

The Social Network Ties of Group Leaders: Implications for Group Performance and Leader Reputation

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This paper uses data from the sales division of a financial services firm to investigate how a leader's centrality in external and internal social networks is related to the objective performance of the leader's group, and to the leader's personal reputation for leadership among subordinates, peers, and supervisors. External social network ties were based on the friendship ties among all 88 of the division's sales group leaders and the 10 high-ranking supervisors to whom they reported. Internal social network ties consisted of 28 separate networks, each representing the set of friendship relations among all members of a given sales group. Objective group performance data came directly from company records. Data on each group leader's personal reputation for leadership was based on the perceptions of three different constituencies: subordinates, peers, and supervisors. Results revealed that leaders' centrality in external and internal friendship networks was related both to objective measures of group performance and to their reputation for leadership among different organizational constituencies.

Key words: social networks; leadership; group performance

Leadership is a topic of perennial interest in organization studies. One reason for the enduring fascination with leadership is the persistent belief that leaders can enhance the performance of work groups. Over the years, a number of different theories—ranging from the early trait, behavioral, and situational approaches to the more recent attributional, charismatic, and transformational perspectives—have sought to explain the relationship between leadership and group performance. The focus of much of this rich and diverse body of work has been on the personal attributes of leaders, such as their personality and behavior. Less attention has been paid to the potential for the ongoing social relationships in which leaders are embedded to explain the relative performance of the groups they lead (cf. Brass and Krackhardt 1999, Yukl 2002). This is surprising because observational accounts have long emphasized that leadership is a social affair (e.g., Machiavelli 1513/1992, Mintzberg 1973). Leaders do not lead in a social vacuum: They are embedded in ongoing systems of interpersonal relationships, or social networks, with subordinates, peers, and superiors.

The social network ties of leaders have received relatively little direct scrutiny in organizational research, but there are at least three existing lines of enquiry that point to the fruitfulness of a social network approach to leadership. First, experimental studies of small groups—conducted primarily in the 1940s and 1950s at the Center for Research on Group Dynamics at MIT—showed that centrality in communication networks is related to leadership emergence and group effectiveness (e.g., Bavelas 1950, Leavitt 1951). This laboratory-based line of work “succeeded in producing a huge amount of important theory and data,” but it dried up as key contributors left MIT to work elsewhere (see Freeman 2005, p. 74). Second, research on leader-member exchange (LMX), which was initiated almost three decades ago (e.g., Dansereau et al. 1975, Graen and Cashman 1975), has provided compelling evidence that the content of a leader's formal dyadic relationship with a subordinate can influence the subordinate's performance, commitment, and satisfaction (for a meta-analysis, see Gerstner and Day 1997; for conceptual reviews, see Graen and Uhl-Bien 1995, Liden et al. 1997, Miner 2005). Third, field-based studies have found that central positions in

informal social networks are related to constructs that are themselves related to leadership effectiveness, constructs such as individual influence (e.g., Brass 1984, Brass and Burkhardt 1992) and individual performance (e.g., Mehra et al. 2001, Sparrowe et al. 2001).

Our paper draws on this earlier work to tackle two interrelated questions in a field-based setting: Are leaders' social network ties related to differences in the objective performance of the groups they lead? And, are leaders' social network ties related to their personal reputations for leadership? Although early laboratory-based studies (e.g., Leavitt 1951) of small groups noted the importance of centrality in social networks for leadership effectiveness, most subsequent research has tended to ignore the informal network ties of leaders (Yukl 2002). We seek to reinvigorate this classic line of laboratory-based work by extending some of its key insights to the study of leadership effectiveness in ongoing work organizations.

The social network perspective we take in this study shares with LMX research a concern with the interpersonal ties of leaders. However, we seek to move beyond traditional LMX research by: (a) shifting attention from the quality of leaders' dyadic relationships to the broader set of direct and indirect ties that connect leaders with their peers, superiors, and subordinates within organizations (cf. Graen and Uhl-Bien 1995, Sherony and Green 2002, Sparrowe and Liden 1997, Uhl-Bien et al. 2000); and (b) by examining leaders' discretionary friendship relations rather than the working relations that have traditionally been the focus of LMX research (see Boyd and Taylor 1998).

Our study examines both leaders' "external" social network ties and leaders' "internal" social network ties. Prior research on the influence of social network ties on group performance has, with rare exception (e.g., Reagans and Zuckerman 2001, Reagans et al. 2004), focused either on the (external) social network ties connecting groups with other groups (e.g., Hansen 1999) or on the (internal) social network ties within groups (e.g., Sparrowe et al. 2001). This tendency to focus exclusively on external or internal social networks ties makes it difficult to rule out the possibility that observed effects on group performance that have been attributed to one type of network tie may really have been due to the other (cf. Burt 2000, p. 361). Moreover, the focus of this earlier work has been on aggregated ties at the group level of analysis. By contrast, we focus directly on the social network ties of group leaders. By including both the external and internal social networks ties of group leaders in our study, we are able to examine whether the effects of these ties on group performance are complementary or redundant.

The logic we use to link leaders' social network ties with the performance of their groups is primarily

"connectionist" (e.g., Lin 2001). From a connectionist perspective, leaders' ties to specific sets of individuals (e.g., superiors, peers) can benefit group performance to the extent that the ties provide access to valuable resources. However, our paper also draws on the different but complementary "structuralist" perspective because it emphasizes how group performance can be enhanced when the overall structure of network ties within a group exhibits certain desirable topological features, such as high overall density (e.g., Coleman 1990; on the distinction between connectionist and structuralist logics in social network research, see Borgatti and Foster 2003, pp. 1002–1003).

In addition to examining how the social network ties of group leaders are related to group performance, we examine how leaders' social network ties are related to leaders' personal reputations for leadership. Much of the recent work on social networks in organizations has emphasized how social ties provide information and other resources to a focal individual. Few studies have examined how the same ties can also provide others with information about the focal individual (cf. Podolny 2001, on network ties as "prisms"). In work organizations, for example, the social network ties of leaders may broadcast information about their personal reputations to a range of others. Organizational researchers have recognized that the reputation for leadership can be an important asset in its own right (e.g., Lord and Maher 1991). We examine the relationship between the social network ties of leaders and their personal reputations for leadership among peers, superiors, and subordinates. In examining the relationship between the social network ties of group leaders, the objective performance of their groups, and their personal reputations for leadership, we seek to develop and test an initial sketch of a social network approach to leadership effectiveness in organizations.

