Beyond the unidimensional collective leadership model

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Abstract

Purpose – A theoretical analysis evidences the existence of multiple patterns of collective leadership and serves as foundation for the proposal of a two-dimensional model of collective leadership, which evaluates leadership sharedness (the extent to which leadership roles are shared by group members), and leadership distribution (the extent to which different leadership roles are permanently assigned to group members). The relationship between these dimensions and committee effectiveness is further tested.

Design/methodology/approach – A social networks methodology is used with a sample of 28 committees. Two complementary network properties (centralization and density) are used to operationalize leadership sharedness and a new measure is developed to operationalize leadership distribution. Stepwise regressions test the relation between collective leadership dimensions and performance.

Findings – The model proposed advances the understanding of collective leadership's internal dynamics and facilitates empirical comparisons of the effectiveness of various forms of collective leadership. The highest committee performance was found in groups where members contribute equally to charismatic and supportive leadership but only when these equal contributions were high. In collective directive and participative leadership, however, equality of contribution was associated to higher performance independently on the strength of members' contributions. No relationship was found between the distribution of leadership roles among group members and committee performance.

Research limitations/implications – A small sample size may have reduced hypothesis testing power. The intraclass corrections (ICC(2)) were lower than recommended. Finally, results cannot be extrapolated beyond committees, which have very unique characteristics due to their low typical interaction.

Practical implications – Organizations can improve committee performance by ensuring high and equal participation of members in their group's leadership through training and selection. Enhancing participation of all members in leadership requires special attention to women and members of minorities, that are typically attributed less leadership influence and whose commitment to the group may be hurt by lack of involvement.

Originality/value – The two-dimensional model proposed goes beyond previously published models in exploring several aspects of collective leadership internal dynamics by advancing the understanding how different aspects of collective leadership patterns affect group performance.

Keywords Social networks, Performance, Collective leadership, Committees

Paper type Research paper

Introduction

Attention to collective leadership has increased significantly in the past two decades. Collective leadership is a dynamic process that involves multiple individuals collaborating in leadership toward the attainment of their common goals (Pearce and Conger, 2003). Challenging the assumption that the leadership role must be carried on by a single individual. While multiple models of collective leadership in the literature are often considered interchangeable, differences among these models deserve attention in order to

advance our understanding of this construct (Fitzimmons *et al.*, 2011; House and Aditya, 1997). Some of these differences are conceptually subtle but important enough to suggest that collective leadership exists in multiple forms, each with a unique pattern of leadership assignment and transfer. A deeper understanding of the collective leadership pattern is necessary to elicit desired group outcomes at the individual and group levels, select group members with the necessary skills to generate these dynamics, and to develop training programs that foster effective dynamics of collective leadership.

Multiple conceptual studies have described alternate patterns of collective leadership in recent years (House and Aditya, 1997; Yukl, 2010), but no model has been proposed yet that captures these alternate patterns and distinguishes between them. In this paper, we propose a model that addresses this methodological gap by distinguishing alternative patterns of collective leadership. The paper builds on the literature to identify the two dimensions of collective leadership that must be studied in order to fully describe the collective leadership pattern: sharedness (the extent to which leader behaviors are shared by multiple people) and distribution (the extent to which these leader behaviors are distributed among multiple people). We use social networks methodology to present appropriate measures for each of these dimensions. Emphasis is placed in the complementary of network centrality (a network property that measures influence variability across group members) and network density (a network property that measures average influence of group members) in the measurement of sharedness. This challenges the assumption that these properties are interchangeable, so that the leadership pattern can be measured by either of these properties (Carson *et al.*, 2007; Mayo *et al.*, 2003). Hypotheses are proposed that relate several dimensions of the newly proposed model to committee performance. Methodology and results are explained, followed by a discussion of the implications of these results for future research on committee leadership and performance.

Patterns of collective leadership

The literature on collective leadership evidences the existence of two main groups of models attending to the characteristics of the leadership pattern. The first subset of models describes collective leadership as distributed leadership roles. They involve the fragmentation of leadership into a set of roles or behaviors that are performed by multiple individuals in a coordinated fashion. In other words, models within this first category describe collective leadership as a division of leadership labor (Bales, 1954; Burke, 1967; Gibb, 1954; Gronn, 2002; Waldersee *et al.*, 1995). Early works within this first group proposed a division of the leader role into two roles necessary for the group's effectiveness: the task leader, who provides the team with guidance to complete the task effectively, and the social leader, who provides others with support and helps generate harmonious environments. This division of labor responds to the challenge a single individual may face when providing the group with direction and also support. Bales (1954) found that emerging leaders in leaderless teams were typically effective task leaders, but it was difficult for them to effectively juggle task and social leader behaviors (Bales, 1954).

Other authors have proposed a partition of team leadership into a larger number of roles, distributed among team members (Barry, 1991; Gronn, 2002; Benne and Sheats, 1948; Schein, 1980). Leadership roles are complementary with each other and emerge or are assigned among team members based on their particular leadership strengths and the needs of the team at the time. Changes in the team development, the task, or the environment may require the team to redistribute these roles. Effectively defining these roles through frequent communication is essential to facilitate the differentiation between them and, ultimately, their integration (Barry, 1991; Gronn, 2002).

The second group of models describes collective leadership as shared leadership roles. They refer to patterns of collective leadership where leadership roles or behaviors are not assigned to individual group members, but shared by the group. This particular view of collective leadership is not usually reflected in conceptual descriptions of the construct but more subtly reflected in the way collective leadership is operationalized. Typically, these models measure collective leadership of a certain leader behavior as the extent to which a specific leader behavior is shared by the group (Bowers and Seashore, 1966; Ensley *et al.*, 2006; Pearce *et al.*, 2003, 2004; Pearce and Sims, 2002; Sivasubramaniam *et al.*, 2002). This operationalization of collective leadership excludes cases of distributed leadership, in which specific roles are not shared.

It is important to note that these two views of collective leadership are not mutually exclusive. They open the door for the existence of a multiplicity of leadership patterns, including hybrid patterns whereby some leader behaviors are shared and others assigned to specific members due to their position of authority, skills, experience or resources (House and Aditya, 1997; Yukl, 2010). The leadership pattern of a group is likely to evolve dynamically based on the development of the team and contingent factors. Being able to operationalize these different patterns of collective leadership in one model will allow us to explore the effectiveness of different patterns of leadership.

