

**SHARED LEADERSHIP IN WORK TEAMS:
A SOCIAL NETWORK APPROACH**

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Abstract

In the past few years, the concept of leadership has shifted from the solitary leader to the team as a potential source of leadership. This shift from a single person to a “shared leadership” model requires new concepts and methods to capture the nature and structure of leadership by teams (Yukl, 1998). In this chapter, we argue that a social network approach helps to provide the conceptual framework and methodological tools to support a shared leadership perspective. To articulate this approach, we first outline some of the basic principles of social network analysis. We then discuss the nature of leadership networks, based on the traditional distinction between transactional and transformational leadership. Next, we discuss the distributional properties of these leadership networks, describing and applying the concept of network centralization. Finally, we discuss the implications of a network conception of shared leadership for research and theory development.

Keywords

Shared leadership, social network analysis, leadership networks, network centralisation.

Introduction

The dominant paradigm for describing team leadership has been a leader-centered perspective, which emphasizes the behaviors and personal characteristics of individual leaders (see Bass, 1990). In the past few years, however, new follower-centric models of leadership are emerging that challenge this view (e.g., Meindl, 1990; Pastor, Meindl, and Mayo, 2001). The shared leadership perspective adds to this new trend by offering an alternative to the traditional vertical leadership perspective. Whereas vertical leadership models consider leadership as emanating solely from the leader, the shared leadership approach considers the role of mutual influence among team members as another source of leadership for the group (e.g., Pearce and Sims 2001b; Perry, Pearce, and Sims, 1999).

The increased interest in shared leadership has resulted in theoretical models and a handful of empirical studies (Pearce, 1997; Pearce and Sims, 2001a). These first studies of shared leadership in teams have used measures of aggregation in which, typically, each team member is asked how much influence the team has over aspects of the leadership process and then responses are aggregated at the team level (e.g., Pearce and Sims, 2001a). This approach has been useful in showing that traditional dimensions of vertical leadership also apply to shared leadership models.

However, this is only a first step toward capturing the complexities of shared leadership. An aggregation measure leaves unexplored many issues related to the overall properties of the team, such as, how are leadership functions distributed in the team? Are they evenly distributed among all members of the group? Can we identify subgroups within the team that specialize in specific leadership functions?

This shift in the conceptualization of leadership from a single person to a team model requires new concepts and methods to capture the nature and structure of shared leadership at the level of teams as wholes. Yukl (1998) states that “viewing leadership in terms of reciprocal, recursive influence processes among multiple parties in a systems context is very different from studying unidirectional effects of a single leader on subordinates, and new research methods may be needed to describe and analyze the complex nature of leadership processes in social systems” (p. 459).

One perspective that may help provide the conceptual framework and methodological tools to study a shared leadership perspective is the social network approach. There are several reasons why a social network perspective can be useful to understand the dynamics of shared leadership in work teams. First, shared leadership is a relational construct that would benefit from a social network approach, which is relational by definition. The social network perspective begins with the assumption that social actors are embedded in a complex web of relationships. As such, the relation is the basic unit of analysis. Second, building on the relation as the basic unit of analysis, the social network perspective has developed concepts and methodological tools to describe and analyze social structures, including small groups. Finally, the essence of shared leadership relies on influence processes, and the social network perspective has widely examined the nature and structure of influence networks.

The purpose of this chapter is to describe a social network approach to shared leadership that extends and complements the emerging research in this area. We provide a model of shared leadership that takes into consideration the nature and distribution of influence among team members as they take leadership responsibilities. To articulate this network approach of shared leadership, we first outline some of the basic principles of social network analysis. We then discuss the nature of leadership networks based on the traditional distinction between transactional and transformational leadership. Finally, we discuss the distributional properties of these leadership networks, describing and applying the concept of network centralization.

Basic Concepts In Intra-Organizational Social Network Analysis

The use of social networks concepts and methods, the traditional domain of sociologists, has been steadily increasing in the organizational behavior literature in the past few years. Until the early 1990s, only a handful of network scholars were developing research agendas for micro-OB research or intra-organizational networks (e.g., Brass, 1984, 1985; Kilduff and Krackhardt, 1990; Krackhardt and Porter, 1985, 1986; Rice and Aydin, 1991). Since then, interest in the topic has grown steadily, as reflected in the increased number of social network studies examining organizational issues that have appeared recently in top organizational behavior journals.

