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**TIES AND TEAMS: A SOCIAL NETWORK APPROACH TO TEAM  
LEADERSHIP**

A Thesis in

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by

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## ABSTRACT

This dissertation proposes and tests a series of hypotheses concerning how a formal leader's influence and eventual effectiveness are dependent on the leader's pattern of ties. Specifically, the present dissertation proposes that a formal leader's performance will be a function of the leader's informal ties with team members and the extent to which the leader and the subordinates have informal ties to employees in the rest of the organization. A leader's direct ties are important determinants of team task performance and subordinate satisfaction. These ties can be with the subordinates, the leader's manager, or to other employees.

To investigate the relationships between the leader's social network and team task performance, I studied multiple work groups in India and the United States of America. All these work groups were composed of educated knowledge workers who were co-located with their leaders. In total, I surveyed 363 respondents belonging to 69 teams to collect data concerning social networks, satisfaction with team leaders and other variables. Further, data about team task performance were gathered by surveying the team leaders' supervisors. Fifteen of the teams were based in the U.S.A with the remaining 54 based in India.

Findings revealed that high performing teams have leaders who play a brokerage role in the team, bridging across disconnects between people. Alternatively, high-performing team leaders are connected to the informal team leaders in the advice network. The results do not support the notion that the leader's prominence in the team advice network is associated with team performance. The results also do not show that

leaders connected via the advice network to organizational boundary spanners are more productive. Similarly, I did not find support for the hypothesis that leaders who were disliked by their subordinates tended to receive lower performance ratings from their supervisors. However, the results do highlight the importance of a leader's advice tie to the leader's supervisor. A leader who was sought for advice by the leader's own supervisor tended to have teams who were satisfied with the leader. Also, such leaders tended to have high performing teams.

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## **CHAPTER 1**

### **SOCIAL NETWORK APPROACH TO TEAM LEADERSHIP**

One of the most enduring areas of organizational research has been the study of leadership. An exhaustive review of leadership research lists more than 7000 articles and books (Bass, 1990). Despite this interest in leadership, few studies look at the leaders in the social context in which they operate. Many studies look only at the individual differences of the leaders and their effects on outcome variables such as job satisfaction (e.g. Judge & Bono, 2000). One important aspect of the social context is the leader-subordinate relationship. Although leadership inherently involves influencing others, most studies focus only on either leaders or subordinates. Even when studies include both leader and subordinates, they tend to account for the leader and a limited number of subordinates (Graen & Uhl-Bien, 1995). Additionally, some researchers have argued that there are very few studies that explore the team relevant consequences of leader's ties to the rest of the organization (Brass & Krackhardt, 1998). By neglecting the leader's relationships with subordinates and other employees in the rest of the organization, previous studies have ignored an essential aspect of leadership.

Overall, this dissertation is about leaders social connections and their implications for the leaders' teams. More specifically, this dissertation seeks to address an important theoretical gap by answering questions concerning leader effectiveness and social relationships in work teams. What implications do team leaders' relationships inside and outside the team have for leaders and subordinates? How does the type of relationship

(whether advice, avoidance) relate to leader effectiveness? Finally, is team task performance predicted by the structure of social ties among team members?

### **Social Networks of Leaders**

This dissertation proposes and tests a series of hypotheses concerning how a formal leader's influence and eventual effectiveness are dependent on the leader's pattern of ties. These informal ties reach inside the team and extend to the leader's own supervisor and other employees in the organization. Leaders, from a network perspective, are expected to influence and be influenced by their ties with subordinates and key employees in other groups. Specifically, the present dissertation proposes that a formal leader's performance will be a function of the leader's informal ties with team members and the extent to which the leader and the subordinates have informal ties to employees in the rest of the organization. A leader's direct ties are important determinants of team task performance and team satisfaction with leader. These ties can be with the subordinates, the leader's manager, or they can span outside the primary team to other parts of the organization. Ties inside the team help the leader motivate and influence subordinates, whereas ties to people in other organizational groups tend to provide diverse knowledge and critical resources that can help the leader achieve team goals.

### **Research Methodology**

To investigate the above research questions concerning the relationships between the leader's social network and leader effectiveness, I studied multiple work groups in India and the United States of America. All of these work groups were composed of knowledge workers who were co-located with their leaders. In total, I surveyed 363

respondents belonging to 69 teams to collect data concerning social networks, satisfaction with team leaders and other variables. Further, data about team task performance were gathered by surveying the team leaders' supervisors. Fifteen of the teams were based in the U.S.A with the remaining 54 based in India. The data were collected from April to July 2003.

## **Results**

The results of this study show support for four of the seven hypotheses proposed. High performing teams have formal leaders who play a brokerage role in the team by bridging across disconnects within the team. Alternatively, high-performing formal team leaders are connected to the informal team leaders in the advice network. The results do not support the notion that the leader's prominence in an advice network is associated with team performance. The results also do not show that leaders connected via the advice network to organizational boundary spanners are more productive. Similarly, I did not find support for the hypothesis that leaders who were disliked by their subordinates tended to receive lower performance ratings from their supervisors. However, the results do highlight the importance of a leader's advice tie to the leader's supervisor. A leader who was sought for advice by the leader's own supervisor tended to have subordinates who were satisfied with the leader. Also, such leaders tended to have high-performing teams.

## **Potential Implications and Contributions**

This study provides insights about leaders, their social ties and team performance. It provides a theoretical explanation and empirical test of leadership from a social

network perspective. Given the prevalence of teams in organizations, and the emphasis given to leaders in organizations, the study is timely and relevant. Unlike most other studies, this dissertation takes a comprehensive view of leaders and their social ties by incorporating ties within and outside the team in the explanation of key team level outcomes. Further, by incorporating both advice and avoidance ties, the dissertation takes a more balanced view of leaders as individuals in wide range of relationships.

In this study I develop and test a fine-grained theory regarding the social structures of leaders as a key explanation for leader effectiveness. The results suggest that the position of the leader in the informal network provides the leader with advantages that manifest in team performance benefits. Further, the results also suggest that leaders' social ties have non-task relevant outcomes such as team satisfaction with leader. This incorporation of both task-related and affective outcomes in the study of leaders' social networks is a significant contribution to our understanding of leadership and its effects.

In the next chapter, I review literature that is relevant to the dissertation. I then develop theory and hypotheses in the third chapter. In chapter 4, I describe the methods by which I tested these hypotheses. The results are presented in Chapter 5. Finally, I discuss the theoretical implications of these results in Chapter 6, along with the limitations of this research.

## CHAPTER 2

### REVIEW OF RELEVANT TEAM LEADERSHIP LITERATURE

The leadership of groups is a vitally important aspect of organizational functioning. It is evident that such leadership takes place in a social context and depends upon the efforts of the other group members. This insight, though, has been neglected to some extent in leadership research, which appears to have focused on either the personality or the behaviors of the leader, rather than the leader's embeddedness in a network of relationships (Brass, 2001). However, this literature review will show that some of the mainstream leadership research has indeed touched upon the networks of leaders. Instead of reviewing the well-known aspects of existing leadership theories which are reviewed elsewhere (e.g., Avolio, Sosik, Dong, & Berson, 2003; Bass, 1990), I choose to selectively review those theories and studies that make a contribution to our understanding of leaders and their social networks in work groups.

The overall objectives of this literature review are to articulate the body of work that I am extending, to collect studies that explore the connection between leaders and their social networks in teams, and to point out problems in these studies. To accomplish these objectives, the literature review has three parts. First, I briefly discuss and critically evaluate the contributions that the Ohio State Leadership studies, Fiedler's Contingency theory, and Leader Member Exchange theory make to our understanding of leaders and their networks in workgroups. Second, I highlight precursor and a few recent studies that look at the effects of leaders' social networks on team-level outcomes. Third, I bring together all these strands in an attempt to forge a new research agenda.

### **Ohio State Leadership Studies and their Network Connections**

That leaders exhibit task (initiating structure) and relationship (consideration) behaviors has been the major contributions of the Ohio State leadership studies (Bass, 1990; Yukl, 2002). The Ohio State studies provided the basis for subsequent two-factor theories of leadership, including Fiedler's contingency theory and Leader Member Exchange theory (Avolio et al., 2003). However, the Ohio State research highlighted many other findings besides the importance of task and relationship orientation. One overlooked finding was the importance of leaders' social networks.

Ohio State University researchers used sociometry (a precursor to contemporary social network analysis) to map the internal social structures of organizations such as navy ships, submarines (e.g., Stogdill, 1957), and aircrews (Hemphill & Sechrest, 1952). For example, sociometric techniques were used to measure the popularity of the commanding officer of a ship, by asking the crewmembers the question, "with whom do you spend the most time in getting work done?" (Stogdill, 1957: 5). Because the crew (including the commanding officer) was free to nominate anyone, the researchers were able to record who sent nominations to whom and who received nominations from whom. In present-day network terms, the Ohio State researchers were able to calculate the in-degree and out-degree of the crewmembers' social networks. These measures of degree were further refined depending on the formal designation of the nominee and nominator. For example, a unit head might receive nominations from fellow unit members, peers, higher ups, and members outside the unit. Similarly, the unit head might also nominate



members within and outside the work unit. Overall, there were 20 measures developed concerning an individual's ties to organizational members (Stogdill, 1949).

The study was advanced even by today's standards, as the networks were measured at two points of time. This incorporation of time in the measurement of social networks is rare even today (Kilduff & Tsai, 2003). Though the researchers did not have any theory to predict the changes in networks over time, they found that the network measures were reliable, as the measures at the two different times were highly correlated (Stogdill, 1949: 58).

The Ohio State researchers extended the social network perspective beyond the individual level to the group level by exploring the association between sociometric structures and team-level outcomes. In a study of 94 B-29 bomber crews, members were asked to identify crew-members that they would choose if they were to create a new crew (Hemphill & Sechrest, 1952). These nominations were used to develop an index reflecting on-crew choices that was similar to present day network density (the ratio of actual ties to maximum possible ties) (Friedkin, 1981). This index was strongly correlated to bombing accuracy of the crew.

### **Summary and Critique**

The Ohio State studies established that informal networks are an important way to understand leaders and their social networks. These studies also showed that making a distinction between ties within units and across units is important. The rest of this literature review will illustrate that the incorporation of both the internal and external ties is one of the common ways of looking at social networks of leaders. This dissertation

builds on this distinction between internal and external ties of leaders to explain team task performance.

Despite these rich insights, these studies suffered from the same weakness as other sociometric studies of their times: they were atheoretical (Wasserman & Faust, 1994). The researchers did not explain why a specific social structure is associated with a certain outcome. For example, why does a crew that prefers its own members as potential workmates tend to have higher task performance than a crew that avoids nominating its own members? Overall, the Ohio State studies considered sociometry more as a technique and less as a basis for theoretical predictions. This limitation was partly addressed by subsequent theories, especially Fiedler's contingency theory.

### **Fiedler's Contingency Theory**

Research that followed the Ohio State leadership studies expanded the scope of leadership research by retaining the distinction between task-based (initiating structure) and relationship-based (consideration) leadership behaviors, while incorporating the situation surrounding the leader in leadership theories. For example, the contingency approach to leadership explains how a leader's style needs to fit with the situation in order to optimize performance (Fiedler, 1971). The "situation" in this research reflected the amount of control the leader exercised on followers, which included leader-member relationships, task structure and position power (Hughes, Ginnett, & Curphy, 1999). The most important of these three elements of situational control was leader-member relationship and it was originally measured as the leader's prominence (also called popularity), as gauged by the number of nominations the subordinates gave their leader

(Fiedler, 1957; Fiedler, 1958). In fact, in many of the studies that were used to develop and test the theory, Fiedler and his colleagues operationalized leader-member relations by measuring the in-degree of the leader in the informal social network (Clevlen & Fiedler, 1956; Fiedler, 1954, 1955, 1957; Fiedler, 1958; Fiedler, 1967; Godfrey, Fiedler, & Hall, 1957).

By proposing that leader effectiveness was a combination of the situation and leadership style, the contingency approach suggested that leader popularity had no main effect on performance. The main evidence supporting the contingency model and rejecting the main effects of leader prominence was a review of three studies conducted by Fiedler (1957). In this review, leader popularity did not consistently predict team outcomes, as three out of four correlations were positive and one was negative. Thus, Fiedler (1957) rejected the hypothesis that leader popularity caused higher performance. The major weakness with Fiedler's finding was that the three reviewed studies had a research design problem: leader popularity was measured after performance had occurred. Such a research design tests the research question: do successful work groups increase the popularity of their leaders? The design does not, however, test the question of interest here, which is whether popular leaders influence the success of their work groups.

Another major weakness of the contingency theory was its inconsistencies concerning the measurement of leader-member relationships. In some studies (Chemers & Skrzypek, 1972), and especially Fiedler's earlier research (Clevlen & Fiedler, 1956; Fiedler, 1954, 1955; Fiedler, 1958; Godfrey et al., 1957), the sociometric approach was

used to identify the leader's popularity with subordinates. Later on, however, Fiedler appears to have abandoned the sociometric approach in favor of psychometric measurement of group atmosphere (e.g., Mitchell, Biglan, Oncken, & Fiedler, 1970).

### **Summary and Critique**

Fiedler's contingency theory went beyond the foundation laid by the Ohio State researchers in multiple ways. First, it extended the sociometric approach to the team-level by operationalizing the leader's popularity at the team level. Most of the Ohio State leadership studies were restricted to the individual level of analysis (except for Hemphil and Sechrest, 1952). Second, the theory suggested a link between leader sociometric popularity (i.e., indegree) and team-level performance (although the empirical tests rejected the hypothesis). This insight remains central to my dissertation, and I develop hypotheses that explore exactly this issue. Third, Fiedler was sensitive to the potential confound of team size and controlled for it either statistically or in choosing very similar teams. Fourth, in a study that would be envied by most strategy researchers, Fiedler and his research team surveyed the social networks of 21 top management teams along with their boards of directors (Godfrey et al., 1957). Their dependent variable in this study was the performance of the companies.

### **Leader-Member Exchange Theory**

Leader-member exchange theory (LMX) is a more recent development (compared to the Ohio State studies and Fiedler's Contingency theory), which also suggests that the leader-subordinate relationship is an important predictor of individual, group, and

organizational-level outcomes (Gerstner & Day, 1997). According to this perspective, leaders differentiate among subordinates and have a high-quality relationship with some subordinates (i.e., high-quality LMX) and a low-quality relationship with others (low-quality LMX) (Howell & Hall-Merenda, 1999). High-quality LMX is characterized by high trust, respect, and influence between leader and subordinate (Graen & Uhl-Bien, 1995). Therefore, subordinates with high LMX have high job satisfaction and organizational commitment, and low turnover intentions (Gerstner & Day, 1997). In contrast, low-quality LMX is characterized by more formal role expectations and is transactional in nature. Subordinates who have a low-quality LMX with their leaders have lower satisfaction, as well as lower organizational commitment than those subordinates with high LMX. As expected, their turnover intentions are higher than subordinates with high LMX.

Besides being a relational approach to leadership, LMX suggests that leaders have relationships with different actors. In earlier studies (e.g., Cashman, Dansereau, Graen, & Haga, 1976; Graen, Cashman, Ginsburg, & Schiemann, 1977), researchers conceptualized the leader as having ties to the leader's own supervisor as well as to subordinates. The leader was, thus, a part of two different dyads or linking pins (Likert, 1961): one dyad with the supervisor (i.e., leader-boss linking pin) and the other with subordinates (i.e., leader-subordinate linking pin). Findings suggest that a high-quality leader-boss linking pin tended to have a positive effect on a leader's supportive behaviors and subordinates' attitudes about the leader's technical competence (Graen et al., 1977). This study provided a key insight about leader's social networks, as it suggested that a

leader's ties to organizational members other than subordinates have important implications for the subordinates. That is, an actor's set of connections outside a work group might influence the outcomes of the work group. Over time, however, researchers have neglected this key insight (i.e., the leader-boss linking pin) and instead have focused on the leader-subordinate linking pin and its implications (e.g., Wayne, Shore, & Liden, 1997).