A social networks two-dimensional model of collective leadership
Recent reviews on the evolution of shared leadership academic emphasize the potential of social network analysis to provide detailed analysis and gain understanding of collective leadership patterns in groups (Denis *et al.*, 2012; Murase *et al.*, 2012). This methodology generates rich depictions of a group's leadership pattern at different levels of analysis, being particularly beneficial for the analysis of dynamics of collective leadership. In this paper, we use social networks to operationalize the two dominant views of collective leadership described above as two separate dimensions: leadership sharedness, which we define as the extent to which multiple group members share a particular leader behavior, and leadership distribution, which we define as the extent to which there is a division of leadership labor in the group. In particular, this paper addresses a gap in the literature by operationalizing a team's division of labor or leadership distribution (House and Aditya, 1997; Gronn, 2002; Mayo *et al.*, 2003).

Collective leadership behaviors
In order to understand the effectiveness of alternative collective leadership patterns, multiple leader behaviors should be studied. Early scholars relied on dichotomous theories of leadership, such as Benne and Sheets' (1948) task and maintenance membership roles – which they acknowledged were leadership roles (Bales, 1954; Burke, 1967; Waldersee *et al.*, 1995). More recently, theories of collective leadership that incorporate more categories of leader behaviors have been developed. Some of these theories have been based on observation (Barry, 1991) while others have been based on existing theories of leadership. Examples are Bass and Avolio's (1990) concepts of transactional and transformational leadership, Yukl and Lepsinger's (1990) managerial practices survey, and House's (1996) reformulated path-goal theory. Leadership behaviors contained in existing leadership models have been used to operationalize collective leadership by Bowers and Seashore (1966), Ensley *et al.* (2006), Hiller *et al.* (2006), and Pearce and Sims (2002).

For the model proposed in this paper, we included four leader behaviors based on Yukl (2012), House (1996), and Shamir *et al.* (1993). These scholars described their leader behavior formulations as appropriate for facilitating group, team or work-unit

performance. Task-oriented/directive leadership involves communicating expectations to others and giving instructions on helpful work methods. Relationship-oriented/ supportive leadership includes being thoughtful of group members' needs and welfare, and maintaining a pleasant friendly work environment. Participative/group decision-oriented leadership consists of getting others involved in decision making, soliciting suggestions and carefully considering members' ideas. Charismatic leadership is a complex construct but we selected the formulation by Shamir *et al.* (1993) because it specifically addressed members' identification with a collective and the salience of a collective identity. The charismatic leadership scale for this study therefore addressed the collective identity and importance of the group as well as charismatic behaviors of enthusiasm for the task and questioning the traditional way of doing things. We believe these leader behaviors were appropriate for this study because of their conceptual clarity and the emphasis by leadership scholars on the need to adapt leadership behaviors to the needs of followers and the situation (House, 1996; Yukl, 2012). As these scholars indicate, a group or team setting is likely to be one situation where these leader behaviors are important.

A social networks analysis of the leadership pattern

Social networks depict leadership patterns using graphs – one for each leader behavior – where nodes represent group members and ties between these nodes indicate the amount of leadership influence exerted by one person upon other group members (ties point at the person who exerts influence). The networks used for this paper are valued, what means that a tie has an associated value that expresses the level of influence of a node on others in the network. Networks are also directional, where the direction indicates which of two linked nodes influences the other. The two dimensions proposed for the model, leadership sharedness and leadership distribution (see Table I), are based on a fundamental property of the node: degree-based centrality, which assesses the extent to which others in the network perceive an individual to be influential. Degree-based centrality is measured as the sum of values of all ties that link this person to each of his or her peers (Freeman, 1979). The degree-centrality of any node in the network i using a given leadership behavior j is noted as $C_D(p_{ij})$. In this study, group members have four values of leadership degree-centrality, one for each leader behavior analyzed: charismatic, directive, participative, and supportive.

Leadership sharedness

This dimension of the leadership pattern refers to the extent to which group members share a certain leadership behavior. In prior research, this construct has been assessed using either of two network properties: centralization and density. Centralization is the extent to which a given leadership behavior is concentrated in one person vs shared by all members of the group, and hence it measures variation among members' levels of influence on their peers. It is calculated as the sum of differences between the centrality of the most central member in the committee and the centralities of the rest of the members, divided by the maximum possible sum of differences in a network of that same size n (Freeman, 1979):

$$C_{Dj} = \frac{\sum_{I=1}^{n} \left[C_{Dj}(p^*) - C_D(p_{ij}) \right]}{max \sum_{I=1}^{n} \left[C_D(p^*) - C_D(p_{ij}) \right]}$$

C_{Dj} is the centralization of the committee for a specific leadership behavior j, $C_{Dj}(p_{ij})$ is the centrality of member i for leadership behavior j, and $C_{Dj}(p^*)$ is the highest of all

Dimensions	Measure/s	Range	Explanation
Leadership sharedness (one value for each given leader behavior)	Network centralization	0-1	Extent to which leadership is concentrated in a small number of people rather than shared by all Highest sharedness (0) when all members have the same influence on each other via a given leader behavior Lowest sharedness (1) when one member has the highest possible influence and all others minimum influence using a given leader behavior
	Network density	1-7	Average level of influence between members in the team for a given leadership behavior Highest sharedness (7) when the average influence between group members is the highest possible via a given leader behavior Lowest sharedness (1) when there is no influence between members in the team via a given leader behavior
Leadership distribution (across leader behaviors)	Distribution	0-1	Extent to which a members' leadership influence on the team varies across leader behaviors Highest distribution (1) when there are important variations in individuals' influence on their group across leader behaviors (their influence is perceived as maximum for some behaviors and minimum for others) Lowest distribution (0) when members' leadership influence on the group is the same, independently of the leadership behavior considered

Table I.
Group-level dimensions of the collective leadership model

members' centralities for that same behavior. Density is the average leadership influence between any two members of a group, and gives an indication of the volume of leadership that takes place within the group. It is calculated as the average value of all the ties between actors in the network (Wasserman and Faust, 1994), and it is therefore an aggregate measure. For valued networks, density is measured using the following formula (Wasserman and Faust, 1994):

$$\Delta_j = \frac{\sum_{i=1}^{n} C_D(p_{ij})}{(n-1)n}$$

where Δj is the density of the leadership network for a specific leadership role j and $C_{Dj}(p_{ij})$ is the centrality of member i for leadership behavior j.