Theory and Hypotheses

The External Social Network Ties of Group Leaders and Group Performance

Organizational groups are seldom self-sustaining: They have to maintain a constant traffic with their environment, importing and exporting ideas and materials, managing impressions, and scanning the environment for potential opportunities and threats (e.g., Lawrence and Lorsch 1967, Allen 1977). The formal structure of most organizations, however, provides limited opportunities for contact among members of different work groups. Groups in one part of the firm are often unaware of resources and ideas in other groups. Because information tends to circulate more readily within than across groups, organizational groups develop distinctive perspectives and skills. People in different groups participate in different social worlds; they "circulate in different flows of information" (Burt 2000, p. 352).

A crucial task of the group leader is to serve as a bridge between formal organizational groups (Burt 2000, p. 360), thereby serving as a conduit to useful information and knowledge located outside the group (e.g., Kotter 1999, cf. Whyte 1943/1993). Field-based studies have shown that leaders devote considerable time to these activities (e.g., Mintzberg 1973). Leaders rely on their interpersonal ties outside the group as a tool for gathering and analyzing information: The social network of the leader can be thought of as “an army of people processing information” that can call the leader’s attention to emerging opportunities and impending threats (Burt 1992, p. 14).

As group leaders interact with other group leaders, some relationships become personalized. Friendships emerge as group leaders meet one another at company meetings, professional conferences, and informal social gatherings. Once personal relationships are established, organizational members are willing to go beyond the employment contract to help give advice to one another (Blau 1964). In the climate of competition that often prevails between organizational groups, friendship ties are particularly important because people may only be motivated to share information and discuss ideas with those people with whom they have established bonds of friendship and trust. The overall pattern of friendship relations constitutes a social network. Within this network, group leaders are variably connected to one another through direct and indirect contacts; they occupy different positions within the external friendship network that connects group leaders with each other. The external social network ties of group leaders cut across formal group boundaries and provide access to ideas and information located in diverse parts of the organization.

Research indicates that location within a social network has important consequences for individual performance (e.g., Brass 1981, Mehra et al. 2001). This is because centrally located individuals are in an advantageous position to monitor the flow of information. Individuals who are centrally located have a larger number of direct and indirect connections to people who are willing and able to alert them to important opportunities and threats. Centrally located individuals are likely to hear about information faster than individuals located on the margins of the social network (Shaw 1964, Seibert et al. 2001). Centrally located individuals are also better positioned to gain instrumental assistance and social support in times of need (cf. Ibarra 1992). Centrality within a social network, therefore, can be “an asset in its own right” (Burt 2000, p. 347).

At the group level of analysis, research in multiunit firms has shown that knowledge sharing occurs more effectively between groups that are connected through established ties (e.g., Galbraith 1973, Gupta and Govindarajan 2000). For example, regularly occurring contacts that are used to transfer technical and market-related

information between groups facilitate new product innovation (e.g., Hansen 1999). Organizational groups that have numerous connections providing them with technical advice tend to outperform groups with few such connections (e.g., Tsai 2001).

Although existing research shows that group centrality is positively related to group performance, the focus of this earlier work has largely been on “aggregated” (Burt 2000, p. 359) ties at the group level of analysis rather than on the personal friendship ties of group leaders. Ties at the group level have been based on individual informants’ perceptions of recurring, “institutionalized” relations between different groups (e.g., Hansen 1999, p. 91; Tsai 2001, p. 999) or they have been inferred by aggregating across individuals on some relevant attribute (such as an individual’s tenure—see Reagans and Zuckerman 2001, p. 508). By contrast, our study focuses directly on the discretionary, personal bonds of friendship that develop between the leaders of different organizational groups.

We emphasize friendship relations because they can be especially important for getting things done in organizations (e.g., Ibarra 1992). For groups engaged in complex organizational tasks, much of the information that can give the group a performance edge over other groups tends to be of a tacit nature. Hansen (1999) has found that strong friendship ties are especially good conduits for the flow of tacit information. Group leaders who are friends are more likely to go beyond the formal job requirements to help each other improve group performance. When the group’s leader has numerous direct and indirect friendship ties with the leaders of other groups, group performance is enhanced because the group enjoys faster and fuller access to novel information located outside the group.

HYPOTHESIS 1. The centrality of a group leader in the friendship network of group leaders is positively related to the objective performance of that leader’s group.

Group leaders also serve as bridges between their own groups and high-ranking organization members who, by virtue of their position in the formal hierarchy, possess significant power and decision-making authority. Ties to the top can be critical to the survival of a group (e.g., Ancona and Caldwell 1992, Hamel 2001, cf. Kidder 1982). A group leader’s personal ties with high-ranking supervisors should provide two benefits to that leader’s group. First, such ties can provide the group with a variety of tangible and intangible resources, such as financial support, advice, and advocacy (cf. Graen et al. 1977). Second, because long-term strategic decisions tend to be made in the upper echelons of the organization, a leader’s ties to high-ranking supervisors can provide that leader’s group with reliable and early forecasts of future actions and directives. Because of the tangible and intangible resources they provide, we predict that group

leaders' centrality in the circle of high-ranking supervisors will enhance the objective performance of their groups.

HYPOTHESIS 2. The centrality of a group leader in the friendship network of high-ranking supervisors is positively related to the objective performance of that leader's group.

The Internal Social Network Ties of Group Leaders and Group Performance

A different challenge that confronts group leaders is that of creating a densely interconnected group. Dense social networks within the group—characterized by a high degree of interconnectivity, or structural “closure” (Coleman 1988)—ensure that knowledge and support is easily shared among all group members. Dense social networks promote interpersonal trust within the group. Mutual surveillance and sanctioning become easier when all group members are highly interconnected. Individuals are less likely to behave opportunistically in such settings because information about a person's past behaviors is readily accessible by others (Granovetter 1985).

To illustrate how dense interpersonal relations within a group can promote trust and facilitate exchange, Coleman (1988) pointed to the wholesale diamond market in New York City where it is common practice for merchants to transfer bags of diamonds to other merchants for the latter to examine in private, at their leisure. The merchandise can be worth hundreds of thousands of dollars. Although such free exchange is critical to the efficient functioning of the market, there is no formal insurance to prevent the substitution of diamonds with others of inferior quality; even outright theft seems possible. The seemingly naïve behavior of these diamond merchants makes more sense once the social structure of the market in which they operate is taken into account: “The wholesale diamond market in New York City . . . is Jewish, with a high degree of intermarriage, living in the same community in Brooklyn, and going to the same synagogues” (Coleman 1988, p. S99). The dense interconnectivity among the members of this community provides a form of structural insurance that facilitates market efficiency.