The most distinguishing feature of a social network perspective is its emphasis on relationships among social actors and the patterns and implications of these relationships (Wasserman and Faust, 1994). The main difference between network and non-network perspectives is that a network perspective uses theoretical concepts and data on relationships among social actors to test theories. To examine social systems under this paradigm, network analysts have developed a new set of concepts and research methods. We review here some of the key social network concepts as they relate to our model of shared leadership.

Social Network. In the intra-organizational literature, a *social network* is commonly defined as a set of individuals with a routine and established pattern of interpersonal contacts who can be identified as members of a network exchanging information, resources, influence, affect, or power. Cartwright and Hararay (1956) outlined the basic idea of representing groups as a collection of points connected by lines. The resulting “sociogram” represents the network of relations among group members that can be analyzed using the methods and techniques of social network analysis.

Social networks have more or less defined boundaries. The whole world’s population can be thought of as a big social network in which people are connected by fewer than six degrees of separation (it takes fewer than six steps to connect any given pair of individuals on Earth). In the intra-organizational networks literature, the boundaries of the network, by definition, are usually established within the organization. Researchers have typically examined groups ranging from large social systems, representing work units and functional

departments with about 30 to 80 individuals, to working teams and task forces with fewer than 10 members. In our model of shared leadership, the term “network” refers to the work team as formally defined by the organization; the nodes are the members of the team; and the links among them are those interactions of influence related to the leadership process within the team.

Relational Ties. The *link or tie* is the basic building block of a social network. A link is not the property of any single individual; rather, it is a relational entity that exists only if two individuals are considered together. The content of this relation defines the nature of the network. Some common ties examined in the OB literature are the communication network, friendship relations, and help relations. A task network develops around work-role performance and is directly associated with the prescribed objectives of the task. A friendship network is defined as organizational members’ exchanging personal information and developing close friendships. An advice network develops as individuals seek advice from others in the network; it serves to identify the experts in the social system. Because social influence is at the core of the leadership process, our model of shared leadership will focus on influence relations among social actors.

The ties among team members can be described along two dimensions: strength and symmetry. The *strength* or *intensity* of the link refers to the frequency with which the two individuals exchange information or influence. For example, a strong link between Person A and Person B exists if A interacts or exchanges information with B more than five times a week; a weak tie exists if A does so only once a month. The definition of a strong link depends, to a great extent, on the average expectation for that type of exchange in that particular social system. *Symmetry* refers to the extent to which the relationship is bi-directional. This is an important feature of ties in networks of influence, because these relations tend to be asymmetrical. That is, the fact that A influences B does not necessarily mean that B will influence A.

Individual Network Measures. A common way to describe individuals’ position in relation to the whole network is network centrality. Centrality is a proxy for an individual’s influence in the social system. Network centrality refers to individuals’ prominence in the social system.

Numerous measures of centrality capture different properties of individuals’ position in the overall social structure. The three most popular measures are degree, closeness, and betweenness centrality (see Freeman, 1979; Borgatti et al., 1992).

Degree centrality refers to the number of links that a person has with other members of the group. The more links, the more central he is in the group. Here it is important to distinguish between out-degree links (i.e., those links reported by the focal person) and in-degree links (i.e., those reported by other group members about the focal person). When using reciprocated links, in-degree and out-degree centrality are equivalent. However, for directed and asymmetric links as in influence networks, they take on different meanings. Out-degrees are nominations (he/she influences me); in-degrees are choices (I have been selected as someone who influences other team members).

Closeness is a measure of centrality that accounts for both direct and indirect links (those of the actors to whom one has direct ties). Conceptually, it represents ease of access to others. For instance, an individual with five ties to central individuals is “closer” to other members of the group than an individual with five ties to five peripheral members of the group. (In contrast, both actors have the same value of degree centrality: 5.).

Finally, *betweenness* refers to the extent to which one individual is between two other individuals who are not connected to each other. A high score in this measure indicates that the person mediates the relationships (following the shortest connecting paths) of a great number of actors. Freeman suggests that this measure indicates how much power a person has in the communication network. If a person is mediating the relationship among several individuals, he or she may withhold or distort the information that is being transmitted. Brass and Burkhardt (1993) point out that while closeness centrality represents independence from others, betweenness centrality is a measure of control of or dependence on others. In a network approach, explanations for regularities in behavior are found in individuals’ structural location in the web of relationships, and not just in the inner forces or personal characteristics that impel individuals to act in certain ways (Wellman, 1988).