Prior literature has used either one of these two properties (density or centralization) to operationalize leadership sharedness (Carson *et al.*, 2007; Mayo *et al.*, 2003; Small and Rentsch, 2010), suggesting that the measurement of one of them would make it unnecessary and redundant to measure the other. However, the two properties capture essentially different characteristics of the network: centralization measures dispersion of network centrality and density measures average centrality within the network. Thus, density and centralization are not interchangeable but complement each other and both need to be measured to fully capture leadership sharedness, as demonstrated in Figure 1 (Friedkin, 1981; Gockel and Werth, 2010; Wasserman and Faust, 1994). This figure includes network representations of multiple groups with different

Figure 1.
Examples of
leadership patterns
attending to
centralization
and density
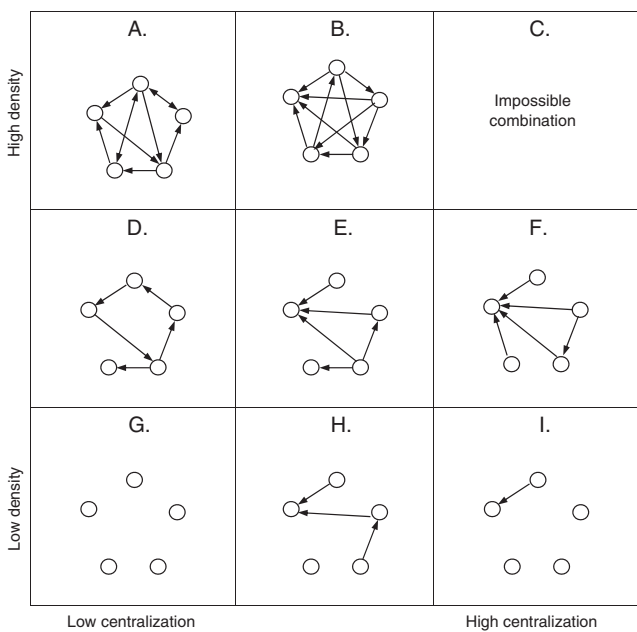
leadership patterns. For simplicity of representation, let's assume that all ties have the same value 1. If we consider only centralization, for instance, we would conclude that patterns A, D, and G all have high sharedness because all these patterns have a value of centralization equal to zero (all the nodes in each network have the same number of ties pointing at them). This means that, in these three groups, all members are equally influential on their peers. However, these three patterns differ considerably when we compare their levels of density. While Case A shows high levels of mutual influence among group members (high density), Case G represents a total absence of leadership in the group (density is zero), a pattern we would not consider an example of collective leadership.

Similarly, if we assess sharedness by looking only at density, we fail to see the existing differences between patterns A and B, because both patterns have the same high value of density. Differences between these two patterns emerge when we look at their centralization. In pattern B, one group member is clearly more influential than any other group members, while in pattern A all members have the same level of influence on their peers. Thus, high leadership sharedness would correspond to leadership patterns with low centralization and high density.

It should be noticed in this figure that, by definition, a pattern with high density and high centralization is conceptually impossible (the pattern that would correspond to C). By definition, high centralization implies that one person is distinctly more influential than others in the group, that is, that most group members have little influence on others; the typical mutual influence between members of this group cannot be high, therefore, the density cannot be take on high levels.

Leadership distribution
The two measures of collective leadership that evaluate sharedness (centralization and density) describe the pattern of leadership for a specific leader behavior. The second

dimension of the model of collective leadership proposed here, leadership distribution, is a comparison of the leadership patterns across behaviors. Distribution is a dimension proposed in this paper that captures the degree to which different leadership behaviors – charismatic, directive, participative, and supportive – are divided among the committee members so that a different person enacts each behavior. A high level of distribution indicates that group members' leadership is highly specialized, each member using a different leader behavior to influence their team. Necessarily, high distribution implies low levels of sharedness, with each leader behavior concentrated in one or a few individuals. In this case, it is not each behavior what is shared by the group but the leadership of the group in broader terms.

Leadership distribution measures the extent to which the group's dependence on each of its members varies with the leader behavior considered. It builds on the concept of leadership dependence, also proposed in this paper, which is measured by the expression $DE_{ij} = \left(C_{ij} - \overline{C_J}\right)$. DE_{ij} is the team's dependence on member i for a leader behavior j. C_{ij} is member i's centrality using leader behavior j, and $\overline{C}_J$ is the team's average centrality using that same behavior. For a specific leader behavior j, the difference between a particular member's centrality and the group's average centrality is an indicator of the group's dependence on that individual's leadership. For instance, when a group member's charismatic leadership influence is much greater than the group's average, the group shows dependance on this person for charismatic leadership. The group's dependence on one person will be close to zero when others perceive him to be just as influential as everybody else. The team's dependence takes negative values when the person studied is perceived to influence the team less than most of the members in the team.

A high level of leadership distribution – a division of leadership labor in a team – is observed in teams where leadership depends on the influence of multiple team members, each of them using a specialized and differentiated type of leadership from the others. Hence, high levels of distribution are observed when the team's dependence on a specific member varies strongly across behaviors (dependence on that member will be very high for some behaviors but very low for others). Strong differences among a certain person's DE_{ij} levels for different leader behaviors that this individual is specialized on one or a few leader behaviors. Leadership distribution is measured as the extent to which group members are specialized into different leadership behaviors, that is, as the average of all group members' maximum dependence difference across behaviors:

$$D = \frac{1}{n}\sum_{i=1}^{n} \frac{\left|DE_i^M - DE_i^m\right|}{max\left|DE_i^M - DE_i^m\right|} = \frac{1}{n}\sum_{i=1}^{n} \frac{\left|\left(C_{ij}^M - \overline{C}_j^M\right) - \left(C_{ij}^m - \overline{C}_j^m\right)\right|}{max\left|\left(C_{ij}^M - \overline{C}_j^M\right) - \left(C_{ij}^m - \overline{C}_j^m\right)\right|}$$

D is the team's leadership distribution. DE_i^M corresponds to the highest dependence of the team on a member i across all leadership behaviors and DE_i^M the team's lowest dependence on that same person. C_{ij}^M and C_{ij}^m correspond to that member's highest and lowest centrality values across behaviors, respectively. $\overline{C}_j^M$ is the team's average centrality for the behavior j that corresponds to member i's maximum centrality, and $\overline{C}_j^m$, the team's average centrality for the behavior that corresponds to i's minimum centrality. It is necessary to note that low levels of leadership distribution (close to zero) can be observed in multiple patterns of leadership across behaviors (see Figure 2), including groups in which all members participate actively in all leader behaviors (high sharedness in all leader behaviors) but also groups that depend on a single person for

