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Simon Guive Minaee
Edith Cowan University

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Simon Guive Minaee

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Abstract

Research on leadership typically assumes a single leader who has managerial authority over the group, unit or organisation. Shared leadership is an emerging concept of leadership as a group-level phenomenon. It builds on antecedents such as democratic leadership, semi-autonomous and self-managed work groups, participative decision-making and co-leadership that are typically studied as variations of leadership by a single leader. Shared leadership is seen as more distributed, informal and emergent than these. Recent empirical research shows shared leadership can have beneficial effects on a variety of group process and outcome variables. However, so far its effects on creativity have not been empirically examined. This is surprising, since creativity is an important response to increased competition and rapid change in the business environment. Much creativity research identifies important pre-requisites that are more likely to be found in shared than hierarchical leadership. Improved creativity may be one of the most valuable benefits of shared leadership.

This study provides empirical evidence on this relationship from a naturalistic experiment in which student groups were allowed to self-manage over a three-month creative project. In assessing shared leadership, two methodological innovations were introduced. First, previous studies have either used aggregated measures of group performance, or more recently the measures of group 'degree centrality' (degree of hierarchy) or 'density' (degree of sharing) developed in Social Network Analysis research. However, none of these measures by themselves adequately captures the distinction between hierarchical and shared leadership, although the SNA measures are potentially more precise. Following recommendations of previous

authors, this study explored the combined use of centrality and density to better reflect the underlying construct. A second refinement was to use a general construct of leadership based on Bass and Bass's (2008) extensive literature review, rather than constructs such as transformational leadership that have a narrower theoretical base and tend to assume a hierarchical context. Results from items measuring sharing of Bass and Bass's five 'leadership functions' were compared with a 'global' measure of leadership sharing. Creativity was assessed by a panel of judges who rated the groups' creative outputs (movies), rather than the more common method of rating creativity in the work process.

The results provide evidence for the hypothesised link between shared leadership and creativity that, although qualified by aspects of the study design, suggests further research is worthwhile. Implications for future research on both leadership and creativity are explored, along with consequences for the practice of management. The issues of how to best measure shared vs. hierarchical leadership, and how much a construct can reflect both forms of leadership, are of particular relevance to the future development of this field.

In summary, this study offers the first evidence directly linking shared leadership to work group creativity, and suggests improvements to current methods for measuring the extent of leadership sharing in a group.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

(i)   Incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

(ii)   Contain any material previously published or written by another person except where due reference is made in the text; or

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Acknowledgements

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Chapter One
Introduction

1.1 Hierarchical vs. Shared Leadership

Academic research on leadership generally refers to the use of interpersonal influence by supervisors or managers to improve performance in their unit or organisation. Typically, managers with influence skills are found to achieve better outcomes than those using formal management behaviours alone (Yukl, 2010). Leadership may involve creating psychologically satisfying work goals, building motivation and encouraging employees to communicate and collaborate as team members, for example (Bass & Bass, 2008). In this view of leadership, a single manager influences his or her subordinates. This hierarchical view underlies most academic theories and public understandings of the concept of leadership.

Today this familiar perspective is increasingly under challenge by the concept of shared leadership, in which social influence and responsibility for work outcomes are shared amongst group members. Although its origins can be traced back at least to Lewin, Lippitt and White's (1939) concept of democratic leadership, researchers have only recently begun to systematically investigate the uses, benefits and drawbacks of shared leadership in empirical studies. The evidence to date attributes many advantages to work-group functioning, including improved problem-solving capabilities (Pearce, Yoo, & Alavi, 2003), better implementation of organisational change (Denis, Lamothe, & Langley, 2001) and greater team member satisfaction (Avolio, Jung, Murry, & Sivasubramaniam, 1996). Shared leadership has also been linked to improved sales (Mehra, Smith, Dixon, & Robertson, 2006), revenue

(Ensley, Hmieleski, & Pearce, 2006), and customer service (Carson, Tesluk, & Marrone, 2007).

So far, however, researchers have not examined the effect of shared leadership on creativity. This is surprising given the growing importance of creativity to organisations and its theoretical links to shared leadership. Creativity becomes increasingly valued in a rapidly changing and highly competitive business environment where organisations must constantly adapt and innovate to survive (Amabile, 1996; Tepper, 2002). Creativity is also increasingly relevant to many advanced economies in which creative industries are expanding to meet more sophisticated consumer needs, and manufacturing and service jobs are lost as work relocates to countries with cheaper labour and resources (Howkins, 2002). However, much research on creativity shows that it depends on work conditions more likely to be found in shared than traditional hierarchical environments. These include personal autonomy, a supportive group climate, participation in decision-making, open communication and collaboration, and diversity of ideas and skills (see Chapter 2). Creativity may therefore be one of the more important benefits of shared leadership.

This study compares the effects of shared and traditional leadership on creativity and associated aspects of group performance. Student groups were asked to make a creative movie over a three-month period and allowed to choose their own approach to group leadership. The degree of sharing was assessed using two measures from Social Network Analysis, a set of quantitative tools for analysing social relationships that have not previously been combined in leadership studies. The creativity of the groups' movies was assessed by both an independent panel and group member self-

ratings. The primary hypothesis was that greater leadership sharing would lead to greater creativity in the group's movies.

Below, the concepts of traditional and shared leadership are compared and the rationale for linking shared leadership to creativity outlined. The research aims are then identified and an overview of the other chapters provided.

1.2 The Concept of Hierarchical Leadership

Many definitions of leadership have been proposed, mostly referring to a process of informal interpersonal "influence" (e.g., Yukl, 2010) that induces people to be willingly guided by the leader (Merton, 1969; Katz & Kahn, 1978). Leadership is typically contrasted with management, which signifies the use of organisational authority to formally direct staff and control resources. The most prominent contemporary theory of leadership reflects this distinction by proposing that 'transformational' leaders improve organisational outcomes by attending to employees' psychosocial needs, providing intellectual stimulation, inspiring employees, and acting as role models. In contrast, non-leader managers (or 'transactional leaders') use formally sanctioned rewards and punishments to control employee behaviour (Avolio & Bass, 1991; Burns, 1978).

Most scholars agree that leadership is important to groups and organisations (Yukl, 2010), and empirical evidence of its benefits has accumulated over many decades. For example, employees with effective leaders are more satisfied with their jobs (Becker, 1992) and outperform peers with less effective leaders (Becker, Billings, Eveleth, & Gilbert, 1996). Well-led work groups are more productive (Lawshe &

Nagle, 1953; Thomas, 1988), adaptable (Maccoby, 1979) and produce higher quality outputs than those lacking leadership (Yukl, 2010).

However, virtually all of these studies focus on a single, fixed, 'hierarchical' leader who also has formal management authority. Hierarchical leadership does not exist as a specific construct but virtually all theories and empirical studies of leadership *assume* a single, fixed leader with formal management authority. As leadership is usually conceptually separated from formal power over the organisation's resources - or 'headship' (Gibb, 1954) - and the associated behaviours of coordinating, controlling, commanding and planning (Fayol, 1949), most research confounds these two concepts. Leaders may have formal power – although a few studies have looked at non-manager leaders (e.g. Neubert & Taggar, 2004; Pielstick, 2000) - but their personal and behavioural characteristics provide an alternative source of influence over group members (Bingham, 1927; French & Raven, 1959). In the hierarchical perspective, this influence stems solely from managers and spreads unidirectionally: leaders aim to improve subordinates' performance and subordinates are expected to follow the leader rather than contribute directly to group leadership (Bennis, 1959). Hierarchical leaders occupy a unique position at the centre of the group (Krech & Crutchfield, 1948), with sole responsibility for uniting group members (Babikan, 1981; Gronn, 1997), focusing their energies (Bernard, 1927) and maintaining organizational structures, strategies and cultures (Krech & Crutchfield, 1948). However, this is not the only form of leadership in an organisation.

1.3 The Concept of Shared Leadership

The modern concept of shared leadership has many historical antecedents but has only recently come into prominence as organisations have begun responding to the

changing business environment by experimenting with practices such as employee participation and semi-autonomous work groups (see Chapter 2). As work tasks become more fragmented and specialized due to technological change and increasing competition, hierarchical management has become too slow and inflexible for many types of work (Pearce & Manz, 2005). One response has been to organize workers into teams, particularly in industries where project work is common, such as construction, some areas of manufacturing, and many professional occupations. In teams, individuals have greater collective responsibility for outcomes. In some environments they have also been given greater autonomy, participation in decision-making and, ultimately, the opportunity to share leadership and responsibility as they choose (Lawler & Finegold, 2000; Raelin, 2005).

Shared leadership is potentially applicable to a wide range of work contexts but has been considered particularly relevant to some. One is where workers are traditionally accorded high levels of autonomy, for example in many professional occupations (Marchington, 2000). Another is the creative industries (Pearce, 2004), since shared leadership can provide the conditions necessary for creativity noted above, including worker autonomy and a climate supportive of collaboration and dialog between group members of diverse backgrounds an experience. Shared leadership is also applicable where team members have highly specialized skills or roles and communication and collaboration between members is critical (Carson, Tesluk, & Marrone, 2007), such as the pharmaceutical, electronics, chemicals, software, and fast-moving consumer goods industries (Pearce & Manz, 2005).

Shared leadership is generally not clearly defined except in contrast to hierarchical leadership, but has evolved as a useful concept for integrating a range of practices in

which hierarchical power is absent or reduced, including co-leadership, participative management, democratic leadership, empowerment and semi-autonomous or self-managed work groups. The essence of shared leadership appears to be in its informal, dynamic and emergent nature, which allows leadership to develop and change amongst group members according to task requirements, providing high levels of autonomy, participation and cooperation (Gibb, 1954; Pearce, Manz, & Sims, 2009; Yukl, 1989). Chapter 2 describes the evolution of this concept, and its differences from hierarchical leadership, in more detail.

However, shared leadership is not an all-or-none practice; rather, groups can have degrees of sharing. At one extreme, group members share equal responsibility for outcomes and may exert equal influence. More often, as task needs change individuals with particular skills take leadership and sharing is maintained over time as many or all group members participate. Closer to the hierarchical extreme are groups where only one or two members act as leaders. Thus shared and hierarchical leadership can be seen as endpoints of a continuum rather than as discrete practices (Gronn, 2002).

The premise underlying shared leadership is that it encourages group members to collaborate with rather than compete with or ignore each other as often happens in hierarchical leadership (Lewin, 1947). A leader does not exercise greater influence than other members unless that suits the group. Members must therefore communicate regularly, recognize the special expertise of others and share responsibility for group processes and outcomes, where hierarchical leadership requires a single person to actively instil such behaviours in the others. In shared

leadership, group members must find the necessary skills amongst themselves, and each therefore has a direct personal investment in group outcomes.

Shared leadership is therefore not so much an extension of hierarchical leadership to multiple persons as a distinct phenomenon in which leadership works at the group rather than individual level. Kurt Lewin identified this in his pioneering studies of democratic, autocratic and laissez-faire leadership (Lewin et al., 1939). Lewin saw groups as entities with a life of their own, more than the sum of the individuals involved, and leadership as an outcome of their internal interpersonal "dynamics" (Lewin, 1947). Lewin considered this type of leadership fundamental to solving complex social problems, in and out of the workplace. In industry democratic leadership 'of the members by the members' was expected to optimise a group's capabilities and outcomes (Lewin, 1947).

Conversely, Lewin recognized that hierarchical leadership discouraged group members from valuing each other's expertise, communicating with and supporting each other, taking personal responsibility for group outcomes, participating in setting the group's direction, and managing its processes, negatives also recognized by modern theorists (e.g., Yukl, 1989). Such problems inhibit adjustment when external contingencies require changing the group's operations (Lawler, 1986; Leana, 1985). The current resurgence of interest in shared leadership reflects both its value in creating positive social dynamics and its greater responsiveness to change.

1.4   The Spread of Shared Leadership

Lewin's studies and the subsequent influence of human relations, humanistic psychology and organisational design movements encouraged industry experimentation with many related practices. These include teamwork, semi-autonomous or self-managed work groups, participative decision-making, worker empowerment and co-leadership. Shared leadership is therefore a prominent characteristic of "post-industrial" organizations (Seers, Keller, & Wilkerson 2003, p. 96).

Perhaps the best known of these antecedents is the self-managed work group (SMWG). This is a permanent or temporary arrangement in which group members are collectively given the authority, responsibility and control over group processes previously reserved for hierarchical leaders (Fisher, 1993). Evolving from socio-technical systems research (Emery & Trist, 1969), the SMWG concept was particularly applied to manufacturing and other mechanised work contexts, such as consumer goods plants (Osburn, Moran, Musselwhite, & Zenger, 1990; Walton, 1977) and coal mining (Trist, Susman, & Brown, 1977).

In recent times shared leadership has become increasingly common in IT, manufacturing, creative, health and service industries (Ensley, et al., 2006; Judge & Ryman, 2001; Pearce, 2004). Organisations as diverse as the computer giant IBM (Fielding, 1999), the power and automation multinational ABB Group (O'Toole, Galbraith, & Lawler, 2003), manufacturing company W. L. Gore and Associates (Manz, Shipper & Stewart, 2009), and machinery and appliance manufacturer Semco (Semler, 1993) have incorporated shared leadership principles into their management.

1.5 Aims and Methods of this Study

Shared leadership is expected to improve group creativity because it encourages autonomy, participation in decision-making, communication and collaboration, a supportive group climate and the exchange of diverse ideas – attributes widely found to underpin creativity in studies in and out of the workplace. However, so far shared leadership research has paid little attention to its effects on creativity. In what appears to be the only relevant empirical study, Leana (1985) found student groups with democratic leadership outperformed those with hierarchical leadership on a brainstorming task. Two other studies predict greater creativity under shared leadership than hierarchical leadership on theoretical grounds (Pearce & Sims, 2000; Hooker & Csikszentmihalyi, 2003), but did not test this.

This study addresses this gap by examining the effects of shared leadership on creativity and related variables in student groups making movies in a semester-long project. Groups were given considerable freedom over both the movie content and the group process, and were accountable for the outcome only as a group. The leadership approach of each group was assessed on a continuum between hierarchical and shared. Group members rated the leadership of each other member, and Social Network Analysis (SNA) indices were used to assess the degree of shared and hierarchical leadership. Creativity of the movies, along with two related attributes, was assessed by a panel of judges.

In measuring and linking these variables, three methodological issues presented problems that introduced secondary research aims. A review of the literature on measuring shared leadership revealed significant flaws in existing approaches

(Chapter 2), and suggested a new approach based on combining two SNA indices, group degree centrality and density. These measures have only recently been used in shared leadership research, and while some authors have called for the use of both indices so far all empirical studies have used only one of them. Chapter 2 identifies some problems with this. A subsidiary aim of this study was therefore to investigate the theoretical and practical value of the use of both measures.

A second problem in existing shared leadership studies is the common use of constructs developed for hierarchical leadership environments, notably transformational leadership (e.g. Avolio & Bass, 1991). These researchers ask group members to rate the whole group's use of the behaviours identified with the construct, a very approximate indication of leadership sharing since it does not directly measure the degree of hierarchy in a group. Further, these constructs were developed for hierarchical leadership; different leader behaviours might be relevant to shared leadership if it is a qualitatively different phenomenon as argued by Lewin and others (see Chapter 2).

A second subsidiary aim of this research therefore involved finding a general construct of leadership not allied to a specific theory developed for hierarchical contexts. Although few theorists have specifically taken such a broad view, Bass and Bass's (2008) taxonomy of leadership roles draws on an extensive literature review and appears to offer a good approximation to this. Bass and Bass's five leadership functions were therefore used to create a rigorous but general measure. This was compared with an alternative approach, common in SNA and other shared leadership studies, of rating leadership with a single 'global' questionnaire item not based on dimensions of a construct.

A third subsidiary aim involved measuring the highly subjective concept of creativity for each group's movie with as much objectivity as possible. Studies of creativity tend to measure group processes or individual behaviours, typically with self-rating scales, but in a business context the group product is more important. A review of the literature suggested Amabile's (1982) Consensual Assessment Technique, which relies on ratings of an independent panel of judges, as the best measure of creativity in group products.

In summary, this study primarily aims to empirically test the hypothesized link between shared vs. hierarchical leadership and the creativity of group products. This necessitated examining the joint use of two SNA indices, developing a measure of different facets of leadership suited to the shared leadership context, and finding a reliable method of evaluating the highly subjective concept of creativity.

1.6 Structure of the Thesis

The next chapter reviews the literature on shared leadership, including the definition and historical evolution of the concept, previous empirical studies, and the different approaches to its measurement including Social Network Analysis. It also examines taxonomies of leadership behaviours, including Bass and Bass's (2008) taxonomy that appears to offer a more rigorous approach to measuring leadership in a shared context. Finally the review examines the nature of creativity and its role in organisations, its measurement, and its links with shared leadership.

Chapter 3 describes the research methods, including the participants, experimental design, measures of shared leadership and creativity, research procedure and

methodological limitations of the study. Chapter 4 presents the study results, including descriptive statistics of the independent and dependent variables, the relationship between centrality and density, hypothesis tests based on several different ways of measuring shared leadership, and observations concerning the three secondary aims described above.

Chapter 5 discusses these findings in relation to both the research aims and previous studies of shared leadership and creativity, exploring their theoretical implications for future research, their qualifications and their limitations. Chapter 6 concludes the study by highlighting its theoretical contributions to the literature, the methodological lessons for future researchers, and its implications for management practice.

Chapter Two
Literature Review

2.1 Introduction

This review examines the conceptual definitions of shared leadership and creativity, the different approaches to measuring them, and the findings of recent studies of shared leadership and its connection with creativity. It begins by identifying the historical antecedents of shared leadership and reviewing recent empirical studies. These take two approaches. One uses group-level measures of theoretical constructs of hierarchical leadership such as transformational leadership, assuming higher ratings represent greater sharing. The second uses the individual-level measures of the actual dispersion of leadership in a group developed by Social Network Analysis researchers. While the SNA measures are potentially more precise, so far no studies have used them in a way that accurately reflects the contrast between shared and hierarchical leadership.

A second problem with many current studies is their reliance on constructs that assume hierarchical leadership by a single person having managerial authority. The review therefore examines more general taxonomies of leadership as a preliminary to developing a broader measure of leadership sharing. The five leadership roles or functions identified by Bass and Bass (2008) are identified as the most promising construct for this purpose.

The chapter then turns to creativity research, examining the concept and the different perspectives of it as a trait, a process, a response to the environment, or a product.

The measurement of creative products is examined to identify the best method for this study. Smaller bodies of research on two other dependent variables, task focus and professionalism, are also reviewed.

In the final section, key linkages between the independent variables – measuring sharing of leadership and the five leadership functions - and the three dependent variables – creativity, task focus and professionalism - are identified from the literature. These form the theoretical framework for this study.

The studies reviewed below primarily refer to 'groups' although some describe 'teams'. 'Team' often refers to a formally-defined workgroup with specific objectives (Bass & Bass, 2008; Hackman & Johnson, 1993), in which members share mental models regarding the team's objectives (Salas, 1993), identify with the team, and may have specialised roles (Hughes, Ginnett, & Curphy, 1993). However, this distinction is not universally intended and this review therefore uses the more inclusive term 'group'. Shared leadership is a concept that has been applied to both formal teams and less tightly structured workgroups.

2.2 Defining Shared Leadership

As noted in Chapter 1, leadership is often defined in terms of social or interpersonal influence. For example, Yukl (2010, p. 8) defines it as "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared goals". Social 'influence' is often contrasted with the formal organizational authority underpinning the concept of management. Leadership involves interpersonal influence aimed at focusing group members on organizational objectives, for

example by creating a 'vision' of the broader meaning of the group's work, clarifying goals, motivating members, providing constructive feedback, developing members' capabilities and team-building. Management, by contrast, involves the maintenance of operations through allocation of resources and monitoring of inputs and outputs (Bass & Bass, 2008; Dimmock, 1999). In practice, 'leadership' and 'management' are rarely defined in either academic or everyday use and tend to have considerable semantic overlap and ambiguity. Separating the roles of personal influence and organisational authority reduces this.

Most definitions of leadership assume the hierarchical influence of a single manager or supervisor on his or her subordinates (Small & Rentsch, 2010). The alternative concept of shared leadership has existed alongside this mainstream view for many decades, but has only recently led to the systematic study of group members' influence of each other (Gronn, 2002; Pearce & Conger, 2003; Pearce & Sims, 2000; Perry, Pearce, & Sims, 1999). This literature tends to focus on leadership in small groups or teams rather than in larger units or a whole organisation, where sharing may be less common and may have different characteristics.

Shared leadership has been defined in many ways. Carson, Tesluk and Marrone (2007, p. 1219) tabulate seven definitions with three common themes (Table 2.1). First, by definition leadership is "shared", "collective", "distributed", "mutual", "carried out by the team as a whole" or "manifested at the group level" in contrast to groups with a single formal leader. The absence of hierarchy democratises influence and makes the group less centralized (Goktepe & Schneier, 1989; Pearce & Conger, 2003). Groups become relational 'wholes' based on collective achievement and

sharing of responsibility (Fletcher & Kaufer, 2003), where success depends more on the relationships between members than the exemplary effort of one.

Second, some definitions describe a "dynamic", "interactive", "emergent", or "ongoing" process where leadership or leaders may change over time, unlike formal leadership based on a fixed job description, or role, derived from organizational authority. Emergence may reflect a philosophy of 'shared governance', where the person most qualified takes charge of a task (Jackson, 2000; Spooner, Keenan, & Card, 1997) and the leader changes as different skills are required (Burke, Fiore, & Salas, 2003; Fletcher & Kaufer, 2003; Packendorff, 1995). Such changes can involve time and frequent member interaction to readjust working relationships (Small & Rentsch, 2010). The group as a whole oversees leadership arrangements and adjusts them as needed (Pearce & Sims, 2000).

The third theme is that shared leadership is generally informal, as group direction is continually negotiated amongst members (Pearce & Conger, 2003). Leaders rely on the tacit recognition of colleagues rather than a single person's formal authority (Cox, Pearce, & Perry, 2003). Groups must therefore develop social cohesion and collaboration in order to manage their work. Only on very rare occasions does formal group leadership involve multiple leaders.

These three characteristics appear to give shared leadership its advantages over hierarchical leadership. *Distributing* leadership more fully uses group members' expertise when making decisions, *informality* increases communication and social cohesion, and *emergence* makes a group more responsive to changing environments and more robust when the leader is not physically present.

Table 2.1   Hierarchical vs. Shared Leadership

Hierarchical Leadership	Shared Leadership
Centralised: the hierarchical leader has a monopoly on authority.	*Distributed*: authority is shared amongst group members.
Fixed: leadership does not change over time.	*Emergent*: leadership can change as task demands or group needs change
Formal: roles and authority are formally defined and codified.	*Informal*: roles and authority are negotiated among the group.

Shared leadership also has limitations (Pearce & Sims, 2000). First, it requires the right conditions: employees must be willing and able to share responsibility through communicating, negotiating and collaborating. Social skills and maturity are therefore needed. Second, shared leadership cannot be imposed on members; rather it must be encouraged or facilitated by managers. Third, the organisation must be willing to devolve authority to group members and provide adequate resourcing and support systems. Fourth, there has to be something to share: the work must have sufficient task complexity and role interconnectivity to make sharing worthwhile. This perspective of the advantages and limitations of shared leadership indicates that it is not so much a replacement for hierarchical leadership as an alternative way of organising group work.

2.3 Antecedents of the Concept of Shared Leadership

Research on shared leadership can be traced back over 90 years, and is found in many different areas of management and leadership (Day, Gronn & Salas, 2004; Pearce & Conger, 2003). Although it remains a minor topic in a field dominated by traditional hierarchical models of leadership, interest in it is growing as a result of two trends. First, since the 1980s industry has increasingly experimented with less hierarchical practices such as democratic leadership (Semler, 1989), self-managed work groups (SMWGs; Brown & Eisenhart, 1998) or semi-autonomous work groups (SAWGs; Emery & Thorsrud, 1976), co-leadership (Solomon, Loeffer, & Frank, 1953) and participative leadership (Locke & Schweiger, 1979). Second, a growing number of theorists have described traditional leadership theory as overly dependent on a single leader, often described ironically as 'heroic leadership' (Gronn, 2002; Mintzberg, 2004; Yukl, 1999). For example, Mintzberg (2004) argues that hierarchical managers become too distant from frontline staff and lose sight of their importance, spend too much time planning and not enough on guiding staff in implementing strategies, and rely too much on abstract analysis at the expense of judgment based on engagement with the actual work of staff.

The modern concept of shared leadership has evolved from a wide range of theoretical antecedents, including the law of the situation, democratic leadership, studies of group dynamics, co-leadership, mutual leadership, self-managed work groups, participative decision-making, empowerment, distributed leadership and 'substitutes for leadership' theory.

Mary Parker Follet is credited with first recognising the importance of social cooperation in organisations in her "law of the situation" (Follet, 1924). This holds

that group authority should shift as work changes, with the person most qualified to handle the current task having authority at that point. Follet was among the first to acknowledge the importance of discretionary employee decision-making, arguing that because a single leader cannot supervise every facet of an organisation or a project, subordinates should take responsibility as much as possible.

An important antecedent of the modern concept of shared leadership is Kurt Lewin's series of experimental studies of democratic leadership in school children in clubs run by adult leaders (Lewin & Lippitt, 1938; Lewin et al., 1939). Lewin found autocratic (authoritarian) leaders and laissez-faire (delegative) leaders' groups had lower quality outcomes than leaders who allowed members to participate in decisions and choose their own working arrangements. Lewin and colleagues were among the first to use sociometric analysis of group relationships, an antecedent of the Social Network Analysis approach now emerging in modern shared leadership studies.

Lewin's studies also lead to a branch of social psychology focused on group dynamics, often using experimental studies of groups without formal leaders. In important development was Gibb's (1954, 1968) conclusion, from reviews of the field, that leadership was often shared amongst or moved between members. Gibb found such groups rarely had a single leader, and concluded that leadership was best understood as a quality of the group's dynamics rather than an individual person. However, it appears these studies had little lasting influence on management scholarship.