Whole Network Measures. Certain concepts are used to describe the whole network. First, *density* refers to the number of links in the network as a proportion of the number of possible links. Dense networks imply greater numbers of interactions among members of the network. Second, *centralization* refers to the degree to which all members of the network are equally central in the network. In highly centralized networks, all members participate and are connected to similar number of actors in the network. By contrast, a less centralized network is hierarchical, with one or few actors very central and the rest connected only to these central actor/s.

A social network approach to shared leadership needs the development of two aspects: the nature of the leadership network and the distributional properties that describe the leadership network as a whole system. Next, we discuss the nature of the leadership network using the distinction between transactional and transformational leadership. Later in the chapter, we will discuss the distributional properties of shared leadership using the concept of network centralization.

The Nature of Shared Leadership

To describe the links among team members as they lead the group, we will use the transactional-transformational theory of leadership (Bass, 1985). Other leadership perspectives could provide valid models for our network model of shared leadership. However, there are three main reasons that this theory is more suitable for our purposes.

First, Bass’ (1985) transactional and transformational leadership theory was developed from a vertical leadership perspective. However, there is evidence that the transactional and transformational leadership dimensions also apply to shared leadership. Pearce (1997) used a behavioral leadership questionnaire asking team members for their perceptions of vertical and shared leadership. The explanatory factor analysis yielded five behavioral influence

strategies of shared leadership (aversive, directive, transactional, transformational, empowerment). A second-order factor analysis of these five dimensions resulted in two factors that closely resembled the transactional (aversive, directive, transactional) and transformational leadership (transformational, empowerment) aspects of leadership.

Second, the transactional and transformational theory of leadership has been successfully applied in different organizational contexts, which adds to its construct validity. Finally, the theory provides a number of leadership dimensions that will allow us to conceptualize shared leadership from a multiple networks perspective.

The transactional and transformational theory of leadership (Bass, 1985, 1990; Burns, 1978) tries to explain the extraordinary effects that certain leaders have on their followers. While transactional leaders obtain expected results from followers, transformational leaders seem to obtain extraordinary effort, motivation, self-sacrificial behavior, and performance from their followers.

Transactional leadership occurs when leader-follower relationships are viewed as exchanges, in which leaders and followers perceive each other as being potentially instrumental to each others' goals and needs, such as accomplishment of a task (Bass, 1990). By contrast, transformational leadership occurs when leader-follower relationships are viewed as transcending their own personal interests to benefit higher-order values and principles (Burns, 1978). During the transformational process, leaders are viewed as visionary, charismatic, sensitive to individuals' needs and feelings, and inspirational (e.g., Burns, 1978; Conger, 1989; Bass, 1985; Conger and Kanungo, 1988).

Charisma has been found to be the major component of transformational leadership (Bass, 1985). Charismatic relationships are characterized by followers' intense emotional feelings about the leader, unquestioning acceptance of leaders' beliefs, and an emotional attachment to the mission. These followers react with devotion, affection, admiration, and extraordinary esteem for their leaders.

These two leadership dimensions have been further described in the literature in terms of specific behaviors. In what follows, we present a brief summary of behaviors that characterize transactional and transformational leadership and how they can be observed among team members, in transactional shared leadership and transformational shared leadership. In order to adapt the transactional-transformational leadership model to shared leadership, we will consider the behaviors of team members as they interact with one another in leading the group.

1. Transactional shared leadership: Transactional leadership occurs through an exchange among team members in which rewards and incentives are offered in exchange for effort and compliance. There are two main categories:

Contingent Reward. Team members clarify goals, talk about expected behaviors and accomplishments, and reward other members for expected performance. Team members assign and get agreements from teammates by clarifying the rewards that will likely be obtained in exchange for satisfactory performance.

Management by Exception. This is a corrective transaction by which team members arrange to monitor others' performance. They look out for errors in order to correct them. This identification process for mistakes can be passive, waiting for errors to occur, or active, when team members examine work processes so they can be corrected before mistakes are made.

2. Transformational shared leadership: Transformational leadership has an enormous influence on others by paying individualized consideration to each of them, talking about possibilities, and acting self-sacrificially (Bass, 1985). During the shared leadership process, transformational leadership occurs when there is a personal identification with the goals of the team, so that team members are willing to exert high levels of effort and commitment.

There are three main dimensions of transformational leadership. Charisma refers to team members' ability to exercise intensive and diffuse influence over other team members' beliefs, attitudes, and behaviors. Charisma here is viewed as a relationship or bond between any two team members in which the behaviors of one of them have a diffuse and intensive influence over the other. Charismatic members articulate overarching goals, communicate high expectations, exhibit confidence in their team members, and establish emotional bonds with the team. Charismatic members project a sense of power, confidence, and dynamism to other team members.