The effect of a group's internal structural organization on the group's effectiveness has been empirically examined using small (three- to five-person) groups in the controlled environment of the laboratory (e.g., Bavelas 1950, Guetzkow and Simon 1955). The results of these investigations are varied and complex, but one thing is clear: For even moderately complex group tasks, the higher the density of connections within a group, the more efficient the group was at problem solving (Shaw 1964, p. 122).

Only a couple of studies have tried to replicate this result in the field. Using data from 224 corporate research-and-development groups, Reagans and

Zuckerman (2001) found that the average level of communication between any two members of a group was positively associated with the group's productivity. Greater communication among group members presumably enabled the group to achieve a greater degree of coordination. Another study, however, found only mixed support for this idea (Sparrowe et al. 2001, p. 323), and yet another reported a curvilinear relationship between network density and group performance (Oh et al. 2004, p. 23). As the authors of these studies have acknowledged, these studies are limited by their reliance on subjective ratings of group performance (see Reagans and Zuckerman 2001, p. 508, Sparrowe et al. 2001, p. 323, Oh et al. 2004, p. 29). We seek to clarify the relation between a group's informal structure and its performance by including in our analysis two objective measures of group performance. Using data from field-based groups engaged in complex tasks, we tested the argument that the higher the (structural) density of social network ties within a group, the higher the group's performance.

HYPOTHESIS 3. The density of friendship relations within a group is positively related to the group's objective performance.

In addition to promoting the overall connectedness of a group, group leaders rely on their direct and indirect social network ties with subordinates to keep abreast of developments within the group, disperse new and innovative ideas among group members, and mobilize collective action (Krackhardt 1996). Although the relationship between the centrality of a formal leader within a group's friendship network and the group's performance has rarely been examined in past empirical work, there is indirect evidence for this line of reasoning. Early field-based (e.g., Whyte 1943/1993) and laboratory-based (e.g., Leavitt 1951) studies have shown that individuals who are centrally located within the group are able to collect and disperse information more quickly than less central individuals. Based on this logic, we suggest that when group leaders are centrally located within their own groups, they can more successfully mobilize and direct group action toward the accomplishment of important group goals, and thereby enhance the objective performance of their groups.

HYPOTHESIS 4. The centrality of the group leader within the group's friendship network will be positively related to the group's objective performance.

The Social Network Ties of Group Leaders and the Reputation for Leadership

In his treatise on leadership, Machiavelli observed: “It is not essential that a Prince should have good qualities, but it is essential that he should seem to have them . . . Every one sees what you seem, but few know what you

are” (1513/1992, p. 46). This advice from the Italian Renaissance is not lost on today’s business leaders. It is common practice for corporate leaders to hire professional image consultants. The idea that leadership is a phenomenological process whereby individuals attribute leadership to certain others has been proposed by organizational researchers as well (e.g., Pfeffer 1977, Meindl et al. 1985, Pastor et al. 2002). From this perspective, leadership is an inference people draw about certain others (Calder 1977, Leary 1989), and “the essence of leadership is being seen as a leader by others” (Lord and Maher 1991, p. 4). Employees share a collective commitment to explain and account for complex organizational outcomes in terms of leadership. “Whether or not leader behavior actually influences performance or effectiveness, it is important because people believe it does” (Pfeffer 1977, p. 110). The reputation for leadership often becomes reality (e.g., Pfeffer 1977; Kunda 1992, p. 45; cf. Snyder et al. 1977).

We theorize that social networks serve a dual purpose in the practice of organizational leadership. Not only do they serve as information conduits, providing leaders timely access to information and advice, but they also channel information about leaders to others in the organization: “The network that filters information coming to you also directs, concentrates, and legitimates information about you going to others” (Burt 1992, p. 14). The social networks of leaders diffuse and disperse information about them to other organizational members (Pastor et al. 2002). A leader with direct and indirect friendship ties to a specific group, therefore, is in a better position to create a favorable personal reputation for leadership among the members of that group than a leader with few such ties. In addition, centrally located individuals may be perceived as leaders by others because of the easily recognized strategic position they occupy within the network (Leavitt 1951, p. 41).

In the context of formal organizations, there are three relatively unconnected constituencies that are likely to form distinct impressions of leaders: subordinate members from within the leader’s group, the set of peer group leaders, and the high-ranking supervisors who belong to the upper echelons of the organization (cf. Tsui 1984). Social distance between the members of these three social circles tends to be great in part because of formal hierarchical differences. Group leaders’ connectedness to a constituency should be related to their leadership reputation within that particular social circle. For example, the better connected a group leader is within the friendship network of her own organizational group, the more likely it should be that the leader will enjoy a positive reputation for leadership within her group. These internal ties, however, may or may not be related to the reputation the group leader enjoys among peers outside the group, or within the upper echelons of the organization. Our prediction is that the more central a group

leader is within a social circle, the more positive the reputation of that leader will be among the members of that social circle.

HYPOTHESIS 5A. A group leader’s centrality in the friendship network within his or her own group is positively related to the leadership reputation of the leader among the members of his or her group.

HYPOTHESIS 5B. A group leader’s centrality in the friendship network of peer group leaders is positively related to the leadership reputation of that leader among peer group leaders.

HYPOTHESIS 5C. A group leader’s centrality in the friendship network of high-ranking supervisors is positively related to the leadership reputation of that leader among high-ranking supervisors.

Methods

Site

Integrity Corporation (a pseudonym), headquartered in the mid-western United States, offered a wide range of financial services to its clients. The firm had 88 field-based sales groups (ranging in size from 8 to 22 sales representatives), each headed by a separate manager who served as the sole group leader. Sales groups worked independently of other sales groups; they were each assigned a unique, nonoverlapping territory by Integrity. Sales groups, therefore, were not competing for the same customers.

Sales representatives within each group sold a variety of financial products, such as mutual funds, annuities, life, automobile, and property insurance. Sales representatives identified potential customers through referrals, seminars, and “cold-calls.” They were paid on a commission basis: Compensation was tied to the new accounts they generated and the old accounts they retained. They also received a “full” benefit package (covering such things as health and disability insurance, and a retirement plan). It was rare for sales representatives within a group to serve the same customer as another sales representative from the group. If they discovered that the potential customer was already being served by a fellow sales representative, then it was the norm for the sales representative to either drop the lead, or, at minimum, to seek the permission of the other sales representative before proceeding further.