Co-leadership is a less-studied practice where responsibility is divided between hierarchical leaders and their protégés (Hennan & Bennis, 1999; Solomon et al.,

1953). It is primarily used in organisations wishing to groom promising subordinates for leadership (Galinsky & Schopler, 1981; Levine, 1981).

In Bowers and Seashore's (1966) concept of mutual leadership the role is informally shared among colleagues as a complement to hierarchical leadership. Bowers and Seashore studied mutual leadership in a US life-insurance company where work unit members often informally took on team-building, affective support and goal-setting roles. They concluded that such leadership responsibilities can be successfully devolved if group members have suitable personal and motivational characteristics.

Self-Managing Work Groups (SMWGs), also called semi-autonomous or self-directed work groups, describe a specific form of work organisation that gained popularity in the US manufacturing industry in the 1980s (Manz & Sims, 1993). SMWGs have a formal supervisor but members have higher levels of autonomy than in traditional teams (Lawler, Mohrman, & Ledford, 1995), and rely more on the work process to create cooperation (Benson, 1992). Members can take temporary leadership when their expertise is needed (Hogg, 2001), reducing vertical hierarchy and creating a network of interdependent relationships. Members report greater sharing of objectives and mental models, more trust, and more group identification compared to traditional teams (Perry, Karney, & Spencer, 2013).

The related concepts of participative and empowering management (or leadership) have been widely studied in recent decades. In participative decision-making, hierarchical leaders include subordinates in decisions to varying degrees (Pearce & Conger, 2003). Usually the formal leader retains final authority and involves employees without fully delegating power. Group members may participate in

problem solving, decision-making or determination of working conditions (Locke & Schweiger, 1979), for example, or may use their specialist knowledge in group decisions (Vroom & Yetton, 1973).

Empowerment is a similar concept in which capable staff are given more control over their work as an individual or a group member (e.g., Fetterman & Wandersman, 2005; Kanter, 1979; Kanungo, 1992; Pearce & Conger, 2003; Potterfield, 1999). Most studies examine the effects of participation and empowerment on individual rather than group performance.

The concepts of a SMWG and participative or empowered decision-making also share some conceptual ambiguities. For example, definitions of self-management, participation or empowerment are diverse and often very general (Fetterman & Wandersman, 2005). However, all point to some form of self-determination within a traditional hierarchical power structure, and therefore overlap to some extent with the concept of shared leadership. They also share theoretical foundations similar to those of shared leadership (Cox et al., 2003), such as supervisor support, shared objectives and mental models, trust, and member identification with the group (Perry et al., 2013).

Shared leadership differs from these earlier concepts in describing a more devolved arrangement in which group members have substantial discretion over how the group operates. Leadership roles are typically more distributed, informal and emergent (Table 2.1), where SMWGs, employee participation and empowerment are typically formal initiatives controlled to a greater extent by hierarchical leaders (Conger & Kanungo, 1988). As well, the antecedent concepts were more commonly related to

management than leadership. However, it appears that in these practices leadership influence was as devolved or more devolved than management authority.

Distributed leadership is a term sometimes seen as synonymous with shared leadership (e.g., Brown & Hosking, 1986; Day et al., 2004), and is particularly used in the educational management field (Gronn, 2002; Spillane, Halverson, & Diamond, 2002). Sometimes used to refer to leadership in small groups or teams (e.g. Day et al., 2004), like participative and empowering management it can also refer to a broader concept in which all members of an organisation perform acts of leadership (e.g., Katz & Kahn, 1987; Spillane, Hallett, & Diamond, 2000). This viewpoint encompasses a growing number of more general perspectives on management and leadership that focus on lateral relations but do not explicitly refer to 'shared' or 'distributed' leadership (e.g, Mintzberg, 2004).

A final antecedent is the substitutes for leadership concept, which recognises that formally-appointed leaders are not needed in some situations (Kerr & Jermier, 1978). For example, professional norms, routinized job design or performance management processes can structure the work and motivate employees, removing the need for leadership influence. Professional workers in medical, accounting or IT teams often have high levels of autonomy and can be managed through professional norms, while routine workers with less autonomy are managed through job design and performance management (although these are also used to some extent with professionals). Professional groups are likely to self-organise when collaboration is needed, and the nature of the work along with the professionals' collaboration skills may make formal leaders unnecessary (Pearce & Conger, 2003).

The concept of shared leadership builds on all these antecedents but goes further than most in advocating a new 'paradigm' for managing groups with little or no hierarchical power relationship between members. While its theoretical antecedents advocate some devolution of power, typically by involving group members in decisions, they do not go so far as to suggest groups can self-manage through distributed, informal and emergent leadership.

2.4 Previous non-SNA Research on Shared Leadership

Research on shared leadership largely focuses on whether it improves group performance compared to hierarchical leadership. Typically, the groups studied are relatively free to set their own degree of hierarchy and any observed differences in sharing are related to group outcomes. A variety of methods have been used to assess the degree of sharing in a group, but relatively little attention has been given to the quality of these measures. This review therefore addresses both the performance advantages and the methods used to assess sharing. A number of limitations in the latter qualify assessments of the value of shared leadership and suggest studies of it are still at an early stage of development.

A few, mostly earlier, studies were qualitative, but a more typical approach involves measuring leadership sharing and work outcomes with quantitative self-report questionnaires. Occasionally, performance outcomes are measured with third party or external measures. Leadership sharing is assessed by averaging members' ratings of either the whole group's leadership or each other member's leadership. Leadership itself is assessed by either global single-item measures of 'leadership', 'influence' or related concepts, or by scales measuring multiple component behaviours of theoretical constructs. More recently, researchers have begun using Social Network

Analysis (SNA) to assess different properties of the network of relationships among group members. These use single-item ratings of each member's leadership.

Below, the non-SNA studies are first reviewed, divided into (i) qualitative approaches, (ii) quantitative studies based on theories of hierarchical leadership, which tend to use group-level measures, and (iii) studies measuring the leadership of each group member. The SNA approach is then introduced, and finally SNA studies are reviewed.

2.4.1 Qualitative Studies of Shared Leadership

Brown and Hosking (1986) examined 'distributed leadership' in a UK community social collective formed to develop a local women's centre. Interviewed members reported that distributed leadership allowed the group to develop shared values, and increased their ability to manage dilemmas. Distributed leadership worked because members saw value in the group's objectives and in each other's ability to jointly work toward them.

Denis et al. (2001) also took a case study approach, using interviews and observations to assess the effects of shared leadership in change management teams in five Canadian healthcare organizations undergoing major change. The teams were allowed to self-organize. Members of teams with the greatest leadership sharing reported greater trust in colleagues and greater use of the group's skills and professional insights to facilitate change, outcomes seen as important prerequisites to successfully managing organisational change.

Brown and Gioia (2002) conducted unstructured interviews with executives in a new online division of a US retail corporation facing a rapidly changing environment and an ambiguous future. Interviewees had no prior experience in online sales, and reported that the considerable market uncertainty had compelled them to share leadership as they came to recognize their own shortcomings and reliance on one another's skills and experiences. The group took collective responsibility for the new division in their frequent formal and informal meetings. Over time, they observed their commitment to the new business had increased as a result of sharing its leadership.

Finally, Shamir and Lapidot (2003) related shared leadership to group satisfaction in an interview study of Israeli Army cadets. Teams of 15 to 20 cadets in an officer training program were observed making member expulsion decisions. The teams were led by a senior officer but members were expected to collaborate and make decisions together. Shared leadership was assessed through interviews with team members and leaders concerning the leadership climate in each team. Shared leadership increased group satisfaction with expulsion decisions and led to higher ratings of trust, discipline and professionalism in teams. Groups with more sharing consistently upheld professional values, rather than erring in favour of social relationships when expelling members.

Together these four studies suggest that shared leadership can improve group collaboration, member commitment and important business outcomes. Similar themes are found in the more common quantitative studies reviewed next.

2.4.2 Quantitative Studies of the Sharing of Hierarchical Leadership Styles

In these studies group members rate other members' use of particular behaviours identified in theories of hierarchical leadership, particularly transformational leadership theory (Avolio, Bass, & Jung, 1999; Ensley et al., 2006; Sivasubramaniam, Murry, & Avolio, 2002). Pearce and Sims (2002) use a similar approach but with a wider range of theories.

Transformational Leadership Theory

The concept of transformational leadership stems from Burns' (1978) influential view of leadership as a process of transforming both leader and 'follower' by raising each to a higher level on Maslow's hierarchy of needs. Burns predicted that such 'transforming' leaders would increase followers' wellbeing, morality and humanity, while 'transactional' leaders who use rewards or punishments to obtain compliance ultimately reduce followers' quality of life.

Bass and other management theorists subsequently refocused Burns' concept on transforming organisations to higher levels of productivity by appealing to employees' psychological needs (Avolio et al., 1996; Sivasubramaniam et al., 2002). The standard version of transformational leadership theory identifies four types of leader behaviour: individualized consideration, or care for employees' individual needs; intellectual stimulation, for example through creative activities; inspirational motivation, such as developing an inspiring vision of the broader meaning of the work; and idealized influence, the role modelling of psychologically mature or moral values.

Transactional leadership, on the other hand, involves modifying employees' behaviour through punishments or rewards (Bass, 1985; Burns, 1978). A transactional 'leader' relies largely on formal hierarchical authority to sanction rewards and punishments, subordinating employees to this authority rather than encouraging independence. This is considered the dominant model of management in Western business organisations. It has a theoretical base in studies of 'exchange relationships' in which managers exchange favours or punishments for employee compliance (Burns, 1978) and theories linking effort to reward (see Pearce & Sims, 2002), notably expectancy theory (Vroom, 1964), exchange or equity theory (Homans, 1961) and reinforcement theory (Luthans & Kreitner, 1985).

Shared leadership is theoretically compatible with the transformational focus on addressing employees' psychological needs through providing support, intellectual stimulation, mentoring and opportunities for greater responsibility in organizational decisions, although transformational theory normally describes these as solely the responsibility of a hierarchical leader. Some researchers have therefore used transformational leadership theory in developing shared leadership theory. Early studies used the Team Multifactor Leadership Questionnaire (TMLQ), a measure of transformational vs. transactional leadership (Avolio et al., 1996; Sivasubramaniam et al., 2002), while more recent studies use the Leadership Behavior Questionnaire (LBQ), which has transformational, aversive, directive and empowering subscales (Pearce & Sims, 2002).

Studies Using the TMLQ

Three studies have examined shared leadership in student groups completing university assignments or training. Group members were self-directed, lacking a

formal leader, and had no previous history of collaboration. Members rated the whole group (Avolio et al., 1996; Sivasubramaniam et al., 2002) or individual members (Balthazard, Waldman, Howell, & Atwater, 2004) on leadership behaviours identified in the TMLQ or its non-team forerunner, the Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 1990). These ratings were then combined to create group averages for analysis, on the assumption that higher averages represent greater leadership sharing.

Avolio et al. (1996) examined shared transformational leadership behaviours in student groups of five to seven members undertaking a university training program or an organizational behaviour course. Member satisfaction, effort and collective efficacy were generally higher in groups with greater sharing of each of the components of transformational leadership (idealized influence, inspirational motivation, intellectual stimulation and individualized consideration).

Sivasubramaniam et al. (2002) studied the effect of shared transformational leadership on 'group potency', the degree of collective effort perceived by members, in forty-one student groups of four or five members. Leadership sharing was assessed with the TMLQ, group potency with a self-report measure, and group performance with semester grades. Sharing of transformational leadership behaviours increased group potency, while collective inaction or task avoidance reduced it.

Balthazard et al. (2004) compared shared leadership in virtual and face-to-face student groups of around four members that were formed for a 90-minute tutorial on ethics. Leadership was assessed by rating each group member on the MLQ, and task performance by an exercise involving ranking ethical work practices. The dependent

variable was constructive interaction between group members, measured by the Group Styles Inventory (Cooke & Rousseau, 1988). Shared leadership and constructive interaction were more common in face-to-face than virtual groups, not surprisingly since virtual members have reduced ability to recognize leadership in others. An obvious limitation of this study is the very short time available for developing group collaboration and direction.

While these studies suggest sharing of transformational leadership behaviours can improve group performance, they do not measure sharing directly but assume it is reflected in group averages. However, while a high aggregate level of a behaviour must reflect at least moderate sharing of it, a moderate or low level can represent either an equal contribution from each group member (full sharing) or a high contribution from one and little or none with others (no sharing). Group averages do not show the pattern of sharing; only an approximation that is more accurate at high values.

Studies Using the LBQ

The sharing of transformational and leadership behaviours has also been studied with Pearce and colleagues' Leader Behavior Questionnaire (LBQ) (Ensley et al., 2006; Pearce & Ensley, 2004; Pearce & Sims, 2002). Pearce and Sims (2002) developed the LBQ from a list of 25 behaviours underlying transactional, transformational, empowering, aversive and directive leadership. They studied change management teams in a large US automotive manufacturing company. While the teams had a formal leader, the change program gave staff (including the change team) "an advanced form of empowerment and ... considerable autonomy" (Pearce & Sims, 2002, p. 178). Team members were asked to rate the use of each behaviour by the

team leader and the team as a whole, used as measures of 'vertical' (hierarchical) and shared leadership respectively. Team effectiveness was assessed though ratings from team members, senior managers and internal team 'clients'.

Pearce and Sims found that while both hierarchical and shared leadership behaviours correlated positively with group effectiveness, shared leadership was the stronger predictor. This finding has been replicated in subsequent LBQ studies (Cox et al., 2003; Ensley et al., 2006; Pearce, 2004; Pearce et al., 2003). The sample size did not permit analysis of the interaction between leadership styles and sharing.

Pearce et al. (2003) studied virtual teams of around 7 trainee social workers who completed an action-learning project via email over a 10-week semester. Group members rated the performance of their hierarchical leaders, using a modified version of the LBQ (Guzzo, Yost, Campbell, & Shea, 1993), and also the leadership demonstrated by the whole group using a group-level LBQ scale. A performance scale was developed by the authors to assess the constructs of team potency, problem solving quality and perceived effectiveness outcomes. Greater sharing of leadership was associated with increased quality of the team's work and more effective problem solving.

Ensley et al. (2006) used the LBQ to compare the effects of hierarchical and shared leadership on employee performance and revenue growth in top management teams. The executives of 154 American start-up businesses rated their team leaders and their teams as a whole on the 25 LBQ behaviours, reflecting hierarchical and shared leadership respectively. While both shared and hierarchical leadership were

associated with growth in employee recruitment and revenue, shared leadership had the greater effect.

Finally, Hoch, Pearce and Welzel (2010) studied 26 project groups in a German consulting company, using what appears to be a version of the LBQ. Shared leadership improved group coordination as rated by group members, and group performance as rated by the group leader.

While these three studies again suggest that leadership sharing benefits group outcomes, they share the limitation of previous studies using group-level ratings to indicate leadership sharing. Rating the group does not directly measure leadership sharing, and rating the leader assumes rather than measures the degree of hierarchy. The results therefore do not directly compare groups with shared and hierarchical leadership. The lack of a precise measure of sharing also inhibits generalization to different populations of groups.

The LBQ studies primarily show that leadership approaches more amenable to sharing (transformational and empowering) increase group effectiveness, while less amenable approaches (aversive, directive and transactional) have no effect or negative effects. This is not surprising given the common definition of leadership as a positive form of social or interpersonal influence (e.g. Yukl, 2010).

The emphasis on sharing behaviours identified in theories developed for hierarchical contexts is a limitation of both the MLQ/TMLQ and LBQ studies. Essentially, their findings confirm that more of these behaviours in a group produce better outcomes. However, the qualitative differences between shared and hierarchical leadership

summarised in Table 2.1 suggest different approaches to measurement may be needed.

Studies Using Other Measures of Hierarchical Leadership

Two studies have used other group-level measures of leadership sharing based on hierarchical models of leadership. Mihalache, Jansen, Van den Bosch and Volberda (2014) assessed shared leadership in Dutch top management teams, using Manz and Sims' (1987) team-level measure of decision-making, motivating and team-building. Leadership sharing was positively associated with two forms of innovation. Erkutlu (2012) found shared leadership lead to a more supportive culture in work groups in Turkish banks. Sharing was assessed by asking group members to rate the frequency with which their group shared four areas of activity: planning and organizing; problem solving; support and consideration; and development and mentoring.

These studies add to the list of outcome variables related to shared leadership but their measures are not specifically developed for shared leadership contexts and have the problems with group-level measures noted above.

2.4.3 Non-SNA Studies of Leadership Sharing Among Group Members

A number of authors have examined shared leadership without reference to theories of hierarchical leadership. Typically, group members rate each of their peers on single-item or short-form measures of leadership, rather than rating the group as a whole on multiple behaviours. This can provide a more direct and precise indication of the degree of leadership sharing in a group.

There are several approaches to analyzing these member-level ratings. The simplest follows the studies above in averaging ratings for each group, in this case (n-1) x (n-1) ratings per group. This approach was used by Carson et al. (2007) to measure leadership sharing in self-directing student consulting teams of four to seven members. Each group consulted to a business client over a semester, and their performance was measured by clients' ratings of the group's work quality. Greater leadership sharing, as assessed by higher averages, was associated with higher client ratings. However, the use of group averages has the limitation noted above of ambiguity in low scores.

A second approach involves a qualitative judgment of whether leadership is shared or hierarchical. Solanksy (2008) studied twenty groups of three to five students who completed class activities over a semester without formal leaders. Students described their group's leadership development in a reflective journal. Content analysis showed the journals "clearly and consistently" depicted group leadership as either shared or single-leader. A self-report questionnaire was used to gather measures of social, motivational and cognitive performance. Shared leadership groups reported better performance on these measures than single-leader groups.

In a more sophisticated qualitative approach, Mehra et al. (2006) categorised groups as hierarchical or distributed by visually inspecting graphs of group relations known as "sociograms" (Moreno, 1934). Sales team members in a financial services organisation were asked to identify peers perceived to be leaders, and the resulting sociograms were categorised by independent coders as hierarchical (only a formal leader) or distributed (having at least one leader besides the formal leader). The latter were later recoded as either coordinated (where leaders also nominated each other) or

fragmented (where subgroups of influence existed). Members were recruited by the team leader but operated largely independently, relying on the leader only to broadly define work parameters; leadership and guidance were provided by team members. Coordinated distributed leadership produced better performance than hierarchical leadership, but fragmented distributed leadership did not. That is, the pattern of sharing is important, not only its degree.

As the latter studies do not use theories of hierarchical leadership they offer a more theoretically valid approach to shared leadership. However, Carson's use of group averages has the limitation noted earlier, and while Mehra et al.'s inspection of sociograms offers a useful advance neither study directly measures the degree of sharing or hierarchy in a group.

2.4.4 Summary of non-SNA Studies of Shared Leadership

The quantitative evidence reviewed above suggests many student or work groups given the freedom to choose will adopt shared leadership and experience improved group performance and member satisfaction. However, two methodological limitations qualify this conclusion. First, it is difficult to know how much sharing is involved in a group without rating the leadership influence of each member. Group averages are ambiguous indicators since moderate or low scores are compatible with both hierarchical and shared leader influence. Second, researchers tend to assess behaviours identified from theories of hierarchical leadership, but shared leadership qualitatively different (Table 2.1) and may involve different behaviours and group-level influences. Studies defining shared leadership via theories of transformational or other hierarchical leadership 'styles' focus more on validating those theories in new contexts than on investigating the nature of sharing per se.

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These limitations provide the background to the SNA studies reviewed below. SNA offers more direct measures of whether a group is shared vs. hierarchical based on the actual pattern of sharing in a group.

2.5 SNA Research on Shared Leadership

Social Network Analysis (SNA) is well suited to studies of inherently relational phenomena such as shared leadership. SNA measures and graphs show the pattern of leadership (or other forms of social influence) in a group in ways that provide more information than simple averages (Wasserman & Faust, 1994). This section introduces the SNA approach and examines the use of the specific measures in shared leadership studies.

2.5.1 The Social Network Analysis Approach to Group Relations

Social network analysis uses a set of mathematical indices that assess different patterns of interaction in a social network, a group of people with a continuing relationship in which information, resources, influence, affect or power are exchanged (Mayo, Meindl, & Pastor, 2003). SNA began as a sociological tool for studying social relationships, but has since been used in anthropological, biological, economic, and political research (Freeman, 2006). In businesses it is commonly used to support customer analysis, marketing, and business strategy needs (Golbeck, 2013), and governments increasingly use SNA for intelligence gathering (Ackerman, 2013).

SNA maps the relationships between members of a bounded group (Mehra et al., 2006). In a typical leadership study, group members rate each other as a leader, but ratings of more specific leadership behaviours or components can also be used. Table 2.2 shows three example groups, with raters shown in rows and ratees in columns. A common practice is to simplify ratings of a person's leadership into binary form, where 1 represents a leader and 0 a non-leader. In Group A, all members rate all other members as leaders. In Group B member 1 is seen as a leader by members 2, 3 and 4, but the latter are each seen as a leader by just one member. Group A has fully shared leadership and Group B partially shared leadership. Group C represents hierarchical leadership, where member 1 is seen by all others as the only leader.

Table 2.2   Example Raw Score Matrices for SNA

Group A	Member 1	Member 2	Member 3	Member 4
Member 1		1	1	1
Member 2	1		1	1
Member 3	1	1		1
Member 4	1	1	1	

Group B	Member 1	Member 2	Member 3	Member 4
Member 1		1	0	0
Member 2	1		0	0
Member 3	1	1		1
Member 4	1	0	0	

Group C	Member 1	Member 2	Member 3	Member 4
Member 1		1	1	1
Member 2	0		0	0
Member 3	0	0		0
Member 4	0	0	0	

Table 2.3 diagrams the links between the group members in Table 2.2 as arrows pointing from a ratee to a rater. Members are numbered clockwise, starting at the top. Thus in Group B, member 1 is seen as a leader by all other members but member 2 is rated only by member 3. These diagrams are known as sociograms.

Table 2.3   Sociograms and SNA Measures for Groups in Table 2.2
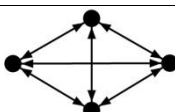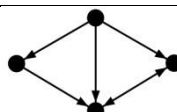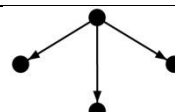
	Group A	Group B	Group C
Sociogram			
Centrality	0	.67	1
Density	1	.50	.25

Table 2.3 also lists two fundamental SNA measures derived from the matrices in Table 2.2, density and centrality, which describe respectively the degree of sharing and the degree of hierarchy in a group (Wasserman & Faust, 1994). The term centrality here refers to 'group degree centrality' rather than other measures sometimes used to describe group centralization such as betweenness or closeness (see below), or measures of a specific actor's centrality in a group. The formulae for calculating centrality and density are provided in Section 3.4.

Centrality and density measures both range from 0 to 1. Leadership in Group A is fully shared, as shown by the density of 1 and corresponding centrality of 0, while Group C is maximally hierarchical with a centrality of 1 and corresponding density of $1/n = .25$. Group B's moderate degree of sharing is reflected in mid-range centrality and density scores. It is important to note that centrality and density are not inversely related as strongly as Table 2.3 might suggest. A centrality of 0 occurs when all members influence each other equally, but this includes the situation where no members influence another – a matrix comprising only zeroes, with no centrality and no density. Shared leadership is therefore indicated by low centrality and high density (while low centrality and low density indicate an absence of leadership). Density is calculated as the ratio of actual links (or 'ties') between members to the total number of possible links - the mean number of links per member. High density indicates leadership influence is distributed fairly evenly across the group.

Conversely, hierarchical leadership is indicated by low density and high centrality. However, when centrality is 1, density must be $1/n$ (where n is the number of members), not zero. Since centrality and density are not fully predictable from each other, they must be interpreted together when distinguishing shared and hierarchical leadership. This is the approach followed in this study.

SNA studies have investigated a wide range of links between network members in different fields of social science, including communication or information flows (Wasserman & Faust, 1994), friendships (Michell, 2000), social influence (Kempe, Kleinberg, & Tardos, 2003) and familial associations (Borgatti, Mehra, Brass, & Labianca, 2009). Shared leadership studies tend to focus on leadership influence

(e.g., Mayo et al., 2003; Mehra et al., 2006; Small, 2007), although other facets of leadership have been examined. For example, Hoppe and Reinelt (2010) investigate leaders' reliance on networks for advice giving, collaboration, friendship and motivational support both inside and outside the organisation.

2.5.2 Mayo et al.'s Conceptual Model of Shared and Hierarchical Leadership

Centrality and density measure hierarchy and sharedness, respectively, in a network of interpersonal influence, but so far no studies have attempted to measure both. Gockel and Werth (2010) in a review of SNA measures for shared leadership recommend using both to overcome the limitations of each noted above. Mayo, Meindl and Pastor (2003) present a theoretical framework for combining centrality and density in order to distinguish shared from hierarchical leadership, shown in Figure 2.1 (with "Decentralization" changed to "Centrality" for simplicity of interpretation and "High" and "Low" correspondingly swapped). Mayo et al. identify four categories of leadership: 'vertical' or hierarchical (high centrality and high density), shared (low centrality and high density), leadership avoidance (high centrality and low density) and 'low shared leadership' (low centrality and low density).