Individualized Consideration. Team members who provide individualized consideration to other team members show concern for their welfare and engage in conversations. They stress the satisfaction and well-being of their interlocutors and often act as coaches and mentors for other team members. They are perceived as friendly and approachable, and show acceptance of individuals' differences. They show active listening and delegate or involve members in challenging tasks to develop them.

Intellectual Stimulation. Transformational members provide intellectual stimulation to other team members by questioning assumptions, reframing problems, and approaching old situations in new ways. They stimulate creativity in the team and never criticize individual members' mistakes.

Next, we take these leadership behaviors by team members and translate them into social network concepts and measures. For ease of presentation, first we will present a hypothetical example.

A Hypothetical Example

This example includes (1) the type of questions needed to collect network data in a team regarding the perceptions of transactional and transformational shared leadership, (2) a hypothetical set of raw data in both transactional and transformational team leadership, resulting in a matrix of transactional leadership and a matrix of transformational leadership, and (3) a sociometric graph of the two leadership networks.

1. A prototypical questionnaire to uncover TA/TF shared leadership:

The first step in describing leadership networks is to develop questions that uncover the leadership behaviors that team members display. The questions below can be used as examples of how to uncover these networks.

An Example of a Shared Leadership Team Questionnaire

Question 1a (Transactional-Rewards). How often does each member of your team acknowledge and rewards you for your contributions to the team? Please use the scale below.

Never or almost never 0 1 2 3 4 Frequently or almost always

- | | | | | | |
|------------|---|---|---|---|---|
| 1. CHARLES | 0 | 1 | 2 | 3 | 4 |
| 2. FRANK | 0 | 1 | 2 | 3 | 4 |
| 3. GREGORY | 0 | 1 | 2 | 3 | 4 |
| 4. DONALD | 0 | 1 | 2 | 3 | 4 |
| 5. DEBRA | 0 | 1 | 2 | 3 | 4 |

Question 1b (Transactional-Rewards). How often does each member of your team clarify for you the incentives and rewards available to you if the team achieves its goals?

Never or almost never 0 1 2 3 4 Frequently or almost always

- | | | | | | |
|------------|---|---|---|---|---|
| 1. CHARLES | 0 | 1 | 2 | 3 | 4 |
| 2. FRANK | 0 | 1 | 2 | 3 | 4 |
| 3. GREGORY | 0 | 1 | 2 | 3 | 4 |
| 4. DONALD | 0 | 1 | 2 | 3 | 4 |
| 5. DEBRA | 0 | 1 | 2 | 3 | 4 |

Question 2a (Transformational-Charisma). How often does each member of your team encourage you to participate in group activities and increase your willingness to cooperate and communicate with other members of the team? Please use the scale below.

Never or almost never 0 1 2 3 4 Frequently or almost always

- | | | | | | |
|------------|---|---|---|---|---|
| 1. CHARLES | 0 | 1 | 2 | 3 | 4 |
| 2. FRANK | 0 | 1 | 2 | 3 | 4 |
| 3. GREGORY | 0 | 1 | 2 | 3 | 4 |
| 4. DONALD | 0 | 1 | 2 | 3 | 4 |
| 5. DEBRA | 0 | 1 | 2 | 3 | 4 |

Question 2b (Transformational-Charisma). How often does each member of your team communicate high expectations of performance to you? Please use the scale below.

Never or almost never	0	1	2	3	4	Frequently or almost always
1. CHARLES	0	1	2	3	4	
2. FRANK	0	1	2	3	4	
3. GREGORY	0	1	2	3	4	
4. DONALD	0	1	2	3	4	
5. DEBRA	0	1	2	3	4	

There are two important aspects to the above conceptualization of leadership. First, we consider leadership as an attribution made about the intentions of an agent of influence. For an influence attempt to be considered part of leadership, it has to be perceived by the receiver of influence as an act of leadership. Second, transactional and transformational leadership are not opposites; rather, they are two aspects of leadership that often coexist in a group. That is, a team member who influences the group can be perceived as transformational or transactional by different team members. The important thing here is how team members perceive each other.