### **Summary and Critique**

LMX provides some of the earliest insights about a relational approach to leadership. The LMX approach is similar to the Ohio State studies, Fiedler's contingency theory, and, to some extent, this dissertation, as it explores the effects of direct leader-subordinate connection on outcomes. Further, I retain this approach's key insight that the leader-supervisor relationship is important for leader-subordinate outcomes by incorporating it into my dissertation.

Although LMX has added to our understanding of leaders and their relationships, it continues to ignore the broader social context in which the leaders and subordinates operate. As LMX is a dyadic approach to leadership (Gerstner & Day, 1997), it looks mainly at the direct connections between leaders and subordinates that are mandated by the organizational hierarchy (Yukl, 2002). By doing so, the theory fails to explain three important sets of leader-relevant relationships that might not be mandated by the organizational structure. These relationships include the leaders' relationship with other organizational members (such as peers), the subordinates' relationships with each other (Sherony & Green, 2002 is an exception), and the subordinates' relationships with

members in the rest of the organization. Each of these relationships is an important conduit of information and resources that might eventually have leadership implications. These relationships are the foundational insights of this dissertation.

Also, by conceptualizing the leader-subordinate relationship to be primarily instrumental (i.e., work-related) (Boyd & Taylor, 1998; Sparrowe & Liden, 1997), LMX overlooks other commonly occurring relationships (such as friendship) that might have implications for leaders and subordinates (Lincoln & Miller, 1979). For example, friendship is a strong source of information and influence (French & Raven, 1959) that could be important for the leader-subordinate relationship. Furthermore, friendship is qualitatively different from the more instrumental or work-related relationship (Ibarra, 1993) that forms the primary relationship of study in LMX (Boyd & Taylor, 1998). Therefore, by categorizing relationship quality as only high/low, LMX takes a narrow view on relationships.

Finally, although LMX research suggests that it can be applied to teams (Graen & Uhl-Bien, 1995), very little work has actually been conducted to look at the effects of leader-subordinate relationships on team outcomes (see Dunegan, Tierney, & Duchon, 1992 for an exception). The research that has developed team-level constructs about the quality of relationships (also called Team-Member Exchange), has been theoretically and methodologically anchored in dyads (e.g., Liden, Wayne, & Sparrowe, 2000). Therefore, there still remains a need to look at leaders' relationships at the team level.

### **Summary of all Three Approaches**

Overall, the three perspectives reviewed above provide key insights about the social relationships of leaders and the implications of these relationships for teams. First of all, all three perspectives recognize that leader-subordinate relationships are important for subordinates and work units. Second, the Ohio State studies and, to some extent, LMX highlight the significance (for the work team) of the team leader's ties to external members, such as supervisors and peers. Finally, both the Ohio State studies and Fiedler's contingency theory extend this network approach to the team-level of analysis: the main focus of this dissertation.

### **Review of Sociometric Studies of Leadership**

This dissertation is about social networks of leaders and the implications of these networks for team effectiveness. The approaches that were reviewed above provide important insights about leaders and their social networks. In this section, I review sixteen studies that precisely explore the effects of leaders and their social networks. Some of these studies were mentioned earlier (e.g., Cleven & Fiedler, 1956), however they will be described in detail along with other studies. This review includes investigations of leaders' networks and their implications for the team performance, and excludes studies that focus on other aspects of leadership and networks (e.g., Fernandez, 1991; Salancik, Calder, Rowland, Leblibici, & Conway, 1975). Also, only studies involving formally appointed leaders are reviewed here (e.g., Borgatta, Bales, & Couch, 1954 is excluded in this review). Further, instead of reviewing the studies chronologically, I have organized them on the basis of their findings and whether they found support for the effects of leader's social networks.



The research question that all the following studies seek to answer is and how the leader's position in the informal social networks is important for team performance. Because I will elaborate on the theory behind this association between network position and team performance in the next chapter, for the present it is sufficient to say that all these studies test whether a leader's position in the informal network has team outcome implications. Most of the studies measure the leader's position in the informal network as the number of nominations received by the leader in the informal network: the popularity (i.e., prominence) of the leader. Therefore, these studies seek to test the popularity-performance hypothesis. I will now review studies that found support for the popularity-performance hypothesis (see Table1) followed by those studies that rejected it.

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Insert Table 1 here  
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### **Studies that Support the Popularity-Performance Hypothesis**

One of the earliest studies exploring the social networks of leaders found support for the "popularity-performance" hypothesis in a seven-member committee with rotating formal leadership (Rock & Hay, 1953). In this study, seven employees who had just participated in a group discussion were asked to identify individuals in the group that they liked to interact with on personal, social, and work fronts. Based on the nominations received, each person had a score reflecting their popularity in the three networks, and the two most nominated individuals were identified as the informal leaders. Over the next three weeks, the committee worked on its tasks, with each member taking charge as the chairperson in different meetings. At the end of each meeting, the group's output was

measured. The findings suggest that the committee was most productive when the informal leaders were the chairpersons (i.e., formal leaders). Under the formal leadership of each of the two informal leaders, the committees accomplished twice as many tasks as under other members.

Another study that tested the popularity-performance hypothesis in a military sample also found support for the hypothesis. Nine aircraft maintenance crews of 11 members each were asked to nominate or reject fellow crewmembers on 12 different criteria (Strupp & Hausman, 1953). To measure the performance of the crew, three management supervisors were asked to rank the crews. Results suggest that high performing crews tend to like their crew chief (i.e., formal leader).

Although both of these studies provide support for the popularity performance hypothesis, they do suffer from critical limitations. First, even though Rock and Hay (1953) is a longitudinal study with performance being measured after social networks, it suffers from lack of independence of observations. That is, each observation is based on committees that are composed of the same set of individuals. This independence problem makes the statistical findings questionable (Pedhazur & Schmelkin, 1991). Second, because the second study (Strupp and Hausman, 1953) uses a cross-sectional research design, it is difficult to say whether popularity leads to performance or vice-versa.

However, a subsequent study did address both these limitations by using multiple teams (composed of different team members) that worked over time. In a study of 24 aircrews training at a military school in Colorado, the researchers found that groups in which the formal leader (during training) was also the informal leader tended to be

effective in combat (Levi, Torrance, & Pletts, 1954). During training in the wilderness, aircrews were asked to identify members who did most of the hunting, joking, complaining, helping others, and least helping. Subsequently, after being in combat, the twenty-four crews were rated on a nine-point scale for different combat effectiveness criteria, including successful completion of missions, economy of performance, and overall effectiveness of air force missions. The analysis suggests that crews in which the formal leader (air commander) received more nominations tended to be better performers. Air commanders of poor performing crews received significantly fewer nominations. Overall, this study provides the strongest evidence in support of the popularity-performance hypothesis for two reasons. First, it is a longitudinal study with popularity being measured before performance (unlike Strupp and Hausman, 1953). Second, the groups did not have overlapping membership, thereby addressing Rock and Hays's (1953) limitation.

Similar to Levi et al. (1954), another set of researchers found support for the popularity-performance hypothesis in a different military sample (Hutchins & Fiedler, 1960). The researchers gathered sociometric and performance data from 14 radar-tracking units and 39 gun crews. Each crewmember was asked to identify three persons that he would prefer to have as a leader if his unit came under attack or went to war. The responses to this question were used to identify the informal leaders in the crews. Of the 53 crews, 8 crews selected their formal leaders as their informal leaders. The commanders of the crews then rated the crews on task-relevant performance measures which were highly correlated with available objective measures of performance. The

results suggest that groups that accepted their formal leaders as the informal leader were significantly more productive than groups that did not accept their formal leaders.

In another study of the popularity-performance hypothesis, 40 anti-aircraft radar crews were rated on their performance over a period of three months (Palmer & Myers, 1955). Subsequently, the crews were asked to nominate three individuals they liked and three they liked the least in the entire battery (which had multiple crews). They were also asked to identify individuals who were most and least valuable to the battery. The data supports the popularity-performance hypothesis, as crews with higher performance had leaders who were popular. Findings also suggest that crews that nominated personnel outside the crew tended to perform better. Unlike the previous studies, the problem with this study is that the sociometric data was collected after the performance data, and so whether performance influences social structure or vice versa is hard to say.

In a rare qualitative study that used the sociometric approach to explain work group effectiveness, Jenkins (1959) found that sociometric status of the formal leaders and cliques within naval air squadrons helped differentiate effective and ineffective squadrons. In the study of two squadrons, one effective and the other ineffective, each of the squadron members was asked to name individuals (inside and outside the squadron) with whom he would and would not like to fly.

The ineffective and effective squadrons differed on three sociometric dimensions. First, the formal leaders in the effective squadron were the most popular individuals in the squadron whereas the skipper of the ineffective squadron did not receive any positive nominations. Instead, two individuals in the ineffective crew refused to fly with their

skipper. Second, there was no other informal leader in the effective crew. In contrast, the ineffective crew had two informal leaders who were surrounded by their own cliques, and there were very few ties that spanned across these two cliques. Third, there were many negative ties within the ineffective crew, including two against the skipper. The effective crews had very few negative ties within, as most of the negative ties were directed towards non-squadron members (i.e., members outside the group).

This work (Jenkins, 1959) provides three important theoretical insights about leaders and groups. First, it suggests that a leader's positive and negative ties have implications for group effectiveness. Second, cliques amongst subordinates are important. When the formal leader is not a part of these cliques, performance of the overall group may suffer. Finally, an individual's ties to outside members can have performance implications for the entire group

All the studies reviewed above were published in 1950s and 1960s, which raises two obvious questions. Are there no recent studies on social networks of leaders and their team outcomes? Also, why was there such a dramatic halt in the work on social networks of leaders? First of all, yes, there are a few very recent studies that do explore this connection. These are reviewed below. Second, one possible reason for the neglect of research on social networks of leaders is the emergence of computers and research tools that encouraged other approaches, such as factor analysis (Rogers & Kincaid, 1981). Subsequently, contemporary researchers have not attempted to uncover these forgotten studies, which has led to academic amnesia (Balkundi & Harrison, 2004; Hunt & Dodge, 2000).

In one such recent study on leaders and their social networks, Friedkin and Slater (1994) explore the relative importance of the leader's networks when compared to the subordinate's networks as a whole. In their study of principals and teachers in 17 elementary schools, the researchers found that different social networks have widely different implications for the schools (Friedkin & Slater, 1994). Nearly 400 teachers and 17 principals of elementary schools in California responded to questionnaires that provided lists of their colleagues, asking them to identify with whom they discussed school-related issues, which ones they turned to for school-related advice, and which colleagues they considered friends. The principals also received an additional questionnaire where they provided information about the school's enrollment and test scores in previous years. Control variables included school size, staff meetings and development activities, staff monitoring, and formal statements of goals. Results suggest that the number of nominations received by the principal (i.e., in-degree) on the advice network was positively associated with the school's performance. The popularity of the principal on the friendship and discussion network was inconsequential. However, the number of nominations sent out by the principal (i.e., out-degree) on the discussion network was positively correlated with the school's performance. The major limitation of this study is that the networks were measured after team performance. Therefore, instead of finding support for the popularity-performance hypothesis, the study finds support for performance-popularity hypothesis, or the notion that having a leader of a high performance team tends to be popular with subordinates.

Oh, Chung and Labianca (2003) in a study of group social capital, explored the effects of leader-subordinate networks and the network ties of group members to other group leaders. There were three research questions (Oh, Chung, & Labianca, 2003). First, do formal group leaders need strongly reciprocated ties to the informal leader to have high group effectiveness? Second, should the entire team have connections to formal leaders of other groups to be effective? Third, do groups that have a broader range of connections to other groups tend to be more effective than groups that have a more focused range of external ties? Basing their findings on 60 teams in 11 Korean organizations, they found support for the first hypothesis that having a strong reciprocated (both expressive and instrumental) tie between the formal and informal leader (highest indegree) is associated with group effectiveness. Also, in more than 33% of the teams, the formal leaders were also the informal leaders. Similarly, a group's expressive ties to other groups' leaders was associated with team effectiveness. However, having a broad range of ties to other groups had no effectiveness benefits.

The study by Oh et al. (2003) is significant in two different ways. First, it highlights the importance of informal leaders in predicting team effectiveness. Unlike most of the studies reviewed (except for Godfrey et al., 1957, which will be reviewed later), recognizing that there are individuals other than the formally designated leader who can influence the rest of the team is an important insight. However, Oh et al. (2003) assumed that there was only one informal leader in the team. This need not be the case, especially in situations where the group has multiple subgroups with multiple informal leaders. However, the insight that a formal leader can benefit by having a strong tie to

the informal leader is an important one. Such a view of leadership incorporates not only the direct ties of a formal leader, but also the indirect ties.

Moreover, Oh et al. (2003) is one of the few studies that simultaneously incorporate both the ties within and outside the group as key predictors of group effectiveness (Mehra, Dixon, Robertson, & Brass, 2003). This attempt to incorporate ties that span outside the group as potential explanations of team effectiveness is new and innovative (Ancona & Caldwell, 1992 is an exception). By incorporating both internal and external ties, the researchers take a comprehensive view of a group as being embedded in its larger social context. As this research suggests, this larger social context, ignored by most leadership research, is important for the group. However, like many of the studies reviewed (e.g., Strupp and Hausman, 1953), the study uses a cross-sectional research design that weakens the potential inferences that can be drawn from it.

Another study that incorporates both the external and internal ties is from Mehra and colleagues (2003). Though the questions they consider are similar to the ones addressed by Oh et al., Mehra et al. look at the centrality of a leader in the friendship network. Mehra et al. are not looking at popularity – though they use just the term centrality. Rather, their measure of centrality is eigenvector centrality, which taps into the idea of being connected to powerful others. That is, they are actually measuring the extent to which the individual is connected to informal leaders. Their findings suggest that a team's leader being central in the friendship network of other team leaders is associated with team effectiveness, which is measured in terms of sales and customer



loyalty. However, being central in the friendship network has mixed effects on outcomes. Friendship centrality was associated only with customer loyalty and not sales.

Both Mehra et al. (2003) and Oh et al. (2004) highlight the importance of intra-group and external ties to other group leaders. In both the studies, external and intra-group ties were associated with team outcomes. However, as both studies are based on cross-sectional research designs, these studies cannot assert that network structures drive performance rather than the other way round. This is an important point, as prior performance determines who becomes central in the network (cf. Powell, Koput, & Smith-Doerr, 1996). Furthermore, each study looks at different ties. Mehra et al. use friendship ties, while Oh et al. use a mix of advice, friendship, and affective ties. They do not separate the effects of the different ties.

### **Summary and Critique**

The nine studies reviewed above provide tentative evidence supporting the popularity-performance hypothesis, as teams with popular leaders tended to outperform teams with less-popular leaders. The consistency of this finding across different organizational settings, such as military (e.g., Levi et al., 1954) and organizational workgroups (e.g., Mehra et al., 2003), suggest strong generalizability of the popularity-performance hypothesis. However, some common limitations remain across the studies. First, most of these studies fail to really explain why a leader's popularity leads to higher performance (Oh et al., 2003 is an exception). This lack of theoretical clarity is partly reflected in the haphazard way that the studies have measured social networks. They have assumed that the friendship ties and work-related ties are identical (e.g., Rock and Hays,

1953). In reality, though, not all social ties are the same – some ties convey more work-related information than others (Ibarra, 1993). Other ties, such as friendship ties, may convey work-related information, but they primarily are affect-based and are mainly conduits of social support. In fact, recent research suggests that making this distinction between work-related (instrumental ties) and expressive ties (e.g., friendship) is important, as they are associated with different team-level outcomes (Balkundi & Harrison, 2004). Second, even though some of these studies claim to be testing the popularity-performance hypothesis (e.g., Friedkin and Slater, 1994), they measure popularity after performance, and, they are testing the performance-popularity hypothesis.