Quadrant I

LOW SHARED
LEADERSHIP

Quadrant II

SHARED
LEADERSHIP

Quadrant III

LEADERSHIP
AVOIDANCE

Quadrant IV

HIERARCHICAL
LEADERSHIP

Low — High (Centrality, vertical axis)

Low — High (Density, horizontal axis)

Centrality

Density
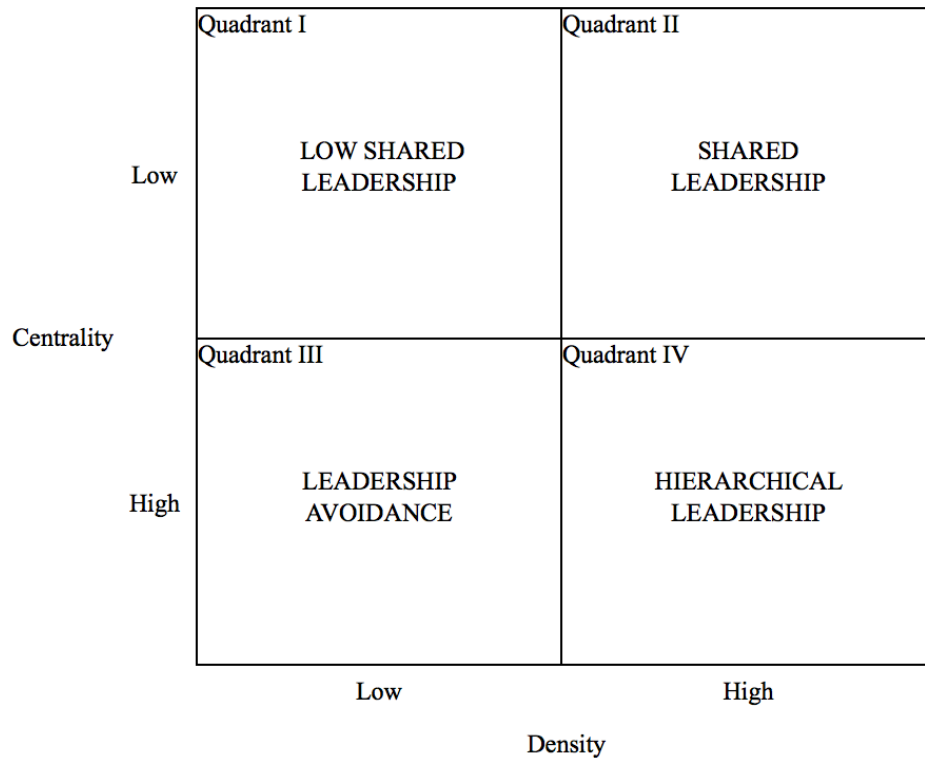
Figure 2.1   Categories of Shared and Hierarchical Leadership. Adapted from "Shared Leadership in Work Teams: A Social Network Approach" by M. Mayo, J. J. Meindl, and J. Pastor, 2003, Shared Leadership: Reframing the Hows and Whys, p. 206.

However, the arrangement shown in Figure 2.1 misrepresents the mathematical relationship between centrality and density in several ways. First, hierarchical leadership is indicated by high centrality and low, not high, density. As noted above, maximum centrality involves a density of $1/n$, which is .25 in a group with 4 members, .12 with 8 members and increasingly closer to zero as group size increases. This also means high centrality cannot coexist with high density – Quadrant IV outcomes are not possible except when both values are close to 0.5. Third, Mayo et al.'s low shared leadership category is low on density as well as centrality and is therefore not particularly shared. For these reasons the modified version of Figure

2.1 shown in Figure 2.2 is used as a theoretical framework for interpreting centrality and density in this study. A more precise picture of the mathematically possible combinations is presented in Section 5.7.

	Low	High
High	SHARED LEADERSHIP	
Low	LOW SHARED LEADERSHIP	HIERARCHICAL LEADERSHIP

Density (vertical axis) — Centrality (horizontal axis)
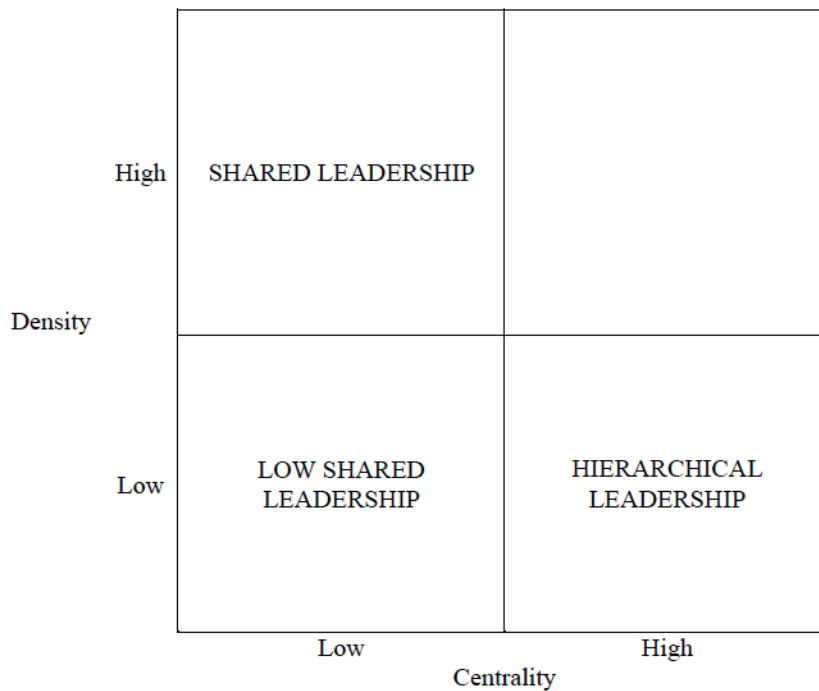
Figure 2.2   Categories of Shared and Hierarchical Leadership – Revised Model. Developed for this thesis.

The low leadership group in Fig. 2.2 has little interpersonal influence - in the extreme case, all members operate fully independently of each other. It seems unlikely that this would describe effective, long-lasting groups unless they rely on leadership substitutes (Kerr & Jermier, 1978). This group is therefore of little theoretical interest here. The high – high quadrant is blank as this is not a possible outcome except when both scores are less than 0.6.

Although centrality and density measures have been used in studies of shared leadership, so far none have attempted to empirically combine these measures. The present study aims to fill this gap.

2.5.3 Social Network Analysis in Leadership Research

Shared leadership studies have so far used either group centrality or density to measure shared leadership, although other SNA indices such as actor centrality have been used to measure perceptions of hierarchical leadership in a group or network (e.g., Balkundi & Kilduff, 2006; Friedkin & Slater, 1994; Sutanto, Tan, Battistini, & Phang, 2011; Zohar & Tenne-Gazit, 2008).

Small and Rentsch (2010) used centrality to investigate shared leadership in 60 four or five-member groups of students conducting a semester-long business simulation. Leadership sharing was assessed with 12 items drawn from the TMLQ and Stogdill's (1963) Leader Behavior Description Questionnaire (LBDQ). Members rated each other on these behaviours, and the ratings were averaged, dichotomized and transformed into centrality scores that were interpreted as inverse measures of leadership sharing. Less centralized groups showed greater trust as measured by Simons and Peterson's (2000) intragroup trust scale. This increased over time, supporting Avolio et al.'s (1996) suggestion that shared leadership requires time to develop. However, in interpreting low centrality as evidence of sharing, Small and Rentsch overlook its other interpretation as a low level of leadership. As Figure 2.2 indicates, by itself centrality is an ambiguous measure.

Carson et al.'s (2007) study of student consultants working with local firms was described in the section on non-SNA studies above. In averaging ratings of

individual members' leadership by other group members, this study is in effect using the SNA measure of density. However, by itself density offers no insights unique to SNA and as a measure of shared vs. hierarchical leadership, is subject to the limitations mentioned earlier.

In summary, while degrees of centrality and density are recommended as joint measures of shared vs. hierarchical leadership, so far this has not been attempted. Both are ambiguous indictors at the low end of their range: low centrality does not necessarily mean shared leadership, and low density does not necessarily mean hierarchical (centralised) leadership. Mayo et al.'s framework, modified as above, offers a guide to their joint use, but invites further questions about the mathematical and empirical relationships between the measures. These are explored in Chapters 3, 4 and 5 of this study.

2.6 Summary of Research on Shared Leadership

Shared leadership has a long history as an alternative to the traditional concept of hierarchical leadership, but has been the subject of relatively few theoretical or empirical studies. The concept can be applied to a variety of work practices where leadership is distributed, informal and emergent. In practice, workgroups may not be fully shared or hierarchical but relatively closer to one or other 'ideal type'. Although shared leadership has only recently emerged as a distinct concept, it overlaps with a variety of similar concepts including co-leadership and mutual leadership; self-managing or semi-autonomous work groups; democratic, participative or empowering management or leadership; and substitutes for leadership.

Studies of shared leadership have grown in recent years, and cover a variety of contexts including sales and manufacturing staff, university students, and military personnel. Student groups are the most commonly studied for reasons of accessibility and control over the research context. A variety of methods are used to assess leadership sharing, often chosen to extend theories of hierarchical leadership into the shared domain. These largely examine sharing of transformational leadership behaviours (e.g. Avolio et al., 1996), sometimes along with 'negative' forms of leadership (e.g. Pearce & Sims, 2002). All these studies ask members to rate the group as a whole and analyse group averages, a measure accurate only with higher levels of sharing.

A second group of studies measures sharing more directly by asking group members to rate each other as leaders, generally without reference to theories of hierarchical leadership. When these are analysed as group averages, information about the pattern of sharing is lost, and again the averages become ambiguous indicators of hierarchy at lower values. Other researchers use qualitative data such as diaries or graphs to classify groups as shared or hierarchical. These also use member-level data but do not analyse it with the precision offered by Social Network Analysis measures of centrality and density.

Although centrality and density have been used by themselves to identify shared vs hierarchical leadership, both measures are ambiguous at lower levels of their range and they must be interpreted in combination to accurately assess a group. Although Mayo et al. (2003) and Small and Rentsch (2010) recommend this, so far it has not been done. Mayo et al.'s conceptual framework for combining centrality and density

scores misrepresents their mathematical relationship, and a modified version of it is used to classify groups in this study.

The studies reviewed here consistently suggest leadership sharing improves member satisfaction, group functioning and work quality. However the limitations of the methods used to assess shared vs. hierarchical leadership present significant limitations to this general conclusion. As a preliminary to examining the effects of leadership sharing on group creativity, the present study aimed to develop a more precise method based on centrality and density scores.

2.7 Measuring Leadership in a Shared Environment

The group-level and individual measures used in previous studies do not only assess sharing differently but take theoretically different views of leadership. The SNA approach is best suited to single-item global measures or short-form multi-item measures of leadership due to the time limitations of having each group member rate all others on each item. Existing multidimensional scales also have the drawback of assuming a hierarchical leader, and may not accurately capture the nature of shared leadership as a more dynamic and informal group-level phenomenon.

On the other hand, multi-item (and multidimensional) measures are traditionally considered to have greater psychometric rigor, although there is increasing evidence that single items can accurately assess global concepts (e.g., Drolet & Morrison, 2001; Bergkvist & Rossiter, 2007).

Multi-item measures are also used in SNA to assess different network properties in a group. For example Friedkin and Slater (1994) used actor centrality to assess the

cohesion of the teachers' networks of partners, advisors and friends, and Zohar and Tenne-Gazit (2008) used centrality and density to assess the effects of communication networks and friendship networks in military platoons. These authors were not primarily interested in shared vs. hierarchical leadership. However, a common theme amongst theoretical models of shared leadership is the capacity for different members to take leadership of different aspects of the group's work. To assess this requires measuring multiple dimensions of leadership.

As global and multi-dimensional each have strengths and limitations, this study employed both and compared the two sets of results. A short multi-item scale was developed from a general taxonomy of leadership roles (Bass & Bass, 2008) that appears to be relevant to both hierarchical and shared leadership. Bass and Bass created their taxonomy from a broad literature review, and the next section describes their model as well as the historical context of generalist taxonomies of leadership.

2.7.1 A General Taxonomy of Leadership Behaviours

Many authors have presented general *taxonomies* of leadership behaviours or roles over the last century. While most do not explicitly include shared leadership, as general statements of the nature of leadership they are more amenable to this than the better-known contemporary theoretical constructs of leadership, which tend to assume hierarchical contexts. Some refocusing of their individual components can improve their relevance to shared leadership, as illustrated in 'explicating' Bass and Bass's five facets of leadership at the end of this section.

Bass and Bass (2008) reviewed 165 studies of leadership from which they identified five common themes in taxonomies of leadership behaviours. Some representative

examples of these taxonomies are provided here to illustrate Bass and Bass's perspective.

Most taxonomic definitions of leadership include the more directive and task-focussed aspects otherwise described under the heading of formal management. For example Schutz (1961) includes developing a hierarchy of group goals and assigning responsibilities according to group members' abilities, Kraut, Pedigo, McKenna and Dunette (1989) include performance management and subordinate instruction, coordination or monitoring, and Fleishman, Mumford and Zaccaro (1991) include group administration. While directive functions may be necessary at times in highly-shared groups, the focus here is more on the social behaviours and functions that underpin the modern concept of leadership.

An example of an influential taxonomic description with both directive and social functions is Chester Barnard's (1946) classic definition of leadership in terms of four functions: setting objectives, applying technical expertise to organisational challenges, coordinating and directing group members, and motivating members to act. Another is Schutz's (1961) definition of leadership as developing a hierarchy of values and goals, integrating members' cognitive styles to achieve a balance within the group, assigning roles according to members' abilities, and helping members to become more autonomous.

Fleishman et al.'s (1991) review of 65 studies identified three leadership functions, both directive and socially-facilitative: leaders perform management or administrative activities such as planning, organizing, controlling and resourcing work; facilitate social interaction to enable group members to work together; and

interact with subordinates to pursue organisational goals. Javidan and Dastmalchian (1993) similarly describe leadership as having a motivational role and a driving or directive role. To these they add an ambassadorial role (representing subordinates externally), a performance-monitoring role and the role of serving subordinates' interests (in addition to the organisation's).

As much as leadership taxonomies include management functions, management taxonomies also include leadership functions. Mintzberg's (1973) taxonomy describes managers as having interpersonal, informational and decisional roles. Interpersonal roles include being a figurehead or leader, and liaison or social interaction roles similar to those of Fleishman et al. and Javidan and Dastmalchian.

Bass and Bass's five basic leadership roles are shown in Table 2.3. As they did not label their roles, for ease of reference names have been provided following Carnap's (1950) concept of explication, or compressing detailed explanations into simple summaries. The labels are designed to apply to both hierarchical and shared leadership functions. They therefore reflect a mix of social functions (notably motivation and teamwork) and task-focused functions described here in terms that also apply to less directive shared leadership contexts (goal clarification, developmental planning and constructive feedback). The division of leadership into task and relationship-oriented roles (Fielder, 1964), or 'initiating structure' and 'consideration' (Stogdill & Coons, 1957), is common to many leadership theories developed for hierarchical contexts, and both categories are relevant to shared leadership.

Bass and Bass's "evaluation of individual and group effort" is therefore labelled here as constructive feedback, since the purpose of evaluation is to provide helpful feedback (O'Leary-Kelly, Martocchio, & Frink, 1994). Their "[provision of] structure, tactics, methods and instruments for individuals to achieve goals" is called developmental planning (Pinto & Prescott, 1990) since it involves organising the development of a task or project. "Setting and clarifying of missions and goals" is described as goal clarification (Lee, Bobko, Earley, & Locke, 1991) rather than the more directive "goal setting". "Energizing and directing others towards missions and goals" is effectively motivation (Kleinginna & Kleinginna, 1981), a term more amenable to sharing than 'directing'. Finally, "resolving conflicting views about means or ends" is seen as team building (Jehn, 1997), creating a consensus about goals and the interpersonal working relationships required to achieve them.

Table 2.4   A Taxonomy of Leadership Roles[1]

Leadership role	Explication
To evaluate the individual, group, or organizational contribution to an effort.	Constructive Feedback
To provide structure, methods, tactics, and instruments for achieving goals.	Developmental Planning
To set and clarify the missions and goals of individuals, groups, or organisations.	Goal Clarification
To energize and direct others to pursue missions and goals.	Motivation
To help resolve conflicting views about means and ends.	Team Building

1 Adapted from Bass & Bass (2008)

No scale has yet been developed to measure Bass and Bass' construct, and the terms in Table 2.3 were also chosen to provide key phrases for the questionnaire items described in Chapter 3. The explication process aimed to increase the validity of this measure by choosing short phrases that capture the essence of the underlying theory (Carmines & Zeller, 1979).

This taxonomy highlights leadership roles or functions that a group member may specialize in. Specialisation may reflect both professional skills and leadership skills. In creative work, for example, a group member may specialize in design, production or stakeholder liaison according to professional expertise. Similarly, one person may take a motivational leadership role while another keeps the group goal-focused. Bass

and Bass's five functions allow testing for this 'functional specialization' in leadership, where a global measure of leadership does not.

The functions in Bass and Bass's taxonomy have the advantage of representing generic facets of leadership grounded in a wide variety of research contexts. As labelled in Table 2.4, they therefore appear more suitable to the measurement of shared leadership than the behaviours drawn from theories of transformational or other specific styles of leadership such as situational, servant, charismatic or authentic leadership.

For example, transformational leadership prescribes behaviours such as role modelling, inspiring staff, addressing their psychological needs and intellectual stimulation that may take quite a different form in shared leadership, *emerging* from interactions rather than being specifically implemented by individuals. Studies measuring the sharing of such behaviours (e.g. Avolio, Jung, Murry, & Sivasubramaniam, 1996; Balthazard, Waldman, Howell, & Atwater, 2004; Sivasubramaniam, Murry, & Avolio, 2002; Pearce & Sims 2002) do not measure the important aspects of shared leadership identified in Table 2.1.

2.8 Creativity

Although shared leadership has been linked to improvements in a wide variety of group satisfaction and performance variables one of its most promising benefits, creativity, has so far received little attention. This section examines different conceptions of creativity in the management literature, viewing it as a trait, a process, a response to the environment or a product. Each of these has implications for the very subjective process of measuring creativity.

2.8.1 The Concept of Creativity in Management Research

Creativity is a broad and elusive concept (Hennessey & Amabile, 2010, p. 571), and no unifying definition exists. Researchers in psychology or management tend to take one of three broad perspectives (Csikzentmihayli, 1996; Runco, 2004). First, creativity has been conceptualised as a problem-solving process: "identifying the difficult; searching for solutions, making guesses, or formulating hypotheses and possibly modifying them and retesting them; and finally communicating the results" (Torrance, 1966, p. 6).

Second, creativity has been studied as a search for novelty or innovation. In this view creativity is the mental act of rejecting prevailing ideas and discovering new ones (Hennessey & Amabile, 2010; Langley & Jones, 1988), transitioning from conventional to unconventional thinking (Sternberg & Lubart, 1999). This might involve bringing previously unrelated ideas together in new insights (Koestler, 1964), or merely becoming more open to new ideas (Barron, 1955).

Finally, some researchers have focused on the outcome rather than the process. Generally outcomes are expected to be not merely new but also useful or potentially useful to others (Beghetto & Kaufman, 2007; Shalley, Zhou, & Oldham, 2004, p. 933). Creativity in outcomes may be reflected in original or unusually high quality outcomes (Chen, 2006; Sternberg, Lubart, Kaufman, & Pretz, 2005), or in the creation of meaningful insights, as found in a new research paradigm or a new approach to artistic or literary expression (Beghetto & Kaufman, 2007; Curşeu, 2010).

Combining these perspectives, creativity can be seen as a process of problem-solving or discovery that produces novel outcomes, including ideas, having practical use or significant meaning to people in a given field. The degree of novelty and usefulness is typically not defined objectively but judged subjectively by experts in the field (Amabile, 1996; Chen, 2006; Sternberg, 2006).

Rhodes' (1961) well-known "4 Ps" of creativity extends this perspective by reminding researchers that as creativity is not only a process or product but also involves a creative person, working alone or in a group, and the "press" of environmental factors that stimulate creativity. Rhodes' "ecology" of creativity is used to organize the brief overview of creativity research below.

2.8.2 Creativity as a Personal Trait

Early researchers studied creativity as a personal trait: "In its narrow sense, creativity refers to the abilities that are most characteristic of creative people" (Guilford, 1950, p. 444). These include open-mindedness and willingness to take risks (Barron, 1955); a readiness to seize new experiences (Golann, 1963; Runco, 2007); tolerance of uncertainty (Sternberg & Lubart, 1991); and self-confidence and willingness to grow (Mumford, Scott, Gaddis, & Strange, 2002).

Operational definitions of creativity as a trait underlie psychometric scales such as Sternberg and O'Hara's (1999) Structure of Intelligence (SOI) test, which asks participants to create titles for short stories, find unusual uses for common items, or list the consequences of an event, in order to assess their ability to identify problems, think divergently, find original solutions and apply them creatively. Torrance's (1966) Test of Creative Thinking (TTCT) gives participants open-ended challenges

and uses trained examiners to assess responses. Similar approaches are found in the Remote Associates Test (RAT) (Mednick, 1962), the Instances Test (IT) (Wallach & Kogan, 1965), and various word association, problem construction or story completion tests (Getzels & Jackson, 1962).

An alternative approach assesses personality variables rather than task performance. For example, tolerance of ambiguity (Vernon, 1970) is considered a hallmark of creativity in studies of painters (e.g., Furnham & Avison, 1997) and school students (e.g., Runco, 1991), and researchers have consequently used Tegano's (1990) Tolerance of Ambiguity Scale (TAS) to assess creativity.

Openness to experience or investigating new possibilities is also related to creativity (George & Zhou, 2001; Prabhu, Sutton, & Sauser, 2008), for example in studies of professional artists (e.g., Amabile, 1996) and the general population (McCrae, 1987). Sensitivity to one's immediate environment (Getzels & Csikszentmihalyi, 1976), willingness to take risks (Griffin & McDermott, 1998; Sulloway, 1996), and curiosity or exploring possibilities (Runco, 1994; Starbuck & Webster, 1991) are related conceptual underpinnings of trait creativity.

Although creativity is widely seen as an individual trait (Cropley, 2000), three key criticisms of this concept exist. First, trait researchers tend to assess creativity in laboratory settings, ignoring longer-term and more complex forms of creative work (Beghetto & Kaufman, 2007). Second, the use of trained judges to standardise scoring of trait tests can introduce subjective bias (Amabile, 1983). Finally, trait research ignores group or team creativity (Runco, 1989), a phenomenon important in organizational settings. While individual traits are important contributors to group

creativity, group dynamics or climate provide an additional level of influence not addressed in trait studies. This influence is considered below in considering studies of the creative process.

2.8.3 Creativity as a Process

Studies of creativity as a process usually view it sequentially. For example, Wallas' (1926) Stage Model begins with a preparation stage in which the problem and the tools needed to solve it are identified, followed by surveying or reviewing the problem, an incubation stage, the illumination stage in which a solution is realized, and finally a verification stage. The Osborn-Parnes Creative Problem Solving Process (Parnes, Noller, & Biondi, 1977) similarly describes stages of objective setting, data gathering, refinement, investigating options, selecting the most promising, and implementation. Similar again is Amabile's (1996) Componential Theory of Creativity involving five stages: identifying the problem, researching it, generating solutions, selecting the most suitable, and finally evaluating its appropriateness. Zhou and George (2003) caution that such stages may not occur sequentially; rather creativity is often messy and stages may be skipped or repeated as creators refine their approach.

Three criticisms have been made of stage models. First, they can be difficult to verify empirically in non-laboratory studies, since participants may not remember how they tackled a long-term creative task (Mace & Ward, 2002) and instead offer imagined cause-and-effect accounts of their progress (Glass & Arnkoff, 1997), particularly ones they believe the researcher wishes to hear (Mace & Ward, 2002).

A second criticism is that stage theories downplay the messiness of real-world creativity, which may not be a response to a specific problem (Lubart, 2001). Viewing creativity as a methodical, goal-focused activity overlooks the role of chance or randomness, play, lateral, analogical or metaphorical thinking, inspiration and other non-rational or non-linear activities. Studies supporting these stages tend to give participants a specific task and a short-term environment suited to sequential, goal-driven activity.

A third criticism is that process studies, like trait studies, focus on individuals. Sequential processes are less practical when group members must collaborate or negotiate with and learn from each other (Milliken, Bartel, & Kurtzberg, 2003). Work groups may have different environments, relationships and tasks to those studied in laboratory studies of student groups (Pirola-Merlo & Mann, 2004).

The Creative Process in Groups

The few studies of creativity in work environments tend to highlight the role of collaboration. Ford's (1996) theory of Creative Individual Action identifies cooperation among group members as essential, along with sound management and organisational support. Pirola-Merlo and Mann (2004) suggest the benefits of teamwork are greatest when the task requires members to collaborate rather than working separately towards a shared objective. Hargadon and Bechky's (2006) field study of work groups in management consulting, multidivisional and engineering firms found greater collaboration leads to more creative problem-solving outcomes in many tasks and work conditions.

Studies of 'group climate' have related group dynamics to creativity (Hill, 1982; Steiner, 1972). Group climate is a global variable defined as "a conglomerate of attitudes, feelings and behaviours which characterize life in the organization [and are manifested] in the ongoing interactions between individuals (personalities) and the organizational setting" (Ekvall, 1983, p. 2). A collaborative climate allows group members to draw on colleagues' unique abilities and provides a sense of trust that encourages original ideas and learning from each other, enabling the creative performance of the group to surpass that of individual members working independently (Hill, 1982). Laughlin and Johnson (1966) found members of groups with a climate of task commitment performed better on a general intelligence test than those in groups without commitment. Kurtzberg and Amabile (2001) describe creative groups as "synergistic" in that members learn from each other, especially when diversity provides differing viewpoints.

Group climate can also stymie the creative process (Woodman, Sawyer, & Griffin, 1993). In "group think", the majority view predominates and alternatives are not considered (Janis, 1982), while "production blocking" involves members waiting for others to present ideas before offering their own (Diehl & Stroebe, 1987). Similarly "evaluation apprehension" can lead members to withhold opinions for fear of criticism from colleagues (Lamm & Trommsdorff, 1973). A climate that prevents communication in these ways leads to mistrust (Osborn, 1957).

Dysfunctional group climates can also encourage "social loafing", where individuals reduce work and expect others to cover the shortfall (Karau & Williams, 1993). In "cognitive interference" social convention causes members to evaluate all ideas

equally rather than choosing the most suitable (Pinsonneault, Barki, Gallupe, & Hoppen, 1999).