2. A hypothetical set of individual row data.

The responses from each individual member to the transactional and transformational scales are averaged (in this case with two items) and included in two 5x5 squared matrices:

MATRIX OF TRANSACTIONAL (Contingent Reward)						MATRIX OF TRANSFORMATIONAL (Charisma)					
	Charles	Frank	Debra	Donald	Gregory	Charles	Frank	Debra	Donald	Gregory	
Charles	-	0.5	2.5	1.5	2.5	-	2.5	2.0	3.5	3.5	
Frank	2.0	-	0.5	2.0	1.0	1.5	-	2.5	1.0	3.0	
Greg	2.5	1.0	-	0.0	3.0	2.0	3.5	-	2.5	3.0	
Donald	3.5	2.5	1.5	-	2.5	0.5	0.0	1.5	-	1.5	
Debra	3.5	3.5	3.5	1.5	-	0.0	1.5	2.0	1.5	-	

In this example, each cell represents transactional and transformational leadership attributed to other members of the team. The row totals can also be used as a measure of the total amount of leadership influence attributed to each member of the team by his or her peers. For instance, Debra is attributed 11.7 points in the transactional network and 5.0 points in the transformational network. In contrast, Gregory has 3.0 and 11.0 points for the transactional and transformational leadership dimensions.

The diagonal represents self-attributed leadership. It is not included in the analysis because attributions of leadership have an effect on team members' behaviors to the extent to which the target of influence grants that power and influence to the agent of influence. High

degrees of self-attributed leadership have no effect on team members; they merely represent self-perceptions.

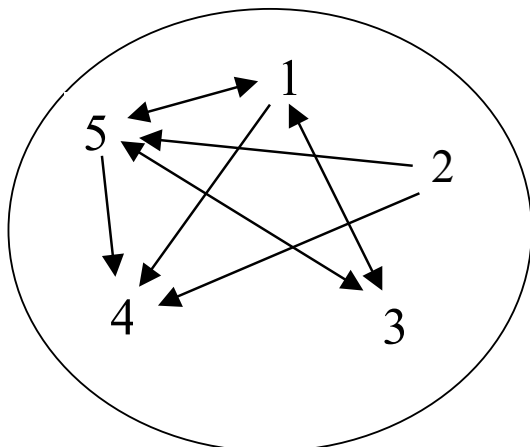
3. Sociometric graph of shared leadership.

The data can be represented in a sociogram or graph, with points representing team members and links representing leadership relations. For ease of presentation, we have dichotomized the data to represent the above network data of shared leadership. Values of 2 or less are considered 0, and values greater than 2 are given the value of 1. In other words, we have moved from a valued network data down to a binary network of data where we count only the presence (rather than the strength) of the relationship. Only present links are represented in the sociogram.

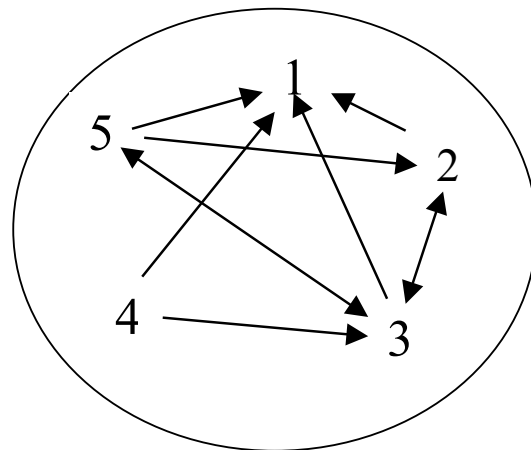
SOCIOGRAMS

MATRIX OF TRANSACTIONAL (Contingent Reward)					
	Charles	Frank	Debra	Donald	Gregory
Charles	-	0	1	0	1
Frank	0	-	0	0	0
Greg	1	0	-	0	1
Donald	1	1	0	-	1
Debra	1	1	1	0	-

MATRIX OF TRANSFORMATIONAL (Intellectual Stimulation)					
	Charles	Frank	Debra	Donald	Gregory
Charles	-	1	1	1	1
Frank	0	-	1	0	1
Debra	0	1	-	1	1
Donald	0	0	0	-	0
Gregory	0	0	0	0	-



TRANSACTIONAL NETWORK



TRANSFORMATIONAL NETWORK

The Topography of Shared Leadership

Once one has identified the nature of the leadership network, the next step in developing a network model of shared leadership involves describing the distributed patterns of leadership within the group. This mapping of shared leadership in a network can be described as leadership topography. From a network level of analysis, the degree of shared leadership indicates the distribution of leadership among members of a social unit. As such, it is a compositional construct that describes a social entity rather than one individual.