#### **Studies that rejected the popularity-performance hypothesis**

Not all studies provide support for the popularity-performance hypothesis (see Table 2). In one such rare study, 32 top management teams were asked to identify fellow employees with whom they spent their leisure time and enjoyed working (Godfrey et al., 1957). The sociometric nominations received by the different individuals were then correlated with organizational effectiveness, which was operationalized in terms of operating efficiency and net income of three preceding years. Sociometric popularity of the company's general manager was not associated with the organizational effectiveness.

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 Insert Table 2 here  
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The major limitation of this study is that the sociometric data was collected after the groups had performed their tasks, and therefore it is difficult to establish the order of causality. Though the authors point out that the top management teams had undergone

little change in the three years for which the performance data was gathered, there is no guarantee that there were no changes in the social networks within the teams.

In another study, 25, five-men tank crews (including the tank commander, the formal leader) were asked to identify seven men in the platoon who were their friends and who were highly effective in combat (Fiedler, 1955). The crews were then measured on different performance variables, including the time it took the tank crew to travel to and hit 25 targets. The correlation between the number of nominations received by the tank commander and performance outcome was positive, but non-significant. The problem with such a small sample size is that it lacks the statistical power to identify significant correlations. However, the next study provides the strongest case against the popularity-performance hypothesis.

In the strongest evidence against the popularity-performance hypothesis, Cleven & Fiedler (1956) found that foremen (i.e., formal leaders) who received the most nominations tended to have groups with lowest performance. Group performance was measured for 14 foremen-led groups working in a large steel plant. Data about group performance were gathered 3-10 months before the administration of the sociometric survey and were operationalized in terms of the tonnage of steel per unit time. The popularity of the leader was negatively correlated with group performance.

### **Summary and Critique**

Overall, the evidence rejecting the popularity-performance hypothesis is weak because of lack of methodological and statistical rigor. Of the three studies that did not support the popularity-performance hypothesis, two measured performance before social

networks. Therefore, even if they found negative correlations between performance and leader's popularity (e.g., Cleven and Fiedler, 1956), they are really testing whether the performance of a leader leads to greater popularity and not the popularity-performance hypothesis. The one study that did measure networks before performance found that a popular leader had a high-performing team, but this correlation was not statistically significant (Fiedler, 1955).

### **LEARNING FROM THE PAST: NEW RESEARCH QUESTIONS**

#### **BASED ON THIS REVIEW**

Having reviewed the Ohio State studies, Fiedler's contingency theory, LMX, and more relevant studies that explored the social networks of leaders, I will now summarize the key themes and identify the unanswered questions. These unanswered questions form the basis for the theory chapter that follows.

**Social structure of leadership:** The studies reviewed above suggest that the position of the leader in the informal network provides the leader with advantages that manifest in team performance benefits. All of the studies (except for Mehra et al., 2003; and Oh et al., 2003) measure the leader's network position in terms of the number of nominations received by the formal leader. This measure has also been called popularity (Moreno, 1953). However, besides popularity, there are other network positions that might provide the leader with team-relevant advantages. One such position in the social network involves being tied to powerful others, as measured by Mehra et al., (2003) and Oh et al., (2003). However, as mentioned earlier, these two studies have theoretical and methodological limitations. Therefore, there remains a need to conceptualize the role of

informal leaders with the team and the entire organization and to determine what implications these team and organizational informal leaders have for team effectiveness. Therefore, given the lack of insights about network positions of leaders and their effects on team outcomes, in the next chapter I develop a more fine-grained theory regarding the social structures of leaders as a key explanation for leader effectiveness.

**Positive versus negative ties:** Of the 14 studies reviewed in this chapter, only two (Jenkins, 1959; Levi et al., 1954) explore the effects of leader's negative ties on team outcomes. Both studies found that disliked leaders have poor performing teams. But why is this so? Why does a team with a disliked leader exhibit lower team performance? One would expect that, in the past half century since these two articles were written, there would have been more studies theorizing and exploring these effects of negative ties of leaders, but, those studies have not emerged. In fact, most social network and leadership research in the last few decades has ignored the negative aspects of relationships, especially those of leaders (Brass, 2001). However, there has been a recent resurgence of research on negative ties, because negative ties have been argued to be better predictors of psychological well-being than positive ties (Labianca, Brass, & Gray, 1998; Rook, 1984). This reemergence and presumed importance of negative ties and leaders, there is a need to incorporate these recent developments into studies to understand how negative ties of leaders influence team outcomes.

**External versus internal ties:** One of the themes running from the Ohio State leadership studies and earlier LMX studies to more recent studies by Mehra et al. (2003) and Oh et al. (2003) is the inclusion of external ties in the explanation of team-relevant

outcomes. For example, LMX studies (Graen et al., 1977) highlighted the importance of leader-boss relationships, whereas Mehra et al. (2003) and Oh et al. (2003) emphasized the relevance of connections to other members of the organization. However, two major issues still remain to be answered. First, it is important to reestablish one of the forgotten but key insights of LMX studies: the role of the leader-boss relationship in team activities. Therefore, in this dissertation I address this by testing the importance of the leader-boss relationship in explaining team outcomes. Second, although formal structures do influence the power of an individual, interpersonal interactions might lead to the emergence of informal leaders in the team and organization as a whole (e.g., Oh et al., 2003). That is, informal leaders might emerge based on their interactions in the team (team-level informal leader) and interactions with the rest of the organizational members (organizational-level informal leader). How does the presence of such informal leaders influence team effectiveness? I develop a theory to answer this question and to explore the effects of team-level and organizational-level informal leaders on team performance.

**Team task performance and affective outcomes:** The outcome of interest in a majority of the sociometric studies reviewed above was team performance, which was measured in terms of output (e.g., Godfrey et al. 1957) or rated by supervisors (Oh et al., 2003). While team task performance is an important outcome that I study in this dissertation, identifying whether team members are satisfied enough to remain and contribute to the team in the future is also critical (Hackman, 1987; Stewart, 2003). This review suggests that one of the key insights was that leader's relationships were associated with subordinates' satisfaction, which was theoretically proposed in LMX

studies and a few sociometric studies (e.g., Chemers & Skrzypek, 1972; Graen, Novak, & Sommerkamp, 1982). Therefore, given the importance of team member satisfaction to the whether the members want to remain the team (i.e., team viability), I explore how the social structures of leaders relate to team satisfaction with leader.

### **CHAPTER 3**

#### **THEORY AND HYPOTHESES**

The literature review in the previous chapter identified multiple unanswered questions about leaders, their social networks, and team outcomes. First, what is the social structure of leadership? The review finds that primarily a leader's popularity (i.e., prominence) in the informal social networks is associated with team performance. This exclusive focus on popularity in these studies leads to the neglect of other possible social structures. There is a need, then, for an overarching theory about social networks of leaders that explains how different social structures of leaders are associated with team outcomes. Second, most of the studies reviewed point to the importance of formal leaders, thereby overlooking a powerful individual: the informal leader. Therefore, in addition to understanding the social structure of formal leaders, there is also a need to understand the role of informal leaders and their social networks. Finally, most of the studies reviewed in the previous chapter focus primarily on positive ties, neglecting negative ties. Even if they do incorporate negative ties in their explanations of leader effectiveness (e.g., Levi et al., 1954), the studies fail to explain why negative ties affect team performance.

This dissertation seeks to address these important questions concerning leader effectiveness and social relationships in work teams. More specifically, what implications do team leaders' relationships inside and outside their teams have for leaders and subordinates? How does the type of relationship (advice or avoidance) relate to leader



effectiveness? Finally, is team task performance predicted by the structure of social ties of team members?

I address the above questions by deriving hypotheses from a structural theory of leadership. First, the basic tenets of the social network perspective on social ties are elucidated. Second, I hypothesize how a leader's ties with subordinates, supervisors, and other organizational members relate to leader effectiveness. I also predict how different types of ties (i.e., advice or avoidance) might have different leadership implications.

### **A Structural Theory of Leadership**

The structural approach to social phenomena explores the importance of social structure for critical outcomes, such as health, job search, performance, and promotions (see Baker, 1994, for a review). Social structures have been defined as, "patterns of connectivity and cleavage within social systems" (Wellman, 1988: 26). Typical patterns of connectivity include the friendship and advice relationships formed by people within social contexts such as organizations.

This approach emphasizes interpersonal relationships between actors, rather than attributes of actors (Wellman, 1988). Social relations are different from individual attributes, because, unlike an individual attribute such as a person's age, a relationship involves more than a single individual. Indeed, the individual's social ties are embedded in larger social networks and may have implications beyond the individual level. An individual's social ties across different teams can help integrate the teams, providing flows of resources between disconnected social actors (cf. Granovetter, 1973).

Furthermore, the structural approach suggests that relationships between actors affect actors' attitudes and behaviors. From this perspective, an individual's behavior is, in part, a function of the particular pattern of relationships the individual develops and maintains. Relationships help individuals exercise influence, seek social support, and gain information (Kilduff & Tsai, 2003). Although relationships can provide critical resources, they can also drain resources. Having too many contacts can nullify the benefits that accrue from social relationships. Relationship maintenance requires expending attention, time, and other resources (Riley & Eckenrode, 1986; Rook, 1984). A person with many ties, therefore, may expend time and resources maintaining these relationships at the cost of other activities.

The structural approach to leadership suggests that a formal leader's influence and eventual effectiveness are dependent on the leader's pattern of informal ties. These informal networks exist inside the team and extend to the leader's own supervisor and other employees in the organization. Leaders, from a network perspective, are expected to influence and be influenced by their ties with subordinates and employees in other groups. In the following paragraphs, I propose hypotheses that focus on the formal team leader's ties with three different stakeholder groups: team members, informal leaders within the team and other external constituents.

### **Leader's Prominence**

Leaders who are prominent in the advice network in the team tend to have more productive teams for multiple reasons. First, by definition, prominent leaders are approached by many subordinates for advice. Such a social structure provides leaders

with abundant information about tasks and activities of different team members (Friedkin & Slater, 1994; Greer, Galanter, & Nordlie, 1954; Knoke & Burt, 1983). Accumulating that knowledge, in turn, leads to greater expert power and overall potential influence of the leader (Yukl, 2002). This increased influence is in addition to the existing influence that comes with the position of the formal leader. Armed with both legitimate and expert power (French & Raven, 1959), these sought-after leaders can influence and coordinate team members toward common team goals and thereby positively affect team performance. Second, with direct ties to subordinates, leaders are able to communicate work-related information directly to these subordinates without depending on brokers who might distort information (c.f., Baker & Iyer, 1992). Overall, better communication and increased influence of prominent leaders result in higher team performance. Prominence was operationalized as indegree centrality in the following hypothesis to avoid confusion (Freeman, Roeder, & Mulholland, 1979/1980). I use the terms indegree centrality and prominence interchangeably. Building on this argument and previous empirical work (Fiedler, 1955; Friedkin & Slater, 1994; Hutchins & Fiedler, 1960) I suggest the following hypothesis

**Hypothesis 1a.** The higher the indegree (prominence) of the formal team leader in the advice network, the higher the team task performance.

### **Leader as a Go-Between**

Prominence in advice networks is likely to help team leaders accomplish their tasks, but a strategic position in the advice network also might have implications for team task performance. One such strategic position for a leader is serving as the go-between for unconnected subordinates in the group, which might lead to mixed consequences. On one hand, to the extent that the leader can join disconnected parts of the team, the leader is more likely to facilitate the accomplishment of team goals. By spanning across structural holes in teams, leaders may help integrate specialists, avoid redundant use of resources, and put people in touch with each other (Burt, 1992; Freeman, 1978/79; Freeman et al., 1979/1980; Krackhardt, 1990). Moreover, leaders who span across structural divides may be able to advise one member that another team member faces a similar work problem, thus promoting coordinated activity. In these and other ways, leaders who bridge structural holes are likely to emerge as effective leaders with

**Hypothesis 1b.** The more the team leader connects unconnected team members in the advice network, the higher the team task performance.

### **Leader and Informal Leaders**

In both of the previous hypotheses I have argued that a formal leader's position in the informal team social networks has performance implications. The underlying assumption in both hypotheses is that a formal leader is able to exercise greater influence over subordinates when the formal leader is also the informal leader (i.e. occupies a

central position in the advice network). The power that a formal leader derives by being in a central position in the informal social network is independent of the formal legitimate power the leader is bestowed with. This distinction between formal leadership that is based on legitimate, organizationally-derived power and informal leadership that is based on informal social interactions has been made since the Hawthorne studies (Etzioni, 1965; Fernandez, 1991). That is, informal leaders tend to emerge from the social interactions among team members and these individuals might or might not be the formal leader (Krackhardt & Kilduff, 2002). In fact, previous research has called them emergent leaders because these individuals were selected by their team members as leaders and emerge as leaders (Hollander, 1961; Zaccaro, Foti, & Kenny, 1991). Like formal leaders, informal leaders have influence over other team members (Pescosolido, 2001), even though, unlike formal leaders, informal leaders have no formal power to hire and fire employees. Further, unlike formal leaders, these powerful individuals do not receive any additional compensation for their roles.

Multiple studies highlight the importance of informal leaders in organizations and teams. For example, Burt and Ronchi (1993) found that the firing of an informal leader in a manufacturing plant was followed by labor unrest. In another study, a researcher traced multiple attempts by workers to strike with the intent of securing a wage increase (Kapferer, 1972). The first attempt at gaining support for a strike among co-workers failed, as there was no clear informal leader who rallied for the strike. However, within seven months of the failed strike, one of the workers emerged as the informal leader (i.e., became central in the informal social network), and the subsequent attempt in organizing

a strike was successful because of the informal leader's backing.

Informal leaders are also important to teams. Studies of leaderless teams have found that informal leaders have a strong influence over the rest of the team members. In a study of leaderless teams, the researcher found that team members' team efficacy (the team's evaluation of its ability to perform specific tasks) was greatly influenced by the informal leader's own estimation of the team's task capability (Pescosolido, 2001). However, other team members' own estimate of the team's task capability did not have such influence. Furthermore, besides influencing team members, emergent leaders might also have important implications for group processes, as they may regulate team members' emotions and thereby manage overall team's emotions (Pescosolido, 2002). Key process variables, such as team efficacy and team emotions, have been found to have strong effects on team performance (Barsade, 2002; Gibson, 1999). Therefore, informal leaders have important implications for organizations, teams and team processes.

Though the above studies were at the organizational level or involved self-managed, leaderless teams, there is a need to understand how informal leaders might have important implications for formal team leaders. I argue that a positive relationship with informal leaders strengthens the formal leader's position, because then the informal leaders can act as representatives of the formal leader and influence other team members to support the formal leader. A leader who cultivates advice ties to informal leaders can exert influence throughout the team through these intermediaries, who bridge the leader and unconnected subordinates (Granovetter, 1973: 1374). That is, informal leaders can act as substitutes for the formal leader (Kerr & Jermier, 1978), thereby enhancing the

formal leader's performance. Having informal leaders who can take over the leader's role and act as second-in-command in the leader's absence, can also keep the team focused on team goals. These informal leaders can minimize the disturbance to the team created by the absence of the formal leader, and thereby increase the formal leader's overall performance. Therefore, through informal leaders, the formal leader can more effectively manage subordinates.

**Hypothesis 1c.** The greater the extent to which the formal leader is connected to the informal leaders in the team in the advice network, the higher the team task performance.

### **Bridging vs. Being tied to informal leader**

Is bridging the same as being tied to informal leaders? In Figure 1 (see Appendix A) the leader Y is simultaneously connected to the informal leaders and bridging the two subgroups. So, are bridging and being tied to informal leaders theoretically the same, or are they different? The distinction between bridging and being tied to informal leaders can be made at two levels: theoretical and mathematical. Theoretically, bridging and being connected to informal leaders have different bases of power and limitations that associated with the respective network structures. Bridging provides formal leaders with information and control benefits, as the leader has access to diverse information provided by different actors. Further, because these actors are not directly connected to each other, the leader can control them and even play one against the other (c.f., Burt, 1992). Also,

by acting as a go-between, a leader becomes essential for communication between team members, thereby making the leader indispensable for the team. Overall, the information and control benefits along with the high dependence increase the influence of the formal leader.