Figure 2.
Leadership patterns with different levels of distribution and sharedness
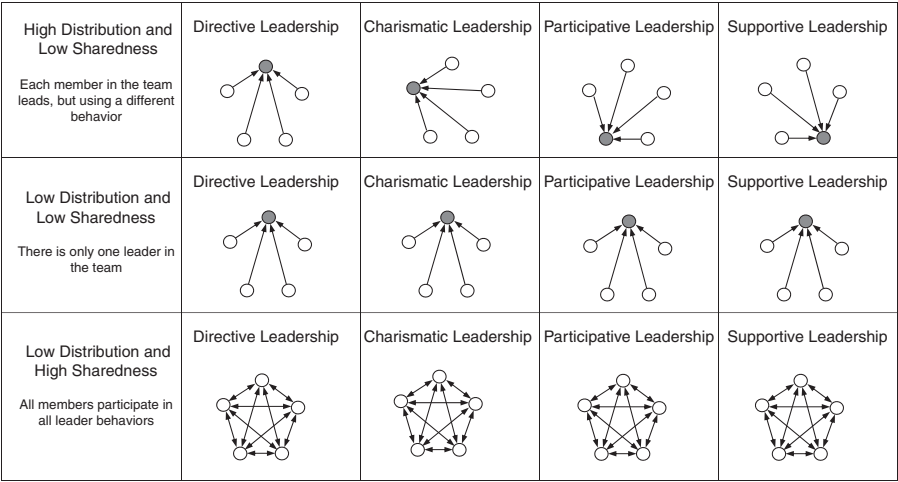
leadership across behaviors (low sharedness in all leader behaviors but concentrated on a single person in the group, that is, low specialization). Hence, distribution alone is not sufficient to fully describe the leadership pattern of a group, but needs to be complemented by the levels of density and centralization that describe the sharedness of each particular behavior. Distribution adds another dimension to the description of collective leadership by comparing the team's leadership pattern across leader behaviors.

Collective leadership and committee performance

The two-dimensional model is applied in this paper to the study of collective leadership pattern influence on committee performance. Despite of the abundance of committees in all types of organizations and despite the unique characteristics of this type of group, committees have received little attention from previous research. The frequency of meetings varies strongly from committee to committee but it is usually low, ranging from weekly to every few (sometimes many) months. This characteristic makes it questionable to extrapolate results from research focussed on groups with more frequent interaction such as consulting teams (Carson *et al.*, 2007), project teams (Hoch *et al.*, 2010), change management teams (Pearce and Sims, 2002), sales teams (Mehra *et al.*, 2006), top management teams (Ensley *et al.*, 2006; Pearce *et al.*, 2003; Waldersee *et al.*, 1995), social development teams (Pearce *et al.*, 2004), and work teams (Hiller *et al.*, 2006).

Committees' typical low interaction may reduce their ability to develop cohesiveness and a collective identity and learn about the abilities of their members, reducing their ability to develop an effective and coordinated pattern of collective leadership (Fletcher and Kraüfer, 2003; Hambrick, 1994). For this reason, authors have questioned the effectiveness of collective leadership for committees (Berkowitz, 1953; Filley, 1970). However, the most successful committees are those that have highly participative members in decision-making by contributing to it with ideas, asking questions, and expressing their opinions about others' contributions (Bales, 1954). In fact, committees could be a natural setting for a collective leadership pattern to thrive because of their usual participatory nature. The multidimensional model of collective leadership facilitates the exploration of the patterns that result in higher levels of committee performance (see Figure 3).
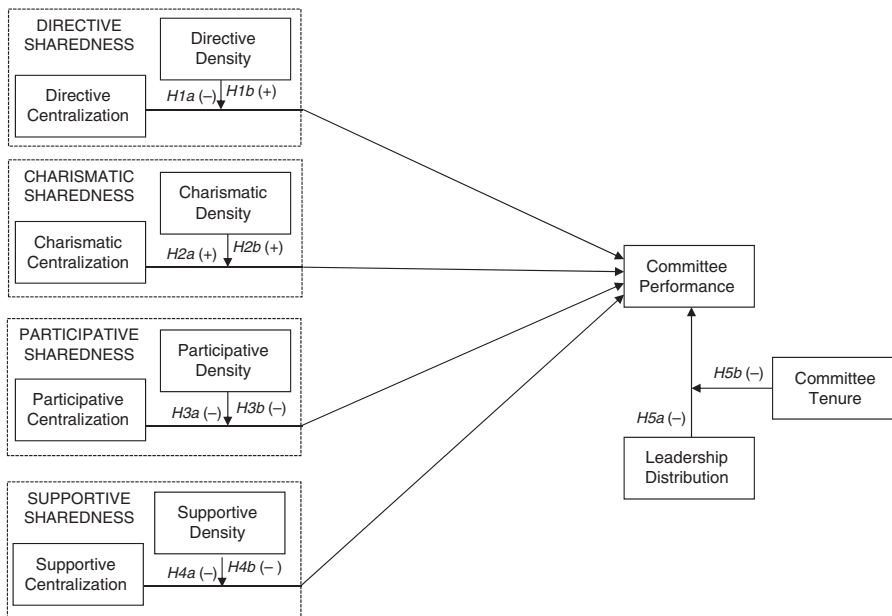
Figure 3.
Model of regression
analyses tested

Sharedness of leader behaviors and committee performance
Different collective leader behaviors have been found to influence group performance.
This is the case of collective charismatic leadership. A group has high charismatic
leadership sharedness when several of its members participate in establishing a vision
for the team, emphasizing the importance of the team for the attainment of common
goals, and questioning existing ways of accomplishing these goals. Prior research has
provided support for the positive effects of charismatic collective leadership on
multiple aspects of team effectiveness, including job satisfaction (Bowers and Seashore,
1966), change management team's effectiveness (Pearce and Sims, 2002), and new
venture growth (Ensley *et al.*, 2006). These results support the notion that a group can
establish a stronger sense of purpose and direction when all members of the group
participate in debating and developing a vision. In this situation, all team members'
participation in collective leadership is also likely to enhance their understanding of the
challenges and opportunities faced by the team (Bales *et al.*, 1978).