Whether a group's climate is positive or negative has a lot to do with leadership. Researchers have typically examined hierarchical leadership as a source of positive climate (Yukl, 2010). For example, Cohen and Bailey (1997) suggest hierarchical leadership can address the problem of leaderless groups that waste time addressing conflicts or process problems rather than business goals. In Mumford, Scott, Gaddis and Strange's (2002) study of creative groups, hierarchical leaders overcame such problems by providing resources, stimulating creativity amongst members and clarifying objectives. Similarly, Barry (1991) found problem-solving performance improved when group leaders encouraged members to develop shared objectives or plans, and fostered internal cohesion.

So far, however, researchers have not considered shared leadership as a means of creating a climate conducive to creativity, a gap addressed by the present study. Shared leadership research suggests it improves group processes and outcomes by encouraging collaboration, communication and sharing of different viewpoints, key elements of the creative process. Creative work especially requires a diversity of ideas (Milliken et al., 2003; Paulus & Nijstad, 2003; Sethi, Smith, & Park, 2001; Thompson, 2003), beyond the general communication and collaboration requirements of teamwork. This is less easily facilitated by hierarchical leadership.

Shared leadership can also reduce the negative aspects of group social relations. Members seeing themselves as co-leaders of the group's work are more likely to be actively involved and less likely to be passively silent, disengaged, afraid of being

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evaluated, overly conformist, accepting of unhelpful ideas, or willing to waste time on conflicts or process issues. While such negatives can be addressed by hierarchical leadership, it is likely that shared leadership will stimulate creativity even more by encouraging greater involvement and more acceptance of others' different viewpoints and capabilities.

2.8.4 Creativity as a Response to Environmental Influences

The third perspective on creativity views it as a response to a person's social or physical environment (Amabile, Conti, Coon, Lazenby, & Herron, 1996). For example, a stimulating environment is important to creativity in both individuals (Amabile, 1996; Bharadwaj & Menon, 2000; Tesluk, Farr, & Klein, 1997) and organizational teams (Amabile et al., 1996; Hender, Rodgers, Dean, & Nunamaker Jr, 2001; Taggar, 2002). An interesting or challenging task, or an organizational need to innovate, can stimulate workplace creativity (Amabile et al., 1996; Paulus, 2000).

Besides stimulation, researchers have found creativity in individuals or work groups is facilitated by personal autonomy, group resources, time pressure and management or leadership style. Autonomy describes an individual or group's freedom in performing a task (Mednick, 1962), and is regularly found to increase creativity in contexts as diverse as university students undertaking an abstract problem-solving task (Zhou, 1998) and R&D teams in a large multinational firm (Paolillo & Brown, 1978).

The environmental resources contributing to creativity include time, organisational support and supervisory feedback (Farr & Ford, 1990; Stokols, Clitheroe, & Zmuidzinas, 2002). Both co-worker and supervisor support are associated with

increased creativity (Zhou, 2003). Time pressure can either encourage or frustrate creativity in individuals and groups. Baer and Oldham (2006) report a curvilinear relationship where moderate time pressure improves group creativity but greater pressure reduces it. Andrews and Farris (1972) found deadlines hampered creative performance in knowledge workers, and Ekvall and Ryhammer (1999) report reduced creativity amongst university staff under time pressure.

Finally, group leadership also affects creativity. Paulus and Brown (2003) found groups with hierarchical leaders who supported and consulted members showed greater creativity in a variety of projects and companies. Other studies report similar effects (Amabile, Schatzel, Moneta, & Kramer, 2004; Mumford, 2002). For example, Barnowe (1975) found supportive, task-focused and technically competent group leaders improved the performance of industrial research groups.

Although no studies have examined these environmental variables in shared leadership contexts, it is likely they would further increase group members' experience of autonomy, stimulation and support from others, along with their capacity to manage the practical and emotional aspects of time pressure.

2.8.5 Creativity as a Product

The final perspective on creativity examines how products of individual or group work present "something that is both new and truly valuable" (Rothenberg, 1990, p. 5) or generate "effective surprise" or "the shock of recognition" (Bruner, 1962). As these responses are highly subjective (Harrington, 1990), creativity in products or outcomes is difficult to assess by conventional social science methods (Barron, 1955).

In response to this challenge researchers have developed a variety of approaches to measuring creativity in a product. Taylor's (1959) taxonomy distinguishes expressive creativity as found in drawings and diagrams, the productive creativity of artistic or scientific products, inventive creativity in ingenious products or ideas, the innovative creativity of incremental improvements to current practices or products, and finally 'emergenative' creativity, where groundbreaking outcomes lead to new disciplines. Other authors have considered novelty, functionality or aesthetic appeal as hallmarks of creative products (Besemer & Trefinger, 1981; Dollinger, Ross, & Preston, 2002; Urban, 1991).

These qualities are typically assessed by a panel whose expert judgments constitute an operational definition of creativity (Besemer & O'Quin, 1986). Amabile (1982) calls this a "consensual definition" of creativity:

> "A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers…" (Amabile, 1982, p. 1001).

Amabile argues that a creative product should be novel, appropriate, useful and correct or valuable to judges. It should also represent the outcome of heuristic thinking, where multiple outcomes are possible, rather than an algorithmic or linearly-structured search for the "correct" answer (McGraw, 1978; Taylor, 1960).

She suggests these criteria underlie everyday perceptions of creativity in products - "in the eye of the beholder" (Hempel & Sue-Chan, 2010).

In Amabile's Consensual Assessment Technique (CAT) an independent panel of expert judges rate a product's novelty, usefulness, correctness, value or use of a heuristic work process (McGraw, 1978; Taylor, 1960). A variation of the CAT is used in this study (see 3.2).

Psychometric tests for assessing product creativity have also been developed, including Taylor's (1975) Creative Product Inventory and Besemer and O'Quin's (1986) Three-Factor Creative Product Analysis Matrix. These use dimensions such as novelty (originality), effectiveness (in achieving its purpose), elegance (how understandable or aesthetically satisfying is an outcome), integration (how well it functions in a broader context), germinality (how much subsequent creativity it stimulates), emotionality (e.g., capacity to stimulate positive emotions) or elaboration (how far it extends previous outcomes) (Besemer & O'Quin, 1986; Taylor, 1975).

The CAT has several advantages over the psychometric approach to evaluating products. It is applicable to a broad range of products, and it embraces rather than avoids the subjectivity inherent in assessing creativity by using a panel of judges. It is also useful for group as well as individual products. For these reasons the CAT is used to assess the creativity of the movies produced by the groups in this study.

2.8.6 Summary

Creativity has been studied as a trait, a process, an environmental outcome and a quality of individual or group products. Each approach contributes to a broad

understanding of the "ecology of creativity" (Rhodes, 1961), but three have particular relevance to understanding creativity in work groups. Studies of the creative process in groups highlight the roles of collaboration and communication, and the acceptance of diversity or difference as a driver of creativity. The process view also emphasizes the need to overcome psychological or social barriers to cooperation in small groups, such as groupthink, social loafing and 'evaluation apprehension'. Research on environmental influences indicates the value of stimulation, autonomy, time pressure and leadership. Finally, studies of the outcomes or products of creative work indicate the value of consensual evaluation by expert judges as a response to the problem of subjectivity in assessing creativity.

Only a few studies of creativity have considered the role of leadership, and all examine only hierarchical leadership. Shared leadership is compatible with the emphasis in these on collaboration, communication, valuing of diversity, supervisor or co-worker support, reduction of psychosocial dysfunction, mental stimulation, autonomy and the need to manage time pressure. To the extent that shared leadership encourages an even more psychosocially amenable group environment, with greater valuing of individual differences and ability to manage time pressure, it is likely to further increase workgroup creativity.

2.9 Professionalism and Task Focus in Creative Work

Creativity in work environments is usually focused on business goals rather than being an end in itself: a creative product or service must also meet the expectations and needs of clients, customers or internal stakeholders. To ensure the creative product produced in this study (a movie) met these requirements, two additional

dependent variables were measured, professionalism and task focus. Studies relevant to these concepts are reviewed here.

2.9.1 Professionalism

While 'professionalism' is a term widely used in the business world, academic definitions tend to be vague and inconsistent. Friedson (1986) describes professionalism as the consistent application and maintenance of exemplary work standards. Other authors refer to having extensive knowledge, skills and experience in an occupational field (Gullberg, Olsson, Alenfelt, Ivarsson, & Nilsson, 1994), or the application of experience to non-routine circumstances (Tschannen-Moran, 2009).

Yet other definitions reflect the social and ethical dimensions of professional life. Professionalism can be seen as a "collective consciousness" among practitioners about appropriate work principles and standards (Gross, 1958, p 79), a shared sense of purpose (Tschannen-Moran, 2009) or the standards presented to 'end-users' (Cooper, 1988). Such standards can reflect an ethic of service or civic responsibility (Bartol, 1979), accountability (Darling-Hammond, 1988) or self-regulation (Richie & Genoni, 2002).

Professionalism is important in creative work because creativity by itself can lead to outcomes that do not meet the standards expected by society, the organisation, other professionals or professional groups, or the organisation's customers. However, the broad characteristics of existing definitions make its measurement difficult. Scales have been developed (Hall, 1969; Haywood-Farmer & Stuart, 1990), but are highly subjective and their validity uncertain (Snizek, 1972; Swailes, 2003). Therefore this

study uses Amabile's Consensual Assessment Technique (CAT) to assess professionalism with an independent panel of experienced assessors, as for creativity.

2.9.2 Task Focus

A second constraint on creativity in the workplace is that a novel product or service must meet the business goal behind its development. Task focus refers to the completion of a plan (Earley & Perry, 1987) or attainment of a specific goal (Huber, 1985) in a way that reflects the underlying intent. In an intellectually challenging task, for example, task focus might be measured by the relevance or value of ideas produced (Hackman, 1968; Hackman, Jones, & McGrath, 1967). Task focus is particularly important in shared leadership because without a single leader group members may lose sight of their goal or the clients' needs.

There is no consensus on how to measure task focus (Straus, 1999). While it involves performance against business goals, this may be difficult to assess when outcomes are multifaceted, non-quantifiable or have 'discretionary' or subjective elements (Steiner, 1972). In group work, task focus has been assessed from a more processual viewpoint by measuring the cooperation or social cohesiveness of members (Shaw, 1981), but this does not guarantee focus on the right goals according to the organization or market. As a result of these problems, this study also uses Amabile's CAT to assess how much group outcomes reflect the task assigned by the "client" (lecturer).

2.10 Theoretical Framework: The Effect of Shared Leadership on Creativity and Related Variables

This study primarily aimed to examine the effects of shared leadership on creativity. Two related dependent variables, professionalism and task focus, were included as checks on the type of creativity produced but are also expected to benefit from shared leadership. Leadership is assessed as both a global variable and a set of five leadership functions: constructive feedback, developmental planning, goal clarification, motivation and team building. The sections below review studies linking leadership and the five leadership functions to creativity, professionalism and task focus.

2.10.1 Shared Leadership and Creativity

Only a few studies have examined the effects of leadership on work-group creativity, most involving hierarchical leadership. For example, Jung (2001) found groups with transformational leaders were more creative in a brainstorming task than leaderless groups. On the other hand, other studies show directive forms of leadership reduce group creativity by restricting member expression (King & Anderson, 1990; Kolb, 1992; Payne, 1990; West, 2003).

While the effects of shared leadership on creativity have not yet been studied directly, five studies offer tangential evidence or argument. Pearce and Ensley (2004) found product innovation teams with shared goals were more innovative than those without, according to both self-perceptions and the ratings of managers and customers. Hooker and Csikszentmihalyi (2003) outline a theoretical link between shared leadership and creative performance based on "flow", a psychological state of

intense task-focus, among group members. Leana (1985) found student groups with 'participative' leaders had better outcomes in a brainstorming task than groups with directive leaders. Creativity has also been related to shared leadership in virtual student groups (Lee, Lee, & Seo 2011). Finally, Mihalache, Jansen, Van den Bosch and Volberda (2014) found shared leadership in Dutch top management teams increased innovation, apparently by reducing the tensions associated with such work.

Several indirect lines of evidence suggest shared leadership should improve creativity. First, group creativity research largely advocates participative leadership (Anderson & Fiedler, 1964; Knorr, Mittermeir, Aichholzer, & Waller, 1979; West, 2003), in which the leader consults openly and works collaboratively with members (Paulus & Brown, 2003). Participative groups show better problem-solving and greater innovation than those with directive leaders (Anderson & Fiedler, 1964). This has been related to lower control and greater autonomy (Manz & Sims, 1989), since "Leaders are not so much responsible for directing specific team actions as they are responsible for developing the underlying individual and team capabilities that enable teams to self-manage their actions'' (Zaccaro, Rittman, & Marks, 2002, p 134).

Group member autonomy has been linked to increased creativity in a number of studies (Deci & Ryan, 1985; Hennessey, 2003; Hennessey & Amabile, 2010). Self-determination, involving the fit between a person's values and job control, similarly improves group creativity in workplaces (Alge, Ballinger, Tangirala, & Oakley, 2006) and laboratory studies (Allen, Lee, & Tushman, 1980). Conversely, directive supervision reduces group creativity and brainstorming effectiveness (Hage & Aiken, 1967; Shepard, 1967; Woodman et al., 1993), and excessive formal oversight reduces

creativity by fostering conformity with supervisors' expectations and stopping members from challenging convention (Walton, 1972).

Self-managed work groups (SMWGs) offer greater autonomy than traditional groups and are considered to improve risk-taking (Amabile, 1988; Burnside, 1990; Nystrom, 1990; Woodman et al., 1993) and provide flexibility to meet changing circumstances (Brown & Gioia, 2002; Manz & Sims, 1987) or depart from planned strategies (Damanpour, 1991; King, 1990; Rubinstein & Woodman, 1984; Zaltman, Duncan, & Holbek, 1973). These effects are likely to contribute to creativity.

A second area of research links shared leadership to creativity through the intervening variable of intrinsic motivation. Intrinsic motivation is a well-established influence on creativity (Amabile, 1996). In work, intrinsic motivation is shaped by both the work and the work environment. Directive leadership is known to weaken intrinsic motivation by increasing conformity (Hennessey, 2003), while shared leadership increases intrinsic motivation and collaboration (Pearce & Sims, 2002), stimulating creative experimentation (Carson et al., 2007).

A third connection involves 'psychological safety', a climate of mutual respect and interpersonal trust within a group that gives members the confidence to share ideas without fear of reproach from other members (Edmondson, 1999). Kessel, Kratzer, and Schultz (2012) found psychological safety in healthcare groups increased creative performance.

A fourth, related, connection involves variables reflecting a positive psychosocial climate, such as trust and affective commitment. For example, Klimoski and Karol

(1976) found high levels of trust helped experimental groups solve problems in a brainstorming task, and Michaelis, Stegmaier, and Sonntag (2009) found affective commitment increase creative performance in R&D teams in an automotive company.

Therefore, although direct evidence of the effects of shared leadership is lacking, the increased autonomy, motivation and psychological safety found in participative leadership and SMWGs is known to improve group creativity. The unique nature of shared leadership as distributed, informal and emergent (Table 2.1) suggests that it, too, facilitates high levels of autonomy, motivation and psychological safety (Nembhard & Edmondson, 2006; Srivastava, Bartol, & Locke, 2006). A large number of other variables highlighted in creativity research (summarized in 2.8.6) are also likely to operate in shared leadership, creating greater collaboration, communication, valuing of diversity, social support and mental stimulation, and reducing certain forms of psychosocial dysfunction.

2.10.2 Shared Leadership and Task Focus and Professionalism

Task focus and professionalism are also expected to improve under shared leadership.

Task Focus

Shared leadership has not been directly linked to task focus, but some related evidence connects participative leadership to aspects of group performance that should facilitate task focus. For example, participative leadership improves member commitment (Kahn & Tannenbaum, 1957; Tannenbaum & Smith, 1964), task commitment and performance goals (Huang, Iun, Liu, & Gong, 2010), and

perseverance during difficulties (Zaccaro et al., 2002) compared to directive leadership.

As well, greater autonomy can enable task focus by encouraging group learning and choice of strategies suited to the group's specific goals and environment (Hackman, Walton, & Goodman, 1986, p. 82). Members are better able to understand their responsibilities and those of colleagues (Cannon-Bowers & Salas, 2001), helping them monitor progress and recognise when help is needed (Zaccaro et al., 2002). Autonomous groups are also better at problem-solving (Kahai, Sosik, & Avolio, 1997; Larson, Foster-Fishman, & Franz, 1998).

While these findings do not directly address task focus, they suggest aspects of group management related to it are improved by participative leadership, and hence by shared leadership

Professionalism

Leadership is considered important to professionalism, since leaders establish organisational norms and performance standards (Clark, Spurgeon, & Hamilton, 2008; Tschannen-Moran, 2009). Studies of professionalism also suggest leaders devolve power once norms are established (Adler & Borys, 1996; Cloke & Goldsmith, 2002; Tschannen-Moran, 2004), since professionalism requires an occupational culture of self-regulation (Richie & Genoni, 2002) shaped by practitioners as well as leaders (Gross, 1958). Shared leadership may therefore encourage professional standards by involving members in their determination. High levels of professionalism are expected in groups with collective self-regulation rather

than bureaucratic control (Richie & Genoni, 2002; Tschannen-Moran, 2009). For these reasons, shared leadership is predicted to increase professionalism.

2.10.3 Hypotheses Concerning Shared Leadership

The studies cited above lead to the central hypothesis of this study, that shared leadership will result in greater creativity in group outcomes compared to hierarchical leadership. Similar effects are predicted for the task focus and professionalism of group outcomes.

Hypothesis 1a: Shared leadership will increase group creativity.

Hypothesis 1b: Shared leadership will increase task focus.

Hypothesis 1c: Shared leadership will increase professionalism.

2.10.4 Hypotheses Concerning Bass & Bass's Leadership Functions

A second set of hypotheses predicts the effects of sharing Bass and Bass's (2008) five leadership functions on the three dependent variables. Studies of these functions in hierarchical leadership settings suggest greater sharing of each will increase the creativity, task focus and professionalism of group outcomes. Studies of self-managed work groups and participative leadership are particularly relevant, and suggest these functions may have a different character under shared leadership.

2.10.5 Constructive Feedback

Feedback in a hierarchical context aims to help group members improve work outcomes by monitoring and evaluating their performance (Yukl, 1998). In a shared leadership environment, feedback is likely to have a more collegial, less directive and often constructive tone. Studies of hierarchical environments show feedback is

used as a means of directive control aimed at increasing the pace of work (Kim & Hamner, 1976) or correcting problems or shortcomings (Forza & Salvador, 2000; Nadler, 1979), for example. The motivational value of positive feedback (Payne & Hauty, 1955) is likely to be more important in shared leadership.

A wide range of studies show feedback improves performance in both individuals (Dockstader, Nebeker, & Shumate, 1977; Ivancevich & McMahon, 1982; Pritchard, Bigby, Beiting, Coverdale, & Morgan, 1981) and groups (Braunstein, Klein, & Pachla, 1973; Harrison, 1970; Hundal, 1969; Smith & Kight, 1959; Weitz, Antoinetti, & Wallace, 1954). For example, increased feedback leads to better group decisions (Guzzo, Jette, & Katzell, 1985; Nadler, 1979). This may reflect the value of knowing accurately how one is performing, but the effects of feedback are also often attributed to its motivational value (Ammons, 1956; Kluger & De Nisi, 1996). For example, positive feedback reduces boredom and discouragement (Nadler, 1979). Shared leadership is expected to encourage both informational and motivational feedback, while the formal nature of hierarchical leadership tends to favour informational feedback. There is more likelihood of a constructive tone to feedback when group members rely on and trust each other.

The effect of shared constructive feedback on creativity is suggested by studies in which hierarchical groups show decreased creativity when highly monitored or evaluated (Amabile, Goldfarb, & Blackfield, 1990; Berglas, Amabile, & Handel, 1981; Szymanski & Harkins, 1992), or faced with strong performance expectations (Amabile, 1996). Such environments favour informational feedback for control purposes over motivational feedback. Creativity requires higher levels of autonomy,

mutuality and support in a group, and constructive feedback is more likely to encourage such a climate.

Studies in hierarchical or partly-shared environments also show positive effects of motivational feedback on creativity: for example, positively-framed practical guidance can increase creativity (Taggar, 2002), and praise from colleagues can increase intrinsic motivation (Deci, 1972), an antecedent to creativity (Amabile, 1996; Deci, 1972). In self-managed work groups (SMWGs), member interdependence improves both informational and supportive feedback (Shalley, 2008; Shalley & Perry-Smith, 2001). Members benefit from colleagues' performance and therefore have good reason to learn from and support them (Zhou, 2003), creating a climate of psychological safety that encourages exploring ideas (Collins & Amabile, 1999).

Shared constructive feedback has been shown to increase a number of variables related to task focus including influence, friendliness, cooperation, member reliability and peer feedback (e.g., Phielix, Prins, & Kirshner, 2010; Xie, Ke, & Sharma, 2008). For example, Pritchard, Jones, Roth, Stuebing, and Ekeberg (1988) found collegial feedback increased group productivity, an indicator of task focus in their study, by an average of 50%. More generally, shared feedback stimulates motivation and learning (Nadler, 1979) and social cohesion (Limon & Boster, 2003), qualities that can help a group avoid straying from their assigned task.

Finally, shared constructive feedback is expected to increase professionalism for similar reasons. For example, shared feedback in SMWGs raises group performance standards and reduces deviations (Kim & Hamner, 1976). Such task-orientated

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discussions can also have a 'cueing effect', raising performance expectations (Nadler, 1979) and hence professionalism. In shared leadership, such discussions are expected to be more frequent and more motivating.

In summary, shared constructive feedback is expected to have similar effects to those found in SMWGs, where members typically benefit from greater understanding of how the group is functioning and the critical issues it faces, as well as the capacity to motivate each other through constructive feedback (Pritchard et al., 1988). Shared constructive feedback is therefore expected to motivate group members to produce more creative, task-focused and professional outcomes.

Hypothesis 2a: Sharing of constructive feedback will increase group creativity.

Hypothesis 2b: Sharing of constructive feedback will increase task focus.

Hypothesis 2c: Sharing of constructive feedback will increase professionalism.

2.10.6 Developmental Planning

Developmental planning involves organizing the structure, methods, tactics and resources a group needs to achieve its goals. In this, leaders take into account group members' individual strengths and the support they need (Lancaster, Di Milia, & Cameron, 2012).

So far, no research has directly examined the sharing of planning in a developmental context relevant to shared leadership. However, some insight comes from studies comparing hierarchical and semi-autonomous work groups. Hackman, Brousseau and Weiss (1976) found SAWG members were better at assembling electrical components because they shared relevant information, which should also help them

plan their activities. Kernaghan and Cooke (1990) found non-hierarchical small R&D groups who cooperated in developing the structure, methods and tactics for achieving their goals were more accurate in selecting proposals likely to win funding, and exercised better quality control when executing projects, than hierarchical groups.

In linking information sharing and social cooperation to both routine and creative work, these two studies suggest general benefits of shared developmental planning that should increase creativity, task-focus and professionalism of group outcomes.

Hypothesis 3a: Sharing of developmental planning will improve group creativity.

Hypothesis 3b: Sharing of developmental planning will improve task focus.

Hypothesis 3c: Sharing of developmental planning will improve professionalism.

2.10.7 Goal Clarification

Goal-setting is traditionally seen as part of a hierarchical leader's role (Bowers & Seashore, 1966; Locke & Latham, 2006; Schutz, 1961), since it involves defining objectives, assigning responsibility to group members (Cattell, 1957; Gross, 1961; Yukl, 1998) and setting performance standards (Bandura, 1986; Bandura & Cervone, 1983). In shared leadership this is likely to be a more inclusive and less directive process, called here goal clarification.

Much research shows that goal-setting enhances individual and group performance (Bass & Bass, 2008; Coffin, 1944; Gross, 1961; Hemphill, 1949; Locke & Latham, 2002). Studies of hierarchical environments show that participative goal setting or clarification improves group creativity, while directive leadership reduces it (Ekvall, 1999; Kahai, Sosik, & Avolio, 2003; Somech, 2006; Woodman et al., 1993). This

appears related to autonomy, an important prerequisite for creative work (Ryan & Deci, 2000). Shared goal-setting gives members more control over task direction (West, 2002), helps them distinguish realistic from unrealistic goals (Shalley & Gilson, 2004), and motivates them by reducing external constraints (Hennessey, 2003). These are likely to be important advantages in creative work.

The effects of goal clarification on task focus are suggested by a wide variety of experimental studies showing that groups setting their own goals (within external parameters) outperform directed groups. This has been observed in brainstorming and sentence-completion (Crown & Rosse, 1995; Guthrie & Hollensbe, 2004), block-manipulation (Larson & Schaumann, 1993) and model-building (Mulvey & Ribbens, 1999) tasks. Shared 'goal-focus' has been found to improve performance in an organizational-management game and word puzzles (Smith, Locke, & Barry, 1990) and a nutritional assessment exercise (Whitney, 1994). It also improves task-motivation in a reasoning problem (Watson, 1983). As well, collective goals tend to be more realistic (Latham & Locke, 2007), reduce intra-group conflict (Filbeck & Smith, 1997) and increase group effort (Locke & Latham, 1990; Saavedra, Earley, & Van Dyne, 1993). These general benefits of shared goal setting on task outcomes and group dynamics suggest it will also improve task focus by focusing members on, and increasing their commitment to, their work goals.

Since professionalism involves commitment to performance standards (Richie & Genoni, 2002), when group members are involved in establishing standards more professional outcomes are expected. Although this has not been directly tested, professional performance has been related to variables such as trust (Tschannen-Moran, 2009), and participative leadership in schools (Uhl-Bien & Graen, 1998) or

health service providers (Haywood-Farmer & Stuart, 1990). Participation in goal-setting gave these professionals greater job autonomy and professional knowledge, two prerequisites for professionalism (Pearson & Moomaw, 2005).

These theoretical arguments suggest shared goal-clarification will lead to greater creativity, task-focus and professionalism than hierarchical goal-setting.

Hypothesis 4a: Sharing of goal clarification will increase group creativity.

Hypothesis 4b: Sharing of goal clarification will increase task focus.

Hypothesis 4c: Sharing of goal clarification will increase professionalism.