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Insert Figure 1 here  
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However, the bridging role brings with it a unique set of limitations. First, the inclusion of an additional person in the communication process, might lead to information distortion and decay (Baker & Iyer, 1992). Second, the possible inordinate dependence on the leader might be one of the drawbacks for a team that has a bridging leader because the communication in the team suffers in the absence of the leader.

In contrast, a team that has an informal leader provides multiple benefits for the formal leader. Leaders, through their connections to informal leaders, would have extended influence even over those subordinates who are not directly connected to the leaders. Moreover, the leader need not invest time and resources in developing and maintaining relationships with multiple individuals in the team. However, such a network structure also constraints the formal leader. By drawing on the influence of the informal leader, the leader is dependent on the informal leader, which increases the informal leader's power. Therefore, an informal leader becomes further powerful because of the connections to other teams members and to the formal leader. In terms of informal influence, the informal leader has a lead over the formal leader. Such a social structure contradicts the formal structure dictated by the organization where the formal leader is



more powerful than the informal leader. This mismatch between the formal and informal structures might lead to conflict and hamper team communication (Fombrun, 1982; Moreno, 1953).

Mathematically, the operationalization of the two concepts are as different as their theoretical differences. The measure that I used to operationalize bridging was betweenness centrality, which has been used before for similar constructs (e.g., Mehra, Kilduff, & Brass, 2001). Betweenness centrality measures the relative frequency of an individual to be between two individuals (Wasserman & Faust, 1994). It is calculated by taking into account the number of times an actor is on the shortest path between all the members of the network. However, if there is another node that is also on the shortest path between the same two actors, then both individuals get reduced betweenness centrality scores (Borgatti, 1995).

In order to measure the extent to which formal leaders are connected to informal leaders, I used eigenvector centrality. Eigenvector centrality measures the extent to which an individual is connected to other highly connected individuals. Unlike the formula for betweenness centrality, the formula for eigenvector centrality is used iteratively to get at the eigenvector centrality of each node. The centrality of a focal node is determined by the sum of the centrality of other nodes that are connected to the focal node (Bonacich, 1987; Bonacich & Lloyd, 2001). Therefore, this recursive nature of the eigenvector centrality algorithm necessitates the usage of computers in calculations and makes it computationally more complex than betweenness centrality.

In summary, being a go-between and being connected to informal leaders are two theoretically and mathematically distinct concepts. Theoretically, the sources of power that these two network positions draw on are distinct. Go-between leaders tend to get information and control benefits from their positions. In contrast, leaders who are connected to informal leaders tend to have extended influences via the informal leaders. Mathematically, eigenvector centrality is calculated using a recursive algorithm and needs massive computing power. In contrast, betweenness centrality is simpler and can actually be calculated manually for small networks.

### **Leaders and Boundary-Spanners**

In addition to leaders being connected to informal leaders in the team, there might be those individuals who occupy strategic positions in the informal social structure of the entire organization. Such informal leaders or boundary-spanning organizational leaders might be in other teams (e.g. person A in Figure 1) or they might be a part of the leader's own team.

Having advice ties to boundary-spanning organizational leaders provides the leader (e.g., leaders X and Y in Figure 1) with information about activities in the rest of the organization. This access to unique and diverse information might have implications for team performance (Ancona & Caldwell, 1992; Feld, 1981). As reviewed earlier, research has found that ties to influential members outside the team are associated with higher performance (Mehra et al., 2003). Therefore, maintaining ties to members who

span across these social worlds provides the leader access to these informational benefits.

This suggests the following:

**Hypothesis 1d.** The greater the extent to which the formal leader is connected by advice ties to boundary-spanners, the higher the team task performance.

### **Leader's Tie to Leader's Supervisor**

One of the most important ties for a leader is the relationship between the leader and the leader's own supervisor (Anderson & Tolson, 1991; Pelz, 1952). As mentioned in the literature review, a leader's connection to the boss (leader-boss linking pin) has important implications for both the leader and subordinates (Graen et al., 1977). For example, when a supervisor seeks advice from a team leader, norms of reciprocity where would require the supervisor to oblige when the leader seeks help from the supervisor (c.f. Gouldner, 1960). Therefore, by seeking advice from team leaders, supervisors have a greater propensity to help leaders by giving important information and resources. Further, by playing the role of an informal advisor to their supervisors, team leaders can influence the decisions of supervisors in their favor. Therefore, having advice ties with the supervisor provides the leader with additional access to resources and support due to norms of reciprocity and influence over the supervisors' decision making. These benefits may be critical for the team's success as well as the leader's overall effectiveness. Furthermore, research has found that leaders who have a high-quality relationship with their bosses tend to be more empowered and, therefore, are less constrained to act (Graen et al., 1977). Overall, leaders with strong ties to their bosses have access to more

resources, and they have greater leeway in the distribution of these resources towards the group goals. This suggests the following hypothesis:

**Hypothesis 2a.** Leaders whose direct supervisors seek them out for advice tend to have higher performing teams than leaders whose direct supervisors do not seek them out for advice.

Having the supervisor not only helps the leader influence the supervisor, it also has a positive effect on the subordinates through two different ways. First, a leader with high influence over the supervisor would be more effective in promoting team interests, and, in turn, is likely to retain the trust and cooperation of team members (Katz & Kahn, 1978; Pelz, 1952). In fact, previous research has found that leaders with a high-quality leader-boss linking pin tend to be more supportive of their subordinates (Graen et al., 1977).

Second, a leader who is sought for advice by a supervisor would be seen as a powerful individual by team members. Being seen with a powerful individual (such as a supervisor) will potentially increase the status of the leader among team members (c.f., Cialdini et al., 1976; Kilduff & Krackhardt, 1994). This basking-in-reflected-glory by the formal leader would reflect in a positive feeling among team members towards the leader. Therefore, team members would evaluate the leader favorably because of the leader's direct supportive behaviors and indirectly because the leader is basking in reflected glory of the supervisor. This suggests:

**Hypothesis 2b.** Leaders whose direct supervisors seek them out for advice tend to have more satisfied teams than the teams of those leaders whose direct supervisors do not seek them out for advice.

### **Leader's Dislike Ties**

The hypotheses proposed above point to the significance of a leader's position in the informal social networks. The various significant positions a leader could occupy in the informal social networks include being a popular person on the team, acting as a bridge among unconnected team members, and maintaining connections to other powerful individuals. Occupying these positions might have important team level outcomes. However, by focusing exclusively on the positive aspect of social relationships, these hypotheses do not account for the role of dislike or avoidance ties in team outcomes. Negative ties have a stronger influence on individuals and groups, even if they are less frequent than positive ties (Baldwin, Bedell, & Johnson, 1997; Labianca & Brass, 2003). In organizations, individuals with negative ties tend to have lower job satisfaction and lower organizational commitment (Labianca & Brass, 2003). Therefore, if a team is composed of individuals who dislike their formal leader, their lower job satisfaction and commitment will eventually bring down the entire team performance, because the entire team depends on each member to contribute. The lack of contribution from one disenchanted member might act as a bottleneck for the rest of the team and thereby pull down the team performance.

Moreover, there is another way that a disenchanted team member might be detrimental to the team. Recent studies of emotions in groups suggest that team members diffuse emotions to each other (Barsade, 2002; Bartel & Saavedra, 2000). These studies indicate that when members share their emotions with each other, the overall group dynamics and processes undergo a change. For example, one study found that when positive emotions diffuse through a group, there is more cooperation and reduced conflict among team members (Barsade, 2002). Similarly, one would expect that negative emotions also diffuse through groups. In a study that confirms that assumption, the researcher found that many individuals who disliked a common person were positively tied to each other (Smucker, 1947). Therefore, when one team member dislikes the leader, others may begin to share that dislike of the leader, which results in a growing number of disenchanted team members who might slow down the team. As these negative emotions about the leader diffuse, the overall performance of the team begins to suffer, because, as reviewed in the previous chapter, studies have found that leaders who are disliked by team members tend to have less productive teams (Jenkins, 1993; Levi et al., 1954). These findings suggest the following:

**Hypothesis 3.** The higher number of the team members who dislike the team leader, the lower the team performance.

In summary, the present dissertation proposes that a formal leader's performance will be a function of the leader's informal ties with team members as well as the extent to

which the leader and the subordinates have informal ties to employees in the rest of the organization. A leader's direct ties are important determinants of team task performance and team satisfaction with leader. These ties can be with either the leader's subordinates or with the leader's superior, or they can span outside the primary team to other parts of the organization. Ties inside the team help the leader motivate and influence subordinates, whereas ties to organizational boundary spanners tend to provide diverse knowledge and critical resources that can help the leader achieve team goals.

## CHAPTER 4

### METHOD

To test the hypotheses proposed in the previous chapter, I conducted a survey-based field study using multiple work groups in multiple organizations (identified by their pseudonyms) in the United States and India. The first organization, Hospital Inc. is a large general hospital in South India with 350 beds. The second organization, Research Institute is a prestigious government-run laboratory also based in South India. Research Institute employs 150 medical doctors and other researchers to conduct applied research on nutrition. Third, Pharm Found is a leading pharmaceutical research-driven firm that employs many doctorates to develop new products. It also has a manufacturing unit that produces pharmaceutical drugs. It too is located in South India. Fifth, I collected data from fifteen engineering teams working on a project for Boeing at a university located in the United States. Each of these research sites is discussed in detail in the following pages.

#### **Hospital Inc.**

The first organization, Hospital Inc. (a pseudonym) was a large general hospital that used multiple teams composed of either doctors or other knowledge workers. These teams were either catering to patients or were involved in the administration of the hospital. Each team had designated formal leader who was responsible for team performance. Hospital Inc. had over 250 employees (working in 25 teams) and there was a clear distinction made by the hospital's management between the line and staff functions. I decided to have separate network surveys for the doctors and hospital staff.



**Research Institute**

Research Institute is a prestigious government-run laboratory also based in South India. Research Institute employs 150 medical doctors and other researchers to conduct applied research on nutrition and health. The mission of the organization is to develop research-based policy guidelines for the Government of India. The teams were based in one campus and were organized primarily on functional expertise. For example, there was a team of pathologists that was composed of medical doctors. However, the microbiology team had primarily Ph.D.s and other researchers who had the required knowledge in that area. I administered the survey to all the 150 employees.

**Pharm Found**

Pharm Found is a leading South Indian pharmaceutical research-driven firm that employs many doctorates to develop new products. It also has a manufacturing unit that produces pharmaceutical drugs. The Research and Development (R & D) unit at Pharm Found is organized around laboratories that work on specific projects. The laboratories were primarily led by Ph.D.s in chemistry and other basic science and were collocated in one building. In contrast, the manufacturing unit was primarily composed of engineers and other technically oriented employees. The R & D unit and manufacturing unit were located in different campuses. Therefore, in Pharm Found, I administered two separate surveys, one for the R & D unit and the other for the manufacturing unit.

**Engineering Teams**

I collected data from fifteen engineering student teams working on a project for Boeing at a university located in the United States. The project involved utilizing their

engineering skills to solve an engineering problem that was given by Boeing. Through the semester the teams made presentations to the class and to the instructor. They were then graded at the end of the semester. Because these fifteen teams were distributed across two separate sections of a course, I administered two separate surveys.

### **Procedures**

Group members in all organizations were surveyed to provide inputs about their social networks and their demographics. Further, subordinates provided information about satisfaction with supervisor. The leaders' supervisors rated leader performance (i.e., leader effectiveness and team performance). In the case of the engineering teams, the course instructor evaluated the groups.

The design of the survey was based on recommendations by Dillman (2000). I pilot tested the survey on students at a large American university. In all the organizations, the paper-based survey (see Appendix B) was preceded by a letter from the researcher describing the study, encouraging participation and assuring complete confidentiality. The letter also emphasized the organizational and scientific importance of the study. One week later, the employees received a package that included a cover letter that explained the study in detail, a survey, and two informed consent forms. Follow-up measures included reminder postcards, and replacement surveys with letters urging individuals to complete the survey. This survey design was implemented in the spring and summer of 2003 in different organizations. The data collection occurred in two waves. In the first wave, the social network surveys were distributed to all the employees of the organizations including the team members, leaders and supervisors. In the second wave

of data collection the leaders' supervisors were contacted and requested to evaluate the leaders on different dimensions.

## Measures

### Independent Variables

**Social networks.** To operationalize the ties of leaders and their subordinates, each member of the team (including the leader and in some research sites the supervisor) was asked to look down an alphabetical list of employees in their organization and place checks next to names of those individuals they considered to be informal advisors. Respondents were asked to place checks next to the names of those “people from whom you seek advice about work-related matters. These are the people whom you turn to when you have a work-related problem or when you need advice about a work-related decision that you have to make” (Mehra, 1998: 49). The advice network question was placed in the front portion of the survey.

Respondents were also asked to identify individuals they preferred to avoid. Specifically, data for the dislike network were gathered by asking respondents to check off names of, “Individuals you prefer to avoid. These are fellow employees you prefer not to work and interact with.” Previous research has argued that using “prefer-to-avoid” might be more socially acceptable to respondents than other terms describing negative relationships (Labianca et al., 1998: 60). To avoid potential bias, the dislike network item was placed at the end of the survey.

Overall, I collected data concerning the two networks for 69 teams in the five organizations. The average response rate for each team was 85%, which is above the 80%

response rate used by other researchers (e.g., Sparrowe, Liden, Wayne, & Kraimer, 2001). Based on the group membership provided by the organization and the employees, I developed the following network measures for the formal leaders. These network measures were normalized (i.e., standardized) so that I could compare across networks of different sizes.

**Prominence.** I operationalized prominence by measuring indegree of the formal leader in the advice and dislike social networks of the team. Indegree is the total “number of ties incoming to a person” (Friedkin & Slater, 1994: 145). For example, a person who is sought for advice by many others has a high indegree in the advice network. For hypotheses 1a, I calculated the indegree of the leader in the advice network of the team. Similarly, for hypotheses 3 I calculated the leader’s indegree in the avoidance network of the team to measure the extent to which the leader was disliked.

**Bridging.** I operationalized the extent to which a formal leader bridged unconnected subordinates by calculating the normalized betweenness centrality of the leader in the advice team networks. For instance, for hypothesis 1b, I calculated the leader’s betweenness centrality in the advice network. Betweenness centrality is the extent to which an “actor serves as a potential “go-between” for other pairs of actors in the network by occupying an intermediary position on the shortest paths connecting other actors” (Kilduff & Tsai, 2003: 132).

**Connection to informal leaders.** To operationalize the extent to which formal leaders were connected to the informal leaders or influential others in the team (e.g., hypothesis 1c), I calculated the eigenvector centrality of the leader. An individual has

high eigenvector centrality when the person's contacts themselves are central in the network (Bonacich, 1987; Bonacich & Lloyd, 2001). For example, a leader who is tied to subordinates who in turn have ties to many other subordinates has high eigenvector centrality. In contrast, a leader who is connected to isolates or subordinates with few or no ties to others would have low eigenvector centrality in the team social network.

**Differentiating bridging from connection to informal leaders.** As mentioned earlier, the operationalization of the two concepts are as different as their theoretical differences. The measure that I used to operationalize bridging was betweenness centrality, which has been used before for similar constructs (e.g., Mehra et al., 2001). Betweenness centrality measures the relative frequency of an individual to be between two individuals (Wasserman & Faust, 1994). It is calculated by taking into account the number of times an actor is on the shortest path between all the members of the network. However, if there is another node that is also on the shortest path between the same two actors, then both individuals get reduced betweenness centrality scores (Borgatti, 1995).

In order to measure the extent to which formal leaders are connected to informal leaders, I used eigenvector centrality. Eigenvector centrality measures the extent to which an individual is connected to other highly connected individuals. Unlike the formula for betweenness centrality, the formula for eigenvector centrality is used iteratively to get at the eigenvector centrality of each node. The centrality of a focal node is determined by the sum of the centrality of other nodes that are connected to the focal node (Bonacich, 1987; Bonacich & Lloyd, 2001). Therefore, this recursive nature of the eigenvector centrality algorithm makes it computationally more complex than betweenness centrality. I

used eigenvector centrality to operationalize the next construct: connection to boundary-spanners.

