variables in all the analyses, which reduce differences due to the diverse metrics extant in the measures. Table 1 presents descriptive statistics and bivariate correlations for all study variables. All hypotheses were tested in SPSS using OLS hierarchical regression. See Table 1 in the Appendix.

Predictors of Intellective Task Performance

Table 2 summarizes the results of OLS analyses testing hypotheses 1-3. Hypotheses 1a & b posited that expressive network density, in this case friendship network density and identification network density, will have no relationship with intellective task performance. I tested this hypothesis by entering the control variable, team experience, followed by the two predictor variables, friendship network density and identification network density, in a hierarchical regression. These hypotheses received mixed support. Friendship network density was marginally and negatively related to intellective task performance (β=-.40, p=.08) while identification network density was not related to intellective task performance (β=-.09, n.s.). See Table 2 in the Appendix.

In hypothesis 2, I predicted that task conflict network density moderates the relationship between shared leadership network density and intellective task performance such that leadership network density is more strongly related to intellective task performance for teams with greater task conflict network density. To test this prediction, I entered the control variable, the predictor variables, and the interaction term in a hierarchical regression. Hypothesis 2 received marginal support as task conflict network density negatively moderated the relationship between leadership network density and intellective task performance (β=-.47, p=.07). This block of predictors explained 22% of the available variance in intellective task performance (R^2=.22). Figure 2 illustrates the interaction. As anticipated, the interaction plot revealed that the relationship between leadership network density and intellective task performance was negative (appropriate in this case since lower intellective task scores were indicative of stronger performance) when task conflict network density was higher. For teams with lower task conflict network density, the slope of the relationship between leadership network density and intellective task performance was almost flat. An additional test of simple slopes revealed that leadership network density negatively predicted intellective task performance when task conflict network density was high (β = -1.01, p<.05), but leadership network density did not predict intellective task performance when task conflict network density was low (β = -.04, ns). See Figure 2 in the Appendix.

Hypothesis 3 posited that task conflict network density moderates the relationship between advice network density and intellective task performance such that advice network density is more strongly related to intellective task performance for teams with greater task conflict network density. To test this prediction, I entered the control variable, the predictor variables, and the interaction term in a hierarchical regression. Hypothesis 3 was supported as task conflict network density negatively moderated the relationship between advice network density and intellective task performance (β=-.53, p<.05). This block of predictors explained 24% of the available variance in intellective task performance (R^2=.24). Figure 3 illustrates the interaction. As anticipated, the interaction plot revealed that the relationship between advice network density and intellective task performance was negative when task conflict network density was higher. For teams with lower task conflict network density, the slope of the relationship between advice network density and intellective task performance was positive. An additional test of simple slopes revealed that advice network density negatively predicted intellective task performance when task conflict network density was high (β = -.95, <.05), but advice network density did not predict intellective task performance when task conflict network density was low (β =.12, ns). See Figure 3 in the Appendix.

Predictors of Judgmental Task Performance

Table 3 summarizes the results of OLS analyses testing hypotheses 4-6. Hypotheses 4a & b posited that instrumental network density, in this case shared leadership network density and advice network density, will have no relationship with judgmental task performance. I tested this hypothesis by entering the control variable, team experience, followed by the two predictor variables, leadership network density and advice network density, in a hierarchical regression. These hypotheses were supported. Both leadership network density (β=.39, n.s.) and advice network density (β=-.36, n.s.) were not related to judgmental task performance. See Table 3 in the Appendix.

In hypothesis 5, I predicted that social loafing network density moderates the relationship between friendship network density and judgmental task performance such that friendship network density is more strongly related to judgmental task performance for teams with lower social loafing network density. To test this prediction, I entered the control variable, the predictor variables, and the interaction term in a hierarchical regression. Hypothesis 5 was not supported as social loafing network density did not significantly moderate the relationship between friendship network density and judgmental task performance (β=-.24, n.s.).