2.10.8 Motivation

Motivation is a central function of leadership (Shiflett, 1979; Yukl, 2010). In hierarchical contexts it includes behaviours such as showing 'individualized consideration' for subordinates and providing intellectual stimulation (Avolio et al., 1999; Bass, 1985). As often noted above, participative group leadership has been shown to improve motivation (e.g., Ellemers, De Gilder, & Haslam, 2004; Jung, 2001).

However it appears no studies have examined motivation in groups without a formal leader. Indirect arguments include Ellemers et al.'s (2004) view that motivation is improved by social identification with the group, which should increase under shared leadership. Weber and Hertel (2007) suggest hierarchical leadership reduces intrinsic motivation by increasing members' perceptions of their dispensability, while self-managed group members are motivated by seeing their contributions valued by peers.

Some theories of group dynamics suggest similar links between shared leadership and motivation. Erez and Somech's (1996) Social Facilitation Model predicts peer evaluation will be less threatening and more motivating than evaluation by a directive leader. In the Köhler Effect, weaker group members strive to improve as a result of recognising their shortcomings in relation to stronger members (Messé, Hertel, Kerr, Lount, & Park, 2002; Weber & Hertel, 2007) and seeking greater social recognition (Kerr, Feltz, & Irwin, 2013). Shared leadership could motivate less capable members through the reward of social recognition where directive controls would fail.

Beyond these specific links, shared leadership is also likely to increase motivation for many reasons mentioned in previous sections. Motivation is a fundamental drive that energises a person and improves general functioning. Therefore, many perspectives suggest that when group members motivate each other greater creativity, task focus and professionalism of outcomes can be expected.

Hypothesis 5a: Sharing of motivational encouragement will improve group
creativity.

Hypothesis 5b: Sharing of motivational encouragement will improve task focus.

Hypothesis 5c: Sharing of motivational encouragement will improve
professionalism.

2.10.9 Team Building

Many authors distinguish "teams" from "groups" by the more collaborative and focused psychological climate of the former (Dyer, 1977; Salas, Dickinson,

Converse, & Tannenbaum, 1992; Offermann & Spiros, 2001). Here, team building refers to creating the social communication and support underpinning the leadership functions discussed above (DeMeuse & Liebowitz, 1981; Klein et al., 2009; Woodman & Sherwood, 1980). Many studies show team building improves group performance in a wide variety of areas. Klein et al.'s (2009) recent meta-analysis found a significant positive correlation between team building and group performance.

Team building may be imposed on a group or may emerge from the groups' own interactions. Wolfe, Bowen and Roberts (1989) and Wellington and Faria (1995) found groups receiving a team building intervention performed worse in a business simulation than those allowed to develop teamwork themselves. Team building is one of the most important benefits of shared leadership, and may be the mechanism for many of its effects on creativity, including increased collaboration, trust, group cohesion, task commitment and involvement, open communication and negotiation (2.10.2; 2.10.8). These benefits are also expected to improve task focus and professionalism.

Hypothesis 6a: Sharing of team building will improve creativity.

Hypothesis 6b: Sharing of team building will improve task focus.

Hypothesis 6c: Sharing of team building will improve professionalism.

2.11   Chapter Summary

Shared leadership

Shared leadership emerges when group members are given autonomy over their work processes and participate in decision-making and leadership according to their

interests and abilities. This phenomenon is little studied, since most leadership studies assume a single leader with strong hierarchical authority over the group. Shared leadership has antecedents in practices such as semi-autonomous work groups and participative or empowering leadership, but these are typically studied as variations of hierarchical leadership. Shared leadership studies tend to start from the premise that the group should decide its own management and leadership arrangements. In practice, leadership is rarely, if ever, fully shared or fully hierarchical; rather groups fall on a continuum between these 'ideal types'.

Research on shared leadership primarily investigates the sharing of hierarchical leadership behaviours, notably those of transformational leadership. This sharing has been linked to a wide range of outcomes, including member satisfaction, customer satisfaction, external manager satisfaction, problem-solving, revenue growth, commitment, participation, sharing of values, trust, ability to handle uncertainty, adaptation to change and organizational learning.

However, these studies do not measure the actual pattern of sharing in each group. Rather, they measure group-level performance on the assumption that more leadership is shared leadership. However, low or moderate levels of group-level leadership do not necessarily indicate hierarchical leadership. Studies assessing the leadership of individual members also face this problem when they analyse only group averages. The Social Network Analysis measures of group centrality and density use individual member ratings in a way that can more accurately reflect the position of a group on the continuum between shared and hierarchical. Some empirical studies use one of these indices, but both are needed due to inherent ambiguities in each.

Existing studies of shared leadership are therefore compromised by limitations in their method of measuring 'sharedness'. A second problem in this literature involves measuring the 'leadership' aspect of the concept. Commonly used multidimensional (or multi-item) measures of hierarchical leadership behaviours may not be relevant to shared leadership and are impractical when rating individual group members. Single-item global measures of leadership are more practical in this context, but may lack the psychometric rigour of multi-item scales and do not show whether different individuals lead different facets of leadership as shared leadership theory suggests. This study therefore uses both a global measure and a general construct of leadership identifying a small number of leader roles (Bass and Bass, 2008). With a slight refocusing, this construct appears suited to both shared and hierarchical leadership.

Shared Leadership and Creativity

Creativity is increasingly valued in a business environment characterized by change, competition, rapid technological development and new social values, and may be one of the main benefits of shared leadership. The creativity literature identifies prerequisite conditions that are more likely to exist under shared than hierarchical leadership.

These conditions include group member autonomy, communication, collaboration, commitment to task and group, appreciation of diversity and realistic goal setting. At the group level, a climate of support and psychological safety allows group members to challenge convention, learn from each other, and adopt new perspectives through the sharing of ideas and peer feedback. This in turn could increase individual members' intrinsic motivation and engagement (or 'flow'), stretch their capabilities,

help them manage time pressure and provide the 'creative tension' widely considered central to creativity. Creativity is also stymied by dysfunctions such as group-think, social loafing, unproductive conflict, evaluation apprehension, unrealistic self-evaluation, lack of task focus and inflexible response to changing demands. Shared leadership is expected to increase many of these positive influences and reduce the negatives of hierarchical leadership.

Creativity is a highly subjective variable of creativity and measuring it is challenging, particularly when it is involves a creative product. A review of relevant literature suggested ratings by a panel of expert judges using Amabile's Consensual Assessment Technique (CAT) as a suitable approach.

Task Focus and Professionalism in Creative Work

Task focus and professionalism of the group outcomes are assessed in this study as variables especially important to creative work in business settings, which do not value creativity for its own sake but as a contribution to business goals that reflects professional standards. Both previous research and general theoretical considerations suggest shared leadership should improve task focus and professionalism.

In summary, this study aims to contribute to the literature on shared leadership by investigating its ability to improve creativity. Although this has received little empirical testing, many prerequisites identified in the creativity literature are expected to be more common under shared than hierarchical leadership. The methodology for testing this link presented in the next chapter involves a new approach to measuring shared leadership using SNA indices to assess a global and a multi-faceted construct of leadership, and measures product (outcome) creativity

along with related variables of task focus and professionalism using an expert panel

to reduce subjectivity.

Chapter Three
Methodology

3.1 Introduction

This thesis reports a study of the relationship between shared leadership and creativity in small groups. Shared leadership is contrasted with hierarchical leadership and measured using Social Network Analysis measures of centrality and density. The student groups were required to produce a movie on a very open-ended topic over a semester, and were allowed to organise their group's leadership as they chose. Shared leadership is measured as both a global variable and a set of five leadership roles or functions. Creativity is measured using a panel of judges, following Amabile's (1982) Consensual Assessment Technique (CAT). The movies were also assessed for task focus and professionalism, to check that the creativity met the task instructions and to assess the effects of shared leadership on these important attributes of a creative product in a business environment.

This chapter describes the methodology used to assess the hypotheses identified at the end of Chapter 2, including the research design, participants, measures, data collection procedure, and methods for analysing the data. Some elements of the approach to measuring shared vs. hierarchical leadership were discussed in the literature review, including the general nature of Social Networking Analysis, the options for collecting SNA data in shared leadership studies, the model of leadership underpinning the current measures, and the Consensual Analysis Technique approach to assessing the properties of creative products.

3.2 Research Design

The study has a correlational design, in which measures of shared vs hierarchical leadership, or sharing of leadership functions, is related to measures of the creativity, task focus and professionalism of the groups' movies. The study is experimental in being conducted under the controlled conditions of a classroom rather than a workplace 'field' setting. A more controlled experiment would have required some groups to use hierarchical leadership and others to use shared leadership, but this was not possible for practical and ethical reasons.

A correlational design provides less rigorous evidence of cause-effect relations than an experiment, and the present results therefore require further confirmation. However, the controlled environment does to some extent limit the possibility of extraneous variables accounting for the observed correlations, since shared and hierarchical leadership groups were tested under the same conditions. More importantly, this approach allowed groups to choose their 'natural' style of leadership rather than having one forced on them, providing the best test of the concept of interest. It is likely that shared leadership works best when chosen by rather than imposed on the group. Giving groups freedom to self-organise also provides data on the 'natural' variations in group leadership emerging in an unconstrained context.

In summary, the design had six independent variables (leadership and the five leadership functions) and three dependent variables (creativity, task focus and professionalism). All were assessed at the end of the semester when the movies were submitted for marking. By this time, the group's leadership styles were well established.

3.3 Participants

Participants were 135 students of three undergraduate leadership classes recruited from the researcher's university. The great majority were aged between 18 and 21. The classes comprised approximately equal proportions of males and females, and a diverse range of cultural backgrounds. Participants self-selected into 31 groups with between 3 and 6 members. Twenty-four groups had either 4 or 5 members. Students were allowed to self-organise into groups, and to decide their own leadership and work arrangements. No students had prior experience of moviemaking.

3.4 Measures

3.4.1 Shared vs. Hierarchical Leadership of Groups

The independent variables were measured by a questionnaire asking respondents to rate the degree of leadership and other behaviours demonstrated by each other group member. Students were asked to write the names of other members and rate the extent to which they "demonstrated leadership behaviour" on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) (see Appendix 1). Similar items were used to measure the five leadership functions identified from Bass and Bass's (2008) review.

The scores were tabulated in a matrix similar to that in Table 2.2. An Excel spreadsheet was used to calculate the SNA indices of group degree centrality and density that are used to measure hierarchical and shared leadership respectively. Following common practice (Mayo et al., 2003; Zohar & Tenne-Gazit, 2008), the five-point ratings were transformed into binary codes by recoding scores of $1 - 3$ as 0

and scores of 4 – 5 as 1. In effect, this codes each member as either a leader or not a leader.

Centrality

The measures known in SNA as actor degree centrality and group degree centralization were developed by Linton Freeman (1979). 'Actor' here describes a group member, since each group is studied as a separate network. *Actor degree centrality* refers to the centrality of *an individual member* in the group network. Centrality scores range from 0 to 1, where 0 represents an individual seen as a leader by *no* other members and 1 indicates an individual who is seen as a leader by *all* other members. Actor and group centrality scores are independent of network size.

Group degree centralization describes the *overall* centrality of leadership in a network (group), and has the same numerical properties as actor centrality. In this study group degree centralization is referred to as centrality for simplicity of expression. Group centrality is used here because the study focuses on group leadership not individual leaders. Freeman's formula was used to calculate group centrality:

$$C_D = \frac{\sum_{i=1}^{g} C_D(n^*) - C'_D(n_i)}{[(g-1)(g-2)]}$$

Where: C_D = group centralization

$C'_D(n_i)$ = actor centrality

$C_D(n^*)$ = largest observed value of actor degree centrality

g = number of members in a group

The concept of group centrality was introduced in Chapter 2 (see Section 2.5.1). To further illustrate its properties, Figure 3.1 shows four possibilities. In a "star graph" (Group A) group centrality is 1 (and density is correspondingly small at 1/n) since one member is seen as the only leader by all others. This leader has an actor centrality of one, and all other members have an actor centrality of 0.
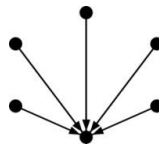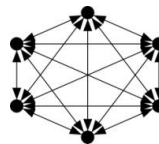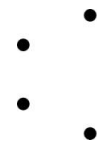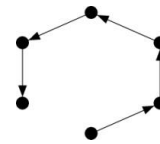
	Group A	Group B	Group C	Group D
Sociogram				
Centrality	1	0	0	0
Density	0.17	1	0	0.17

Figure 3.1 Centrality in a six-member group. Developed for this thesis.

A group centrality of zero is consistent with two theoretically opposite possibilities: either *all* members are seen as leaders by all others (Group B), or *no* members are seen as leaders (Group C). The first situation describes fully shared leadership; and the second no leadership. For this reason a second measure is needed to separate out shared leadership.

Density

Density is widely used as a group-level measure of cohesion (Blau, 1977) or how close-knit network members are (Bott, 1957; Barnes, 1969). In shared leadership studies it is interpreted as the total degree of influence in a group as a proportion of the total possible influence. Density can also be described as the average

standardized actor degree centrality of a network (Wasserman & Faust, 1994), and is calculated as:

$$D = \frac{\sum_{i=1}^{g} C'_D(n_i)}{g}$$

Where: D = group density

$C'_D(n_i)$ = actor centrality

g = number of members in a group.

In simpler terms, density is the average rating for a group's members as a proportion of the maximum possible average. A density of 1 indicates a fully shared or 'dense' group, with maximum interpersonal influence: all members see all other members as leaders. This situation always has a centrality of 0 (Group B in Figure 3.1). A density of zero indicates no interpersonal influence in the group (Group C).

As described in Chapter 2, density scores in the lower half of the range (0 - .5) are ambiguous about the degree of hierarchical (centralised) vs. shared (dense) influence. A density of 1/n could represent a fully centralised group (Group A) *or* the moderately shared group of the partial 'wheel graph' in Figure 3.1 (Group D). Such maximally ambiguous densities range from 0.5 in a two-member group to 0.1 in a ten-member group: the larger the group the more ambiguous low density scores become. Thus, a centrality score of 1 indicates hierarchical leadership (Group A) and a density score of indicates shared leadership (Group B), but both measures are ambiguous in the lower half of their range. As a result, both are needed as indicators

p66of the underlying construct. Their use in testing the study hypotheses is discussed below (3.6).

3.4.2 Creativity, Task Focus and Professionalism of Group Products

The three dependent variables were assessed with Amabile's (1982) Consensual Assessment Technique (CAT), which uses a panel of judges. This is a common approach to measuring highly subjective aspects of creative products. The CAT was developed specifically to compare creative works across different environments (Baer, Kaufman, & Gentile, 2004), and is considered a reliable and straightforward method for this (Dollinger & Shafran, 2005; Hennessey, 2003).

The three judges rated each movie in random order and separately from each other in accordance with the CAT guidelines, using a three-item questionnaire covering creativity, task focus and professionalism. The instructions asked judges to separate creativity from technical sophistication or aesthetical appeal. The procedure used by the judges is further described below.

A three-judge panel is widely used in previous CAT studies (Baer, 1994; Brinkman, 1999; Dollinger, 2007; Hennessey, 2003; Hickey, 2001; Kaufman, Baer, Cole, & Sexton, 2008; Plucker, 2004). The inter-rater reliability reported in Section 4.4 suggests the panel functioned effectively.

3.4.3 Self-Reported Creativity and Other Dependent Variables

Four items were included on the student questionnaire to assess the students' own views of their movies and the group process. These measured movie creativity and overall quality, and the extent to which the groups were well-organised and worked

effectively as a team. These items were not designed to test formal hypotheses but provided an alternative perspective on group outcomes and processes from the participants' viewpoint.

Shared leadership studies often use self-reported measures of dependent variables but such measures are subject to biases such as social desirability bias, and are generally seen as less rigorous than objective measures obtained from independent judges. Correlations between independent variables and self-reported dependent variables are reported here as an insight into the difference between the two approaches. However, given the possibility that the higher correlations for self-reported measures are due to measurement artefacts such as social desirability bias, and the broader possibility of common method bias (discussed below), the self-reported dependent variables are not used in formal hypothesis tests.

3.4.4 Reliability, Validity and Other Measurement Issues

The reliability of a measure refers to its consistency, that is, the extent to which it involves measurement error as well as measurement of the desired concept (Carmines & Zeller, 1979). Reliability cannot be measured directly since the ratio of error to true score is unknown, and is instead assessed using approximations such as test-retest measures of consistency over time or measures of internal consistency.

Reliability of the independent and dependent variable measures could not be assessed by test-retest comparisons since the student project could only be performed once, and measures were necessarily collected at the end of the project when the groups' leadership arrangements had 'matured' and the movies were finished. Internal consistency of the leadership ratings is addressed by the intercorrelations reported in

Chapter 4. The ratings were not combined into a single index of leadership since the theoretical interest is primarily in their differences, and hence Cronbach's alpha measure of consistency is not relevant.

Reliability of the dependent variable measures was assessed by inter-rater reliability, which analyses the consistency between raters (Gwet, 2012; Kottner et al., 2011; McGraw & Wong, 1996; Veitch, Salmon, & Ball, 2008). A two-way analysis of variance (ANOVA) on interclass correlation coefficients (Cicchetti, 1994; Rankin & Stokes, 1998; Shrout & Fleiss, 1979) is reported in Section 4.4.

A measure's validity reflects the extent to which it addresses the relevant theoretical construct. In survey research this is often assessed by correlations with another measure which is either theoretically related to the focal construct (convergent validity) or separate from it (discriminant validity). This was not possible here due to the time constraints involved in gathering SNA data, where students must rate other group members on multiple criteria, and in using the CAT, where each judge must rate 31 movies. As well, alternative well-tested measures of leadership sharing and product creativity are not easily found.

On the other hand, some aspects of the study design and results increase confidence in the validity of the measures of shared vs. hierarchical leadership. Bass and Bass's (2008) five leadership functions are based on a comprehensive literature review and therefore appear to adequately represent the broad concept of leadership with content validity. Measures of these showed moderate to high inter-correlations on both centrality and density (Tables 4.2 and 4.3) suggesting convergent validity. As well,

these measures correlated moderately with the single-item measures of centrality and density.

Moderate to high intercorrelations between the dependent variables (Table 4.6) are similarly suggestive of validity. On the other hand, both sets of intercorrelations may reflect common method bias (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003), in which aspects of the research method introduce errors that inflate estimates of the relationship between variables. This is an issue not only for assessing validity but also for testing the hypothesised relationships between independent and dependent variables. However, the latter concern is eliminated here by using a self-report questionnaire to measure leadership sharing and a panel of raters to measure the dependent variables.

Measurement error also includes the specific errors or biases that all measurement systems exhibit. For example, social desirability bias (Nederhof, 1985) may have caused some participants to increase ratings of leadership for members of their group to create a good impression on the lecturer or assessors. Leniency or severity errors (Borman, 1977) might distort scores for some individuals, which may affect network measures in a small group. Although there is no obvious reason to suspect these biases are more prevalent here than in other studies, future validation of the results is desirable. The properties of the measures of sharing vs. hierarchical leadership are particularly worthy of further examination. Some suggestions for this are presented in Chapters 4 and 5.

3.5 Procedure

Students from three undergraduate leadership classes were recruited at the start of semester. The classes were told that participation involved completing a questionnaire at the end of the semester, and that declining to participate would have no bearing on their grades. They were also informed that participation in this study was voluntary and students were free to withdraw at any time. A signed consent form was obtained from those volunteering.

In the first week of the semester participants were invited to self-select into groups of 3 to 6 members. The assignment required them to produce a 15-minute movie on "the challenges of leadership" reflecting the course content, to be evaluated as part of the course grade. Although some further details were provided, the formal parameters were deliberately kept open-ended to provide room for creativity. Students were encouraged consult the lecturer if this presented difficulty, but generally required only broad guidance. They were told that an expert panel of three leadership scholars would review their movie for creativity, task focus and professionalism. Digital video cameras were provided to each group and their use explained.

In the last class of the semester participants were given a questionnaire asking them to assess their experiences in the group by rating their colleagues' leadership and other aspects of the group process and outcomes. Participants returned these to the researcher in a sealed, unmarked envelope. To protect anonymity, the questionnaires were stored in a secure location accessible only to the researcher. At this point the students had not seen the other groups' movies.

The expert judges were recruited from colleagues who had taught management or leadership for at least five years. They were informed of the study purpose and the requirement to rate 31 movies, along with the voluntary nature of participation, their right to withdraw at any time, and the confidentiality of the results.

3.6 Data Analysis

The data were first subjected to descriptive statistics to indicate the overall levels of shared leadership, creativity, task focus and professionalism. The variables were then tested for normality, and the dependent variables were additionally tested for inter-rater reliability. The hypothesis tests primarily involved two separate approaches, non-parametric tests of the *differences between groups* with shared and hierarchical leadership, and *correlations* relating independent variables - using both centrality and density measures - to dependent variables. The rationale behind these two approaches was influenced by the distributions of centrality and density, and other findings reported in Chapter 4, and is outlined below. Finally, visual inspection of sociograms was used to confirm the patterns suggested by the SNA measures and to test for the possibility that different group members might take leadership of one or more of the facets of leadership identified by Bass and Bass (2008).

This study is the first to use measures of centrality and density to identify groups on a continuum between shared and hierarchical leadership. While the need to use both indicators has been recognised (Mayo et al., 2003; Gockel & Werth, 2010, Small & Rentsch, 2010), how to do this is less clear. It appears there is no mathematical formula for combining the two indices into a single unambiguous measure of shared vs. hierarchical leadership. Therefore, hypothesis tests rely on jointly assessing two measures. One solution is to divide sample groups into shared and hierarchical

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categories as suggested by Mayo et al.'s framework. Although their schema reflects some misconceptions, the revised version shown in Figure 2.2 can be used to categorise groups as shared, hierarchical and low leadership. This approach is followed in the first set of analyses reported in the next chapter.

However, two aspects of Mayo et al.'s approach can create problems. First, a criterion point for dividing centrality and density scores into categories is required. The scale midpoint is an obvious choice and implied in Mayo et al.'s diagram, but if the distribution of scores on centrality and density is too skewed about this point, one or other category may have too few groups to support the inferential statistics needed to compare group means. So far, no authors have reported on the distribution of these indices in shared leadership or related research. This problem was encountered in the results reported in Chapter 4, and an alternative criterion of the group medians was used.

Median splits on these measures are, however, a compromise as medians are somewhat arbitrary boundary criteria. The resulting hypothesis tests address centrality and density *relative to* the sample medians (or means, another possible criterion), which makes comparison of different studies difficult. As well, median splits can increase the proportion of ambiguous scores – those below 0.5 - in one or other theoretically interesting category. For example, in a sample with more shared groups, the median centrality will be below 0.5 increasing the proportion of scores in that range counted as "hierarchical". Although there is no theoretically identifiable and precise point at which ambiguity starts, 0.5 appears to be a good approximation of this for both centrality and density.

A second problem with any splitting process is that considerable information is lost by converting metric scores into binary measures. An alternative is to correlate centrality and density with the dependent variables. While improving the measurement process, this does not directly reduce the ambiguity problem. However, an approximate check on ambiguity is possible. As centrality and density are negatively related in shared leadership and hierarchical leadership groups, their correlations with any dependent variable should have opposite signs. That is, such samples would have relatively few 'low leadership' groups as defined in Table 2.2. With this in mind, the correlational approach is also used in Chapter 4.

In summary, two approaches to assessing groups on the hierarchical – shared continuum were examined in this study, both with advantages and disadvantages. As the value of each depends to some extent on the actual distribution of centrality and density scores in the sample, the analytical process of this study was somewhat exploratory and further discussion of relevant methodological issues is reported in Chapters 4 and 5.

3.7 Limitations

The study design has some limitations due to some practical problems commonly encountered in conducting research on shared leadership in student groups and the greater difficulty of finding workplaces that will permit rigorous research, as noted above. First, the groups were self-selected and had only 13 weeks to develop group processes. Second, the use of student groups raises questions about the generalizability of the results to workplaces. Third, the design is correlational, using statistical tests to compare shared and hierarchical leadership rather than a

randomised trial comparing experimental and control groups. These limitations are discussed in more detail in Chapter Six.

Chapter Four
Results

4.1 Introduction

This chapter presents the results from the study described in Chapter Three. The effects of shared leadership on creativity and related variables were studied in 31 self-managed student groups who each created a movie over a semester. During this time the experimenter observed that some groups were close-knit and tended to share the work fairly evenly, while others had members who were more distant and shared relatively little. Subjectively, these different approaches to leadership appeared to influence groups' attitudes toward the project. The quantitative and qualitative data presented below primarily aim to test the hypothesis that shared leadership results in more creative group outcomes.

Before addressing the hypotheses outlined in Chapter 2, properties of the independent and dependent variables were examined to "get a feel" for the data and to guide subsequent analyses. Sections 4.2 - 4.4 present means and intercorrelations for the six independent variables and the three dependent variables. Inter-rater reliability for the latter is also assessed.

A central problem in testing the hypotheses involves measuring shared vs. hierarchical leadership with group centrality and density scores, following the recommendations of Mayo et al. (2003), Gockel and Werth (2010) and Small and Rentsch (2010). Empirical insights on these two measures are presented and related to Mayo et al.'s conceptual schema for shared leadership in Section 4.5. Section 4.6 describes a test of the link between shared vs. hierarchical leadership and creativity

using Mayo et al.'s, schema. Limitations in this approach suggested that a more reliable test could be made by correlating centrality and density separately with the dependent variables.

Investigation of the centrality and density measures also suggested that group size might be an important moderating variable, since larger groups provide more opportunities for sharing and greater diversity of members. Size had a significant correlation with both creativity and professionalism (4.7), and was therefore controlled for in the hypothesis tests described in 4.8.

The indices of shared and hierarchical leadership used in the hypothesis tests have certain limitations that can be addressed with sociograms, which provide a fuller graphical presentation of the data showing, for example, which individuals were nominated as leaders. This is relevant to determining whether different individuals are active in different group functions. A visual analysis of sociograms, using four categories of sharing with different implications for 'functional specialisation' is described in 4.9.