While developing high charismatic sharedness may be challenging for committees
because of their usual less frequent interaction (Fletcher and Kraüfer, 2003), active
members in this leader behavior are likely to develop a better understanding of the task
and feel motivated to contribute to the team with new ideas for task completion, all of
which are essential for high committee performance. Thus, we predict that charismatic
leadership sharedness is positively related to committee performance. It must be noted
here that charismatic sharedness is high in patterns of charismatic leadership
characterized simultaneously by low centralization (all committee members have
similar levels of influence on their team) and high density (high average influence
between committee members):

H1a. Charismatic centralization is negatively associated to committee performance.

H1b. Charismatic density moderates the relationship between charismatic centralization and committee performance, so that their negative relationship is stronger for high values of charismatic density.

High directive leadership sharedness involves group members conveying the group's expectations and giving instructions to one another. Prior research has not produced conclusive results regarding the positive or negative effects of these behaviors on team performance. Directive leadership sharedness has been associated to lower levels of change management team effectiveness (Pearce and Sims, 2002) but also to new venture growth (Ensley *et al.*, 2006) and life insurance agency employees' feelings that their time was not being wasted (Bowers and Seashore, 1966). Some specific characteristics of committees are of interest here. On the one hand, committee membership often experiences rotations. In fact, it is not unusual for a committee to replace half or more of its members regularly. On the other hand, committees' tasks are not typically the main activity of its members. It is reasonable to presume that the specific procedures and schedules associated to committee work will not be as well known by all members as it is by the chairperson or facilitator who acts as a liaison for the group. A directive chair will keep the committee aware of tasks that need to be completed and upcoming deadlines, and schedule meetings to meet those. The chair will help new members understand the standards others expect from their work and the rules they need to consider as they collaborate in new tasks. We would therefore expect a committee's performance to benefit from directive leadership patterns characterized by high centralization:

H2a. Directive leadership centralization is positively associated to committee performance.

When attending to directive leadership density, however, high levels of density seem to be particularly necessary for effective performance. Failure to provide specific guidelines and convey clear expectations to committee members can generate feelings of confusion and ambiguity if not all members in the committee are aware of the specifics associated to the task they are completing. Therefore, stronger directive leadership (as measured by directive density) is likely to moderate the relationship between directive centralization and committee performance:

H2b. Directive density moderates the relationship between directive centralization and committee performance, so that this positive relationship is stronger for high values of directive density.

Committees exhibit high levels of participative leadership sharedness when their members demonstrate interest and consider others' opinions in their discussion and observations, and when they encourage others to participate in their discussions. Participative leadership sharedness has been associated with change management team effectiveness (Pearce and Sims, 2002) and new venture growth (Ensley *et al.*, 2006). We expect that the effect of participative leadership sharedness on performance will also be high in the case of committees. It is reasonable to presume that participative leadership will strongly benefit from high levels of sharedness among committee members. Even when a leader insists that all members be given the opportunity to participate and that everyone's opinions be considered, a culture of openness, inclusion and participation will be more effectively fostered by multiple group members. We expect that an open and inviting attitude toward all members' input will benefit committee performance, particularly when their main task involves collective decision making. Thus, we predict that committees with

higher levels of participative sharedness (as measured by higher density and lower centralization in participative leadership) would have greater levels of performance: Unidimensional collective leadership model

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H3a. Participative centralization is negatively associated to committee performance.

H3b. Participative density moderates the relationship between participative centralization and committee performance, so that this negative relationship is stronger for low values of participative density.

Finally, committees with high supportive sharedness are those where all members behave in ways that make the committee work enjoyable for others and make others feel that their needs and problems are being considered. Supportive leadership sharedness has been positively associated with individual job satisfaction (Bowers and Seashore, 1966), but no evidence has been found in past research that links it to team performance. Committee work is typically peripheral to the main professional activity of its members (e.g. a senate committee for a professor, a performance improvement committee for a nurse, a health committee in a city hall), which may reduce the need for supportive behaviors in committees when compared to other teams that carry on tasks that are more central to the professional success and advancement of its members. Still, specific situations may emerge in which support is necessary, for instance if members need to miss or reschedule a meeting or be assigned less workload because of other pressures outside the committee. Committees whose members feel that their personal needs and specific situations are being taken into consideration by their peers (and not only the chairperson) are more likely to be experience greater collective commitment, positively influencing committee performance (Conway and Briner, 2012). Hence, we predict that committees with higher levels of supportive sharedness would have greater levels of performance:

H4a. Supportive centralization is negatively associated to committee performance.

H4b. Supportive density moderates the relationship between supportive centralization and committee performance, so that this negative relationship is stronger for low values of supportive density.

Distribution of leader behaviors and committee performance
There is scant empirical research on distributed leadership (Barry, 1991; Waldersee *et al.*, 1995). Waldersee *et al.* (1995), conducted a case study in which the most successful change management teams were those where the hierarchical leader, often in charge of task-oriented roles, was complemented by a second leader, typically lower in the hierarchy of the firm, who carried on a relationship-oriented role. The establishment of permanent leadership roles among group members has been found to have positive effects on individual outcomes, generating greater role clarity and lower feelings of frustration and ambiguity within in the team (Katz and Kahn, 1978; Mohammed and Dumville, 2001). Burke *et al.* (2003) explain that the emergence of an effective leadership distribution depends on the group's ability to generate a common understanding of the specific leadership skills of each of its members, that is, a "shared mental model" of the team leadership skills (Burke *et al.*, 2003). Committees are likely to need a longer period of time than other teams to generate a shared understanding of the leadership qualities of its members due to their little interaction. Consequently, a split of leadership roles is likely to generate less effective patterns of collective committee leadership. This circumstance becomes even more acute when the committee experiences frequent changes in its membership. In such cases, the group will benefit from members' role flexibility and role

sharing rather than role specialization. In this way, members can adapt their roles to the needs of the team based upon who is in attendance at a particular meeting (Benne and Sheats, 1948). It is to be expected, however, that as committee members interact and spend time with each other, they will have a better understanding of each other's strengths and this negative effect will be less important. Hence, we predict that leadership distribution will have a negative effect on committee performance, but this relationship will be moderated by the average tenure of committee members:

H5a. Leadership distribution is negatively associated to committee performance.