Hypothesis 6 posited that social loafing network density moderates the relationship between identification network density and judgmental task performance such that identification network density is more strongly related to judgmental task performance for teams with lower social loafing network density. To test this prediction, I entered the control variable, the predictor variables, and the interaction term in a hierarchical regression. Hypothesis 6 was supported as social loafing network density negatively moderated the relationship between identification network density and judgmental task performance (β=-.47, $p<.05$). This block of predictors explained 24% of the available variance in intellective task performance (R^2=.24). Figure 4 illustrates the interaction. As anticipated, the interaction plot revealed that the relationship between identification network density and judgmental task performance was negative when social loafing network density was lower. For teams with higher social loafing network density, the slope of the relationship between identification network density and judgmental task performance was negative. An additional test of simple slopes revealed that identification network density positively predicted judgmental task performance when social loafing network density was low (β =.75, <.05), but identification network density did not predict judgmental task performance when social loafing network density was high (β =-.19, n.s.). See Figure 4 in the Appendix.

DISCUSSION

In this paper, I sought to answer two broad questions regarding the impact of social network structure and content on two specific types of team performance: intellective and judgmental tasks. First, I considered the impact of instrumental and expressive networks on intellective task performance. I found that the identification network (expressive) had no relationship with intellective task performance. I also found that the relationship of the shared leadership and advice networks (instrumental) to intellective task performance was dependent upon the density of the task conflict network. Secondly, I considered the impact of the instrumental and expressive networks on judgmental task performance. I found that the shared leadership and advice networks (instrumental) were unrelated to judgmental task performance. I also found that the relationship of the identification network (expressive) to judgmental task performance was dependent upon the density of the social loafing network. I now turn my attention to discussing implications of these findings, limitations of the present study, and paths for future research.

Theoretical Implications

Taken together, these findings offer two important contributions. First, this study extends research on the social ledger model (Labianca & Brass, 2006) by investigating the interactive effects of positive and negative ties in predicting team task performance. The social ledger model asks researchers to consider different social relations in networks as linked together, rather than considering them in isolation as has often been the case in past studies. Negative asymmetry, which underlies the social ledger model, suggests

that negative relationships are more salient to individuals than are positive ones (Skowronski & Carlston, 1989). The increased salience is due to negative ties occurring less commonly than positive ones, thereby drawing more individual focus and attention (Skowronski & Carlston, 1989). Thus, considering only positive ties in organizational studies provides an incomplete picture of how individuals form judgments and attitudes. These results suggest that when negative ties such as social loafing are present in a team, positive ties become even more important in maximizing team performance. This finding offers support to the notion that positive and negative ties should be studied together to achieve a better understanding of social systems in the workplace.

Secondly, this study applies an interdisciplinary lens by integrating theories from psychology and sociology to predict team task performance. While prior studies have certainly investigated social network closure, tie content, and team performance (e.g., Balkundi & Harrison, 2006; Sparrowe et al., 2001), the range of network content considered has been somewhat limited. Studies commonly investigate some combination of friendship ties, communication ties, and advice ties. In this research, I take well-established psychological concepts such as social identification, task conflict, and social loafing and investigate these concepts as content in social networks. The support I find for the relationships I propose suggests that there is significant value to be gained from this integrative, interdisciplinary approach and that further research in this area is warranted.

Managerial Implications

Maximizing team performance in organizations holds great importance with today's managers (Mathieu et al., 2008). This research offers two important practical implications in maximizing team performance. First, considering one relation at a time is insufficient when managers think about social networks in their teams. As demonstrated in this study, networks interact with one another to predict important outcomes such as team task performance. While prior investigation of a single network's impact on team functioning has yielded interesting results, it is arguably much more realistic to think of network relations as more complex and overlapping. Managers need to have a keen understanding of the relations among their team members and how the relations might benefit or hinder important aspects of team performance.

Additionally, managers need to use this team member relation knowledge when assembling teams to work on different tasks. For example, these findings suggest that instrumental and expressive networks are useful for different types of team tasks. Thus, thinking only about how likely a potential member is to take on a leadership role within a particular group of individuals without considering the task type will provide an incomplete or erroneous picture of the ideal team composition. Considering whether the task requires judgmental skills, such as creative thinking, will provide a more complete managerial picture of how useful a potential member's shared leadership skills might be to that specific group.

Limitations and Directions for Future Research

As with any study, the present research has several limitations. These limitations help to highlight potentially fruitful future avenues for research. First, this study provides a static, snapshot view of the relationship between social network structure and content, and team task performance. While this method is conventional in organizational and particularly in social network research, the cross-sectional design prevents us from determining causality in these relationships. Furthermore, greater understanding of how team task performance evolves requires a longitudinal study design. Thus, future studies should investigate social network structure, content, and team task performance over time.