Measures of participants' own perceptions of their team's functioning and outcomes were also obtained on the questionnaire, and are analysed in 4.10 to see whether they corroborate the SNA measures of group performance, the independent raters' measures of group outcomes and the hypothesized links between these.

4.2 Independent Variables

Table 4.1 shows mean scores on group centrality and density for each of the six independent variables: leadership, constructive feedback, developmental planning,

goal clarification, motivation and team building. A centrality score (C) of 1 indicates that a single person is cited as influential by all others and a score of 0 indicates equal influence, with all group members isolated from each other. Density (D) varies between 1, indicating all members influence all others, and 0, indicating that no influence exists between members.

Table 4.1   Mean Centrality and Density Scores for the Independent Variables

	Group Centrality		Group Density	
	M	SD	M	SD
Leadership	.26	.20	.71	.19
Constructive Feedback	.22	.18	.75	.23
Developmental Planning	.28	.21	.74	.20
Goal Clarification	.27	.18	.75	.17
Motivation	.24	.20	.72	.22
Team Building	.23	.17	.77	.18

As Table 4.1 show, centrality was generally low, ranging from .27 to .36, while density was generally high, between .71 and .77. Together, these results suggest all groups in this study had at least moderate sharedness: low levels of hierarchical influence and high overall levels of leadership influence. Only four groups had centrality scores above 0.5 (two with 0.56), and only two had density scores below 0.5.

Tables 4.2 and 4.3 present correlations between the six independent variable measures of centrality and density. The centrality measures were all moderately inter-correlated with the exception of Developmental Planning, which had low and

insignificant correlations for all variables except Leadership. The reason for this is unclear, but it appears Developmental Planning is theoretically distinct from Bass and Bass' other functions. Two other centrality correlations were just over the significance level of $\alpha = .05$. The density measures were all moderately and significantly inter-correlated. The interpretation of the differences between centrality and density measures, and between Bass's five 'leadership functions' is discussed in Chapter 5 (5.4, 5.5 and 5.7).

The normality of the independent variables was assessed with Shapiro-Wilk tests (Table 4.4). Constructive Feedback, Motivation and Team Building did not have normal distributions on either centrality or density measures. Consequently, non-parametric measures were used to test hypotheses about means (4.6) and correlations (4.8), although the latter were also tested with parametric correlations.

Table 4.2 Correlations Between Centrality Measures of Independent Variables

		Constructive Feedback	Developmental Planning	Goal Clarification	Motivation	Team Building
Leadership	r	.47**	.37*	.36*	.49**	.32
	p	.01	.04	.04	.01	.08
Constructive Feedback	r		.33	.55**	.46*	.37*
	p		.07	.00	.01	.04
Developmental Planning	r			.22	.17	.05
	p			.23	.36	.79
Goal Clarification	r				.61**	.46*
	p				.00	.01
Motivation	r					.59**
	p					.00

* p < 0.05 (2-tailed)   ** p < 0.01 (2-tailed)

Table 4.3   Correlations between Density Measures of Independent Variables

		Constructive Feedback	Developmental Planning	Goal Clarification	Motivation	Team Building
Leadership	r	.59**	.63**	.45*	.52**	.37*
	p	.00	.00	.01	.00	.04
Constructive Feedback	r		.57**	.62**	.70**	.50**
	p		.00	.00	.00	.00
Developmental Planning	r			.47**	.46**	.43*
	p			.01	.01	.02
Goal Clarification	r				.68**	.59**
	p				.00	.00
Motivation	r					.62**
	p					.00

* p <0.05 (2-tailed)   ** p < 0.01 (2-tailed)

Table 4.4   Shapiro-Wilk Normality Tests of Independent Variables

Centrality	Statistic	Significance	
Leadership	.949	.150	Normal
Constructive	.873	.002	Non-normal
Developmental Planning	.934	.058	Normal
Goal Clarification	.954	.195	Normal
Motivation	.854	.001	Non-normal
Team Building	.913	.016	Non-normal

Density	Statistic	Significance	
Leadership	.946	.122	Normal
Constructive	.879	.002	Non-normal
Developmental Planning	.935	.061	Normal
Goal Clarification	.952	.181	Normal
Motivation	.917	.019	Non-normal
Team Building	.921	.025	Non-normal

4.3   Dependent Variables

The three dependent variables measure the creativity, task focus and professionalism of the groups' movies using Amabile's (1982) Consensual Assessment Technique (CAT). Table 4.5 shows the means and standard deviations for these variables. Overall, the movies were rated as moderately creative, focused according to the task instructions, and professional.

Table 4.5   Means and Standard Deviations - Dependent Variables

	M	SD
Creativity	3.32	.83
Task Focus	3.24	.90
Professionalism	3.29	.76

The dependent variables were all quite strongly correlated (Table 4.6). This is perhaps not surprising, as a "good" movie was required to have all three attributes. As in workplace projects, creativity that does not fulfil the project brief or goes against the professional values of the organization or group is undesirable.

Table 4.6   Correlations between Dependent Variables

		Task Focus	Professionalism
Creativity	r	.62**	.76**
	p	.00	.00
Task Focus	r		.62**
	p		.00

** $p < 0.01$ level (2-tailed)

Table 4.7 presents the means and standard deviations of the rating scores for each rater. These suggest the raters were reasonably uniform in their use of the 5-point rating scale across the three dependent variables.

Table 4.7   Means and Standard Deviations of Raters' Ratings – Dependent Variables

		Rater 1		Rater 2		Rater 3	
	N	M	SD	M	SD	M	SD
Creativity	31	3.23	.99	3.48	1.03	3.26	1.09
Task Focus	31	2.94	1.06	3.48	1.03	3.29	1.30
Professionalism	31	3.32	.91	3.42	1.15	3.13	1.09

4.4 Inter-Rater Reliability

Inter-rater reliability assesses whether the raters used the rating scales consistently for each movie (Kottner et al., 2011; McGraw & Wong, 1996; Veitch, Salmon &

Ball, 2008). A two-way analysis of variance (ANOVA) on interclass correlation coefficients (Cichetti, 1994; Rankin & Stokes, 1998; Shrout & Fleiss, 1979) revealed good agreement in the mean scores for creativity, and moderate agreement for successful task completion and professionalism (Tables 4.8 and 4.9).

Table 4.8   Inter-Rater Reliability Coefficients – Dependent Variables

Rating category	Rate of Agreement	p
Creativity	.71**	.00
Task Focus	.70**	.00
Professionalism	.54**	.00

** p < 0.01 level (2-tailed)

A second aspect of inter-rater agreement is whether raters had different overall mean scores, which could imply different levels of leniency or severity in using the rating scale, or different means for each variable, which could indicate different interpretations of these variables. Tables 4.10 and 4.11 show the relevant means.

A one-way ANOVA showed no significant difference between the raters' overall mean scores in Table 4.10, ($F(2, 276) = 2.04$, $p = .13$). Their consistency across variables was further tested with a mixed factorial ANOVA (2 raters x 3 variables).

Table 4.9   Interclass Correlation Coefficients – A two-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig
Between groups	4.67	2	2.34	2.04	.13
Within groups	315.96	276	1.15		
Total	320.63	278			

Table 4.10 Means and Standard Deviations for Each Rater

Raters	N	M	SD
Rater 1	93	3.16	.99
Rater 2	93	3.46	1.06
Rater 3	93	3.23	1.15

Relevant means are shown in Table 4.11. There was no significant difference between the means for the three variables ($F(2, 90) = .912$, $p = .41$), and no significant interaction between variables and raters ($F(4, 280) = 1.48$, $p = .21$) (Table 4.12). In summary, both the inter-rater reliability coefficients and the rater or rater by variable means suggest the raters were consistent in their approach to the CAT.

Table 4.11 Means and Standard Deviations for Each Rater for Each Dependent Variable

	Rater	N	M	SD
Creativity	Rater 1	31	3.23	.99
	Rater 2	31	3.48	1.03
	Rater 3	31	3.26	1.09
	All Raters	93	3.32	1.03
Task Focus	Rater 1	31	2.94	1.06
	Rater 2	31	3.48	1.03
	Rater 3	31	3.29	1.30
	All Raters	93	3.24	1.15
Professionalism	Rater 1	31	3.32	.91
	Rater 2	31	3.42	1.15
	Rater 3	31	3.13	1.09
	All Raters	93	3.29	1.05

Table 4.12 Two-way ANOVA: Raters x Variables

	Within-Subject Effects					
Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Ratings	.35	2	.18	.38	.68	.00
Ratings*Rater	2.70	4	.68	1.48	.21	.03
Error (Ratings)	82.28	180	.46			

	Between-Subject Effects					
Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Ratings	3007.37	1	3007.37	1173.61	.00	.93
Ratings*Rater	4.67	2	2.34	.91	.41	.02
Error (Ratings)	230.62	90	2.56			

4.5 The Relationship between Centrality and Density Measures

Previous authors have recommended the combined use of group centrality and density indices to assess shared vs. hierarchical leadership (Mayo et al., 2003; Small & Rentsch, 2010). As described in Chapters 2 and 3, centrality measures the concentration of a network around a single hierarchical leader, while density measures sharing or influence amongst members. However, both are ambiguous about the other property in the lower half of their ranges, so neither is a sufficient measure by itself. Therefore, hierarchical leadership is represented by high centrality and low density, and shared leadership by low centrality and high density. A third combination, low centrality and low density is theoretically possible, but both measures cannot be high for a given group high.

These points suggest centrality and density will be negatively correlated, at least when there are relatively few low leadership groups in a sample. The latter are of little theoretical interest as groups with a laissez-faire approach to leadership are expected to perform poorly. To test this assumption, correlations between centrality and density measures for each of the six independent variables were obtained (Table 4.13). A moderately linear negative correlation (r = -.56) was observed for leadership, and higher negative correlations ranging from r = -.61 to -.83 for the five leadership functions. The lower correlation for leadership is consistent with other findings in which the global measure differs from the leadership five functions (see 4.8 & 4.10 below). Of more importance here is that all six variables showed the expected negative relationship between centrality and density.

Table 4.13 Correlation between Centrality and Density for Independent Variables

	r	p
Leadership	-.56[**]	.00
Constructive Feedback	-.75[**]	.00
Developmental Planning	-.83[**]	.00
Goal Clarification	-.83[**]	.00
Motivation	-.65[**]	.00
Team Building	-.61[**]	.00

** $p < 0.01$ level (2-tailed)

Further insight on the relationship between centrality and density can be obtained from the scatterplots shown in Figure 4.1. In a few instances groups with exactly the same C and D scores fall on a single point in these graphs, but overall they adequately convey the dispersion of sample groups.

The moderate to strong negative linear relationships indicated in the correlation coefficients are reflected in the great majority of groups being categorized in the 'Shared' or 'Hierarchical' leadership quadrants in Mayo et al.'s schema (Figure 4.2). Only a small number of groups depart from this trend, almost all in the low centrality, low density 'Leadership Avoidant' quadrant.

Centrality and density are mathematically linked by a formula involving only the maximum actor centrality and the group size (Van Wegberg 2003), and it is therefore not surprising that they are related in real networks. As indicated in Chapter 3, this relationship is expected to be negative in a sample of groups with varying degrees of shared and hierarchical leadership.
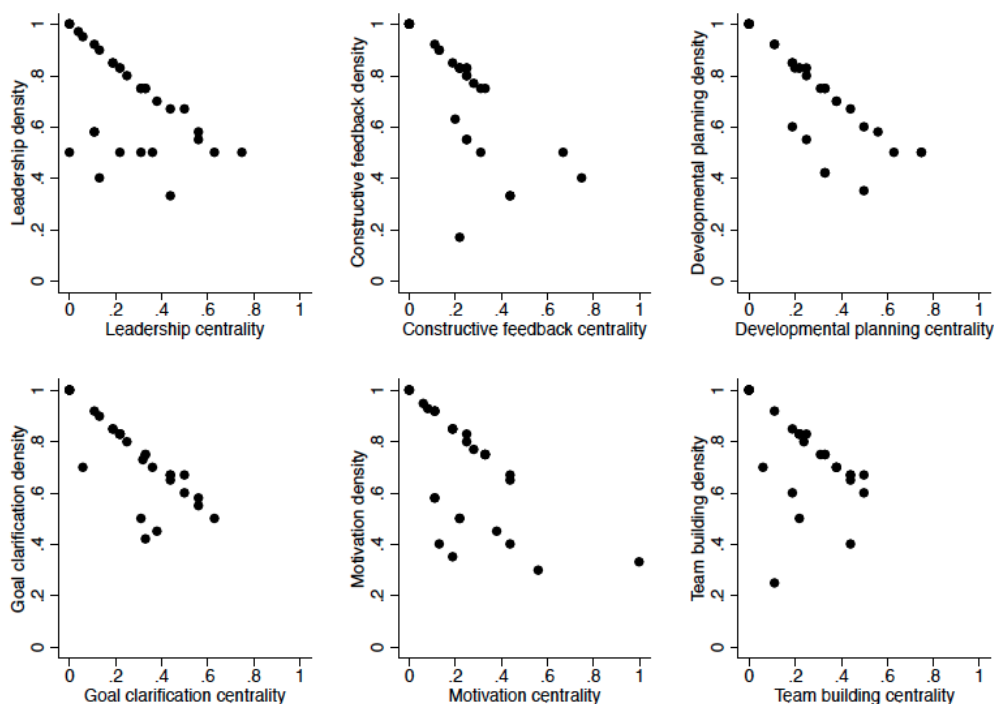
Figure 4.1   Scatterplots of Density and Centrality for the Six Independent Variables Developed for this thesis.

Table 4.13 suggests that in at least some group leadership contexts they may be highly correlated. This supports the notion of conceptualising shared leadership as a continuum between fully shared (C = 0, D = 1) and hierarchical endpoints (C = 1, D = 1/n) rather than the four quadrants advocated by Mayo et al. One the other hand, the latter framework − or at least the revised version shown in Figure 4.2 - is conceptually simpler and easier to test as it involves one rather than two tests for each hypothesized relationship. The relative merits of these two approaches are examined in the sections below.
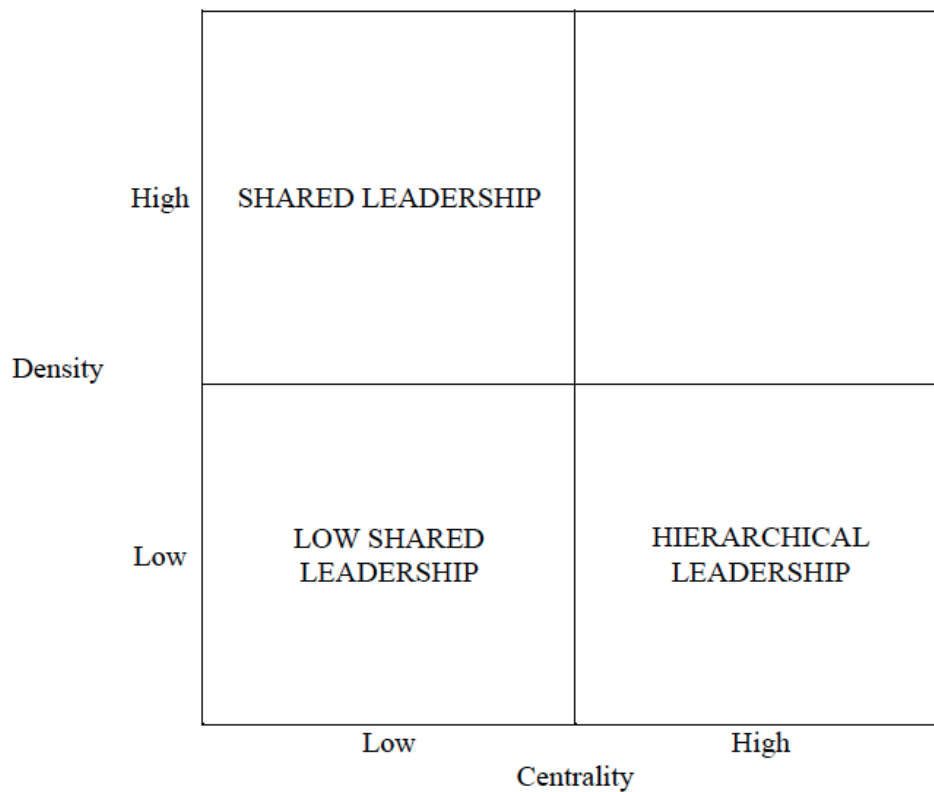
Figure 4.2   Categories of Shared and Hierarchical Leadership − Revised Model. Developed for this thesis.

4.6 Hypothesis Tests Using Mayo et al.'s Quadrants

To examine the value of Mayo et al.'s approach, the sample groups were classified into four quadrants using the scale midpoints (< 0.5 vs. > = 0.5) on leadership

centrality and density. Around two thirds (n = 21) were classified as Shared Leadership (low centrality and high density), two as Hierarchical Leadership (high centrality, low density), six as Leadership Avoidant and two as what Mayo et al. call Low Shared Leadership (high centrality, high density). As noted in 2.5.2, the last category is largely meaningless as high–high combinations are mathematically impossible. The two groups in this category had centrality and density scores in the range 0.55-0.58, around the maximum for high-high combinations in small groups (see 5.4). This suggests 0.6 would be a more useful criterion than the scale mid-point, although 0.6 is still a somewhat arbitrary boundary between hierarchical and shared groups. However, as there are still only two groups classified as hierarchical, it is not possible to use the present data to examine differences between hierarchical and shared leadership.

A common approach to defining groups in psychological studies uses the median, which has the advantage of creating groups of equal size and often represents a more 'natural' or empirically-based criterion. A test of the major hypotheses of this study was therefore made using median centrality (.22) and density (.75) as criteria. As these medians are far from the scale midpoints, the resulting groups may be better described as relatively shared or hierarchical. Table 4.14 shows the resulting distribution, with two larger groups classified as Shared (n = 9) or Hierarchical leadership (n = 11), and two smaller groups classified as Low Shared Leadership (n = 7) or Leadership Avoidant (n = 4) in Mayo et al.'s terminology. A problem with this approach is that around a third of the groups (11) are now in categories of little theoretical interest (Low Shared Leadership or Leadership Avoidant).

Table 4.14 Mean Creativity, Task Focus and Professionalism for Median-Split
Quadrants

Quadrant	Creativity			Task Focus		Professionalism	
	N	M	SD	M	SD	M	SD
I Shared Leadership	9	3.70	.90	3.63	1.03	3.56	.75
II Low Shared Leadership	7	3.48	.90	3.29	.78	3.33	.51
III Leadership Avoidance	4	3.34	.81	3.17	.43	3.58	.99
IV Hierarchical Leadership	11	2.91	.62	2.91	.94	2.94	.77

However, as hypothesised, the means of the Shared groups are higher than those of
Hierarchical groups on all three dependent variables. A non-parametric Mann-
Whitney U test of the statistical significance of these differences showed that shared
leadership increased the raters' perceived creativity of the movies but not their task
focus or professionalism at α = .05 (Table 4.15). Thus, on this test Research
Hypothesis 1a is accepted and Hypotheses 1b and 1c are rejected.

Table 4.15 Mann-Whitney U Tests - Shared vs. Hierarchical Leadership

	U	p (exact)
Creativity	23	.05*
Task Focus	30	.15
Professionalism	33	.23

* $p < 0.05$ level (2-tailed).

Overall, however, the 'quadrant' approach of Mayo et al. does not provide an
adequate test of the hypotheses as too many groups fall outside the categories of
interest. Even where a sample has more hierarchical groups, and the problematic

high-high combinations are reclassified or ignored, the criteria above are all theoretically ambiguous to some extent and near the boundaries arbitrarily shift closely related groups into different categories. As well, binarisation largely ignores the metric information in centrality and density scores, creating an unnecessarily 'gross' test of the hypotheses.

To address these problems, the hypotheses were tested by separately correlating centrality and density with the dependent variables, using the parametric data for each independent variable in a more acceptable sample size (see 4.8). Prior to this, the potentially confounding role of group size was examined.

4.7   Effects of Group Size on Independent and Dependent Variables

Group size is considered an important potential confounding variable in this study for several reasons. First, the self-selection process used to create the groups meant their size varied from three to six members (although most had four or five). Three and six member groups appear to offer qualitatively different environments for both leadership and creative work. Second, it is reasonable to assume that there are optimal group sizes for both leadership and creativity (and the other independent and dependent variables). Too few members would reduce the diversity and tension often considered essential for creativity, while too many would make it difficult to integrate diverse ideas, encouraging 'groupthink' (Taggar, 2002; Woodman, Sawyer, & Griffin, 1993). Similarly, groups might be too small or too large for effective leadership sharing. Studies of the 'span of control' suggest group size is also important for hierarchical leadership (Williamson, 1967). A group can be too large for a single leader to control, and perhaps too small for hierarchy to be taken seriously by other members.

A third issue is that group size affects the mathematical relationship between centrality and density. For example, a fully centralized group of 3 has a density of .33, where a fully centralized group of 6 has a density of .16. It is therefore desirable to control for group size in studies of shared leadership using centrality and density.

For these reasons the effect of size on the dependent and independent variables was examined prior to the final hypothesis tests. Since the median size was 4, groups were categorized as 'small' (3 or 4 members) or 'large' (5 or 6 members), producing 14 large and 17 small groups. Mann-Whitney U tests were used to compare the means of large and small groups, on centrality and density (for each of the six leadership networks), and on the three dependent variables.

Group Size and Independent Variables

Mean Leadership centrality was slightly lower in small groups ($M = .26$, $SD = .22$) than in large groups ($M = .28$, $SD = .17$) and the difference was not significant ($U = 106.5$, $p = .63$). Mean Leadership density was the same in small groups ($M = .71$, $SD = .20$) and large groups ($M = .71$, $SD = .19$). The five leadership functions were similarly unaffected by group size, whether measured by centrality or density.

Group Size and Creativity

The mean creativity rating for movies was lower in small groups ($M = 2.96$, $SD = .77$) than large groups ($M = 3.76$, $SD = .68$), a significant difference ($U = 51$, $p = .01$). Professionalism was also significantly lower for small groups ($M = 3.04$, $SD = .83$; large group $M = 3.60$, $SD = .54$; $U = 63.5$, $p = .03$), but Task Focus was not affected by group size ($U = 96.5$, $p = .38$).

These results for creativity and professionalism are consistent with their hypothesised links to shared leadership. Larger groups by definition have quantitatively more opportunities for sharing, and are likely to contain a wider range of individual differences.

It is not surprising that Task Focus is unaffected by group size, since it reflects the ability to follow instructions or meet the project specification. It is unlikely this would be improved by having more members or a greater diversity of members, since it involves conforming to external criteria more than openly creating something new.

In summary, although size does not appear to affect centrality or density, it does have a predictable link to creativity and professionalism. Along with its mathematical role in linking centrality and density measures, this suggests size should be controlled for in hypothesis tests where possible. Accordingly size was partialled out of the correlations reported in the next section.

4.8 Hypothesis Tests Using Correlations

Given the limitations with Mayo et al.'s binary categorisation approach, the best test of the study hypotheses appears to involve separately correlating centrality and density measures with the three dependent variables. These tests used Pearson's product-moment correlation coefficient (r) with an $\alpha = .05$. As noted in Section 4.2, Shapiro-Wilk tests showed Leadership, Goal Clarification and Developmental Planning have normal population distributions, while Constructive Feedback, Motivation and Team Building are not normally distributed. While Pearson's r does

not assume normality, significance tests of it are known to lack robustness under departures from normality, particularly with small samples (Wackerly, Mendenhall, & Scheaffer, 2008). However, the non-parametric alternatives such as Spearman's rho measure relationships between ranks rather than scores, giving them different mathematical properties that confound comparisons with Pearson's r (and other correlation indices). Therefore some authorities recommend that rank-based measures not be used as alternatives to Pearson's r (Pearson, 2005; Randles, 1984).

As the variables in this study are measured on an interval scale, Pearson's r is an appropriate measure of the correlations. To allow comparison between variables representing normal and non-normal populations, Pearson's r is used in all the hypothesis tests below. Given its potential for error under non-normality, tests were also conducted using Spearman's rho, which showed the same outcomes in all but one case.

4.8.1 Hypothesis 1: Correlations between Leadership Measures and Dependent Variables

Table 4.16 shows that centrality of the Leadership networks in sample groups had a moderate negative correlation with all three dependent variables (using Cohen's 1988 criteria of .3 - .49 as 'moderate'), while density had similar but positive correlations.

Table 4.16 Correlations between Leadership and the Dependent Variables

Leadership	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	-.30	.11	-.35	.06	-.43*	.02
Density	.31	.09	.34	.06	.30	.11

* p < .05 (2-tailed)

Centrality was significantly related to Professionalism at α = .05, and two other correlations (centrality and density with Task Focus) had p = .06. The other three correlations were below or just above p = .10, an alpha level sometimes recommended for exploratory research where the risk of Type II error (rejecting a 'true' new theory) is reduced at the cost of a greater risk of Type I error (accepting a 'false' new theory).

Using the conventional alpha level, Hypothesis 1 is only partially supported, although the size and direction of all six correlations is consistent with expectations. Further, the non-parametric test of the difference between mean Creativity for shared and hierarchical groups (defined by median split) showed the predicted difference (see 4.6). Therefore, while the link between shared vs. hierarchical leadership and the outcome measures is only partially supported, it appears strongly worthy of more rigorous testing with a larger sample or improved measures.

4.8.2 Hypothesis 2: Correlations between Constructive Feedback and Dependent Variables

The remaining hypotheses test the effects of sharing the five leadership functions identified by Bass and Bass (2008). Table 4.17 shows that centrality of the

Constructive Feedback networks had a low correlation with all three dependent variables, while density showed larger correlations similar to those for Leadership. No correlations were significant, although all density results were in the range $p = .05 - .09$. While Hypothesis 2 is not formally supported, the size of the correlations with density and their significance levels suggest the presence of a relationship worthy of future investigation.

Table 4.17 Correlations between Constructive Feedback and the Dependent Variables

Constructive Feedback	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	-.15	.43	-.17	.38	-.14	.46
Density	.36	.05	.33	.08	.32	.09

4.8.3   Hypothesis 3: Correlations between Developmental Planning and

Dependent Variables

As Table 4.18 shows, both centrality and density of the Developmental Planning networks showed a small to medium correlation with the dependent variables, consistent with the hypothesized relationships.