Work teams vary in terms of how much each member exercises leadership in the group. Thus, one can describe teams in terms of their leadership distribution. For instance, a team with the maximum degree of shared leadership occurs when the transactional and transformational aspects of leadership are distributed evenly among all members of the team. In other words, the maximum degree of shared leadership represents an egalitarian distribution of power and influence among team members along the transactional and transformational leadership dimensions. By contrast, a team with centralized leadership is one in which one or a few members dominate and take on most of the leadership responsibilities in the team. These few members take responsibilities in the group, motivate other team members and correct their actions when necessary.

Shared Leadership as Team Centralization

Team centralization is a measure of compactness. It describes the distribution of network ties and whether these links are organized around particular focal points. Team centralization with respect to individuals' centrality in the network can be useful to conceptualize the idea of shared leadership. The degree of shared leadership in a team can be thought of as the degree of team centralization in the two leadership dimensions: transactional and transformational. If all members of the network participate equally in displaying leadership behaviors, we will have the highest level of shared leadership. But when leadership behaviors revolve around a single individual or few actors, we say the leadership network is highly centralized. That is, one or few individuals are quite central, or have emerged as informal leaders, with the remaining group members being in the periphery of the network. The concept of team centralization, then, is a measure of variability and dispersion of individuals' centrality. As such, it could be taken as an indication of leadership differentials within the work team.

The operationalization of team centralization involves two steps. First, one must identify individuals' centrality in the leadership networks; second, the dispersion of these individual centrality indexes is computed. Individual centrality is a structural characteristic of individual members that indicates that the actor is at the center of the social system. For directed relations, as in the case of leadership networks, centrality is also a measure of prestige. Prestigious actors are those with many in-degrees or "choices" – that is, prestigious actors are chosen or nominated by many other individual members. Prestige is a structural attribute of each individual; it refers to his/her level of prominence and importance in a social system (Moreno, 1934; Knoke and Burt, 1983). The prestige of an individual is similar to the more popular term of "star" or being the most "popular." It

indicates who stands at the center of attention (Scott, 1997). Prestige is a relational attribute of an individual, and it is taken here as an indication of the individual's contribution to the leadership function in the team.

In our example above, the sum of rows in each of the matrices represents the total leadership influence attributed to each team member in the two leadership dimensions by the rest of the team members. (The cells in the diagonal represent self-attributed influence, and as such are not used to compute total influence.) These values are the "in-degrees" in network terms, and they are commonly taken as an indication of individual centrality and status within the team. Thus, the individual centrality or prestige of each member of this team in the transactional and transformational networks is: Charles (2/4), Frank (0/2), Gregory (2/3), Donald (3/0), and Debra (3/0).

Second, we compute the dispersion of these individual centrality indexes. Team centralization represents the inequality with which group members participate in the leadership process. A team centralization measure expresses how tightly the team is organized around its most central individuals (Scott, 1997). Among all the indices available to measure dispersion of individual prestige (see Wasserman and Faust, 1994, for a review), the variance is the most widely recommended (Snijders, 1981; Hoivik and Gleditsch, 1975; Coleman, 1964). Freeman (1979) provides a convenient formula to operationalize the variance of centrality:

$$S^2_c = \left[\sum_{i=1}^g (C_D(n_i) - \bar{C}_D(n_i))^2 \right] / (g-1)(g-2)$$

where $\bar{C}_D(n_i)$ is the in-degree centrality of individual i , $\bar{C}_D(n^*)$ is the maximum observed value, and g is the number of team members. This index varies from 0 to 1, with a value of 0 team centralization (or status differentiation) indicating that the status of all individuals in the group is spread equally (condition of maximum shared leadership) and with a value of 1 team centralization indicating that the status in the team is centralized around a single member (condition of minimum shared leadership).

The usefulness of the network approach to measuring shared leadership can best be illustrated through our example. In a previous section, we measured individuals' centrality in both the transactional and transformational leadership networks: Charles (2/4), Frank (0/2), Gregory (2/3), Donald (3/0), and Debra (3/0). However, this still describes each individual member and therefore is not a property of the group.

The next step is to describe the distribution of these individual centrality indices in the network by applying the formula above. In our example, the variance of these centrality values equals 0.42 for the TA network and 0.92 for the TF networks. These values are taken as measures of the degree of shared leadership, which is a property of the group and a group-level measure. The lower the variance, the greater the degree of shared leadership. In our example, the transactional network is more shared than the transformational network. It seems that most team members, except No. 2, share responsibilities for rewarding and correcting errors in the group. However, only Nos. 1 and 3 seem to take on most activities regarding inspiring, motivating, and paying personal attention to team members.