Secondly, this study utilizes a set of temporary teams to study the phenomena of interest. While temporary teams are widely used in contemporary organizations (Moldjord & Iversen, 2015), the teams in this study are an extreme example of temporary teams as they worked together for less than two hours. Further research should examine how social network structure and content relates to team task performance with different types of teams working together over different lengths of time.

Finally, I measured team intellective and judgmental task performance using a single example of each type of task, the Lego Man assemble activity and the slogan-generation activity. While these tasks are used

and validated in prior research studies, many types of intellective and judgmental tasks exist in organizations. Future researchers should investigate how social network structure and content relates to different types of intellective and judgmental tasks, and whether the relationships found in this study are consistent across a broad spectrum of task examples.

Conclusion

This paper takes a significant step toward developing a greater understanding of how different types of social network relations interact to predict team task performance. I offer contributions to the organizational networks and teams literatures by considering the simultaneous impact of different types of positive and negative ties on team performance. Additionally, I offer an interdisciplinary perspective, integrating theory from sociology and psychology to predict team performance. While the findings from the present study provide a solid foundation for future research, much work remains before we fully understand the complex relationship between social networks and team performance.

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APPENDIX

TABLE 1
DESCRIPTIVE STATISTICS AND CORRELATIONS

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Team Experience	3.67	0.68	--								
2. Friendship Network	3.11	0.44	0.23	--							
3. Identification Network	3.03	0.54	0.21	0.64*	--						
4. Shared Leadership Network	3.04	0.40	0.18	0.20	0.46*	--					
5. Task Conflict Network	1.37	0.35	-0.37*	-0.20	-0.27*	-0.18	--				
6. Advice Network	2.91	0.44	0.24*	0.21	0.47*	0.62*	-0.14	--			
7. Social Loafing Network	1.62	0.35	-0.24*	-0.12	-0.41*	-0.58*	0.19	-0.42*	--		
8. Intellective Task Performance	24.99	22.56	-0.24	-0.47*	-0.34	-0.26	0.21	-0.21	0.07	--	
9. Judgmental Task Performance	39.58	14.82	0.10	0.16	0.25	0.18	-0.17	-0.10	-0.28	c	--

Note. *N*=66 except task performance, which is n=33; *p <.05; c=cannot be computed

TABLE 2
OLS RESULTS: HYPOTHESES 1-3

DV: intellective task performance

	Model 1	Model 2	Model 3
Team Experience	-.15 (.16)	-.09 (,17)	-.38 (.19)
Friendship Network	-.40 (.22)+	--	--
Identification Network	-.09 (.21)	--	--
Shared Leadership Network	--	-.50 (.22)*	--
Advice Network	--	--	-.40 (.20)*
Task Conflict Network	--	.12 (.18)	.29 (.19)
Task Conflict x Leadership	--	-.47 (.24)+	--
Task Conflict x Advice	--	--	-.53 (.22)*
R^2	.24+	.22+	.24*

Note. * p <.05, + p<.10

TABLE 3
OLS RESULTS: HYPOTHESES 4-6

DV: judgmental task performance

	Model 4	Model 5	Model 6
Team Experience	-.01 (.20)	-.01 (,20)	.01 (.18)
Friendship Network	--	.24 (.21)	--
Identification Network	--	--	.28 (.20)
Social Loafing Network	--	-.25 (.24)	-.04 (.25)
Social Loafing x Friendship	--	-.24 (.24)	--
Social Loafing x Identification	--	--	-.47 (.21)*
Shared Leadership Network	.39 (.24)	--	--
Advice Network	-.36 (.25)	--	--
R^2	.10	.13	.24*