Table 4.18 Correlations between Developmental Planning and the Dependent Variables

Developmental Planning	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	-.17	.37	-.22	.25	-.31	.09
Density	.18	.33	.28	.13	.38*	.04

* $p < .05$ (2-tailed)

As five of the six tests were insignificant, Hypothesis 3 is generally not supported. However, density was related to Professionalism at $\alpha = .05$ and centrality at p = .09. Further testing of the effect on Professionalism is therefore recommended.

4.8.4 Hypothesis 4: Correlations between Goal Clarification and Dependent Variables

Table 4.19 shows that centrality and density of the Goal Clarification networks had small to moderate correlations in the predicted directions with the dependent variables. Centrality and density were both significantly related to Professionalism, and Hypothesis 4 was therefore partially supported. As well, density showed a near-significant relationship to Task Focus, a finding that should be further investigated.

Table 4.19 Correlations between Goal Clarification and the Dependent Variables

Goal Clarification	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	-.26	.17	-.18	.35	-.38*	.04
Density	.22	.24	.34	.07	.43*	.02

* $p < .05$ (2-tailed)

4.8.5 Hypothesis 5: Correlations between Motivation and Dependent Variables

As shown in Table 4.20, both centrality and density of the Motivation networks had small and insignificant correlations with the dependent variables, and Hypothesis 5 was not supported. All correlations were in the predicted direction.

Table 4.20 Correlations between Motivation and the Dependent Variables

Motivation	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	-.08	.67	-.16	.39	-.23	.22
Density	.16	.42	.16	.41	.23	.23

4.8.6 Hypothesis 6: Correlations between Team Building and Dependent Variables

Table 4.21 shows that centrality and density of the Team Building networks both had a small correlation with the dependent variables. Since none were significant, Hypothesis 6 was not supported.

Interestingly, while the density measures in Table 4.21 were in the predicted direction centrality had positive relationships with the dependent variables where negative relationships were observed with all other independent variables. Given the large p values and small effect sizes, no theoretical interpretation is attached to this. However, since this unusual result is consistent across all three dependent variables it may warrant future examination.

Table 4.21 Correlations between Team Building and the Dependent Variables

Team Building	Creativity		Task Focus		Professionalism	
	r	p	r	p	r	p
Centrality	.22	.24	.13	.51	.12	.52
Density	.00	.98	.09	.66	.07	.70

If supported, the notion that centrality of a team building network increases (rather than decreases) creativity and other project outcomes would be theoretically interesting. It could, for example, suggest that too little coordination results in less creative outcomes.

Table 4.22 Summary of Correlational Hypothesis Tests

		Creativity		Task Focus		Professionalism	
		r	p	r	p	r	p
Leadership	C	-.30	.11	-.35	.06	-.43*	.02
	D	.31	.09	.34	.06	.30	.11
Constructive Feedback	C	-.15	.43	-.17	.38	-.14	.46
	D	.36	.05	.33	.08	.32	.09
Developmental Planning	C	-.17	.37	-.22	.25	-.31	.09
	D	.18	.33	.28	.13	.38*	.04
Goal Clarification	C	-.26	.17	-.18	.35	-.38*	.04
	D	.22	.24	.34	.07	.43*	.02
Motivation	C	-.08	.67	-.16	.39	-.23	.22
	D	.16	.42	.16	.41	.23	.23
Team Building	C	.22	.24	.13	.51	.12	.52
	D	.00	.98	.09	.66	.07	.70

* $p < .05$ (2-tailed)

4.8.7 Summary of Hypothesis Tests

Table 4.22 summarises the results of the hypothesis tests. All correlations were in the predicted direction with the exception of Team Building centrality, which had positive but non-significant correlations with all three dependent variables.

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Effects of Sharing on Creativity

The correlations provide partial support for the main hypothesis linking shared vs. hierarchical leadership to improved Creativity. The correlations for both centrality and density are in the expected directions, but their p values suggest further testing is needed to confirm the link. In contrast, the correlations for the five leadership functions did not generally support the hypothesised relationships between sharing and creativity, with the possible exception of Constructive Feedback density with a p = .05.

These results lend support to those based on Mayo et al.'s four categories, which showed that Shared Leadership groups had less creative movies than the Hierarchical Leadership groups. A third test of this hypothesis, using self-reported rather than expert judges' ratings of creativity, is reported in 4.10.

Effects of Sharing on Task Focus and Professionalism

Leadership centrality and density generally correlated with Task Focus and Professionalism at similar (marginally significant) levels to Creativity, with the exception of the significant correlation between centrality and Professionalism (r = .43, p = .02). The leadership functions often had lower correlations than the global leadership measure, and were generally not significantly linked to these dependent variables. Two noteworthy exceptions are that Goal Clarification and Developmental Planning showed significant, or in one case near-significant, correlations with Professionalism, suggesting sharing of these functions contributed to movie professionalism. Three other density correlations were marginally significant (p < .10), but not matched by corresponding results for centrality.

Overall, the results suggest that sharing of the leadership functions contributes less to group outcomes than sharing of leadership itself. Sharing of some functions may improve professionalism, but sharing of leadership itself is more likely to improve creativity. The implications of these findings are discussed in Chapter 5.

4.9 Analysis of Sociograms

Although centrality and density measures summarise important properties of groups, they have limitations. First, as summaries they do not capture all the information present in the rating scores. Second, centrality and density each reflect the shared-hierarchical distinction only partially and no simple mathematical method for combining them is available. For these reasons sociograms offer a valuable complement to SNA measures by allowing visual representation of the raw data (or the binary transformed data, see 3.4.1). To better understand the spatial patterns of influence in the sample groups, sociograms were constructed using UCINET 6.1 software.

Several observations were made. First, the high degree of sharing suggested by the low centrality and high density scores (see 4.2 and 4.5) was readily apparent. Even the most centralised groups, such as Kilo (shown below in Figure 4.7), are clearly far from hierarchical leadership.

Of more interest are the actual patterns of sharing vs. centralisation across the six networks on which the independent variables are based. Sociograms are valuable because centrality (or density) scores do not identify which group members are leaders. For example, where multiple functions are measured in a group a different member might lead each. This would be a form of shared leadership with high

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centrality and low density (possibly 1 and 0, respectively) in each network, where sharing is defined functionally rather than 'spatially'. So far it appears this possibility has not been examined in social network studies of shared leadership, most of which measure only a single network property.

Visual comparison of the six sociograms for each of the 31 groups showed a variety of differences between them, in both the degree of sharing and, in more centralized groups, who lead each function. These could be broadly summarized into four categories. One group showed complete centrality in each function, where the question of functional differentiation does not arise. Four groups had a tendency towards high sharedness in most but not all functions, and showed minor differences in who lead them. The majority of groups (n = 20) demonstrated moderate sharedness, often with one member leading multiple functions but in other cases different group members each lead a function. The fourth category comprised six groups with little discernible consistency across the six functions. Here there was some tendency for a different member to predominate in each function. Examples of these four categories are discussed below.

4.9.1   Fully Shared Leadership

Figure 4.3 shows the Leadership network for the one group in which all six functions are fully shared (i.e. centrality = 0 and density = 1), known here as Foxtrot. Functional specialization is by definition not possible in such a group.

Foxtrot had only three members, raising the question of whether very high levels of sharing are more likely when there are fewer members to disagree on important decisions. However, two four-member groups (Juliet and Quebec) and one five-

member group (Whiskey) showed centrality scores close to zero (0.01 − 0.06, see Appendix X) and density scores close to 1 (.96-.99), and the next most highly shared was a six member group (Alpha, with centrality = .13 and density = .89). Therefore, high sharing is not necessarily associated with small groups.
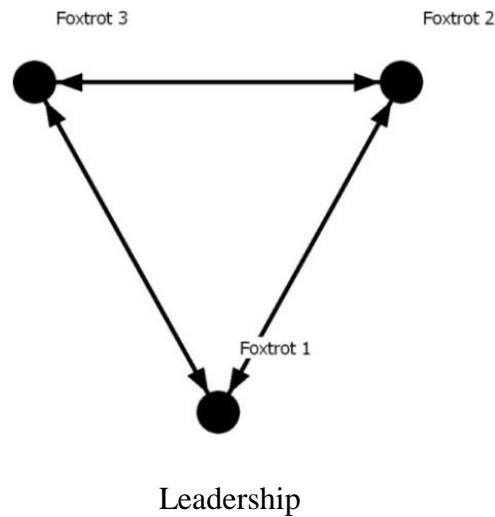
Figure 4.3   Leadership Sociogram: Foxtrot.

4.9.2   Highly Shared Groups

The four groups in this category had average centrality scores between .01 and .16. A typical example is Juliet, a five-member group with high sharedness in all six networks. Figure 4.4 shows Juliet's leadership network, with arrows pointing in the direction of influence, i.e. from leader to 'follower'. The single departure from full sharing is that Juliet 4 did not nominate Juliet 5 as a leader. Such high sharedness does not allow functionally differentiated leadership.

The other three groups in this category exhibited a similar pattern of uniformly high but at times incomplete sharing in all of their networks. Whiskey had one incomplete (i.e. not fully shared) network, Quebec two and Alpha had five. The incomplete

networks ranged in centrality up to .36 (most were under .10), and in density down to .70 (most were above .80).
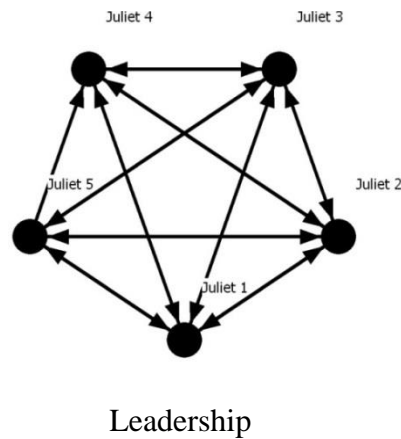
Leadership

Figure 4.4   Leadership Network Sociogram: Juliet.

4.9.3   Moderately Shared Groups

The two-thirds of groups classified as moderately shared over the six network functions had average centrality scores from 0.13 to 0.50 and average density scores from 0.54 to 0.88. A typical example is Longbow, a four-member group with low centrality (.11 or .33) in all networks, high density in the networks for Bass' five leadership functions (.75 or .92), and a moderate density for Leadership (.58) (Table 4.23). The corresponding sociograms are shown in Figure 4.5. In the Leadership network, two members nominated Longbow 1, 3 and 4 as leaders, while Longbow 3 also saw Longbow 2 as a leader.

Table 4.23 Centrality and Density Measures: Longbow

	Leader-ship	Cons Fdbk	Develop Plan	Goal Clarif	Motivn	Team Build	Average
Centrality	.11	.33	.11	.11	.33	.33	.22
Density	.58	.75	.92	.92	.75	.75	.77
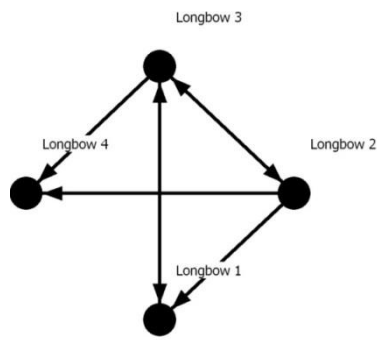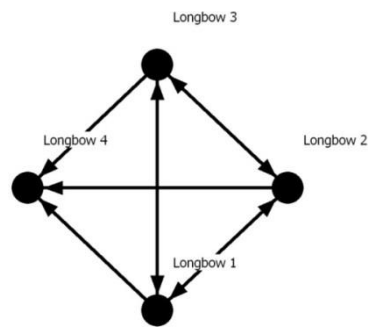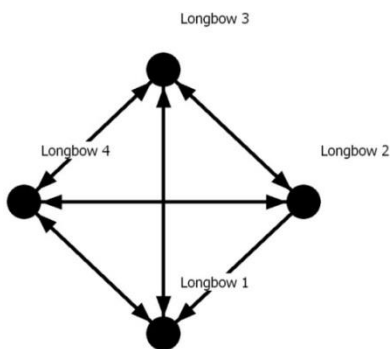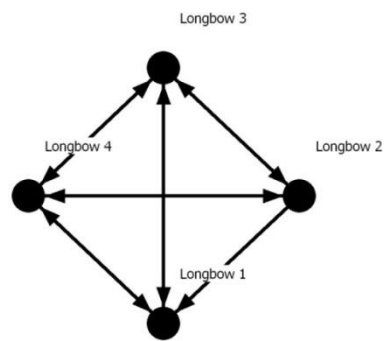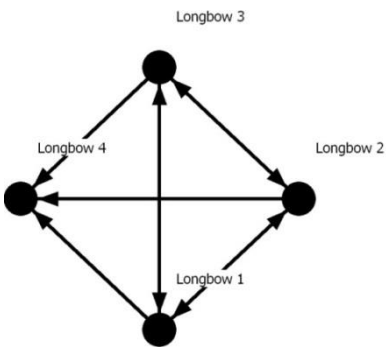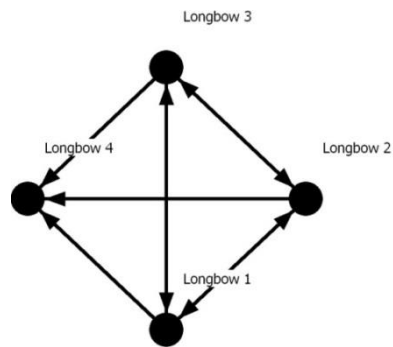
Figure 4.5   Network Sociograms: Longbow

This specific pattern is replicated in the other five networks, but with additional influences. One is that Longbow 4 is nominated by the same three members in each network, but only two nominated Longbow 4 in Leadership. Similarly, Longbow 1

and 3 receive an additional nomination in some networks. In part this variability might be exaggerated by dichotomising the five-point rating scales to "nominated" or "not nominated" categories: scores of 4 register as. Sociograms do not show such fine distinctions.

What is striking about Longbow is that while it demonstrates a moderate degree of sharedness on all six functions, apart from minor variations the same three members are consistently nominated in all networks. There is little evidence of functional specialization, rather the Leadership network is strongly representative of all others. This pattern is typical of the majority of groups in this study.

4.9.4   Varied Patterns of Group Leadership

Six of the thirty-one groups had higher average centrality scores (0.28 to 0.59) than those above and moderate density scores (0.41 to 0.71). Concomitant with this greater centrality, they showed more variation across the network functions. Two cases, Gymnast and Kilo, stand out as illustrative.

Table 4.24 Centrality and Density Measures: Gymnast

	Leader-ship	Cons Fdbk	Develop Plan	Goal Clarif	Motivn	Team Build	Average
Centrality	.13	.31	.50	.38	.19	.44	.32
Density	.40	.50	.35	.45	.35	.40	.41

Gymnast

Gymnast was a five member group with low centrality scores (.13 - .19) in two networks, moderate centrality (.31 - .50) in others, and moderate density (.35 - .50) in

all (Table 4.24). Figure 4.6 shows that Gymnast 3 comes closest to a leader across the six networks, being nominated by either 2 or 3 members in each. The only other nominations by 3 members were for Gymnast 1 (in Planning) and Gymnast 5 (in Constructive Feedback). In both cases Gymnast 3 also received 3 nominations, suggesting the possibility of some functional specialisation where Gymnast 3 works with either Gymnast 1 or Gymnast 5 in two networks.

Unlike the categories above, in this Varied category all groups had at least one network where at least one member was not seen as a leader. In Gymnast, the non-leaders were Gymnast 4 in Leadership, Planning and Team Building, and Gymnast 2 in Planning. Interestingly, neither of these individuals nominated many others: only two in two networks (or four out of 24 possible nominations) for Gymnast 4, and none for Gymnast 2. Gymnast 4 is therefore quite isolated from other members, while Gymnast 2 is sometimes nominated but never nominates others.

In summary, while Gymnast shows some variation between the six networks the consistencies are more striking. One member stands out, although not strongly, when the six networks are considered together, and the other patterns of nomination are moderately consistent: some members receive nominations in some networks, one is seen as participating little (and sees others the same way), and one is nominated occasionally and sees no one else as a leader. Thus the variations relate more to specific members than specific networks.

Leadership   Constructive Feedback

Developmental Planning   Goal Clarification

Motivation   Team Building
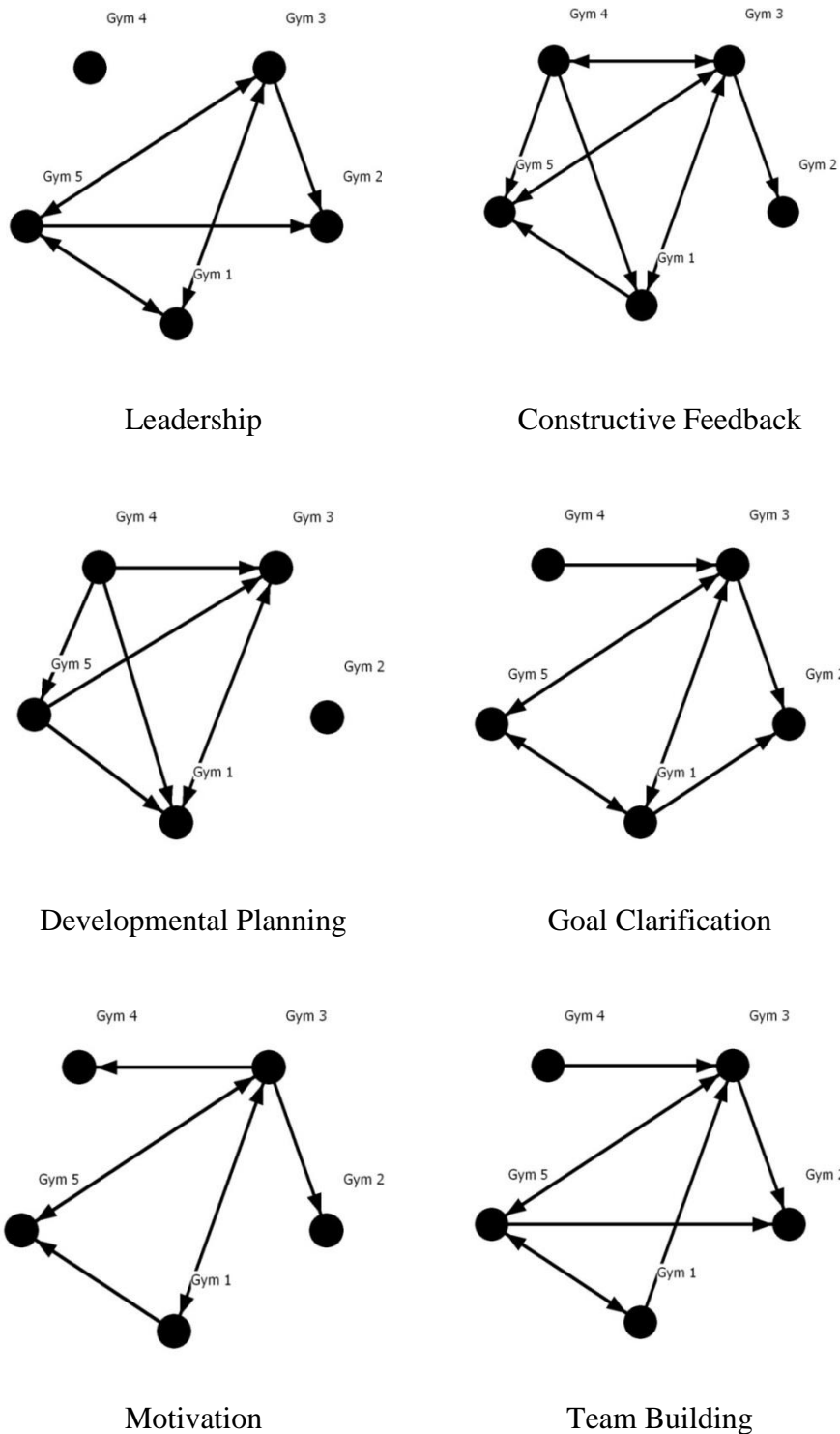
Figure 4.6 Network Sociograms: Gymnast

Kilo

Kilo was a five-member group with the highest average centrality score in the sample (.58) and the fourth lowest average density score (.49). Kilo could be called

the most hierarchical group. Overall Kilo had moderate-to-high centrality scores (.56 - .75), with one exception (.38 for Team Building), and mostly moderate density scores, ranging from .38 to .70 (Table 4.25).

Table 4.25 Centrality and Density Measures: Kilo

	Leader-ship	Cons Fdbk	Develop Plan	Goal Clarif	Motivn	Team Build	Average
Centrality	.56	.75	.63	.63	.56	.38	.58
Density	.55	.40	.50	.50	.30	.70	.49

The sociograms in Figure 4.7 reflect Kilo's relatively high centralisation. This most consistently centred on Kilo 1, who is nominated in Leadership by all other members. Kilo 1 is not an absolute leader, however, as the other members received 3, 2, 1, and 1 nominations respectively.

Kilo 1 was the most nominated person in two networks, but shared this status with another (Kilo 2 or Kilo 3) in three other networks. As with Gymnast, one member was rarely seen as a leader, receiving only two nominations (Kilo 5). A second member (Kilo 4) was in a similar position but received three nominations for Team Building, apparently a strength of this member.

Overall, while Kilo shows more variation across the networks than Juliet or Longbow, the panels of Fig 4.7 also show a fairly consistent pattern such that some members are more involved in all or most networks and some less involved in all or most. As with Longbow, evidence for the functional specialisation form of shared leadership is relatively minor. In both examples one member stood out across the

functions to some extent, but in some functions other members received more nominations. In Gymnast this person was not particularly nominated as a leader while in Kilo he or she was the most nominated for Leadership, echoing the higher centrality score for this group. However, another member received more nominations in other networks.

Summary

The sociograms visually illustrate the generally shared nature of leadership in the sample groups, consistent with their low centrality and high density scores. The least shared, most hierarchical groups such as Gymnast and Kilo still had high levels of sharing, and even when one person consistently received more nominations (e.g., Gymnast 3 or Kilo 1) one or two others also had multiple nominations. This pattern could be described a hybrid form of leadership with elements of both hierarchy and sharing.

The sociograms showed little evidence of functional specialization. The two best examples are Gymnast 1 and 3 and Kilo 2 and 3, but in each group another member was more consistently prominent (Gymnast 3 and Kilo 1). Specialization was generally not a significant feature even in these groups. Rather, the pattern is more that members are consistently highly, moderately or little involved in all networks.

Although this analysis did not find strong evidence of member specialisation, it does show how visual analysis of sociograms can be a useful adjunct to measures of centrality and density.
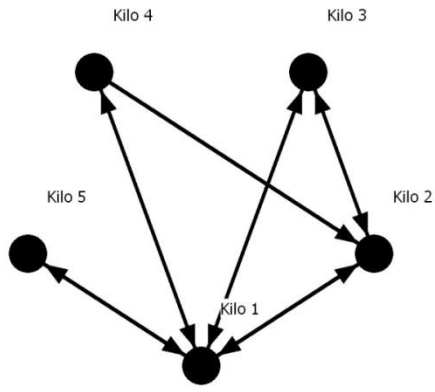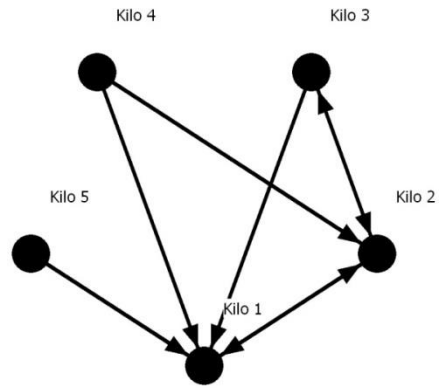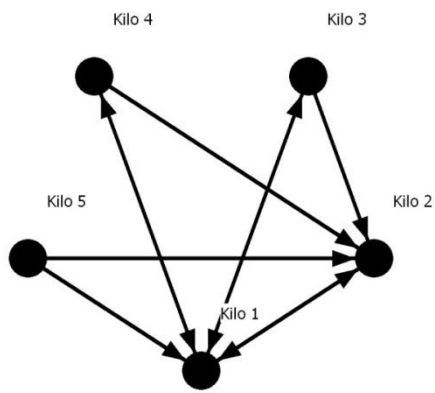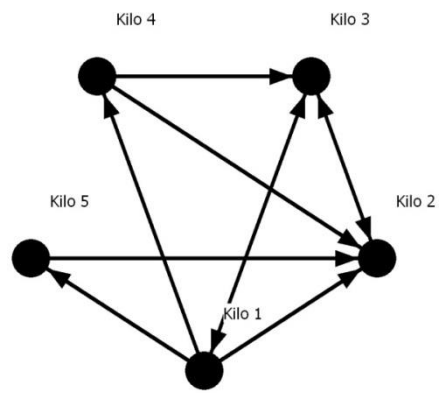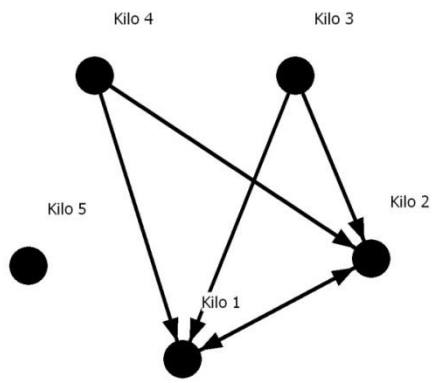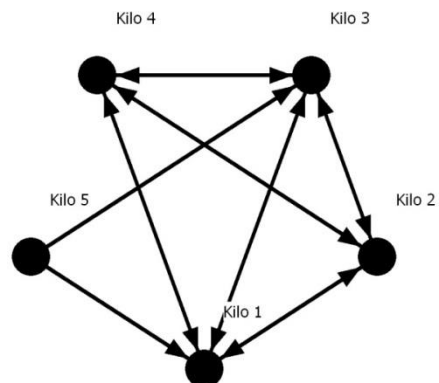
Figure 4.7   Leadership Network Functions: Kilo.