H5b. Committee members' average tenure moderates the relationship between leadership distribution and committee performance, so that this relationship is weaker for higher levels of tenure.

Methods
Sample and data collection
The sample included 28 committees from higher education, local administration, health, and not-for-profit organizations. The median committee size was ten members, varying from three to 16 members, and a majority of respondents were females (64 percent), educated (75.5 percent had at least a college degree), and 51 years old (ranging from 20 to 78 years old). The surveys asked committee members to respond to rate the leadership influence that each of their peers had on them, considering multiple leader behaviors. The chair rated the committee's performance in a separate questionnaire. Missing data were replaced by the mean in the computation of leadership centrality values for the four leader behaviors. For other variables, listwise deletion was selected to treat missing data considering that this is the method that yields least biased results, and that the missing data are MCAR (missing completely at random). Centralization, sharedness, and distribution scatterplots were generated that helped identify two outlier committees in the sample. After a careful study of the dynamics observed during the meetings, both committees were eliminated from the sample. The elimination of these two committees resulted in a final sample size of 26 committees.

Measures
All the constructs in this paper were measured on seven-point Likert scales with possible responses ranging from 1 (strongly disagree) to 7 (strongly agree).

Pattern of leadership. Members' perceptions of their peers' leadership were analyzed using social networks. For this paper, we relied on path-goal theory as a widely recognized theory that groups leader behaviors into four categories: directive, goal oriented (or charismatic), supportive, and participative (specific items are provided in Table II; House and Mitchell, 1974; House, 1996). These ratings were used to compute the three model properties of the collective leadership pattern discussed above, centralization and density, for each leader behavior and distribution across leader behaviors.

Team performance. Performance was evaluated using a five-item scale proposed by Zellmer-Bruhn and Gibson (2006) adapted to committees, assessing the extent to which the committee accomplished its objectives, met its deadlines, fulfilled its mission, satisfied their expectations for a job well done, and finally, the extent to which the committee performance was high. Evaluations of performance were gathered for each committee from a supervisor or chair who was in a position to evaluate the output of the committee. The reliability for this measure was $\alpha = 0.90$.

Item	Charismatic lead	Directive lead	Participative lead	Supportive lead
This committee member approaches a new project or task in an enthusiastic way	0.77**			
This committee member stresses the importance of our committee to the larger organization	0.82**			
This committee member questions the traditional way of doing things	0.56**			
This member helps provide a clear view of who and what our committee is	0.86**			
This committee member helps explain the level of performance, that is expected of other members		0.85**		
This committee member helps explains the quality of work, that is expected of other members		0.90**		
This committee member helps explain what is expected from other members in their jobs		0.88**		
This committee member helps give others instructions about how to do their work		0.87**		
This committee member gives serious consideration to what other members have to say			0.85**	
This committee member asks others for suggestions on how a project should be advanced			0.85**	
This committee member tries to get others involved in discussion of problems			0.78**	
This committee member is willing to modify a proposal when a member has strong objections against it			0.76**	
This member helps make our committee work more pleasant				0.81**
This committee member maintains a friendly working relationship with other members				0.88**
This committee member behaves in a manner which is thoughtful of other members' personal needs				0.91**
This committee member looks out for other members' personal welfare				0.79**

Note: **$p < 0.01$

Table II.
Leader behavior items and factor loadings for confirmatory factor analysis

Team tenure. In this paper, team tenure is defined as the number of years that individual members reported membership to the team and is calculated as the average of these individual values (Wiersema and Bantel, 1992).

Control variables. We controlled for various team characteristics that have been associated to team performance in past research: team size, team tenure, and tenure diversity.

Results

There were high and significant correlations among the densities of the four leader behaviors, all greater than 0.60 (see Table III). Values over 0.80 were found for the correlations between charismatic leadership and directive leadership densities and between charismatic and participative leadership densities. This result suggests that the level of mutual influence among committee members is similar across different

Table III.
Descriptive statistics, Pearson correlations, and reliabilities of variables at the individual and team levels

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Individual-level variables																				
1. Charismatic leadership centrality	5.23	0.68	(0.83)																	
2. Directive leadership centrality	5.16	0.79	0.84**	(0.93)																
3. Participative leadership centrality	5.40	0.67	0.84**	0.68**	(0.89)															
4. Supportive leadership centrality	5.57	0.71	0.69**	0.49**	0.82**	(0.91)														
Team-level variables																				
6. Team size	9.77	3.70																		
7. Average team tenure	3.39	2.34						0.06												
8. Team tenure diversity	2.99	2.14						0.27**	0.51**											
9. Charismatic leadership centralization	0.16	0.05						−0.34**	−0.20**	−0.44**										
10. Directive leadership centralization	0.19	0.06						−0.08	−0.30**	−0.57**	0.58**									
11. Participative leadership centralization	0.16	0.06						−0.46**	−0.12	−0.22**	0.70**	0.52**								
12. Supportive leadership centralization	0.15	0.05						0.18**	0.44**	0.52**	0.12	−0.14*	0.32**							
13. Charismatic leadership density	5.45	0.29						−0.22**	0.09	−0.07	−0.36**	−0.34**	−0.39**	−0.32**						
14. Directive leadership density	5.42	0.34						−0.05	−0.16*	0.14*	−0.57**	−0.46**	−0.45**	−0.17*	0.84**					
15. Participative leadership density	5.57	0.34						−0.23**	0.21**	0.00	−0.14*	−0.27**	−0.37**	−0.24**	0.89**	0.64**				
16. Supportive leadership density	5.73	0.35						−0.35**	−0.05	−0.22**	0.25**	−0.06	−0.15*	−0.55**	0.77**	0.55**	0.75**			
17. Leadership distribution	0.06	0.02						−0.30**	0.08	0.06	0.25**	0.34**	0.54**	−0.06	−0.19**	−0.25**	−0.08	0.20**		
18. Team performance	5.95	0.91						0.04	0.14**	0.23**	−0.24**	−0.15*	−0.15*	0.08	0.54**	0.38**	0.59**	0.47**	0.02	(0.90)

Notes: Cronbach's α are included between parentheses for the surveyed scales. $*p < 0.05$; $**p < 0.01$

leader behaviors. The values of density for all leader behaviors were comparable to those obtained by prior empirical research (Carson *et al.*, 2007).

Significant correlations were observed between committee performance and the eight measures of sharedness in the team (centralizations and densities for all four leader behaviors) but no correlation was significant between committee performance and leadership distribution.