Note. * p <.05

FIGURE 1
HYPOTHESIZED THEORETICAL MODEL

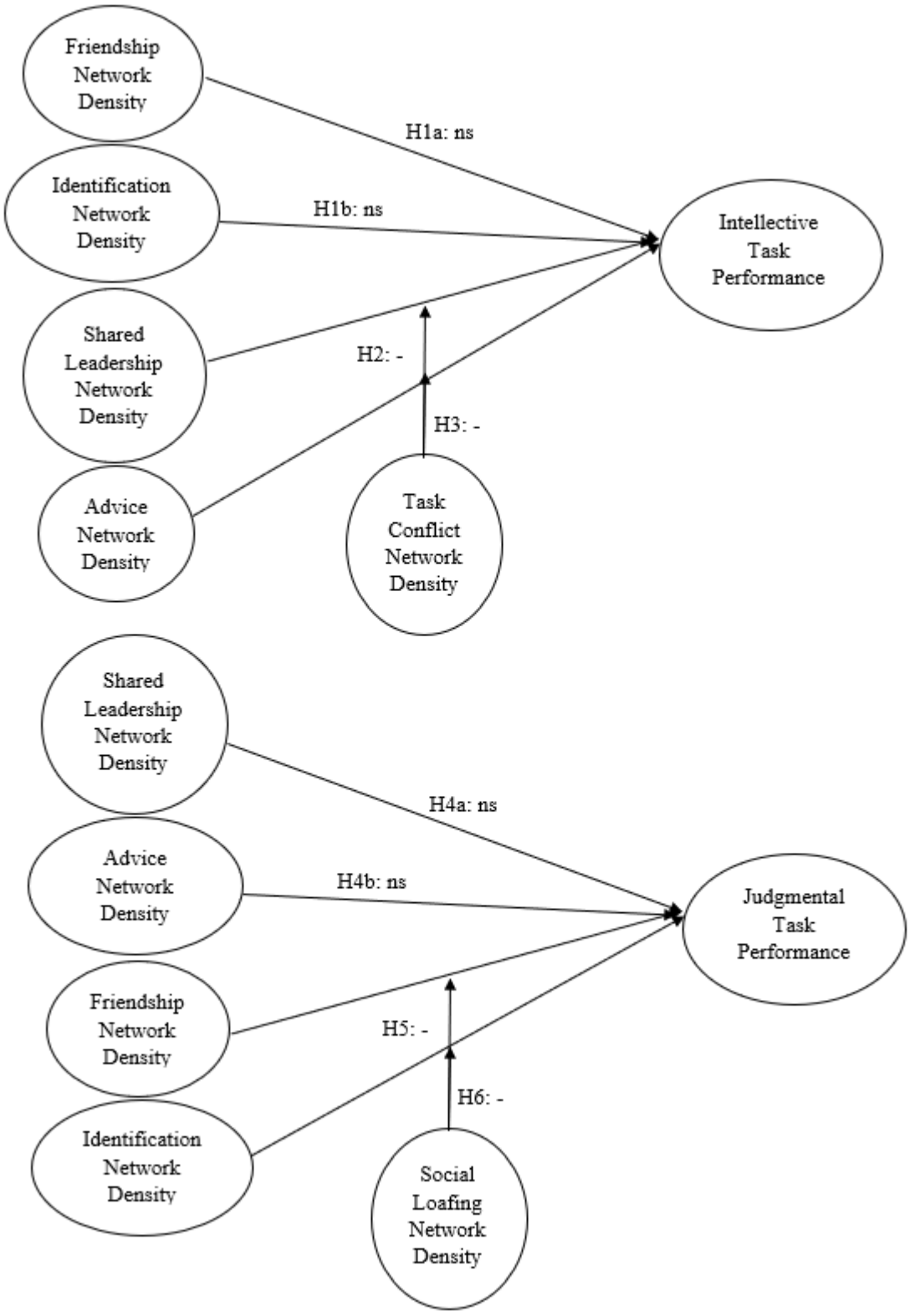

FIGURE 2
MODERATING EFFECT OF TASK CONFLICT NETWORK DENSITY ON THE RELATIONSHIP BETWEEN SHARED LEADERSHIP NETWORK DENSITY AND INTELLECTIVE TASK PERFORMANCE