In the previous sections, we have provided a conceptual framework for analyzing and measuring shared leadership in work teams. The main elements of this framework are conceptualization of work teams as social networks (nodes and relations), development of the two types of shared leadership networks (the transactional and the transformational network), and analysis of these networks at the whole-group level with the concept of group centralization. In the next section, we will examine some implications of our model for research in organizations.

Research Implications

A network conception of shared leadership raises a number of intriguing possibilities for research and theory development. Next, we present a few of these implications in the form of research questions.

- 1) **What is the relation between, or interaction of, vertical and shared leadership?** Are vertical and shared leadership substitutes for one another? Are they complementary? Or are they redundant systems? How do various forms and amounts of vertical leadership affect the emergence and development of shared leadership among team members? Are certain network characteristics of shared leadership encouraged/discouraged by different vertical leadership styles and approaches? Are certain combinations of vertical leadership (type and amount) and shared leadership (type, amount, and distribution) more or less effective? For example, some degree of vertical leadership in combination with shared leadership may be critical for the effectiveness of project teams that work only for a limited time to produce one-time outputs. On the one hand, project teams usually work on novel and complex tasks that require intensive input from experts who many times are new to the team. Accordingly, a key factor in the effectiveness of project teams is members' ability to rapidly become acquainted with the task at hand and with one another. Thus, some degree of vertical leadership could be very effective in getting the team started. Project teams need clear direction and deadlines; otherwise they run the risk of spending too much time socializing or arguing over unimportant issues (Hackman, 1990). It is important, then, that the general goal of the team is clear from its inception and in most cases that the team objectives and deadlines are established beforehand by management. On the other hand, shared leadership could be very effective for these teams as they strive for social integration and familiarity. Increasing the interactions among team members will provide more information about the task and about team members' areas of expertise. Also, shared leadership may be a way to increase the legitimacy of the decision-making process by increasing the participation of all team members.
- 2) **Can we now identify or define different types or models of shared leadership?** Can various team archetypes be identified in terms of the type of shared/distributed leadership model that is being used? Our approach allows one to potentially discover different models of how teams share leadership, depending on network characteristics. For example, a preliminary classification of degree of shared leadership based on the density of the leadership network (high or low) and the decentralization of the leadership network (high or low) divides shared leadership into four categories (see

Figure 1). The lowest level of shared leadership is defined in Quadrant I by low levels of decentralization (hierarchical) in a leadership network that is highly dense. A low level of shared leadership is defined in Quadrant II by low levels of decentralization but in a leadership network that is low-density. Quadrant III represents a moderate level of shared leadership, in which the distribution is egalitarian but with low levels of interaction. Finally, the highest degree of shared leadership occurs when the distribution of leadership is highly decentralized in a highly dense network.

- 3) **What is the relation between and interaction of different shared leadership concepts?** Within an emergence context, does centralization of one leadership function/type also imply centralization of other leadership types? Shared leadership could imply decentralization (high sharedness) of all leadership functions/types, *or* shared leadership could imply centralized leadership concepts, but not to the same person (similar to different team members' playing different leadership roles). What are the implications of one or the other? For example, the leadership network may be decentralized for transformational aspects of leadership (inspirational, intellectual stimulation, charisma, etc.) but centralized for transactional aspects of leadership.

What is the relationship between and interaction of the leadership network to other networks? Are leadership networks correlated with other networks: friendship, communication, status? Are some of these networks more or less conducive to the emergence and sustenance of shared leadership? For example, one could speculate that the emergence of shared leadership structures in teams may be negatively correlated with status differentiation. Status theories (Berger, Cohen, and Zelditch, 1966, 1972) argue that social categories such as sex, age, and race are indicators of status in our society. These demographic attributes are used as initial markers of status, and therefore status differentiation will likely occur within the team. Therefore, compared to demographically homogeneous teams, demographically heterogeneous teams will be more likely to develop centralized leadership. Furthermore, the centralization of the leadership network will probably develop around individual members regarded as having the highest social status. One familiar type of team that is highly diverse in terms of its members' status is the cross-functional team in a hospital. It is usually composed of doctors, nurses, social workers, and other personnel. Each of these categories is clearly associated with a different relative status in our society. As such, these teams will likely develop less shared leadership than teams whose members are more similar in social status.