Preliminary analyses
Results of a confirmatory factor analysis yielded a reasonable fit for the four leader behavior measurement model (χ^2 (98) 1268.8, $p < 0.01$, CFI $= 0.91$, TLI $= 0.90$, RMSEA $= 0.11$, SRMR $= 0.06$), although RMSEA exceeded the cutoff value 0.06 (Jackson *et al.*, 2009). This model explained more variance than a theoretically sound two-factor model consisting on task-oriented and relationship-oriented behaviors (Bales, 1954; χ^2 (103) $= 1841.6$, $p < 0.01$, CFI $= 0.88$, TLI $= 0.86$, RMSEA $= 0.13$, SRMR $= 0.09$) and a one-factor model (χ^2 (116) $= 12441.9$, $p < 0.01$, CFI $= 0.12$, TLI $= 0.09$, RMSEA $= 0.32$, SRMR $= 0.50$). The factor loadings for this confirmatory factor analysis are included in Table II. The internal consistency of each scale was supported by Cronbach's α values for all scales over 0.8 (Murphy and Davidshofer, 1988). Interrater agreement and interrater reliability were calculated for ratings of committee members' leader behaviors (see Table IV). Interrater reliability r_{wg} ranged from 0.59 to 0.63, below the recommended value 0.7, and interrater agreement intraclass corrections (ICC(2)) indices ranged from 0.39 to 0.43, also below the recommended level 0.7 (Klein and Kozlowski, 2000). These results could affect the validity of the aggregation of ratings of members' leadership influence to the group level.

Test of hypotheses
We used stepwise regressions to test our hypotheses. Due to the high correlations between the densities of the four leader behaviors and to prevent problems of collinearity, each leader behavior was analyzed in a separate regression model. In each model, the control variables were introduced in a first step, followed by centralization and density of the corresponding leader behavior in the next step, and in a final step the interaction effect between density and centralization was introduced (see Table V).

Regarding *H1*, when charismatic centralization and density were added, centralization was a significant negative predictor of committee performance ($\beta = -0.356$, $p < 0.001$), giving support to *H1a*. In the third step of this model, the interaction effect between density and centralization was not found to be a significant predictor of committee performance ($\beta = 0.342$, $p = 0.069$), failing to support *H1b*. The directive leadership regression analysis failed to support *H2a*, where directive centralization was a significant but negative predictor of committee performance ($\beta = -0.198$, $p < 0.01$). Interestingly, though, when introducing the interaction effect between directive centralization and

Leader behaviors	WMS	BMS	*K* (resps/grps)	ICC(1)	ICC(2)	r_{wg}
Charismatic leadership	1.22	2.01	9	0.07	0.39	0.59
Directive leadership	1.23	2.73	9	0.12	0.55	0.59
Participative leadership	1.19	2.08	9	0.08	0.43	0.60
Supportive leadership	1.12	1.96	9	0.08	0.43	0.63

Table IV.
Interrater reliability and interrater agreement indices

Variables	Model 1: charismatic leadership	Model 2: directive leadership	Model 3: participative leadership	Model 4: supportive leadership	Model 5: leadership distribution
Step 1: controls					
Team size	0.109				
Team tenure average	−0.020				
Team tenure diversity	0.208				
Org tenure diversity	−0.408**				
R^2	0.185				
Step 2: main effects					
Centralization	−0.356**	−0.198*	−0.269**	−0.086	
Density	0.052	0.053	−0.009	−0.044	
Distribution					−0.129
ΔR^2	0.111	0.223	0.055	0.006	0.014
Step 3: moderating effect					
Centralization × density	0.342	0.590**	0.599	0.515**	
Centralization × team tenure average					0.000
ΔR^2	0.059	0.038	0.040	0.112	0.000
Total R^2	0.315	0.287	0.002	0.069	0.200

Notes: $n = 136$. *$p \leqslant 0.05$; **$p \leqslant 0.01$

Table V.
Standardized β weights for moderating effects on team performance

directive density in the regression model, the interaction was a significant positive predictor of performance ($\beta = 0.590$, $p < 0.01$), giving support to *H2b*. Centralization was no longer a significant predictor of performance ($\beta = -0.355$, $p = 0.723$). In the participative regression analysis, participative centralization was found to negatively predict committee performance, providing support for *H3a* ($\beta = -0.269$, $p < 0.001$). The interaction between participative centralization and density was not a significant predictor of performance, so the analysis failed to support *H3b* as ($\beta = 0.119$, $p = 0.550$). Supportive centralization was a negative but not significant predictor of committee performance, failing to give support for *H4a* ($\beta = -0.086$, $p = 0.442$). The interaction effect between supportive density and centralization was a significant but positive predictor of performance, against *H4b* ($\beta = 0.515$, $p < 0.001$). Finally, *H5a* and *H5b* are not supported, as neither distribution ($\beta = -0.129$, $p = 0.131$) nor the moderated effect of team average tenure on team distribution ($\beta = 0.000$, $p = 0.995$) are significant predictors of committee performance.

Discussion and conclusions

Our study advances prior collective leadership literature in several ways. First, we proposed a model of collective leadership that incorporates multiple dimensions of social networks, which facilitates empirical comparisons of the effectiveness of different dynamics of collective leadership in groups. Second, our results demonstrate that leadership density is a significant moderator of the relationship between leadership centralization and performance. Thus, our study advances prior literature that used either density or centralization to operationalize shared leadership by showing that both measures are complementary and, together, they advance our understanding of the internal dynamics of collective leadership. Finally, our results demonstrate that equal participation is often beneficial for committee performance. In the particular case of

charismatic and supportive leadership, however, equality is not sufficient to drive committee performance, but it is members' equally strong contributions to these leader behaviors what has a positive impact on this group outcome.

Theoretical implications
Despite the discussion of alternate forms of collective leadership in recent conceptual literature (Crevani *et al.*, 2007; Denis *et al.*, 2012; House and Aditya, 1997; Yukl, 2010), empirical literature continues to operationalize collective leadership as a single form of leadership. The model proposed in this study used social networks methodology and advanced prior literature by assessing multiple network properties that provide a more detailed description of the characteristics of groups' collective leadership and analyzing their association to group performance. The social networks methodology provides complex descriptions of leadership patterns and therefore it is very appropriate to explore collective leadership internal dynamics. Past research has used social networks to operationalize collective leadership, but always through the calculation of a single property of the network. The use of complementary properties of social networks helps us analyze internal dynamics of collective leadership. While our findings support prior research that associates collective leadership to higher levels of group performance (Hoch *et al.*, 2010; Pearce and Sims, 2002; Small and Rentsch, 2010), our results also identify specific patterns of collective leadership associated to greater levels of performance in a context of committees.