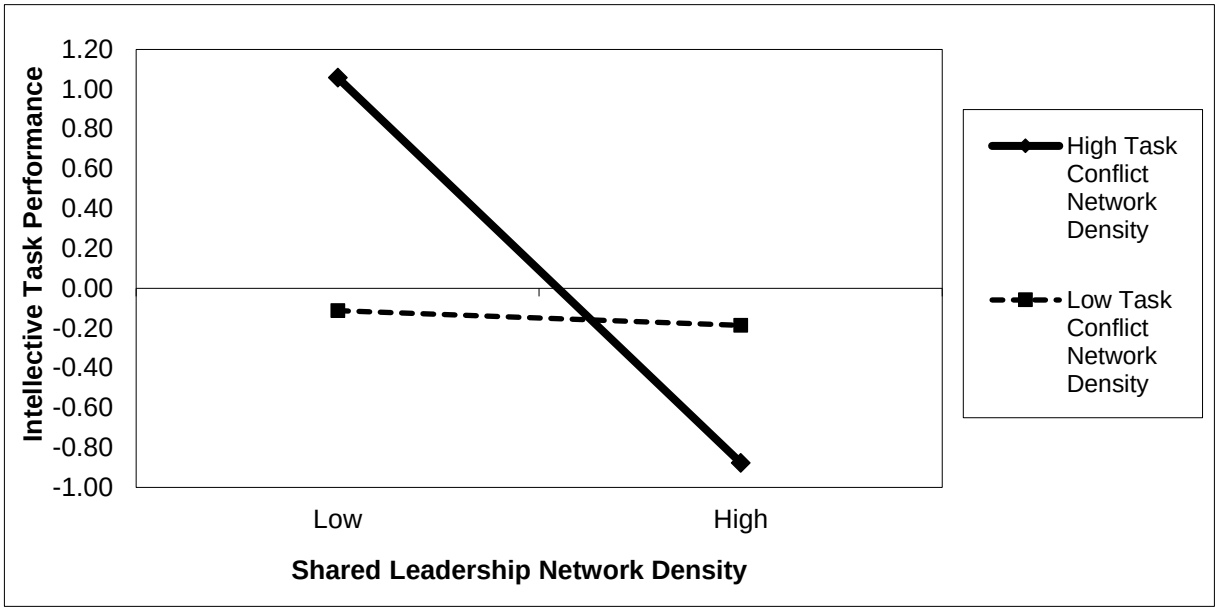

FIGURE 3
MODERATING EFFECT OF TASK CONFLICT NETWORK DENSITY ON THE RELATIONSHIP BETWEEN ADVICE NETWORK DENSITY AND INTELLECTIVE TASK PERFORMANCE

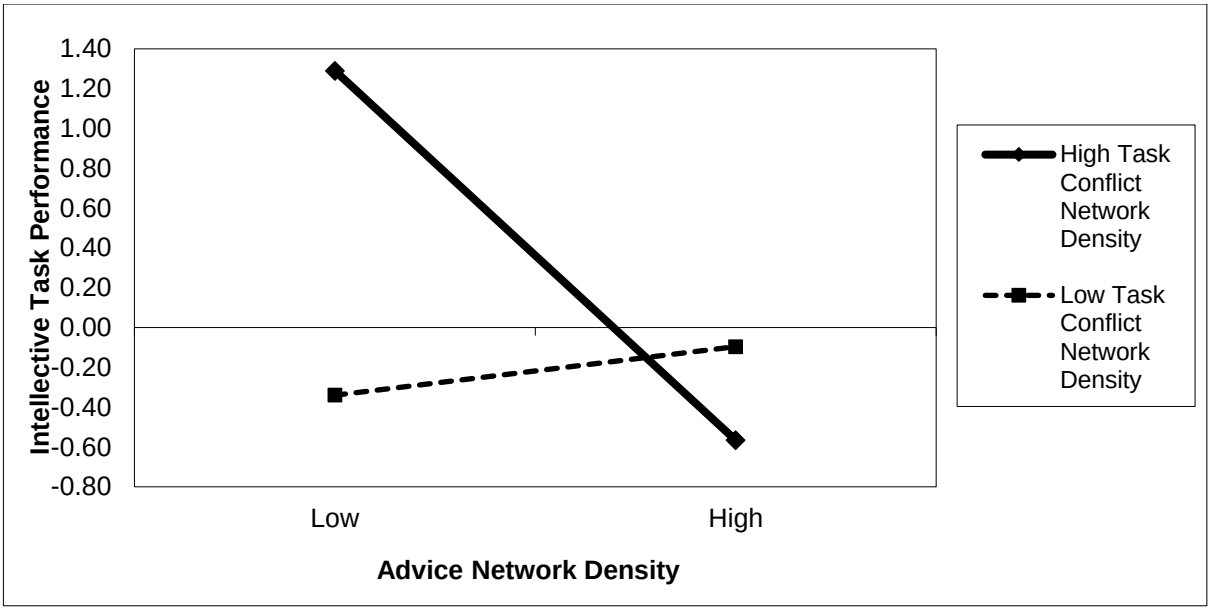

FIGURE 4
MODERATING EFFECT OF SOCIAL LOAFING NETWORK DENSITY ON THE RELATIONSHIP BETWEEN IDENTIFICATION NETWORK DENSITY AND JUDGMENTAL TASK PERFORMANCE