Sales group leaders were responsible for the recruitment and professional development of their sales representatives: They counseled representatives on sales techniques, helped with the identification of market opportunities and threats, offered advice on existing and new products, and promoted idea-sharing and interaction among their sales representatives. Group leaders received commissions based on the business generated

and serviced by their sales group, a full benefits package, as well as periodic bonuses for attaining specific goals (e.g., target sales, employee retention) set by top management. Although sales group leaders were not competing with other sales group leaders for customers, they did compete informally with each other because group performance numbers were widely shared and discussed within the company, and sales group leaders often vied to attain the best numbers.

Exploratory interviews indicated that contact between sales representatives from different sales groups within the company was rare, but sales representatives from within a sales group met frequently (ranging from weekly to monthly) with each other and with their group's leader. Group leaders, by contrast, had numerous opportunities to connect with the leaders of other sales groups because of periodic trips to headquarters, and mutual attendance at company-sponsored seminars and meetings. These meetings tended to be large affairs (with hundreds of attendees) that brought together sales group leaders, industry experts, and members of the firm's top-sales management team—who were salaried company employees responsible for: (a) helping formulate and implement Integrity's overall sales strategy; (b) recruiting and developing sales group leaders; and (c) serving as the primary liaisons between company headquarters and Integrity's various sales groups—to discuss and disseminate new product ideas, marketing and sales techniques, and other information related to the financial services business.

Data

We collected "whole-network" data on friendship ties between group leaders through a mail-based questionnaire sent to all 88 of Integrity's group leaders, each of whom headed one of the firm's 88 field-based sales groups. The whole-network approach samples all the individuals in a bounded network (Wellman 1988, p. 26). By contrast, in the "ego-network" approach, a sample of individuals is asked to name their contacts and to give their perceptions of which of their network contacts have ties to each other; the contacts themselves are not surveyed. The ego-network approach is less time consuming and resource intensive than the whole-network alternative, but it may also be more prone to distortion due to systematic perceptual biases (see Mehra et al. 2001, pp. 129–130; Obstfeld 2005, p. 126). Of the 88 group leaders, 81 (92%) responded to our questionnaire. T-tests revealed no significant differences between the performance of groups whose leaders responded to our questionnaire and those whose leaders did not. This questionnaire was also sent to the 10 high-ranking supervisors, who collectively made up the top-management sales team. The response rate for high-ranking supervisors was 100%.

In addition, we separately collected whole-network data on friendship ties within each of 28 randomly selected field-based groups at Integrity. For the 28 separate sociometric questionnaires used to assess friendship relations within groups, the average within-group response rate was 90%. The 28 groups ranged in size from 8 to 22 members. We ran all analyses with and without three groups that had response rates below 85%. Because the pattern of results was unchanged, we retained all 28 groups for hypothesis testing. The number of sales representatives who participated in the study was 336.

Measures

Friendship Networks. We used the roster method to collect data on friendship networks. Respondents were asked to look down an alphabetical list and check the names of people they considered "personal friends." For the questionnaire used to gather data on friendship relations among the 88 group leaders and the 10 high-ranking supervisors to whom they reported, therefore, the list contained 98 names. In the 28 separate questionnaires used to gather whole-network data on friendship relations within groups, the list of names on each questionnaire contained the names of all members of that group, including the name of the group's formally designated leader.

Respondents were free to check the names of as many friends as they wanted, an approach that is preferable to fixed-choice designs that set an upper-limit on the number of friends one is allowed to nominate. Artificially restricting the number of friends one can nominate introduces measurement error in network data (Holland and Leinhardt 1973).

Data from the questionnaire sent to the 88 group leaders and the 10 supervisors were arranged in a binary 98×98 matrix, where each cell X_{ij} corresponded to i 's relation to j as reported by i . If i reported j as a friend then the cell C_{ij} was coded as 1, otherwise the cell was coded as 0. This matrix contained 9,604 observations on all possible pairs of people.

We used the same approach to code friendship data from the questionnaires sent separately to the 28 randomly selected sales groups. The friendship data from each of the 28 groups were arranged in a separate matrix. Each of these 28 matrices captured the full set of friendship relations among all members of one of the 28 groups selected for analysis.

Independent Variables

External Social Networks.

Group leader centrality in the friendship network of group leaders. To assess a group leader's centrality in the friendship network among group leaders, we first created a matrix of friendship relations among all

88 group leaders. We calculated the centrality of the group leader within this inter-group network using the (normalized) eigenvector routine in UCINET 6 (Borgatti et al. 2002) that computed centrality as the summed connections to others weighted by the centrality of those others (Bonacich 1972; for an application, see Mehra et al. 1998).¹ The higher the eigenvector centrality score of an individual, the more the individual is connected to individuals who are themselves connected with many others. Because both direct and indirect ties are taken into account, the eigenvector scores are an appropriate measure of availability of information and potential for influence because “direct and indirect ties provide access both to people who can themselves provide support and to the resources those people can mobilize through their own network ties” (Adler and Kwon 2002, p. 24; see also Ahuja 2002, p. 430). To make this eigenvector score comparable across networks, we followed the standard practice of normalizing this score (e.g., Sparrowe et al. 2001, p. 320).

We used the eigenvector measure of centrality rather than the betweenness measure of centrality because the eigenvector measure most closely matches our theoretical concern with information access. Betweenness, by contrast, is better conceived as a measure of information brokerage (cf. Freeman 1979). The pattern of results was the same irrespective of which of the two centrality measures was used.

Because the eigenvector routine only accepts symmetric data, we symmetrized the 88×88 friendship matrix using the rule that if either member of a pair reported the other as a friend, then the pair was treated as a friendship-pair. An important advantage of this operational definition is that it preserves information on weak ties (Granovetter 1973, p. 1364; Lauman and Pappi 1976, p. 137; Lincoln and Miller 1979, p. 187; Mehra et al. 1998, p. 444). We also symmetrized the friendship matrix using the alternative rule of only if both parties nominated each other as a friend would the pair be treated as a friendship-pair. This alternate operational definition produced slightly weaker significance levels for some variables in the regression analysis, but the pattern of results was the same as that reported in this paper.

Group leader centrality in the friendship network of high-ranking supervisors. To compute this measure, we created 88 separate matrices. Each matrix contained the full set of friendship relations among the 10 high-ranking supervisors and one of the 88 group leaders. Each of these 88 matrices, therefore, consisted of 11 rows and 11 columns.² By separately submitting each of the 88 matrices to the (normalized) eigenvector routine within UCINET 6, we obtained a measure of the extent to which each of the 88 group leaders was connected through direct and indirect friendship ties with the set of high-ranking supervisors. We symmetrized

each of the 88 matrices using the rule that if either member of a pair reported the other as a friend, then the pair was a friendship-pair. We also tried two other operationalizations for this measure: a raw count of the number of friendship ties that a group leader received from high-ranking supervisors, and the eigenvector measure recomputed after the friendship matrix had been symmetrized using the rule that a tie was a friendship tie only if both parties nominated each other as friends. The pattern of results was unchanged, with one exception: when we operationalized this variable as a raw count of ties that a group leader received from high-ranking supervisors, the variable was a marginally significant ($p = 0.07$) predictor of the group leader’s leadership reputation among high-ranking supervisors.