- 4) **Are certain leadership network parameters linked to team effectiveness?** Does team effectiveness in certain kinds of tasks depend on the density and centrality of the leadership network? Is there an optimal level of sharedness? For example, the task of top management teams is one of coordination and overall responsibility for the firm's performance. Yet their main risk is conflict of interest between the overall performance of the organization and the interests of their own functional area. Hackman (1990) speculates why the potential for a top management team to be effective is not more fully exploited: "It is significant (...) that the main responsibility of each team member typically is in his or her own functional area and that membership in the top management team is an extra activity for everyone – with the possible exception of the chairman or president. If he or she also views the team as just one of many competing

demands, then it may be that *nobody* is paying much attention to building and supporting the team as a performing unit” (p. 490). Faced with this dilemma, top management teams will likely benefit from transformational shared leadership. A key success factor for a top management team is to get its members sharing their vision, information, and enthusiasm. Shared leadership can provide access to key and timely information that may be critical for the firm’s performance and even survival.

- 5) **How is the leadership network related to other group-level processes?** Are characteristics of the leadership network (density, centrality, etc.) correlated to cohesiveness, transactive memory, etc.? For example, shared leadership may help to develop transactive memory. As people work together on a task, they develop shared understandings about the task and about who is good at what in the team. In a series of experimental studies, Moreland and his colleagues (1999) showed that members who trained together developed better transactive memory systems. That is, they developed more complex and accurate beliefs about the task and the distribution of relevant skills within the team. In a similar vein, these implicit shared understandings of the task and the group members will be facilitated when team members share leadership processes, such as mutual intellectual stimulation, envisioning, and identification with the team.
- 6) **How does the leadership network change or evolve over time?** How does a team evolve away from a strictly vertical leadership model to a shared model? How does the leadership network grow and develop over time? Are there typical stages or punctuations in the way leadership becomes increasingly shared? How do external events (crisis? performance feedback?) cause the leadership network to expand and/or contract? Is the expansion and contraction of the leadership network symmetrical or asymmetrical?

Concluding Remarks

This chapter contributes to the leadership literature by presenting a novel way to conceptualize and measure shared leadership at the group level of analysis using social network analysis. We have developed a network approach to shared leadership in work teams based on the traditional distinction between transactional and transformational leadership.

In particular, the network concept of group centralization applied to these two types of leadership results in two leadership networks: the transactional and transformational leadership networks. The advantage of these leadership networks over aggregated procedures to measure shared leadership is that they capture the distributed patterns that emerge when taking the whole team into account. These patterns are not taken into account with aggregated measures and may be crucial to understanding the different patterns of shared leadership. We then have discussed the research implications of this new conceptualization and measurement of shared leadership.

This chapter also advances the social network area by applying whole-network concepts to study team processes. Research in intra-organizational network analysis has often used social network parameters as independent variables. As have those in any other academic field striving for legitimacy, social network researchers have emphasized the predictive power of network-derived measures over more traditional measures. The two network measures that have been used most often to predict individuals' attitudes and behaviors are the presence or strength of the link, and centrality. For instance, individuals who are linked by strong ties have been found to have similar attitudes toward technology (Rice and Aydin, 1991), job satisfaction (Roberts and O'Reilly, 1979), and attributions of charisma to the leader (Pastor, Meindl, and Mayo, 2001). Similarly, centrality in the network has been found to be related to power and influence (Krackhardt, 1990, Burkhardt), and to high levels of satisfaction (Ibarra and Andrews, 1993).

There have been, however, a few studies that have used social networks as dependent variables and have sought to predict individuals' position in the network based on personal characteristics. For instance, some studies have shown that men and women tend to have segregated networks of contacts in which they develop close ties with peers of the same gender (e.g., Brass, 1985; Ibarra, 1993). Also, education, cognitive complexity, social status, tenure, and communication skills have been associated with centrality in the social network (Albretch, 1979; Schwartz and Jacobson, 1977; Roberts and O'Reilly, 1974; Hurt and Preiss, 1978; Monge, Edwards, and Kirste, 1978; Lincoln and Miller, 1979). While there are numerous studies at the individual and dyadic levels of analysis, there seems to be a lack of studies at the whole-network level in intra-organizational research. This chapter provides a model of shared leadership using team-level network concepts.

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Figure 1.
Degrees of Shared Leadership.

Decentralization	High	Quadrant III MODERATE LEVEL	Quadrant IV HIGHEST LEVEL
	Low	Quadrant II LOW LEVEL	Quadrant I LOWEST LEVEL
		Low	High
		Density	