**Connection to boundary-spanners.** To operationalize the extent to which formal leaders were connected to the boundary spanners (e.g., hypothesis 1d), I calculated the eigenvector centrality of the leader in the organizational network. As mentioned earlier, an individual has high eigenvector centrality when the person's contacts themselves are central in the network (Bonacich, 1987; Bonacich & Lloyd, 2001). For example, a leader who is tied to employees who in turn have ties to many other employees in the organization has high eigenvector centrality. In contrast, a leader who is connected to isolates or employees with few or no ties to others would have low eigenvector centrality in the organizational network.

**Ties to the leader's supervisor.** A leader was defined to have an advice tie to the leader's supervisor when the supervisor nominated the leader in the advice network.

### **Dependent Variables: Leader Effectiveness**

**Team task performance.** Supervisors were asked to rate their teams on a scale of 1 (very poor) to 7 (outstanding) for eleven items developed by Campion, Papper, and Medsker (1996). Sample questions included "The quality of work done by this team was \_\_\_\_." In their study of forty-two teams, Campion et al. (1996) found these items to have good psychometric properties including high variance among teams and internal consistency. In the present study, the scale's reliability as estimated by Cronbach's (1951) alpha was 0.93.

**Team satisfaction with leader.** Group members were asked to rate their leaders on three items from the Job Diagnostic Survey (Hackman & Oldham, 1980). These three items were “I am satisfied with the overall quality of supervision I receive in my work,” “I am satisfied with the amount of support and guidance I receive from my leader,” and “I am satisfied with the degree of respect and fair treatment I receive from my leader.” These items were rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Previous research has found this set of items to have high reliabilities (Judge & Bono, 2000). The reliability in the present study was 0.90 (as measured by Cronbach’s alpha). I aggregated the measure at the team level by calculating the mean value for each team (with leader excluded). The mean  $r_{wg}$  for team satisfaction with leader was 0.80.

### **Control Variables**

In order to control for alternative explanations, I collected friendship network and demographic (gender and age) and other information from respondents.

**Constraints Acting on Leader.** Previous research has argued that leaders who develop friendship with subordinates find it difficult to take actions that benefit the organization at the expense of the friendly subordinates (Dobbins & Russell, 1986; Taylor, Hanlon, & Boyd, 1992). To control for this explanation, I measured friendship network as I measured the advice and avoidance network. However, respondents were asked to nominate their friends or “people with whom you like to spend your free time, people you have been with most often for informal social activities, such as visiting each other’s homes, attending concerts or other public performances” (Mehra et al., 2001:

130). To operationalize the extent to which formal leaders had friendship ties in the team I had three different measures that captured the notion of leader being constrained by position in the team friendship network. First, I calculated the eigenvector centrality of the leader in the team friendship network (Bonacich, 1987; Bonacich & Lloyd, 2001). Second, I calculated the betweenness centrality of the leader in the team friendship network. This captures the extent to which the leader is autonomous and not constrained by being friends with team members. Betweenness centrality is the extent to which an “actor serves as a potential ‘go-between’ for other pairs of actors in the network by occupying an intermediary position on the shortest paths connecting other actors” (Kilduff & Tsai, 2003: 132). Therefore, betweenness is reverse coded. Third, I used the team friendship network to calculate the extent to which leaders is connected to others who themselves are connected to each other (Burt, 1992). Also called constraint, this measure captures the degree to which the leader is constrained and restricted by friends.

**Leader’s individual differences.** Prior research has suggested a leader’s individual difference might have significant implications for teams (Bass, 1990). One such individual difference that has been found to have important implications for leader outcomes is gender (Eagly & Johnson, 1990). I coded leader’s gender (1 = male, 2 = female).

**Gender diversity in team.** Previous research has suggested that gender diversity might have important implications for team outcomes (Williams & O’Reilly, 1998). I used data from the survey to code each individual’s gender (1 = male, 2 = female). From this categorical data, for each team I computed Blau’s (1977) index of heterogeneity (see



Jackson et al., 1991, for details) for gender. Blau's index can vary from zero (when all team members are the same) to a high of one (when all team members are different).

**Age diversity.** Similarly, age diversity too might have implications for team outcomes (Jehn, Northcraft, & Neale, 1999). Using the survey data, for each team I computed the standard deviation of members' ages, a measure recommended for samples that exhibit varying team size (Bedeian & Mossholder, 2000).

**Tie availability.** The centrality of a person is partly dependent on the size of the network that surrounds the person. A person in a large team has the opportunity to forge more ties than one who is in a small team. I used normalized measures of centrality to control for this availability of ties. When the level of analysis was the team (e.g., Hypothesis 1a), using normalized centrality measures meant that I controlled for team size. I also used normalized measures of centrality for hypotheses involving external ties (e.g., Hypothesis 1d). Because the data involved multiple sites with samples of varying sizes, the availability of ties was less in small relative to large organizations.

**Task interdependence.** I controlled for an important team property -- the extent to which team members were task interdependent (Bell & Kozlowski, 2002; Maznevski & Chudoba, 2000). Previous research has suggested that the degree to which tasks are interdependent will be associated with important team outcomes (Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996). In the present study, I measured task interdependence using the three items developed by Campion et al (1993). Estimated reliability was 0.63 (Cronbach's alpha). For each team I calculated the mean score for all three items. The mean  $r_{wg}$  for task interdependence was 0.74.

## CHAPTER 5

### ANALYSES AND RESULTS

The data that I collected through the surveys, had to be aggregated to the appropriate level of analysis: team/leader level of analysis. Network measures such as indegree and betweenness of the leader were calculated at the team level by restricting the boundaries of the network exclusively to the team. However, psychometric measures such as team satisfaction with leader required justifying the aggregation to the team level by establishing high  $r_{wg}$ . A high  $r_{wg}$  (above 0.7) suggests that there is high agreement among team members (Kidwell, Mossholder, & Bennett, 1997). This is the basis used to justify the aggregation to the team level. This involved calculating the mean values of the team members' responses as teams' values.

Once, all the measures were at the same level of analysis, I performed multiple hierarchical regression analyses using network variables to predict team-outcome variables. The team gender diversity, age diversity, betweenness centrality of leader in friendship network, structural holes surrounding the leader and task interdependence variables were non-significant in all the analyses reported below. The pattern of results was not affected by the inclusion or exclusion of these variables, but the exclusion of the variables did improve the overall fit of the regression models. Analyses including the non-significant control variables are available from the author.

Table 4 shows the means, standard deviations, and zero-order correlations between the variables. All the means for network variables represent percentages given that all the scores are normalized to help control for size differences across networks. On

average, a leader was connected via advice ties to 64 % of the subordinates, as indicated in the normalized indegree centrality mean ( $M = 64.45$ ,  $s.d. = 28.65$ ). However, as indicated by the indegree of the leader in the dislike network, on average a leader was disliked by less than 2% of subordinates ( $M = 1.73$ ,  $s.d. = 7.50$ ). Also, 39 % of the leaders were sought for advice by their supervisors.

The leaders surveyed here were 37 years old and were primarily men (84%). They had been in the organization for an average of 7 months and were highly educated with 49% either having a masters or an M.D. These leaders had 6 team members reporting to them. The team members were slightly younger (mean age 33) and less educated (40% had Masters or M.D) than the leaders although they had been in the organization slightly longer (8.35 months) than the leader. These leaders reported to their supervisors who had been in the organizations for a substantially longer time (10 years). These individuals had moved into the supervisory role around 4 years ago. Around 6 leaders reported to each supervisor.

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 Insert Table 4 here  
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Table 4 also provides additional insights about the associations between the different variables. Given that the dependent variable in 6 out of the 7 hypotheses was team performance, there were only two variables that were statistically correlated to performance. First, formal leaders who were connected to informal leaders in the team tended to receive higher performance ratings from their supervisors ( $r = 0.30$ ,  $p < .05$ )<sup>1</sup>. Second, high performing teams (relative to low performing teams) tended to have

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<sup>1</sup> All statistical tests reported here use one-tailed tests

members who were satisfied with their team leaders ( $r = 0.29, p < .05$ ). There were no other significant correlations between network variables and team performance, although one variable: betweenness in advice networks ( $r = 0.20, p < .10$ ) approached significance in predicting performance.

### **Social Networks of Leaders**

Recall that Hypothesis 1a asserted that leaders who are popular in the team advice network tend to have better performing teams (see Model 2 in Table 5). However, I did not find support for this prediction. Task performance was not associated with the leader's indegree in the team advice network, even though the sign of the regression coefficient was in the predicted direction ( $\beta = 0.14, p > 0.1$ ) and the overall model remained statistically significant.

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 Insert Table 5 here  
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According to Hypothesis 1b, leaders who act as go-betweens in the team advice network tend to have more productive teams. The results in Table 5 (Model 3) show support for this hypothesis ( $\beta = 0.30, p < .05$ ). Hypothesis 1c predicted that leaders connected to team informal leaders would have teams with high task performance. The regression coefficients in Table 5 (Model 4) suggest that this was the case ( $\beta = 0.36, p < .01$ ). Overall, these results suggest that leaders who acted as go-betweens or who were connected to team informal leaders tended to have more productive teams.

Hypothesis 1d extended the concept of informal leaders to the organizational level by suggesting that high performing teams would have leaders who were connected to

organizational boundary spanners. Results in Table 5 (Model 5) do not support this hypothesis, even though the sign of the regression coefficient is in the predicted direction (beta = 0.10,  $p > 0.1$ ).

Hypotheses 2a and 2b highlight the importance of the leader's relationship with the leader's own supervisor. Recall that Hypothesis 2a predicted that leaders whose direct supervisors seek them out for advice would tend to have high performing teams. I found weak support for this hypothesis (see Model 2 in Table 6), as leaders who were nominated by their supervisors in the advice networks tended to have higher performance ratings than those leaders who were not nominated by their supervisors (beta = 0.29,  $p < .05$ ). According to Hypothesis 2b, leaders nominated by their supervisors in the advice network will tend to have subordinates who are satisfied with their leaders. Results in Table 6 (Model 4) offer support for this prediction (beta = 0.39,  $p < .05$ ). Further, a MANOVA analysis taking the two outcomes together (i.e., team performance and team satisfaction with leader) confirmed a significant effect for leaders' advice ties with supervisors on both dependent variables ( $F = 3.07$ ;  $p < .05$ ).

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 Insert Table 6 here  
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Finally, hypothesis 3 suggested that leaders who are disliked by their subordinates tend to have poor performing teams. However, I did not find support for this prediction (see Table 7, Model 2), even though the regression coefficient was in the direction predicted by theory (beta = -0.09,  $p > 0.1$ ).

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 Insert Table 7 here  
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### **Additional Analysis**

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Insert Figures 2,3 and 4 here  
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To illustrate the situation of teams in which leaders occupy these different network positions I provide the sociograms in Figures 2, 3 and 4. The team leader (Sumantra) in Figure 2 is prominent in the advice network as all five team members seek him for advice. Similarly, Arun (team leader in Figure 3) is also sought for advice by all team members, but he also bridges multiple individuals (e.g., Sona, Hema and Koka) to the rest of the team (e.g., Mir and Nandan) and with each other. If Arun were to leave this team, the team would possibly fragment as isolates such as Sona and Hema would have no connection with each other and the rest of the team. Arun has a high betweenness centrality score in the team advice network. The team illustrated in Figure 4 has a leader (Rao) being connected to the informal leader (Char). Through Char, Rao is able to convey information to Patel and Shah even though they are not directly connected to the Rao who thus received a high eigenvector centrality score.

To further validate whether informal leaders did actually exist in the sample, I looked in a sub sample of the teams the number of times an individual was nominated as a leader. Respondents were asked to place checks next to the names of those “people you consider to be leaders. These individuals may or may not be officially designated as leaders in the organization.” In the 9 teams with four or more members (see Table 8), 33% of leader nominations were towards the formal leader. The next person to have the

most number of nominations in the leader network received 22% of the total nominations made by team members. Therefore, over 55% of leader nominations were concentrated in two individuals: the formal leader and what I call the informal leader. In these 55%, around 40% of the nominations were directed towards the informal leader.

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 Insert Table 8 here  
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One of the key dependent variables of this study is team satisfaction with leader. This is actually measured at the individual level, as individual team members filled the questionnaire. However, the independent variable (leader's tie with supervisor) is at a different level of analysis: the team level. There are multiple ways of testing hypotheses with variables at different levels (Hofmann, 1997). The first method is what I used above: justify the aggregation of member satisfaction with supervisor to the team level by establishing sufficient agreement among team members. This involved calculating the  $r_{wg}$ , which measures the extent to which team members agree. When  $r_{wg}$  for a construct is greater than .70 the aggregation to the team-level is meaningful (George, 1990). Because the  $r_{wg}$  for team member satisfaction with leader was 0.80, I aggregated team satisfaction with leader by taking the mean value of team members' satisfaction with leader.

But using only the average value at the team-level, the mean-as-an-aggregate approach fails to utilize the meaningful variance at the individual level (Hofmann, 1997). The approach that overcomes the above limitation is Hierarchical Linear Modeling (HLM) (Bryk & Raudenbush, 1992; Hofmann, 1997). HLM takes into account both the variances at the individual level and at the team level. Therefore, I used HLM to validate my findings regarding Hypothesis 2b. Here too, similar to the mean-as-an-aggregation

method, I had to take a two-step approach. First, I had to establish that there is sufficient systematic variance between groups (Hofmann, 1997; Kidwell et al., 1997). Second, based on whether there was sufficient variance between the groups, I had to test for the model that I was interested in.

The results suggest that there is sufficient variance at team level of analysis (chi-square = .114.67,  $p < .001$ ) to warrant the usage of a model at the team level of analysis. Therefore, I tested for a model that included whether the leader was sought for advice by supervisor to predict individual team members' satisfaction with leader. The analysis suggests that having team members whose leaders are sought for advice by the supervisor tend to report greater satisfaction with leaders ( $t = 1.904$ ,  $p < .05$ , one tailed test). Therefore, this provides additional support to hypothesis 2b, which tests whether leaders who have advice ties with supervisors tend to have more satisfied subordinates. Therefore, by using HLM and means I was able to find support for hypotheses 2b.

### **Summary of Results**

The results of this study show support for four of the seven hypotheses. High performing teams have leaders who play a brokerage role in the team, bridging across disconnects between people. Alternatively, high-performing team leaders are connected to the informal team leaders in the advice network. The results do not support the notion that the leader's prominence in an advice network is associated with team performance. The results also do not show that leaders connected via the advice network to organizational boundary spanners are more productive. Similarly, I did not find support



for the hypothesis that leaders who were disliked by their subordinates tended to receive lower performance ratings from their supervisors. However, the results do highlight the importance of a leader's advice tie to the leader's supervisor. A leader who was sought for advice by the leader's own supervisor tended to have subordinates who were satisfied with the leader. Also, such leaders tended to have high performing teams.

In summary, the results suggest that high performing teams have leaders who are well connected to their own supervisors or to informal leaders in the team. These results are also summarized in Table 9. In the next chapter I discuss the theoretical and managerial implications of these results, and the limitations of this research.

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Insert Table 9 here  
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## **Chapter 6**

### **Discussion and Conclusion**

There are three conclusions to be drawn from the results. First, the pattern of leader social ties to team members predicted team performance. Second, leaders who were sought for advice by their own supervisors tended to have high team performance. Third, subordinates of such leaders expressed satisfaction with their leaders.

The results of this study did not support the notion that the leader's prominence in team advice network was associated with team performance. The results failed to support the prediction that there would be a positive association with the extent to which leaders connected to organizational boundary spanners (via advice ties) and team task performance. Similarly, I did not find support for the prediction that leader's indegree in the dislike network would be negatively associated with team performance. The rest of this chapter will discuss the implications and limitations of this study.