Internal Social Networks.

Group leader centrality in the friendship network within their own group. Whole-network data on the friendship relations within each of 28 groups were coded in 28 separate matrices. We calculated the centrality of group leaders within their own groups by separately running the (normalized) eigenvector routine on each of these matrices. The higher a group leader’s eigenvector centrality within the leader’s sales group, the more that leader was connected to group members who were themselves well connected within the friendship structure of the group.

Overall density of friendship relations within a group. For each of the 28 groups, we separately computed the overall density of the unsymmetrized friendship network between all members (including the formal group leader) of that group. This measure calculates the proportion of ties as a function of the total number of possible ties (see Wasserman and Faust 1994 for a discussion, and Sparrowe et al. 2001 for a recent application). Density can vary from a minimum of 0 to a maximum of 1.

Dependent Variables

Group Performance.

Group sales. This objective measure of group performance was based on the total dollar amount of sales generated by a given sales group for the current financial quarter. To control for the effects of group size, and to maintain comparability with our other measure of group performance (described below) we divided the overall sales figure for a group by the number of sales representatives within the group. To preserve company anonymity, we then divided this figure by an arbitrary constant.

Customer loyalty. This performance measure was based on an objective indicator of customer turnover that is commonly used in this industry. For each sales group, we obtained from archival company records the

percentage of financial policies that were retained, on average, by a sales group over the most recent three-year period. This measure is an indicator of the loyalty of the group's customers.

Leader Reputation.

Group leaders' leadership reputations among high-ranking supervisors. This was a three-item measure. The first item was based on leadership perceptions collected via the sociometric questionnaire sent to group leaders and high-ranking supervisors. Supervisors were asked to identify those sales group leaders whom they "perceived as leaders." The item was based on a count of the number of leadership nominations a group leader received from the set of 10-high-ranking supervisors. Data for the second and third items came from a separate questionnaire sent only to the 10 high-ranking supervisors (all 10 responded). For the second item, each supervisor was asked to rank the group leaders they supervised on the basis of "overall performance" (1 = "bottom 25%"; 4 = "top 25%"). For the third item, supervisors evaluated, for each group leader they supervised, the likelihood that the group leader would achieve "future career-related success" (1 = "strongly disagree," 6 = "strongly agree"). We informed supervisors that these ratings would be confidential and used only for research purposes. Respondents tend to provide more reliable ratings of performance when they know that the ratings will not be used for making administrative decisions (Wherry and Bartlett 1982). For each group leader, we standardized the three items and then combined them to form a composite measure of leader reputation. Cronbach's alpha for the combined three-item measure was 0.75.

Group leaders' leadership reputations among group leaders. We used data from the sociometric questionnaire to operationalize this variable. Group leaders looked down a list of peers and placed a check next to the names of individuals they "perceived as a leader." This measure was derived using the normalized in-degree centrality routine within UCINET 6 (Borgatti et al. 2002). The in-degree measure counts the number of leadership nominations received by a group leader from all (87) other group leaders. The normalized in-degree centrality is the in-degree centrality divided by the maximum (87) possible score expressed as a percentage.

Group leaders' leadership reputations within own groups. The data for this measure came from the sociometric questionnaires sent to members of the 28 different groups. Group members were asked to look down the list of fellow group members (including the formal group leader), and to place a check next to the names of those whom they perceived as leaders. This measure was computed using the normalized in-degree centrality routine in UCINET 6; it represents the (normalized) number of leadership nominations that were received.

Control Variables

Sales Territory. We included as a control a measure of the likely profitability of a sales territory. This measure was based on headquarter's perception of the prospects for sales growth in a given territory. The variable was coded as 1 if the overall market characteristics of a sales territory—such as the general socioeconomic conditions and the level of prior company advertising in the region—created conditions likely to enhance the ability of the sales group to achieve high levels of sales; the variable was coded as 0 otherwise. Data for this variable came directly from a four-member panel of veterans located at company headquarters who had broad oversight over the company's various sales territories.

We considered several additional variables as potential controls. One of the variables we considered as a control was the length of time that the group leader had been the formally appointed leader of the group. This variable was not significant in any of the regression models, and it did not change the overall pattern of regression results. A second variable we considered was the age of the group leader. This variable, too, did not change the pattern of results. A third variable we considered was the overall length of time the group leader had been with Integrity. This variable correlated strongly ($r = 0.69$, $p < 0.001$) with our measure of the likely profitability of a sales territory: Longer serving employees tended to be assigned territories that were likely to be more profitable. The pattern of results did not change when we included length of time at Integrity as an additional control variable, although the significance levels for some of the variables were slightly weaker. To reduce multicollinearity, and preserve statistical power, we included only one of these two measures ("sales territory") in the analysis presented here. The final two variables we considered as controls were the average industry experience and the average age of sales representatives within a team. These (self-reported) variables were not significant in any of the regression models; we dropped them from further consideration. Analyses that include these potential control variables are available from the first author.

In addition to these quantitative data, we obtained qualitative data from the following sources to contextualize and make sense of the findings: (a) a six-hour session in which we discussed our findings with a panel of eight high-level firm employees (three were members of the top sales-management team; the remaining were managers and executives located at headquarters, all with significant prior experience as sales managers and/or sales representatives at the financial services company where the research was conducted); and (b) five semistructured telephone interviews (which lasted about an hour each) with industry experts, two were members of top management sales teams at their companies; two

were sales group leaders; and one was a sales representative. The five individuals were each drawn from different firms in the financial services and insurance industry.

Analysis and Results

For each of the two dependent variables, we report separate OLS regression models that include the two measures of leader centrality in external social networks, the two measures of leader centrality in internal social networks, and the control variable. We computed variance inflation factor (VIF) scores to check for multicollinearity: The maximum VIF scores were well below the standard benchmark score of 10. Multicollinearity was not a serious problem in any of our regression models.

Table 1 presents means, standard deviations, and zero-order correlations. On average, group leaders were better connected in the social networks within their own groups than in the external social networks of peers and supervisors. Groups assigned to more favorable territories tended to achieve significantly higher sales ($r = 0.42$, $p < 0.001$), but sales territory was unrelated to customer loyalty ($r = 0.15$, *ns*). The pattern of intercorrelations in Table 1 shows some support for the conceptual distinction between external and internal social networks: Group leaders' centrality in the external social networks of their supervisors and their peers were positively correlated ($r = 0.57$, $p < 0.001$); but neither of these two measures was significantly correlated with either of the two measures of internal social networks.