Leadership sharedness was operationalized by two properties of collective leadership networks that had been previously used as alternate social networks measures of collective leadership, centralization and density (Carson *et al.*, 2007; Mayo *et al.*, 2003; Small and Rentsch, 2010). Our findings confirmed that both properties, centralization measuring the inequality of contributions to leadership for a specific leader behavior and density measuring the total volume of that leader behavior used by all members in the group, are not alternate measures of the same construct but complementary measures that enhance our understanding of internal dynamics of collective leadership.

Centralization was found to be a significant predictor of committee performance for charismatic and supportive leadership but only when this relationship was moderated by density. This result suggests that the most effective committees are those that generate a culture of equal participation in charismatic and supportive leadership but only when equal participation is strong by actively collaborating in building an identity for the committee, finding new ways to accomplish their tasks that challenge the existing, and generating an inviting and supportive environment for their peers. That is, in charismatic and supportive leadership, equality is insufficient for performance but active engagement of committee members is necessary to establish a common vision of the task that unifies members' efforts and building a culture of support for members and their unique voices. This result supports prior findings by Carson *et al.* (2007), who identified a strong internal team environment as an important antecedent for collective leadership in consulting groups. This strong environment was characterized by a clear and unifying direction and a strong sense of interpersonal support for individual members and their contributions. In our model, the analysis of the leadership pattern suggests that these antecedents may be, instead, consequences of collective charismatic and supportive leadership provided by members of the group, which foster the development of a cohesive internal environment. Further research

should focus on the exploration of collective commitment to the group as a potential mediator of the relationship between collective charismatic and supportive leadership and group performance (Conway and Briner, 2012).

Centralization of directive leadership significantly predicted committee performance but this relationship was not moderated by directive density. Committees where all members contributed to explain the tasks and expectations of others showed higher levels of performance, independently of whether these behaviors were highly active and frequent or whether they were equal but rare. A similar result was observed in collective participative leader behaviors, where centralization was an important and negative predictor of committee performance, but the relationship was not moderated by density. This result shows that group members' equal contributions to fostering a culture of equal participation were more important than the frequency of these contributions. These results suggest that analysis of contingent factors may be needed to determine how much directive or participative leadership are most adequate for group effectiveness in different settings. Contingent theories of leadership were essential in identifying situational factors that make specific vertical leader behaviors most necessary (enhancers) or redundant and unnecessary (substitutes). For instance, tasks that are inherently ambiguous and where performance demands are unclear or providing the leader with access to key information or connections were identified as important enhancers of vertical directive leadership (House, 1996; Howell et al., 1990). The quality requirement of a decision and the need for decision acceptance by subordinates were found to significantly enhance the need for participative behaviors in the vertical leader (Vroom and Yetton, 1973). Further research should analyze contingent factors that affect the effectiveness of collective participative and directive leadership patterns.

Finally, we developed a new measure for leadership distribution that compared networks across leader behaviors to identify patterns of division of leadership labor. Our results showed that a division of labor was not beneficial for performance, even in those committees that had long collective tenure, having had time to develop a shared understanding of the specific leadership strengths of each member of the group. This result challenges the assumption that the best leadership of a group is attained by combining the leadership strengths of each individual in the group (Barry, 1991; Burke et al., 2003; Waldersee et al., 1995). Instead, members' collaboration in all aspects of the group's leadership was found to be most important in the specific context of committees.

Managerial implications

This study has important implications for the design and management of groups and, more specifically, for the management of committees. First, the results suggest that building a culture of equal and active contribution to charismatic and supportive collective leadership is of great importance to attaining higher levels of group performance, a result that is consistent with prior research (Carson et al., 2007; Conway and Briner, 2012). Organizations can promote greater committee member engagement in both charismatic and supportive leadership through selection and training, ensuring that committees have tools that help them establish common goals and develop interpersonal skills and supportive membership roles (Benne and Sheats, 1948; Larson and Lafasto, 1989).

Second, given the importance for group performance of equal member participation in collective leadership, organizations should pay special attention to problems of inequality in committees. Despite the expectation that collective leadership involves more equal participation of all members (Heilman and Haynes, 2005), past research has

challenged this expectation and demonstrated that existing gender inequalities in group leadership, where men were perceived to contribute to leadership significantly more than women, were just as important in groups with high levels of leadership sharedness as they were in groups with low leader sharedness (Mendez and Busenbark, 2015). These inequalities reflect social expectations for leader prototypes that identify effective leaders with "masculine" characteristics such as assertiveness and directive behaviors. Similarly, social expectations may affect the equality of committee members' contributions to leadership for minorities. Organizations should pay special attention to the involvement of women and minorities in the leadership of the group in order to ensure that a unifying culture is built within the team and all members feel equally supported by their peers.

Limitations and future research

The small sample size of this study may have negative effects on the results obtained in the study by lowering the power of its statistical analyses (Schwab, 1999) and can render significant but inaccurate parameters (Kelley and Maxwell, 2003). Additionally, the low ICC(2) may have affected the validity of the aggregation of individual-level centrality values to the team level for the four leader behaviors studied. These results indicate, however, that a significant portion of the variance resides between teams in the variables studied and are comparable to others in the literature (Hirst *et al.*, 2009). A final limitation of the study is the low variance of the distribution that may be responsible for the lack of support for *H5*. The low values of leadership distribution in the sample result from the high values of sharedness across behaviors. Future research would benefit from a more diverse sample of teams that provides greater leadership pattern diversity.

Qualitative analyses of leadership dynamics in groups will help bring light to the relationship between the leadership pattern and group performance considering contingent factors like the frequency of interaction and the type of task assigned to the group. Additionally, the effects that time may have on the leadership pattern through a longitudinal study would help improve our understanding of the emergence of distributed and shared roles along the life of the group, also considering contingent factors that may influence these developments.

Finally, future research should explore potential differences in the effectiveness of leadership patterns in different settings. We anticipate the emergence of differences in effective patterns of collective leadership when comparing committees in private and public sector or committees across industries. A comparative study would help identify these differences.

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