A key contribution of this dissertation is the identification of network features that differentiate effective leaders from non-effective leaders. The picture of effective leaders that emerges from this study is of people who successfully manage relationships with their supervisors and subordinates. The caveat is: relationship management is different from prominence. An effective team leader manages relationships by occupying an advantageous position in terms of either bridging unconnected subordinates or by being connected to informal team leaders. Surprisingly, team performance appears to be unaffected by the extent to which subordinates like or dislike the leader: the prominence measures in the advice and dislike networks failed to predict team task performance.

Therefore, what really matters for team performance is the leader's pattern of ties. This suggests that, in order to be effective, a leader need not win a popularity contest with subordinates as long as the leader is connected to key individuals within and outside the team. Furthermore, the findings extend to team satisfaction with leader. Leaders who play a bridging role in the team advice network tend to have subordinates who are satisfied with team leaders. Overall, a leader who has support from above and below is less likely to experience poor team performance.

There has been a recent resurgence in network research in social sciences in general, and this effect has been felt in organizational sciences (Borgatti & Foster, 2003). Network research in organizations has been used primarily at two different levels: inter-organizational and intra-organizational. Studies that explore relationships between organizations to explain key outcomes such as learning (Powell et al., 1996) and organizational survival (Uzzi, 1997) are the more popular of the two approaches (for a review article see Baker & Faulkner, 2002). The research on intra-organizational networks looks within the organization by studying individuals in organizations, their networks and their outcomes. For example, at the intra-organizational level, social networks predict individual's starting salary (Seidel, Polzer, & Stewart, 2000), and eventual promotions (Brass, 1984; Burt, 1992).

However, what has been neglected until now has been what lies between the inter-organizational level and intra-organizational level. That is teams. The present study seeks to address this gap by increasing our understanding of social networks in teams and their outcomes by building on core social network concepts. First, I do retain the key network

idea that is common to both intra and inter-organizational network studies: the pattern of connections. However, instead of looking at patterns of connections between organizations or within the organizations, I study the leaders' connections and their patterns with employees and team members. Second, like other network studies, I also distinguish between the different types of ties (e.g., advice versus dislike) in my explanation of outcomes. Third, my key dependent variables are central to both of these research streams: performance and attitudes (Baker & Faulkner, 2002; Raider & Krackhardt., 2002).

But, there are key differences between the two research streams mentioned above and my work. First, in studies of both intra- and inter-organizational networks, researchers look at how network structure influences nodes (individuals or organizations). Such research with variables at two different levels of analysis (e.g., at the network and the node level) though uncommon in mainstream organizational behavior research (Rousseau, 1985), dominates network research at both the intra- and inter-organizational levels. However, in a majority of the hypotheses explored in this study, the dependent variables and independent variables are at the same level of analysis, as I explore how the network pattern affects network-level outcomes. This is rare in network studies. One reason for the lack of such research might be the amount of effort needed to collect multiple networks and their outcomes.

Second, the phenomenon of study here is unique and different from individuals and organizations. The study of teams is becoming an important area of research as teams are becoming a common structure that organizations use to get tasks done. Indeed, more

than 80 % of firms with 100 or more employees use team structures (Gordon, 1992), and more than 90% of all employees work part of their day in teams (Cascio, 1998). Given the importance of teams to organizations it is essential to understand their outcomes and factors that might be associated with such outcomes. Therefore, This dissertation is aligned with the recent trend to extend the social network approach to the team level of analysis (see Balkundi & Harrison, 2004 for a review).

Third, as mentioned in the literature review, most of the studies that explored the social networks of leaders focused exclusively on leader prominence and team performance. Though some recent efforts have attempted to explore more complex social structures of leaders (e.g., Oh et al, 2003; Mehra et al, 2004), they remain theoretically and methodologically limited (as discussed in Chapter 2). Further, these more complex studies have ignored the huge body of literature that explored exactly these issues in the early 1960's. This dissertation acknowledges and extends this body of literature by testing for more comprehensive leadership structures as antecedents to team performance.

This dissertation also addresses two key ideas in organizational behavior. First, there has been on long standing debate about the distinction between job satisfaction and climate (Johanesson, 1973). A version of that debate that is relevant in the present dissertation would seek to clarify how team satisfaction with leaders differs from team climate. Broadly speaking (not just restricted to team climate), climate is the “perceptions of what is important in the organization, be it service, creativity or safety” (Schneider & Rentsch, 1988:182). That is, climate reflects the perception of individuals about policies, procedures and practices in the organization. More specifically, in the context of teams,

team climate relates to some specific practices in the team. For example, one team climate construct is team transfer climate, which is the extent to which team members accept behaviors learned in training programs (Smith-Jentsch, Salas, & Brannick, 2001)). However, unlike team satisfaction with leader, team climate is a perception and not an affective evaluation (Brief & Weiss, 2002). Further, team satisfaction is about the affective state of the team members and not about the procedures and practices. However, the perceptions of procedures and practices might lead to affective states such as team satisfaction with leader (c.f., Schneider, 1975). Therefore, team climate is theoretically distinct from team satisfaction with leader and might even affect it.

Even so, team climate and team satisfaction with leader are team-level constructs and, therefore, have similar methodological issues regarding aggregation. For example, for both team satisfaction with leader and team climate to be team-level constructs they need to meet two important conditions (Edmondson, 1999). First, they have to be a property of the team (Klein, Dansereau, & Hall, 1994). Second, the team members need to agree about their satisfaction levels with the leader or the team climate (Schneider & Rentsch, 1988). Therefore, one-way of establishing that these two constructs exist at the team level is to show that there is greater agreement within teams than between teams with regard to these two constructs (Gavin & Hofmann, 2002). Then only can the measures be aggregated to the team level.

Second, the finding that leaders who are connected to informal leaders in the team tend to receive higher performing teams differs from recent work that looks at dual leadership in top management teams (Hambrick & Cannella, 2004). In a study of CEOs

and their seconds-in-command COOs (chief-operating officers), researchers argued that CEOs tend to handle stakeholders who are external to the organization, whereas COOs tend to focus internally. Therefore, allocation of internal functions to COOs and external functions to CEOs should reflect in improved performance. However, contrary to predictions, the researchers found that CEOs who had COOs tend to have poorer performing organizations compared to companies with only CEOs. How is this finding different from the results reported in this study? First of all, one possible reason that CEO/COO duos tend to have low performing organizations is that the presence of a COO adds an additional layer of bureaucracy in the organizational hierarchy that may reflect in distorted communication and inferior decision making (Abelson, 1999). In the present study, informal leaders did not yield any formal power because of their positions as informal leaders and therefore did not in anyway increase the formal hierarchy or the bureaucracy in the team. Instead, they might have improved the flow of communication between the formal leader and team members who were not directly connected to the formal leader. Second, even though the team leaders in this study had to interact with members outside the team, their primary tasks required interacting with the members of their own teams. For example, the head of surgery department in a hospital might interact with doctors from other specialties, but the head surgeon's primary duty required interacting with fellow surgeons and the associated staff. However, in the case of the CEO/COO duos, there was no strong need for CEOs to take charge of internal duties and interact with company employees, as this was the role of the COO. Therefore, these two

distinctions between a formal second-in-command and an informal second-in-command may be why the findings reported here contradict findings about CEO/COO duos.

This dissertation also extends previous relational leadership approaches, including leader-member exchange theory (LMX) and its theoretical precursor, Vertical Dyadic Linkage approach (VDL). However, the dissertation goes beyond LMX by explaining how a leader's indirect ties have implications for the team. For example, the results presented here suggest that a leader's indirect connections to subordinates through informal leaders matter. Indeed, this study finds that highly effective leaders extend their influence even to those subordinates to whom they are not directly connected. LMX (at least in the present form) cannot account for such a social structure, as it incorporates only direct connections between leaders and subordinates in the explanation of leader effectiveness. This dissertation also brings forth the key insights of the VDL theory and extends it to the team level. As reviewed in chapter 2, the level of analysis in the VDL approach was the dyad. In some studies, the boss-leader linking pin was used to predict the quality of the leader-subordinate linking pin. However, in this dissertation the independent variable remained the boss-leader linking pin, but the dependent variable included two team level outcomes: team task performance and team satisfaction with leader. I found support for this extension of the VDL approach.

The study's research design increases our confidence in the findings. First, in six of the seven hypotheses, the data about independent variables and dependent variables came from different sources, thereby avoiding artificially inflated correlations caused by single-source biases. Second, in most cases the collection of the network data preceded



the collection of the team performance data suggesting that networks precede performance and not the other way round.

### **Limitations and Future Research**

There were two main limitations of this study. First the lack of findings for the effects of organizational boundary spanning (hypothesis 1d) might have arisen from the fact that the teams were highly professional and autonomous. Many of the teams were self-sufficient and did not have formal dependence on other work teams. Thus, these teams differed from other work arrangements, such as assembly line teams, that have high task interdependence (Thompson, 1967). It is important for future researchers to explore how task interdependence between teams moderates the effects of organizational boundary spanning on team outcomes.

A second limitation of this study was the lack of access to strategies and cognitions of the leaders and subordinates. Understanding strategies and cognitions is important in uncovering the processes by which the network structure of leaders facilitates team performance. Drawing from Moreno (1935), a strategic fit between the formal and informal structure might be expected to reduce conflict, and thereby increase team performance. Alternatively leaders in structurally advantageous positions in informal networks tend to have accurate perceptions of their group's attitudes towards issues relevant to the group (Chowdhry & Newcomb, 1952; Hites & Campbell, 1950). Therefore, groups that are led by such central leaders tend to have high performance as a consequence of accurate perceptions about group informal social networks (Greer et al., 1954). That is, the fit between the leader's cognition about the team social network and

the team's actual social network may result in greater team performance (Greer et al., 1954). Therefore, future research needs to test these two competing fit hypotheses.

A question that has challenged network researchers is: where do networks come from (Salancik, 1995)? The development of a social network approach to leadership requires addressing the question as to why it is that some leaders are able to occupy key positions in the informal network whereas others are not able to do so. The structural approach has tended to ignore such questions (Kilduff & Tsai, 2003). However, if we are to develop a theory that explains a leader's social networks and their implications, it is important to understand why some individuals are able to occupy central positions, whereas others remain at the periphery of the social networks. Is it that some leaders do not perceive the need to occupy these advantageous positions? Or, do the personalities of some leaders give them a propensity to occupy such advantageous positions? For example, previous research has found that high self-monitors (relative to low self-monitors) tend to occupy brokerage positions in informal social networks (Mehra et al., 2001). Other research has found that high self-monitors tend to emerge as leaders (Day, Shleicher, Unckless, & Hiller, 2002). Some unanswered questions concern the effects of self-monitoring on the network structure of teams: Do high and low self-monitoring team leaders tend to build different network structures? And, if so, how do these structures affect team performance?

### **Conclusions**

This study provides insights about leaders, their social ties and team performance. It provides a theoretical explanation and empirical test of leadership from a social

network perspective. Given the prevalence of teams in organizations, and the emphasis given to leaders in organizations, the study is timely and relevant. Unlike most other studies, this dissertation takes a comprehensive view of leaders and their social ties by incorporating ties within and outside the team in the explanation of key team level outcomes. Further, by incorporating both advice and avoidance ties, the dissertation takes a more balanced view of leaders as individuals embedded in a wide range of relationships. As teams become prevalent in today's organizations, leaders need to capitalize on social networks to improve team performance and keep subordinates satisfied. The research described here takes a first step at understanding these processes.

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**APPENDIX A**  
**TABLES AND FIGURES**

TABLE 1

## Studies that Support the Popularity-Performance Hypothesis

Authors	Key Leadership Measure	Type of Network	Outcomes	Result
Rock et al., 1953	Sociometric popularity of rotating chairperson.	Instrumental and expressive network	Committee's performance	The committee was most productive when the informal leader was the chairperson.
Strupp & Hausman, 1953	Sociometric popularity of leader.	Nominations and rejections on 12 criteria	Ranking of crews	High performing crews had popular leaders
Levi, et al., 1954	Sociometric popularity of leader	Leadership and "man near breaking point" networks	Combat effectiveness	Formal leaders who were also nominated as leaders had better performing crews. Negative nominations for leader reduced performance.
Fiedler 1955	Sociometric popularity	Primarily instrumental (3 out of 5 questions were work related) – going on a dangerous mission	Tank Crew's performance	Popularity was positively correlated with performance
Palmer and Myers, 1955	Sociometric popularity Nominations to outside the team	Like network Valuable to the group network	Crew performance	Popular leaders had better performing crews Crews that nominated outsiders tended to perform better
Jenkins, 1959	Sociometric popularity	Instrumental (like and dislike)	Effectiveness of squadron	Effective squadron has popular leader. Ineffective squadron had disliked leader.
Hutchins et al., 1960	Sociometric popularity of leaders	"unit came under attack", "go to if have personal problems" Friendship	Supervisor's performance ratings	Friendship was discarded due to few responses. Groups that accepted their leaders as informal leaders and therapeutic leaders were more effective
Chemer et al., 1972	Leader popularity	Good friends and easy to work with. Liked least and hardest to work with.	Group atmosphere	Groups with popular leader was had better group atmosphere than groups with disliked leader.
Friedkin & Slater (1994)	Indegree of leader	Discussion, Advice and Friendship Network	School performance in third and sixth grades	Only advice network degree centrality was associated with performance
Mehra et al (2003)	Leader's eigenvector centrality in team network and team leaders' network	Friendship	Sales Customer loyalty	Team centrality predicted only customer loyalty; centrality in team leaders' network predicted sales and customer loyalty
Oh et al (2003)	1) Leader-informal leader strength of tie; 2) Ties to others teams leaders 3) Ties to other teams	<ul style="list-style-type: none"> <li>• A composite network: advice, friendship and affective ties</li> <li>• Friendship ties</li> <li>• Friendship ties</li> </ul>	Team effectiveness	Strength of tie between formal leader and informal leader predicted team effectiveness Ties to teams leaders predicted team effectiveness

TABLE 2

## Studies that Reject the Popularity-Performance Hypothesis

Authors	Key Leadership Measure	Type of Network	Outcomes	Result
Fiedler 1955	Sociometric popularity	Primarily instrumental (3 out of 5 questions were work related) – going on a dangerous mission	Tank Crew's performance	Popularity was positively correlated with performance but not statistically significant
Cleven et al., 1956	Sociometric popularity of leader	Not available	Tonnage of steel per unit	Sociometric popularity was negatively correlated with performance
Godfrey et al., 1957	Sociometric popularity of leader, being endorsed by president of company who is the informal leader	Primarily Instrumental	Operating efficiency Net income	Sociometric popularity of leader was positively correlated with outcomes but not statistically significant.