Hypothesis 1 states that the centrality of a group leader in the friendship network among group leaders

is positively related to the objective performance of that leader's group. The results presented in Models 1 and 2 of Table 2 show that a group leader's centrality in the friendship network among group leaders was a significant predictor of both group sales ($b = 0.70$, $p < 0.01$) and customer loyalty ($b = 0.68$, $p < 0.01$). Hypothesis 1, therefore, was supported.

Hypothesis 2 reasons that group leaders' centrality in the network of supervisors is positively related to their groups' performance. The results presented in Table 2 show no support for this hypothesis.

Hypothesis 3 states that the overall density of friendship relations within an organizational group will be positively related to the performance of the group. This hypothesis was supported, but only for one of the two measures of group performance: The density of friendship relations within a group was positively related to customer loyalty ($b = 0.43$, $p < 0.05$). The relationship between density and sales, our other measure of group performance, was in the anticipated direction but fell short of conventional benchmarks of significance ($b = 0.21$, $p = 0.10$). We tested for curvilinear effects but found none for either dependent variable.

The fourth hypothesis states that the centrality of group leaders within the friendship network inside their own groups is positively related to their groups' performance. The results presented in Table 2 show that this hypothesis was supported when the measure of group performance was based on customer loyalty ($b = 0.32$, $p < 0.05$); but it was not supported for sales performance ($b = 0.14$, *ns*). Hypothesis 4, therefore, received only partial support.

Table 1 Means, Standard Deviations, and Correlations

Variables	N	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Sales territory	81	0.62	0.49										
2. Group leader centrality in friendship network of high-ranking supervisors	88	24.72	15.04	0.21									
3. Group leader centrality in friendship network of group leaders	88	13.08	7.35	0.48***	0.57***								
4. Group leader centrality within own group's friendship network	28	42.32	13.93	0.15	0.05	-0.21							
5. Density of friendship network within group	28	0.28	0.08	0.11	0.32	-0.04	0.01						
6. Group sales	82	33.37	12.52	0.42***	0.29**	0.44***	-0.04	0.13					
7. Customer loyalty	82	88.81	10.18	0.15	0.09	0.29**	0.19	0.33	0.40***				
8. Leader reputation among subordinates	28	58.69	22.69	-0.09	0.15	0.20	0.47*	0.32	0.14	0.40***			
9. Leader reputation among peers	88	14.39	12.19	0.21	0.48***	0.45***	-0.01	0.03	0.46***	0.14	0.37*		
10. Leader reputation among high-ranking supervisors	88	0.11	2.37	0.04	0.46***	0.28**	0.25	0.13	0.45***	0.17	0.47*	0.63***	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2 Results of Regression Analyses Predicting Group Performance

Independent variable	Group performance	
	Sales 1	Customer loyalty 2
Sales territory	0.15	0.14
External social networks		
Group leader centrality in friendship network of high-ranking supervisors	−0.13	−0.27
Group leader centrality in friendship network of group leaders	0.70**	0.68**
Internal social networks		
Group leader centrality within own group's friendship network	0.14	0.32*
Density of friendship network within group	0.21	0.43*
Model <i>F</i>	4.43**	2.74*
Adj. <i>R</i> ²	0.39	0.24

Note. *N* = 28 for analyses reported here.
 p* < 0.05; *p* < 0.01; ****p* < 0.001.

According to Hypothesis 5a, group leaders' centrality in the friendship networks within their own groups is positively related to their leadership reputation among their subordinates. Model 1 in Table 3 shows that this hypothesis was supported (*b* = 0.58, *p* < 0.001). This model also shows that the overall density of friendship relations within a group was positively related to group

leaders' reputations for leadership among their subordinates (*b* = 0.43, *p* < 0.01). The results presented in Model 2 of Table 3 show that these effects remained significant even after controlling for the two measures of objective group performance. Hypothesis 5a, therefore, received support.

Hypothesis 5b states that group leaders' centrality in the friendship network of group leaders will be positively related to group leaders' reputation within the circle of group leaders. The results in Model 3 show that this hypothesis was supported (*b* = 0.74, *p* < 0.001). Model 4 in Table 3 shows that this relationship remained significant even after controlling for the significant effects of group sales performance. These results support Hypothesis 5b.

Hypothesis 5c states that the group leaders' centrality in the friendship network of high-ranking supervisors will be positively related to the group leader's reputation for leadership among high-ranking supervisors. Model 5 in Table 3 shows that this hypothesis was not supported.

Although we did not construct specific hypotheses relating the centrality of the group leader in the friendship network within one constituency and their reputation for leadership among the members of a different constituency, the results in Table 3 provide preliminary evidence for such a relationship. As shown in Model 2 of Table 3, centrality of the group leader in the friendship network of peers was positively related (*b* = 0.84, *p* < 0.001) to the reputation of the leader among subordinates; but the group leader's centrality in the network of

Table 3 Results of Regression Analyses Predicting Leader Reputation

Independent variable	Group leader reputation					
	Among subordinates within own group		Among peer group leaders		Among high-ranking supervisors	
	1	2	3	4	5	6
Sales territory	0.22	0.20	0.30	0.39*	0.35 ⁺	0.44*
External social networks						
Group leader centrality in friendship network of high-ranking supervisors	−0.35 ⁺	−0.40*	0.19	0.16	0.05	0.00
Group leader centrality in friendship network of group leaders	0.63**	0.84**	0.74***	0.68**	0.70**	0.37
Internal social networks						
Group leader centrality within own group's friendship network	0.58***	0.65***	0.10	0.13	0.35*	0.30*
Density of friendship network within group	0.43**	0.52**	0.03	0.01	0.13	0.05
Group performance						
Sales		0.20		0.34*		0.54*
Customer loyalty		0.11		0.26		0.05
Model <i>F</i>	4.40**	3.19*	6.66**	6.72**	3.34*	4.00*
Adj. <i>R</i> ²	0.39	0.36	0.51	0.60	0.30	0.43

Note. *N* = 28 for analyses reported here.
 p* < 0.05; *p* < 0.01; ****p* < 0.001; ⁺*p* < 0.10.

high-ranking supervisors was negatively related to reputation among subordinates ($b = -0.40$, $p < 0.05$).