**TABLE 3**  
**Summary of Research Variables**

Variable	Operationalization
Leader Centrality Measures	
Popularity of leader	Normalized indegree in team advice and dislike networks
Bridging role of leader	Normalized betweenness centrality in team advice network
Connection to informal leaders	Normalized eigenvector centrality in team advice network
Connection to boundary spanners	Normalized eigenvector centrality in organizational advice network
Ties to supervisor	If nominated by supervisor = 1, otherwise = 0
Dependent Variables	
Team task performance	Supervisor's response to 11 items on 5-point scale
Team satisfaction with leader	Mean value of subordinates' response to three items on 7-point scale
Control Variables	
Team size	Number of members in team
Leader's gender	If male = 1 and female = 2
Gender diversity	Blau's (1977) index
Age diversity	Standard deviation of team members' ages
Task interdependence	Subordinates' response on three items on 5-point scale

**TABLE 4**  
**Descriptive Statistics and Correlations <sup>a</sup>**

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10
Control variables												
1. Leader's gender	1.16	0.37										
2. Friendship eigenvector centrality	45.36	28.67	0.12									
Independent variables <sup>b</sup>												
3. Indegree in advice network	64.45	28.65	-0.02	0.20								
4. Bridging in advice network	16.00	29.35	-0.06	0.53**	0.18							
5. Connections to informal leaders	60.96	23.97	-0.06	0.48**	0.52**	0.59**						
6. Indegree centrality in dislike network	2.00	7.50	-0.05	-0.22	-0.28*	-0.13	-0.50**					
7. Connections to organizational boundary spanners	19.64	9.89	0.09	0.38**	0.31*	0.17	0.28*	-0.19				
8. Bridging in organizational network	3.53	8.46	-0.02	0.20	0.02	0.00	0.10	-0.07	0.14			
9. Connection to supervisor	0.39	0.49	-0.02	-0.07	0.07	0.11	0.05	0.18	0.03	-0.11		
Dependent variables												
10. Satisfaction with supervisor	5.40	1.09	-0.08	-0.01	0.33**	0.16	0.36**	-0.54**	0.00	-0.08	0.10	
11. Team performance	41.29	7.06	0.13	-0.01	0.16	0.20	0.30*	-0.11	0.09	0.13	0.03	0.29*

<sup>a</sup> n varies from 43 to 56 due to missing data

<sup>b</sup> All variables are at the team level of analysis unless specified

<sup>+</sup> p < .10; \* p < .05; \*\* p < .01 (one tailed tests)

**TABLE 5**  
**Summary of Regression Analysis of Leaders' Positions**  
**in Advice Networks Predicting Team Performance <sup>a</sup>**

Variable	Models				
	1	2	3	4	5
Rater Effects <sup>b</sup>	-0.36**	-0.34**	-0.38**	-0.32**	-0.35**
Gender	0.18	0.20	0.19	0.23*	0.18
Friendship eigenvector	-0.08	-0.10	-0.24	-0.24	-0.11
Advice network:					
Indegree in team		0.14			
Bridging in team			0.30*		
Connections:					
to team informal leaders				0.36**	
to boundary spanners					0.10
F	2.92*	2.46*	3.26*	3.94**	2.27*
$R^2$	0.16	0.18	0.22	0.26	0.17
$\Delta R^2$		0.02	0.06*	0.10**	0.01

<sup>a</sup> n = 50; Entries are standardized regression coefficients

<sup>b</sup> research institute = 1, otherwise = 0.

\* p < .05

\*\* p < .01 (one tailed tests)

TABLE 6

Effects of Leader's Advice Relationship with Supervisor on Team Performance and Satisfaction with Leader <sup>a</sup>

Variable	Team Performance		Satisfaction with Leader		MANOVA
	Model 1	Model 2	Model 3	Model 4	Wilks' Lambda
Organizational Type <sup>b</sup>	-0.29*	-0.42**	-0.41**	-0.60**	
Leader's gender	0.08	0.05	-0.16	-0.19	
Leader's bridging role in whole organization	0.23	0.26*	0.00	0.04	
Connected to supervisor		0.29*		0.39*	0.85, F = 3.07*
F	2.90*	3.21*	2.62*	3.61**	
R <sup>2</sup>	0.17	0.24	0.16	0.27	
$\Delta R^2$		0.06 <sup>+</sup>		0.11*	

<sup>a</sup> n = 45. Entries are standardized regression coefficients<sup>b</sup> Engineering teams Unit 1 and Doctors = 0 rest = 1.

\* p &lt; .05; \*\* p &lt; .01 (one tailed tests)

**TABLE 7****Summary of Regression Analysis of Leaders' Position in Dislike Network****Predicting Team Performance <sup>a</sup>**

Variable	1	2
Rater Effects <sup>b</sup>	-0.36**	-0.35**
Leader's Gender	0.18	0.19
Friendship eigenvector	-0.08	-0.10
Leader's indegree in dislike network		-0.09
F	2.92*	2.26*
$R^2$	0.16	0.17
$\Delta R^2$		0.01

<sup>a</sup> n = 50. Entries are standardized regression coefficients.

<sup>b</sup> research institute = 1, otherwise = 0.

\* p < .05 \*\* p < .01 (one tailed tests)



**TABLE 8****Number of Nominations Received by Formal and Informal Leader in Leadership Network**

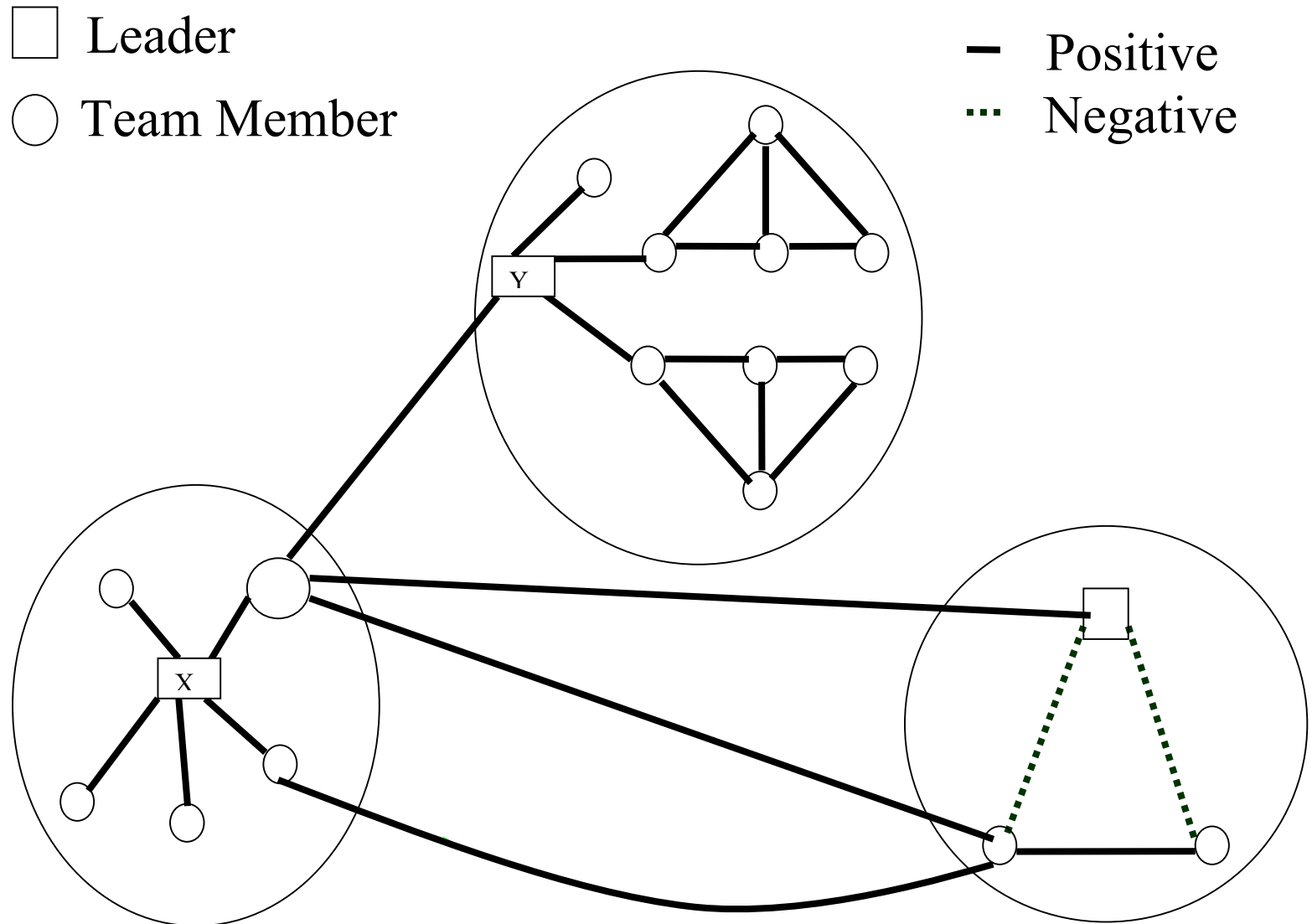
	Formal Leader	Informal Leader	Total nominations in team	Team Size
Team A	7	4	13	12
Team B	6	4	13	12
Team C	4	4	24	14
Team D	3	0	3	5
Team E	3	3	11	6
Team F	3	1	4	4
Team G	1	0	1	8
Team H	8	7	34	12
Team I	7	5	23	12
Total	46	31	133	

**TABLE 9**  
**Summary of Support for Hypotheses**

Hypotheses	Measurement Source <sup>a</sup>	Supported
<b>Leader's position in the Advice Network</b>		
H1a. The higher the indegree of the formal team leader in the advice network, the higher the team task performance.	<u>IV</u> : Team members <u>DV</u> : Supervisor	No
H1b. The more the team leader connects unconnected team members in the advice network, the higher the team task performance.	<u>IV</u> : Team members <u>DV</u> : Supervisor	Yes
H1c. The greater the extent to which the formal leader is connected to the informal leaders in the team in the advice network, the higher the team task performance.	<u>IV</u> : Team members <u>DV</u> : Supervisor	Yes
H1d. The greater the extent to which the formal leader is connected by advice ties to boundary-spanners, the higher the team task performance.	<u>IV</u> : Entire organization <u>DV</u> : Supervisor	No
<b>Leader's Advice Tie to Supervisor</b>		
H2a. Leaders whose direct supervisors seek them out for advice tend to have higher performing teams than leaders whose direct supervisors do not seek them out for advice.	<u>IV</u> : Supervisor <u>DV</u> : Supervisor	Yes
H2b. Leaders whose direct supervisors seek them out for advice tend to have more satisfied subordinates than the subordinates of those leaders whose direct supervisors do not seek them out for advice.	<u>IV</u> : Supervisor <u>DV</u> : Team members	Yes
<b>Leader's Dislike Ties</b>		
H 3. The higher indegree of team leader in the dislike network, the lower the team performance.	<u>IV</u> : Team members <u>DV</u> : Supervisor	No

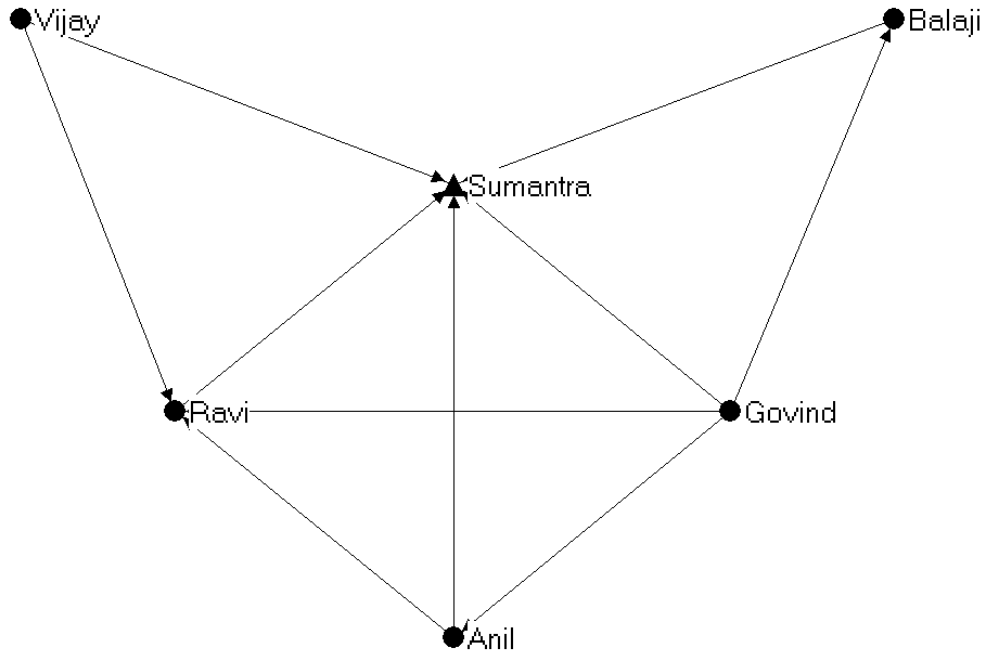
<sup>a</sup> IV stands for independent variable and DV for dependent variable

FIGURE 1  
Social Structure of Team Leadership



**FIGURE 2**

**Team with Prominent Leader in Advice Network**



● Team Members

▲ Team Leader

**FIGURE 3**

**Team with Leader as Go-between in Advice Network**

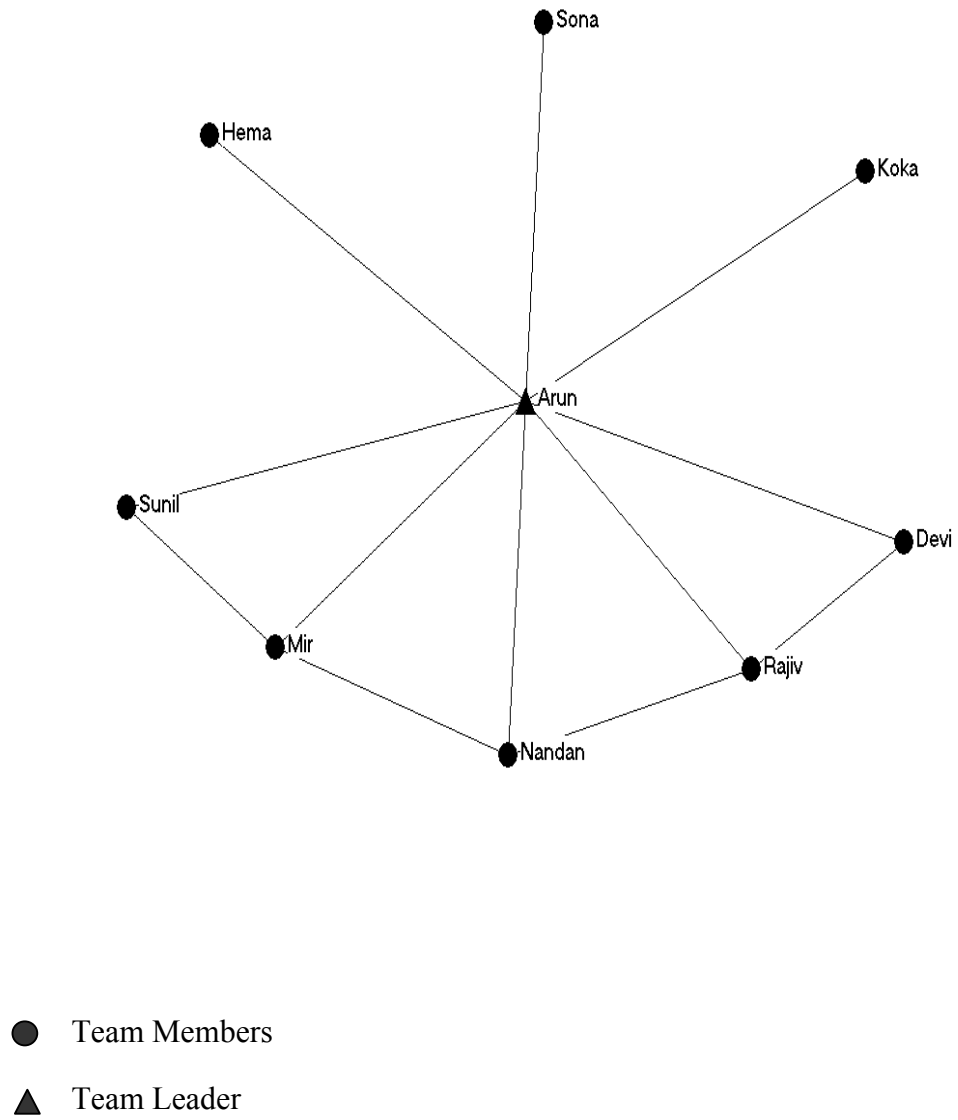
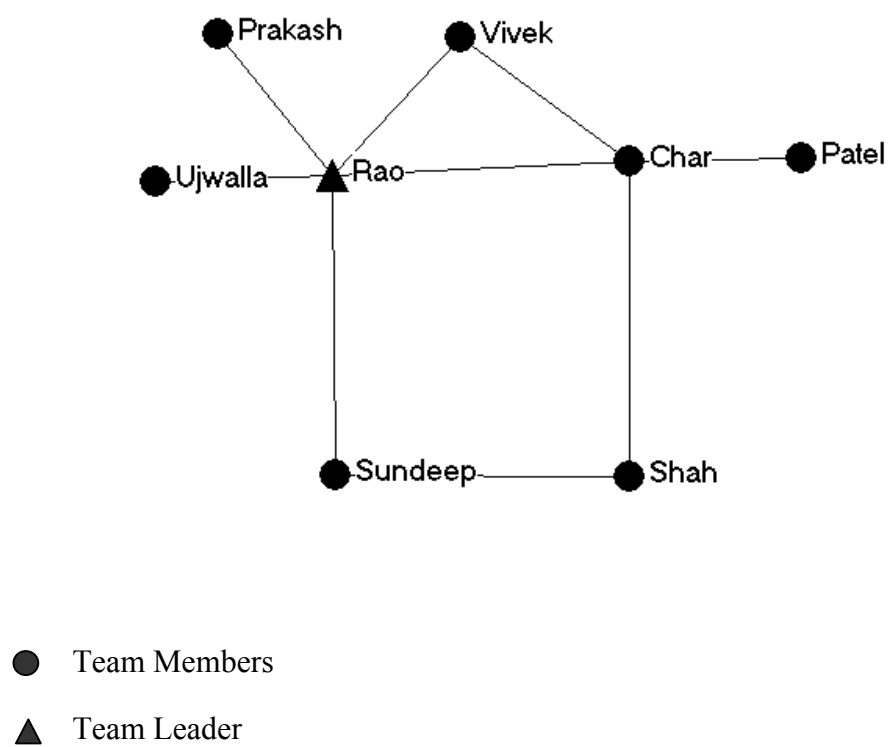