Discussion

This research provides field-based empirical support for a social network approach to leadership effectiveness in organizations. We have presented evidence linking the centrality of leaders in friendship networks to the objective performance of the groups they lead, and to their personal reputations for leadership among three important constituencies: subordinates, peers, and high-ranking supervisors. Our study suggests that the friendship ties of group leaders play a dual role in the practice of leadership: Not only do they appear to provide leaders access to resources that facilitate group performance, but they also seem to help them secure favorable reputations for leadership in the eyes of their subordinates, peers, and supervisors.

Unlike previous work in this area, our research included whole-network data on both internal and external social network ties as well as objective measures of group performance. We found that leaders' external and internal social network centrality scores were unrelated, but both centrality scores were independently related to objective measures of group performance and to leaders' personal reputations for leadership. Our findings suggest that social network studies of group performance that focus exclusively on internal or external network ties may be running the risk of conflating different but complementary processes.

The External Social Network Ties of Group Leaders and Group Performance

We found that the centrality of group leaders in the friendship network of their peers (i.e., other group leaders) was positively related to objective measures of group performance. Group leaders who were well connected in the friendship network of their peers presumably had better and faster access to information, advice, and support. In follow-up interviews, one group leader indicated that, like other group leaders he knew, he relied on his friendship ties with peer group leaders to "discuss everything: finances, contracts, recruiting, sales training." This interviewee explained that group leaders are often "reticent to share" this type of information with those group leaders with whom they have no personal connection because the information "... is going to help them get ahead of you." Our interviews supported the idea that group leaders used the ideas gleaned from their network of friendship ties with peers outside their groups to enhance performance within their groups.

The Internal Social Network Ties of Group Leaders and Group Performance

We found that social networks within the group were related to group performance. In high performance

groups, leaders were centrally located within the group's friendship network, and the overall internal friendship network within the group exhibited high density (network closure). Although early laboratory-based work provided evidence linking social networks and group performance (Leavitt 1951, Shaw 1964), there has been little subsequent empirical work on this topic. The few recent studies that have examined the issue have yielded mixed results (Reagans and Zuckerman 2001, Sparrowe et al. 2001, Oh et al. 2004). One reason for these mixed findings may be that these recent studies have relied on subjective assessments of group performance. Using objective measures of performance, and using data on friendship networks among all group members, our study shows that the overall density of a group's internal friendship network has a positive, linear relationship with group performance.

The density of the friendship network within the group was related to only one of the two measures of group performance: customer loyalty. To better understand why, we conducted follow-up phone interviews with group leaders. As one interviewee explained, when there are numerous friendship ties within a sales group, sales representatives are "more motivated to do the best thing for the client" instead of merely "pedaling product." This, our interviewee explained, is because sales representatives "want to maintain those friendships and so are less likely to sell inappropriate products to consumers." The heightened interpersonal accountability produced by network density appears to enhance group performance in terms of customer loyalty. The relationship between network density and objective group performance, therefore, may be different for different types of group performance.

The Social Network Ties of Group Leaders and the Reputation for Leadership

Our study shows that a group leader's centrality in internal and external friendship networks is directly related to the leader's personal reputation for leadership. Even after controlling for the significant relationship between objective group performance and leader reputation, group leaders' centrality in friendship networks was related to their personal reputations for leadership among subordinates, peers, and supervisors. As previously suggested, a reputation for leadership can be an asset in its own right (Lord and Maher 1991).

Our results show that a leader's integration in the friendship network of one social circle can be related to the leader's reputation in other social circles. Moreover, we found that this relationship can be positive or negative: Group leaders' centrality in the friendship network of peers, for example, was positively related to their leadership reputation among subordinates; but their centrality in the network of high-ranking supervisors was negatively related to their reputation among

subordinates. To make sense of this unanticipated negative relationship, we conducted follow-up interviews, and we scrutinized written feedback from the original questionnaires. We found that sales representatives at Integrity felt that top management's compensation policies were putting an unfair squeeze on their commissions; indeed, this was the most common comment on the written feedback we received from sales representatives. One sales representative wrote that he had "seldom seen such a pathetic relationship in [his] life." This "us" versus "them" mentality, according to a veteran sales group leader we interviewed, is not uncommon in this industry. Because of the negativity with which many sales representatives viewed top policy makers, sales group leaders who were perceived as too friendly with top-management ran the risk, he told us, of being viewed negatively by sales representatives.

Past research has shown that individuals' personal reputations can be enhanced by the mere perception that one is socially connected to prominent others (e.g., Kilduff and Krackhardt 1994). Our study suggests that this basking-in-reflected-glory effect may also work in reverse: connections to individuals who are viewed negatively could detract from one's reputation. Of course, group leaders may try to influence others' perceptions of the social networks within which they are embedded as a means of selectively shaping their reputation for leadership across diverse social circles (cf. Cialdini 1989). How leaders' leverage their social network ties to cultivate desirable reputations in the eyes of various organizational constituencies, especially when these constituencies view one other with distrust and suspicion, is a topic for future inquiry.

Future Research

Our study raises several other questions for future research. We found that group leaders' centrality in external social networks was unrelated to their centrality in internal social networks. We also found that centrality in external networks and centrality in internal networks were themselves differently related to measures of group performance. This differentiated pattern of results highlights a question of theoretical and practical importance: Given limited time and energy, how should leaders manage the trade-off between building internal and external friendship ties? Can leaders accumulate a wealth of friendship ties outside the group only by risking a poverty of social capital inside the group? And are the benefits of internal and external friendship ties interactive in the sense that only certain combinations are optimal? Additional analyses (not reported here) that examined all possible combinations between centrality in internal and external friendship networks found no evidence for interactive effects in our data. However, building on the general literature on team activities and performance, we speculate that group performance

will be maximized when group leaders strike a balance between centrality in internal and external networks—where the "right" balance will depend on several factors, such as: (a) the nature of the tasks faced by the team; (b) environmental characteristics (e.g., uncertainty, turbulence); and (c) the extent of team dependence on the external environment for necessary resources (cf. Choi 2002). The study of how leaders manage the trade-off between building external and internal social network ties to enhance group performance is a topic that deserves greater attention.

Further research is also needed to more fully investigate the relationship between the social capital embedded in networks and success across multiple levels of analysis. For example, although a dense pattern of interconnections among group members appears to have salutary effects on group performance, previous work at the individual level of analysis has shown that the same pattern of ties can detract from individual performance and workplace mobility (e.g., Burt 1992, Mehra et al. 2001). Similarly, it seems possible that the friendship ties that enhance performance at the group level of analysis may detract from performance at the level of the overall organization: When groups are able to directly connect with other groups, this may increase the relative bargaining power of groups relative to management by allowing them to forge a united front to oppose management on unpopular issues, such as layoffs. Carefully designed multilevel studies are needed to explore how social capital that is beneficial at one level of analysis may be detrimental at another.