FIGURE 4

Team with Formal Leader Being Connected to Informal Leader



APPENDIX B (SURVEY INSTRUMENTS)

**INFORMED CONSENT FORM**  
The Pennsylvania State University

**Title of Project:** Team effectiveness in a globally changing environment.

**Principal Investigator:** Prasad Balkundi, 438 Beam Building, University Park, PA 16802  
(814) 865-1263 bprasad@psu.edu

**Other Investigator:** Prof. Martin Kilduff, 424 Beam Building, University Park, PA 16802  
(814) 865 9822 mkilduff@psu.edu

1. Purpose of the Study: The purpose of this research study is to explore how teams and their leaders can influence team performance. Also of interest is the relationship between team members and other organizational members.
2. Procedures to be followed: You will be asked to answer several questions on a survey. Also, the researchers will seek demographic information and other archival data from the company directly. This data includes your age, ethnicity, gender, organizational tenure, team tenure, and education.
3. Discomforts and Risks: There are no risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort.
4. Occasionally, your organization might seek to identify individuals who can help it improve, and you are one such person, we will first seek your permission before we reveal your identity to the company.
5. Benefits:  
You might learn more about yourself and your team by participating in this study. If you desire, a summary of the research findings can be emailed to you. This research might provide a better understanding of how teams and leaders affect teams. This information could help improve teams and team members.
6. Duration: It will take about 30 minutes to complete the questions.
7. Statement of Confidentiality: Only the person in charge, and his/her assistants, will know your identity. If this research is published, no information that would identify you will be written.
8. Right to Ask Questions: You can ask questions about the research. The person in charge will answer your questions. Contact Prasad Balkundi at (814) 865 1263 with questions. If you have questions about your rights as a research participant, contact Penn State's Office for Research Protections at (814) 865-1775.
9. Compensation: There is not compensation for participating in this study.
10. Voluntary Participation: You do not have to participate in this research. You can end your participation at any time by telling the person in charge. You do not have to answer any questions you do not want to answer.

You must be 18 years of age or older to consent to participate in this research study. If you consent to participate in this research study and to the terms above, please sign your name and indicate the date below.

You will be given a copy of this consent form to keep for your records.

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

The informed consent procedure has been followed.

\_\_\_\_\_  
Investigator Signature





Performance Questionnaire *for* Supervisors



**Department of Management  
And Organization**

**The Smeal College of Business**

**The Pennsylvania State University  
University Park, PA 16802  
U.S.A**

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Cell Phone: 814-876-0273

**SECTION A**

**Q1. The following questions ask you to describe the leadership effectiveness of**

**(name of supervisor).**

Please rate this supervisor.....	<u>Very Poor</u>	<u>Poor</u>	<u>Slightly Poor</u>	<u>Average</u>	<u>Slightly Strong</u>	<u>Strong</u>	<u>Very Strong</u>
➤ on the supervisor's demonstrated ability to formulate and communicate a vision of the future for his/her work group.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's demonstrated ability to set a good example for subordinates to follow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's demonstrated ability to motivate employees to exert extra effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's demonstrated ability to promote cooperation toward group goals among his/her subordinates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's expectations for quality and excellence on the part of his/her subordinates.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's demonstrated concern for the needs and feelings of followers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's demonstrated ability to stimulate employees to think about problems in new ways.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's ability to manage and direct the activities of his/her subordinates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ on the supervisor's ability to lead subordinates to meet group performance goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

➤ overall, as a leader

**Q2. Thinking about \_\_\_\_\_ (name of work unit), how would you rate it on the following statements?**

	<u>Very Poor</u>	<u>Poor</u>	<u>Average</u>	<u>Good</u>	<u>Very Good</u>
➤ The quality of work done by this unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The customer service provided by this unit is.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The productivity of this work unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ This unit is ..... in completing work on time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ This unit is ..... in completing work within budget.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ This unit is ..... in providing innovative products or services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ In responding quickly to problems or opportunities this unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The job satisfaction of members of this unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The overall performance of this unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The initiative of the unit is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ The cooperation of the unit with non-unit members is .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Job and Background Characteristics**

**Q 3. JOB TITLE: \_\_\_\_\_**

**Q 4. NAME: \_\_\_\_\_**

**(PLEASE PRINT)**

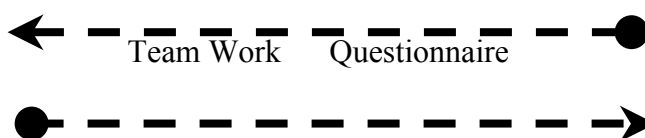
**Q5. How many years have you WORKED for this company?** \_\_\_\_\_ Number of years

**Q6. How many years have you SUPERVISED the present work unit?** \_\_\_\_\_ Number of years

**Q7. How many work units do you supervise?** \_\_\_\_\_ Number of teams

**Thank you for taking the time to complete this questionnaire. Your assistance in providing this information is very much appreciated. If you would like an summary of the research findings, please mention it in the space below along with an email address. If there is anything else you would like to tell us about this survey, please do so in the space provided below.**

**Your responses are indispensable to this project. Please make sure that you have completed all of the questions, and then use the enclosed envelope to return your questionnaire to us.**



Department of Management  
and Organization

The Smeal College of Business

The Pennsylvania State University  
University Park, PA 16802

**Q1.** The following is a list of students in this company. Please look carefully down the list and place a check next to the names of people with whom you **REGULARLY COMMUNICATE AT WORK**. Communication may be face-to-face or it may take place via telephone, electronic mail, or some other electronic media. Please be as candid and accurate as possible when answering this question. The individual responses you provide will be treated as strictly confidential.

“ I REGULARLY COMMUNICATE WITH...”	“ I REGULARLY COMMUNICATE WITH...”	“I REGULARLY COMMUNICAT E WITH...”
▼	▼	▼
<input type="checkbox"/> Ackroyd	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q2.** Below is a list of statements that are used to describe supervisory behavior in organizations. Please write down the name of your leader \_\_\_\_\_. Then, carefully read each descriptive statement and then decide to what extent you agree that it best describes your leader’s potential behavior. Please “mark” the oval that best represents how you feel.

My leader can . ....	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Disagree nor Agree</u>	<u>Agree</u>	<u>Strongly Agree</u>
➤ increase my pay level.....	▼ ○	▼ ○	▼ ○	▼ ○	▼ ○
➤ give me undesirable job assignments.....	○	○	○	○	○
➤ make me feel that I have commitments to meet.....	○	○	○	○	○

commitments to meet.....					
➤ give me good technical suggestions.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make me feel valued.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ influence my getting a pay raise.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make my work difficult for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤					
➤ make me feel that I should satisfy my job requirements...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ share with me his/her considerable expertise and/or training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make me feel like he/she approves of me.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ provide me special benefits....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make things unpleasant here...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ give me the feeling I have responsibilities to fulfill.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ provide me with sound job-related advice.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make me feel personally accepted.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make me feel important.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ influence my getting a promotion.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ provide me with needed technical knowledge .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make me recognize that I have tasks to accomplish.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ make being at work distasteful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q 3. Please look carefully down the list and place a check next to the names of people you SEEK ADVICE FROM on work-related matters. These are people that you turn to when you have a work-related problem or when you need advice about a work-related decision that you have to make. Please**

be as candid and accurate as possible when answering this question. The individual responses you provide will be treated as strictly confidential.

▼ “ I GET WORK-RELATED ADVICE FROM...”	▼ “ I GET WORK-RELATED ADVICE FROM...”	▼ “I GET WORK- RELATED ADVICE FROM...”
<input type="checkbox"/> Ackroyd	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q4. Each of the statements below is something that a person might say about his or her job. Please indicate your own personal feelings about your job by marking how much you agree with each of the statements. Please mark the appropriate oval.**

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
➤ I feel fairly satisfied with my present job.	▼ <input type="radio"/>	▼ <input type="radio"/>	▼ <input type="radio"/>	▼ <input type="radio"/>	▼ <input type="radio"/>
➤ Most days I am enthusiastic about my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Each day at work seems like it will never end.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ I find real enjoyment in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ I consider my job to be rather unpleasant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Q5. Now please indicate how satisfied you are with the following aspects of your leader by marking the appropriate oval.**

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Slightly Disagree</u>	<u>Neutral</u>	<u>Slightly Agree</u>	<u>Agree</u>	<u>Strongly Agree</u>
➤ I am satisfied with the overall quality of supervision I receive in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ I am satisfied with the amount of support and guidance I receive from my leader.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ I am satisfied with the degree of respect and fair treatment I receive from my leader.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q6. This part of the questionnaire asks you to describe your job as objectively as you can. Please try to make your descriptions as accurate and objective as you possibly can. Please mark the oval that most accurately describes your job**

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neutral</u>	<u>Agree</u>	<u>Strongly Agree</u>
➤ I cannot accomplish my tasks without information or materials from other members of my team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Other members of my team depend on me for information or materials needed to perform their tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Within my team, jobs performed by team members are related to one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q7. The following is a list of students in this class. Please look carefully down the list and place a check next to the names of people you consider to be your GOOD FRIENDS. These are people with whom you like to spend your free time, people you have been with most often for informal social activities, such as visiting each others homes, attending concerts or other public**

performances. Please be as candid and accurate as possible when answering this question. The individual responses you provide will be treated as strictly confidential.

“ I AM GOOD FRIENDS WITH...”	“ I AM GOOD FRIENDS WITH...”	“I AM GOOD FRIENDS WITH...”
▼	▼	▼
<input type="checkbox"/> Ackroyd	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q8.** Please look carefully down the list and place a check next to the names of people you consider to be your **WORK FLOW CONTACTS**. These include people who provide you with inputs that are essential for your work. Workflow contacts also include people who depend on you for their inputs. That is your finished products are their inputs. For example, Jack may provide you with certain parts that you then use to complete a job which you then pass on to Jill. Jack and Jill, would be your Work Flow Contacts. Please identify your work flow contacts below.

“ ... IS MY WORK FLOW CONTACT”	“ ... IS MY WORK FLOW CONTACT”	“...IS MY WORK FLOW CONTACT”
▼	▼	▼
Ackroyd		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q9. The following questions ask you to describe the leadership style of your leader. Please judge how frequently each statement fits the leader and “mark” in the appropriate oval.**

	<u>Not at all</u>	<u>Once in a while</u>	<u>Sometimes</u>	<u>Fairly often</u>	<u>Frequently if not always</u>
➤ Shows determination when accomplishing goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ I have complete confidence in him/her.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Makes people feel good to be around him/her.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Communicates high performance expectations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Generates respect.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Transmits a sense of mission	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
➤ Provides a vision of what lies ahead	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q10. The statements below are opinions you might have about your team’s leader. Please write down the name of your leader \_\_\_\_\_ . Thinking about your leader, carefully read each question and then circle the appropriate response.**

➤ What amount of leadership does your leader exhibit?	None	Little	Neutral	Moderate amount	Extreme amount
➤ How willing would you be to choose your leader as formal leader?	Not At All	A little	Neutral	Willing	Very Willing
➤ How typical of a leader is your leader?	Not At All	A little	Neutral	Typical	Very Typical
➤ To what extent does your leader engage in leader behaviors?	Not At All	Little	Neutral	Moderate extent	Extreme extent
➤ To what extent does your leader fit your image of a leader?	Not At All	Little	Neutral	Typical	Very Typical
➤ how much did this individual contribute to the effectiveness of the group?	None	Little	Neutral	Moderate amount	Extreme amount
➤ How much did this individual contribute to the effectiveness of the group's task?	None	Little	Neutral	Moderate amount	Extreme amount

**Q11. Please look carefully down the list and place a check next to the names of people you consider to be LEADERS. These individuals may or may not be officially designated as leaders at the Company. Please be as candid and accurate as possible when answering this question.**

<b>“ ... IS A LEADER”</b>	<b>“ ... IS A LEADER”</b>	<b>“...IS A LEADER”</b>
▼	▼	▼
<input type="checkbox"/> Ackroyd	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Job and Background Characteristics**

**Please note that the individual responses you provide will be treated as strictly confidential.**

Q12. **JOB TITLE:** \_\_\_\_\_

Q13. **GENDER:**

- MALE
- FEMALE

Q14. **EDUCATION:** (Please mark the highest level achieved)

- HIGH SCHOOL
- 2-YR COLLEGE
- 4-YR COLLEGE
- MASTERS
- DOCTORATE

Q15. **You are**

- AN ONLY CHILD
- FIRST BORN
- MIDDLE BORN
- LAST BORN
- NOT APPLICABLE (e.g. TWIN, ADOPTED LATER IN LIFE, ETC.)

Q16. **AGE** \_\_\_\_\_

Q17. **RACIAL/ETHNIC Heritage** (Please mark one circle)

- AFRICAN AMERICAN
- AMERICAN INDIAN
- ASIAN AMERICAN
- WHITE
- HISPANIC AMERICAN
- OTHER (please specify) \_\_\_\_\_

Q18. How many years have you **WORKED** for this organization? \_\_\_\_\_

Q19. How many years have you been a member of this workgroup? \_\_\_\_\_

**Q20. Please look carefully down the list and place a check next to the names of people you PREFER TO AVOID. These are fellow employees you prefer not to work and interact with. Please be as candid and accurate as possible when answering this question. The individual responses you provide will be treated as strictly confidential.**

▼	▼	▼
<input type="checkbox"/> Ackroyd	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Smith	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Stallone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Willis	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> ....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thank you for taking the time to complete this questionnaire. Your assistance in providing this information is very much appreciated. If you would like an summary of the research findings, please provide an email or mailing address in the space below. If there is anything else you**

## VITA

### **Prasad Balkundi**

Prasad Balkundi is a visiting assistant professor of organizational behavior at Texas Tech's Rawls College of Business. Prasad received his Ph.D. in business administration with an emphasis in management and organization from The Pennsylvania State University in 2004. His primary research interest is in studying social networks of leaders at the team-level of analysis. In line with this research, Prasad's dissertation focuses on how leaders' social ties to team members and leaders' supervisors affect team performance and team member satisfaction. His 2004 *Academy of Management Best Paper Proceedings* article with Dr. David Harrison is a meta-analysis of over 30 network studies that summarizes the effects of team network structures on team outcomes. At Penn State University, Prasad taught courses in organizational behavior, organizational theory and design and human resources management and received Penn State's Outstanding Graduate Assistant Teaching Award in 2000. He serves as an ad hoc reviewer for *Academy of Management Journal* and *British Journal of Management*, and is a member of the Academy of Management. He lives in Lubbock, Texas with his wife Swapna.