Limitations

Our work is limited in several respects. For our analyses of internal friendship networks, it would have been ideal to collect whole-network data from within every sales group at the firm. Due to limited resources and company restrictions, we were forced to concentrate on a small number of groups for part of our analyses. However, despite the small sample, we were able to obtain support for most of our hypotheses. Our study does compare favorably with past network studies of group performance because it combines whole-network data on both internal and external network ties with objective measures of group performance. Nevertheless, caution must be exercised in generalizing the results of our study.

A limitation of our study derives from its cross-sectional research design, which makes it difficult to draw definitive causal connections between centrality in friendship networks and group performance. Although a recent meta-analytic study argues that network structure is better positioned as an antecedent of team performance rather than as its consequence (see Balkundi and Harrison 2006, p. 28), the reverse relationship is plausible. It is also possible that the right social connections (both within the firm and within the broader

industry) help group leaders create positive reputations for leadership, which, in a self-fulfilling manner, then enhance group performance because they help group leaders attract and retain superior sales talent. Studying these dynamic, structural processes (cf. Giddens 1984, Barley 1986, Watts 2003) over time could help generate new theoretical insights into the coevolution of social networks, group performance, and the reputation for leadership.

Another limitation of our study derives from its exclusive focus on friendship ties. Past social network research has identified two broad classes of workplace ties: instrumental ties (which convey advice on job-related issues), and expressive ties (such as friendship ties, which serve as conduits for social support). Although these two classes of workplace ties are conceptually distinguishable, they can be difficult to untangle in practice. In the organization we studied, for example, interviews suggested that organizational members used their friendship ties to access both expressive resources (e.g., confidence building, and other emotional support) and instrumental resources (e.g., advice on how to access new customers and retain existing ones). As one sales group leader we interviewed explained, his friendship ties with other sales group leaders were grounded in both “caring and sharing.” Friendship ties doubled as advice ties; they appeared to be conduits for both expressive and instrumental support (cf. Coleman 1988, p. 108 on the “appropriability” of such ties).

Our focus on friendship ties rather than on the resources that presumably flowed through them prevents us from making definitive claims about precisely how these ties facilitated group performance and the reputation for leadership. Our interview data provide some assurances about information flow, but no definitive claims can be made. To develop a more fine-grained and dynamic view of precisely which types of ties convey which kinds of resources, we recommend a three-pronged approach for future research: (a) identify work contexts in which expressive and instrumental ties are more readily separable than in the sales organization we examined in this study; (b) include a broader range of social network ties in the workplace (see Podolny and Baron 1997 for a useful taxonomy); and (c) complement sociometric analyses of network structure with detailed qualitative work that shows (rather than merely infers) how different types of ties convey different types of resources (cf. Kilduff and Tsai 2003, p. 119).

Our research is also potentially limited because it did not include traditional leadership measures of traits, styles, or behaviors. For example, it is possible that the relationship between leaders’ social networks and group performance may have disappeared once controls were introduced for leadership style (e.g., transformational versus transactional), which has been shown in past work to influence group performance (Bass 1985).

We have provided an initial sketch of how the friendship network ties of leaders are related to leadership effectiveness; future studies will need to test whether network relationships add to the variance explained by more traditional measures of leadership.

Implications for Practice

Two implications of our study deserve consideration because they have the potential of providing managers and policy makers with a different way of thinking about leadership and group performance. First, organizations may want to pay greater attention to helping group leaders build the social network ties that promote group performance. Although most organizations recognize that informal contacts facilitate learning and support, they are often reluctant to fund activities that enhance social networks. Budgets for travel to meetings, parties, and other social events are often among the first to be cut when times get tough. Our study suggests that, because the social network ties of leaders may have direct economic consequences for the groups they lead, organizations should resist the temptation to cut programs that facilitate the building of informal social network ties (see Collins and Clark 2003 for recent evidence on the link between network-building HR practices and group performance in a sample of 73 high-technology firms).

Second, the social network ties of group leaders are an important and practical point of leverage for the enhancement of group performance. To turn around a failing organizational group, for example, management may want to devote attention to helping the group leader build the necessary internal and external social network ties. Alternatively, management could select a leader with extensive social network ties to head up a group that is not performing well.

Conclusion

Our study offers an initial sketch of a social network approach to leadership effectiveness. Following in the tradition of research on the influence of informal structure on organizational processes (e.g., Roethlisberger and Dickson 1939/1961), we found, in this field-based study, that the embeddedness of leaders in the friendship networks of their subordinates, peers, and supervisors has implications for objective group performance and leader reputation. From a social network perspective, leaders are, among other things, social architects (cf. Bennis 1976) who carefully build and manage their informal ties with others to enhance both the performance of their work groups and their personal reputations for leadership. Leadership theory has wound its way over so many circuitous paths over the years that some have declared the search for a comprehensive theory of leadership a “neverending quest” (Ott and Sullivan 1989, p. 251). A social network theory of leadership makes no claims about comprehensiveness. What it

offers, instead, is a distinctive perspective on a topic of enduring interest.

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Endnotes

¹The eigenvector measure is computed as follows: “Given an adjacency matrix A , the centrality of vertex i (denoted c_i) is given by: $c_i = \alpha \sum A_{ij} c_j$ where α is a parameter. The centrality of each vertex is therefore determined by the centrality of the vertices it is connected to. . . . The normalized eigenvector score is the scaled eigenvector centrality divided by the maximum difference possible expressed as a percentage. For a given network with vertices $v_1..v_n$ and maximum eigenvector centrality c_{\max} the [normalized eigenvector centrality measure] is $\sum (C_{\max} - (cv_i))$ divided by the maximum value possible, where (cv_i) is the eigenvector centrality of vertex v_i ” (Borgatti et al. 1992, p. 86). Because the eigenvector algorithm can produce misleading results when the network is disconnected, we checked every network for connectedness before submitting it to the eigenvector routine.

²Our measure of group leader centrality in the friendship network of high-ranking supervisors does not take into account the possibility that a group leader may be indirectly connected to the circle of high-ranking supervisors through his or her contacts with group leaders who are themselves directly connected to one or more high-ranking supervisors. To see how our operational definition influenced our results, we reran the analysis with a single measure of centrality in external networks based on (normalized) eigenvector centrality in a 98×98 matrix consisting of all 88 group leaders and all 10 supervisors. This measure of centrality was significant and positive in all regression models reported in Tables 2 and 3.

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