4.10   Group Member Ratings of Performance

In addition to rating other members' leadership, participants were asked to rate their group's performance on four variables: organization, teamwork, movie quality and movie creativity. The use of member ratings for both dependent variables (e.g. Avolio et al., 1996; Pearce et al., 2004; Sivasubramanium et al., 2002) and independent variables (e.g. Pearce & Sims, 2002) is common in non-SNA shared leadership studies. The group performance data obtained here allows comparison of self-ratings and expert ratings of the dependent variables, and additional tests of the main hypotheses of this study.

Descriptive Statistics

The total number of members in the sample groups was 135. Table 4.26 shows their mean scores for group organization, teamwork, and move quality and creativity. Overall, the participants had relatively high opinions of their teamwork and performance.

Table 4.26 Mean Self-ratings for Group Organization, Teamwork and Movie Quality and Creativity

	Mean	Standard Deviation
Well Organised	3.91	.96
Effective Teamwork	4.17	.89
Movie Quality	4.19	.82
Movie Creativity	4.29	.74

Self-Rated vs. Expert-Rated Dependent Variables

Participants' ratings of their movies did not correlate well with the expert panel

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ratings (Table 4.26). With group size partialled out, all but one of the twelve correlations were insignificant and, interestingly, all were negative. The two measures of creativity were unrelated (r = -.14, p = .10). It appears the students and judges generally had quite different criteria for judging group performance, including creativity of the movies. However, several differences between the two measurement approaches should be noted. First, the students had not viewed other groups' movies and could not compare their own against them. Second, the students may have been influenced by perceptions of their group's *process*, which the experts did not observe. Finally, self-reports are likely to suffer from social desirability bias and other artefects of the measurement system (Podsakoff, McKenzie, Lee, & Podsakoff, 2003). All three of these issues suggest self-rated measures of group process and performance variables should be taken with caution in shared leadership studies. Further studies of the relationship between the subjective and objective approaches are suggested.

The significant relationship between student-rated teamwork and judge-rated task focus is difficult to explain unless it is a statistical anomaly. In addition, the four self-rated measures were predictive of judge-rated creativity at levels of p = .07 - .13, although the correlation coefficients are all small. The more important issue for future research is the lack of any positive correlation between the self-reported and judge-reported measures.

Hypothesis Tests Using Self-Reported Group Performance Data

The self-rated group performance measures can be used to test the hypotheses linking leadership and Bass's leadership functions to creativity (Table 4.29). Group

size was partialled out of these correlations. Leadership centrality and density were significantly related to Movie Creativity in the hypothesized directions, as were three of the leadership functions.

Table 4.27 Correlations between Self-Reported and Expert Panel Measures of Group Performance

		Creativity	Task Focus	Professionalism
Well Organised	r	-.153	-.083	-.062
	p	.078	.339	.475
Effective Teamwork	r	-.156	-.196*	-.051
	p	.071	.023	.560
Movie Quality	r	-.132	-.040	-.003
	p	.128	.643	.975
Movie Creativity	r	-.143	-.107	-.073
	p	.099	.216	.399

* $p < 0.05$ (2-tailed)

Table 4.28 also shows the other three self-rated outcome and process variables were similarly predicted by the leadership variables. Overall, the self-reported results provide further confirmation of the hypothesized relationship between shared leadership and creativity, and suggest that sharing of the individual leadership functions is less effective. These conclusions reflect the general findings from the independent ratings of movie creativity, task focus and professionalism. However, further investigation of the differences between self-reports and expert judges ratings is recommended.

Table 4.28 Correlations between Self-Rated Independent and Dependent Variables

		Well Organised		Effective Teamwork		Movie Quality		Movie Creativity	
		r	p	r	p	r	p	r	p
Leadership	C	-.15	.09	-.22*	.01	-.22*	.01	-.18*	.04
	D	.27**	.00	.35**	.00	.26**	.00	.34**	.00
Constructive Feedback	C	-.25**	.00	-.24*	.01	-.13	.12	-.19*	.03
	D	.28**	.00	.29**	.00	.17*	.04	.27**	.00
Developmental Planning	C	-.40**	.00	-.30**	.00	-.34**	.00	-.42**	.00
	D	.41**	.00	.34**	.00	.39**	.00	.43**	.00
Goal Clarification	C	-.20*	.02	-.14	.11	-.10	.27	-.18*	.04
	D	.19*	.03	.16	.07	.15	.08	.22**	.01
Motivation	C	-.10	.28	-.14	.11	-.05	.61	-.12	.16
	D	.29**	.00	.30**	.00	.14	.12	.28**	.00
Team Building	C	-.03	.76	-.05	.55	-.03	.71	.02	.86
	D	.21**	.01	.17	.06	.10	.26	.07	.45

** p < .01 (2-tailed) * p < .05 (2-tailed)

4.11   Chapter Summary

This study examined the relationship of between shared leadership and creativity in groups engaged in a movie-making project over three months. Leadership sharing was assessed using SNA measures of group degree centrality and density. Leadership was measured by a global variable and five variables describing specific leadership functions. Creativity was assessed by a panel of independent judges, as were the task focus and professionalism of the movies.

Descriptive analyses of the independent and dependent variables showed four main findings. First, the sample groups had moderate to high levels of *shared leadership* and correspondingly low levels of hierarchical leadership as judged by mean

centrality and density on the six independent variables. Second, the *inter-rater reliability* of the dependent variable measures was high. Third, *centrality and density were highly negatively correlated* for all six independent variables, as expected on the basis of their mathematical properties but contrary to Mayo et al.'s (2003) framework for measuring shared leadership.

As well, scatterplots of centrality and density for the six independent variables showed some practical problems with Mayo's framework. Using the scale midpoint to categorize groups placed many into categories of little theoretical interest ("Low Shared Leadership" and "Leadership Avoidant"), and produced only two Hierarchical groups. Median centrality and density were more useful criteria, assigning enough groups to Shared and Hierarchical categories to allow non-parametric hypothesis tests. In these, leadership sharing was significantly related to creativity but not task focus or professionalism.

However, categorizing groups on the basis of median splits indicates only relative sharing, and ignores the metric information in these measures. These limitations and the sample size problem were addressed by separately correlating centrality and density with each dependent variable, treating shared vs. hierarchical leadership as a continuum rather than two discrete categories. Group size was partialled out of these correlations as it correlated with creativity and professionalism, and is theoretically related to many measures of small group performance.

These correlational tests provided partial support for the research hypotheses. Leadership centrality and density showed moderate correlations with Creativity, Task Focus and Professionalism. While only one was significant at $\alpha = .05$, the

remainder showed p = .05 - .11. None of the leadership *functions* were associated with Creativity in both centrality and density. Goal Clarification was related to Professionalism, and Developmental Planning came close to this. Three other functions had marginally significant correlations between density and Task Focus or Professionalism. Although further testing is needed to confirm and explain these differences, it appears sharing of the leadership functions has less effect on outcome variables than sharing of leadership itself.

Visual inspection of *sociograms* for each group showed the pattern of sharing more precisely than the SNA indices, particularly in showing whether different individuals lead different leadership functions. A few groups with relatively high centrality had some evidence of such specialisation, but even these showed much more consistency than diversity in members' roles. In general, individuals were either consistently active, moderately active or little active across all the leadership functions. Even where an individual clearly lead one or two functions, another more consistently lead the other functions. Shared leadership in the form of multiple specialized individual leaders was not strongly evident.

Finally, *self-reported* ratings of movie creativity, quality and group process measures did not correlate with the independent judges' ratings. Leadership sharing had small but highly significant correlations with creativity and other group outcome or process measures. Sharing of the leadership functions appeared to improve the self-reported variables to a lesser extent, as found in the tests involving judges' ratings. Further research is needed to verify and explain both these results and the general differences between self-ratings and judges' ratings.

Chapter Five
Discussion

5.1   Introduction

The primary hypothesis of this study is that shared leadership in a small group leads to more creative outcomes than hierarchical leadership. The results presented in Chapter Four provide qualified support for this hypothesis, and this chapter discusses their broader meaning and context. It begins by considering the degree of shared leadership and creativity in the sample groups, then summarises the hypothesis test results and several qualifications to them. Next, differences between leadership and the five leadership functions or roles are explored, along with the possibility that group members might specialize in these functions. The use of SNA measures in shared leadership research is then discussed, and the role of a potential confounding variable, group size, examined. In the last sections, implications for future research on both shared leadership and creativity are identified, and limitations of the study noted.

5.2   The Degree and Effectiveness of Shared Leadership

When left to decide their own leadership arrangements, the sample groups generally showed moderately to highly shared leadership as indicated by low centrality and high density scores on the global leadership rating (Table 4.1). Only three groups had centrality scores above 0.5, and only two had density scores below 0.5. This is consistent with the findings of other studies using student groups, although whether workplace groups given the freedom to decide their leadership arrangements would respond similarly has not been addressed in the literature. The five 'leadership

functions' showed a similar tendency towards sharing in their centrality and density values.

All six centrality measures were moderately to highly correlated (r = .32 - .61), as were the six density measures (r = .37 - .68). The small sample size does not permit analysing the factor structure underlying these variables, but the correlations suggest they measure both a common element – presumably leadership – as well as distinct elements reflecting the unique aspect of each function.

Participants reported that their groups were well-organized and worked together effectively (Table 4.26). While there may be some incentive to appear socially desirable in a classroom, observations of group interactions and performance over the semester suggested they were indeed functioning well. No complaints were received, another sign that the groups had self-organised to a high degree.

The quality of the movies was good in the context of a semester-long student project conducted for course credit. Movie-making involves *creative* skills of designing, conceptualising, filming and editing, the *task-management* skills of communicating, scheduling, monitoring and executing, along with *leadership* skills such as communicating, motivating and collaborating. Students had little or no experience in creative work yet produced quite creative movies by the lecturer's judgment.

The three independent judges gave the movies moderately high ratings for creativity, averaging around 3.3 out of 5 (Table 4.5), and had good inter-rater reliability. Participants self-rated their movies higher, averaging 4.3 out of 5 for creativity and 4.2 for overall quality (Table 4.26). Interestingly, the judges' and students' ratings

were not related. This may reflect differences in the criteria used by judges and students, or influences such as social desirability bias (see 4.10).

The independent judges also considered the movies to have good task focus ($\overline{X} = 3.2$) and professionalism ($\overline{X} = 3.3$), corroborating the lecturer's observation that the movies generally reflected both the project instructions and the professional standards expected of student assignments.

In summary, both the objective data and informal observations indicate the groups had a reasonably high level of leadership sharing, and produced creative movies that generally met the assignment brief and environmental constraints.

5.3   Results of Hypothesis Tests

Shared Leadership and Creativity

Three different analyses provided consistent but qualified support for the hypothesised link between shared leadership and creativity. First, when groups were assigned to Shared and Hierarchical Leadership categories using a version of Mayo et al.'s (2003) conceptual framework based on median splits, relatively shared groups had higher mean creativity than more hierarchical groups. A limitation of this approach to measuring shared vs hierarchical leadership is that about a third of the groups did not fit either category. Second, although statistically significant only at p = .09, leadership centrality had a moderate negative correlation with creativity (r = -.30) when the confounding effect of group size was eliminated. Density was positively related to creativity at a similar level (r = .31, p = .11). Importantly, the different directions of these two correlations are as predicted under the research

hypothesis. Third, leadership centrality and density were significantly related to *self-rated* creativity in the expected directions. Each of these findings is qualified by aspects of the methodology that invite further testing (see below), but together they suggest qualified support for the hypothesized link.

In contrast, the centrality and density of the five *leadership functions* were generally not related to creativity at a level that suggests further testing, with the possible exception of Constructive Feedback density at p = .05. The latter is harder to interpret in the absence of a corresponding negative correlation for centrality. At face value it suggests the overall level of sharing is important but whether it comes from one or multiple members is not clear. If replicated, this might indicate a difference between leadership itself and the leadership functions, a general possibility raised in other places below. The 'symmetry' of centrality and density measures is further discussed in 5.7.

The general conclusion is that whether the leadership functions identified by Bass and Bass are shared or hierarchical does not affect creativity as rated by the independent judges. On the other hand, three of these variables had significant correlations in the predicted directions with *self-rated* creativity, and a fourth was correlated in density alone. However, the possibility of common method bias inflating these correlations has to be considered in reconciling these findings. The judges' ratings appear to be more reliable indicators, but the discrepancy between self-ratings and judge's ratings deserves further investigation.

Shared Leadership and Task Focus and Professionalism

The centrality and density measures of the global leadership sharing variable had moderate correlations in the predicted directions with *task focus* and *professionalism.* Similar to the creativity results, most had a p = .06 - .11, although leadership centrality was significantly related to professionalism.

The *leadership functions* had more mixed relationships with these variables. Centrality and density of Goal Clarification and Developmental Planning were related to *professionalism*, in the expected directions, at p = .02, .02, .04 and .09 respectively. The functions also had mixed relationships with three measures of *self-rated* group process and outcomes, but more of these were significant than in the judge-rated results. As noted above, the self-ratings may be less reliable guides to movie quality and group process. The discrepancy between leadership and the leadership functions is further discussed below.

Overall, the study provides consistent but qualified support for the hypothesis that shared leadership improves creativity in small groups compared to hierarchical leadership. Shared leadership also improved the task focus and professionalism of the groups' movies to a similar extent. However, sharing of the five leadership functions identified by Bass and Bass generally did not improve these three variables. The differences between the global leadership variable and the leadership functions are further discussed in 5.5, and theoretical and practical implications of these general conclusions are discussed in 5.8 and 5.9. The next section addresses the methodological qualifications to these conclusions.

5.4   Methodological Qualifications

Several aspects of the study design qualify the conclusions drawn above. First, the sample size of 31 groups restricts the study's statistical power. Assigning groups to shared or hierarchical categories using median splits left a sample of only 20 groups. Many of the correlational test results fell just beyond the conventional .05 level of statistical significance, in the range of $p = .06$ to .11, and others were just above this. While any of these may result from sampling error, the number of near-significant results and their consistency with the theoretically predicted directions suggest at least some represent real correlations in the population. As the first study to link shared leadership with creativity, the first to use both centrality and density to measure leadership sharing, and the first to compare global and dimensional measures of leadership sharing, the study's aims involved hypothesis generation as much as hypothesis testing. Further testing of the hypotheses with larger samples or other means of increasing statistical power is therefore recommended.

Second, *measurement error* should be considered as an explanation for the null findings. It is possible raters did not accurately answer questions such as "to what degree does your team rely on [member n] for leadership?" or "how much does [member n] motivate you to perform well in the project?". Although there is no obvious reason to attribute the null results to questionnaire design any more than the significant ones since both use the same format, future research should examine the effects of other question and response formats.

Measurement error could also involve a wide range of biases (see Podsakoff et al., 2003) in the independent or dependent variable measures. For example, only three judges were used: despite the high-level inter-rater reliability it is possible more or

different judges might have produced different ratings. The lack of a correlation between the expert's ratings and the participant's ratings of creativity and other group outcomes particularly calls for further investigation. Again, further testing of both the questionnaire and the expert rating method is needed.

A broader qualification to many leadership studies comes from *common method error* in which independent and dependent variables correlate because they use the same method, introducing a common error component that inflates correlations and other similar comparative measures (Podsakoff et al., 2003). This possibility was eliminated here, since the centrality and density measures of the independent variables come from self-ratings while the dependent variables in the main hypothesis tests come from an expert panel.

A third qualification is that the sample groups were all *closer to the shared end* of the hypothesised continuum. The centrality and density scores did not often approach the hierarchical end, and had relatively small standard deviations. It is possible a more varied sample would reveal greater variation in the dependent variables and hence more significant mean differences or correlations. Future research could use experimental designs where some groups are directed to use hierarchical leadership, or field contexts where hierarchical leadership is more prevalent.

At present little is known about the 'natural' range of centrality and density settings of groups in different industry contexts. This is likely to depend on the management model applied, other organizational factors such as organisational culture, the task, and perhaps group members' personal or cultural preferences. Knowledge of how

sharing varies in different contexts is needed to estimate the generalisability of research findings based on different levels of shared vs hierarchical leadership.

With these qualifications in mind, certain theoretically interesting or unexpected aspects of the results are now examined.

5.5   Differences Between Leadership and Leadership Functions

Bass and Bass's Construct of Leadership

The leadership functions or roles identified in Bass and Bass's (2008) literature review were used here to define leadership more systematically than a global measure permits. They also provide a general construct of leadership, where previous studies of shared leadership have employed constructs of specific leadership 'styles' such as transformational leadership that were developed for hierarchical contexts. The leadership function variables showed both similarities and differences to the global leadership variable.

First, the descriptive statistics suggest the five functions are indeed related to leadership. Their centrality and density measures all had means and standard deviations similar to those for Leadership (Table 4.1), and correlated positively and at least moderately with Leadership, except for Team Building centrality ($r = .32$, $p = .08$; see Tables 4.2 and 4.3).

The five functions also had similar means and standard deviations *to each other*, and generally correlated positively and moderately or highly with each other. All five density measures were positively interrelated. Amongst the centrality measures (Table 4.2), Developmental Planning was not related to Goal Clarification,

Motivation or Team Building. The empirical status and meaning of this is a topic for future research.

Finally, three of these variables had non-normal distributions for both centrality and density (Constructive Feedback, Motivation and Team Building, see 4.2). Again, further examination of the relationship between these variables is recommended.

Despite such differences, the overall similarities between the six 'networks' suggest they operate jointly to a moderate degree, supporting the notion that each measures a unique aspect of a common construct of leadership. As the first empirical use of Bass and Bass's five 'dimensions', the results above provide encouragement for future researchers wishing to more fully investigate this construct.

Differences in Hypothesis Test Outcomes – Leadership vs Leadership Functions
Despite their commonalities, the leadership functions did not produce consistent results in the hypothesis tests (Table 4.22). None were significantly related to Creativity (although one had a $p = .05$ for centrality), two correlated with Professionalism on centrality *and* density (at $p = .02$ - .09), and four more correlated with Task Focus or Professionalism on density ($p = .05$ - .09) but not centrality. The latter asymmetrical results are discussed further when considering the use of SNA measures in Section 5.7. As well, the self-reported results involving creativity and three other dependent variables had less consistent relationships with the leadership function than with leadership itself.

The general conclusion is therefore that sharing of the leadership functions does not generally improve group outcomes as much as the sharing of leadership itself. This is

most evident in the effects on creativity. Although some results require further confirmation, it appears that while shared leadership as a global quality improves creativity, sharing of the leadership functions generally has little or no effect.

One explanation for this difference is that Bass and Bass's functions might be more relevant to work outcomes where creativity is unimportant, and therefore sharing of them is largely irrelevant here. This is consistent with the origin of these functions in research on hierarchical leadership and the common implication in the creativity literature that hierarchical leadership is in many ways antagonistic to creativity (see Chapter Two). The hierarchical context of Bass and Bass' functions is evident in their description of leaders as agents who change, structure and direct others' work and 'modify' group members' psychological characteristics:

> "Leadership is an interaction between two or more members of a group that often involves a structuring or restructuring of the situation and of the perceptions and expectations of the members. Leaders are agents of change, whose acts affect them. Leadership occurs when one group member modifies the motivation or competencies of others in the group. Leadership can be conceived as directing the attention of other members to goals and the paths to achieve them." (Bass & Bass 2008, p 25).

Shared leadership theory suggests group leadership involves more subtle, negotiated and inclusive means of achieving goals. Although an attempt was made to refocus the description of Bass and Bass's functions to be more amenable to shared leadership, the differences found here may suggest a need to revisit the components of the newer construct. So far most multi-item measures used in shared leadership

studies measure behaviours identified in theories of hierarchical leadership. If the present findings are a guide, this may be slowing development of this field of study.

A second possible explanation for the difference between leadership and leadership functions is that participants could more easily recall who had been a leader than who had lead the individual functions. This may indicate leadership is more than the sum of its parts, a quality perceived wholistically by human observers but less readily captured in constructs comprising a small number of dimensions. If so, researchers should consider including global measures of leadership when checking the validity of multi-dimensional psychometric scales.

A third explanation is that sharing of leadership *functions* is less important than sharing of leadership itself. That is, leadership is more than the sum of its components, at least those defined by isolable roles or functions; a higher-level construct with more explanatory power. There appears to be little discussion of this issue in the leadership literature. Perhaps, it is a concern more relevant to shared leadership, because the actual roles involved are different (as suggested above), or because shared leadership is a group-level phenomenon with a qualitatively different character (Lewin et al., 1938) in which such roles are less important.

Although the evidence here is modest, the apparent differences between leadership and the roles suggested by Bass and Bass suggest an interesting topic for future theoretical development and research in shared leadership, particularly given the evolution of the field as an extension of hierarchical leadership theory and the contrast between studies using multi-dimensional constructs and single-item global

measures. The present results at least raise the possibility that these measure different sorts of 'leadership' in small groups.

Differences Between the Leadership Functions

The leadership functions did not produce consistent results and some significant findings may be worthy of future investigation. In particular, sharing of Developmental Planning and Goal Clarification appears to improve Professionalism of the groups' movies. These are task-focused functions, and may therefore be more relevant to traditional hierarchical workgroups where creativity is less important and the work is more structured and bounded. Motivation, team building and possibly constructive feedback have a more psychological focus on engagement with the group as an aid to task completion. These may be more helpful in creative work, which tends to be less structured or bounded and therefore depends more on interactive problem-solving. The results are compatible with the notion that *explicit* sharing of these psycho-social functions is not needed for creativity, but sharing of planning and goal direction can make project outcomes more relevant to professional standards. Future research could investigate the potential differences between task-based and relationship-based leadership functions, to use Fielder's (1964) language, in shared leadership: does the benefit of sharing vary for different types of leadership and different dimensions of group activity or outcomes?

Further evidence of the difference between these two sets of functions is that sharing of Motivation and Team Building did not affect any of the dependent variables at a level close to significance, and Motivation had very low correlations with all three.

In summary, while sharing of leadership appears to improve creativity more than sharing of leadership functions in general, the specific differences noted here suggest a more complex picture in which some *aspects* of leadership may be relevant to some tasks. If confirmed, future researchers might consider how task parameters affect the relative benefits of shared and hierarchical approaches to leadership.

5.6   Specialisation: Leadership of Different Group Functions

Some SNA studies of shared leadership have examined multiple networks in each group (e.g. Boyer et al., 2010; Small & Rentsch, 2010). In this study leadership and the five leadership functions are considered separately, raising the possibility that *different* group members may lead in different areas. SNA measures do not identify such differences, and visual analysis of sociograms is required. When the 31 sociograms were categorized into four levels of sharing, the most hierarchical groups showed some evidence of specialization, in which different members were frequently nominated as a leader in one or two functions (see 4.9). However, in all cases another member was more often nominated the leader across a broad range of networks. The former is a specialist but the latter is more generally a leader.

Functional specialization is a theoretically interesting possibility combining characteristics of both shared and hierarchical leadership, and is expected from the often-stated premise that shared leadership allows group members to take leadership in their particular areas of expertise (Avolio, Walumbwa, & Weber, 2009; Pearce & Conger, 2003). Despite this, shared leadership research rarely investigates multiple networks and has not yet empirically examined leadership specialisation. Future

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researchers should consider measuring multiple networks to detect specialization, and examine sociograms as well as SNA measures.

The possibility of specialization further complicates the issue of whether shared leadership is better understood as a global or multi-dimensional construct, as discussed previously. Perhaps a broader view of leadership encompassing both general leadership and more specific leadership functions as well as task-specific functions will be needed. The latter could include design and production skills in creative work, for example. A group member could specialize in leadership generally, which is equivalent to hierarchical leadership if that person also achieves formal status, or may be the sole leader in generic leadership functions or specialized areas of task-related expertise.

5.7   SNA Measures in Shared Leadership Research

SNA measures have been used in studies of hierarchical leadership (e.g. Balkundi & Kilduff, 2006; Hoppe & Reinelt, 2010), but have not so far been used to measure shared leadership in an effective way. Carson et al. (2007) used density and Small and Rentsch (2010) used inverse centrality scores, but examination of the mathematical properties of each shows both are ambiguous indicators of the underlying concept at lower ends of the scale. Several groups of authors recommend using both measures (Mayo et al., 2003; Gockel & Werth, 2010; Small & Rentsch, 2010), but only Mayo et al. have suggested how they should be combined in data analysis and so far no published studies have used their method.

Several problems were identified in attempting to use Mayo et al.'s approach. First, their definition of hierarchical leadership should be amended to refer to high centrality and low density; high levels do not reflect hierarchical leadership, and are not mathematically possible. A revised version of their schema is proposed in Figure 2.2. With this modification, Mayo et al.'s general approach was used to test the main hypothesis of this study. However, the distribution of group centrality and density scores presented a practical problem: dichotomising these variables using the scale midpoint (0.5) resulted in only two groups in the Hierarchical category and eight in theoretically uninteresting categories. An alternative approach using median splits classified 20 of the 31 groups into Shared or Hierarchical categories, allowing nonparametric tests of *relative* centrality and density. However, 11 groups were excluded by this approach.

Small and Rentsch (2010) have similarly dichotomized centrality using a mean split. However, all such approaches face the problem of justifying the choice of category boundaries. A theoretical or mathematical rationale, or empirical evidence of a bimodal distribution, would make this less arbitrary, but are presently lacking in shared leadership research. Indeed, the present results suggest small changes in the boundary, for example from midpoint to median or even mean to median, can move a significant number of groups across boundaries, since groups tended to fall more in the mid-range than the scale extremes (Figure 4.1). As previous authors have not published distributions of group centrality or density, the general consequences of using mean or median splits are unclear. As such values differ from sample to sample they are somewhat arbitrary, and further make comparing studies difficult.

In addition, dichotomising ignores most of the information in an interval or ratio scale. Because of this and the problems above, it appears correlating group centrality and density scores with dependent variables is preferable to categorizing groups. Hierarchical and shared leadership are conceptually opposed in the literature (e.g. Denis, Langley, & Sergi, 2012; Ensley et al., 2006; Pearce & Sims, 2002) and can therefore be considered endpoints of a continuum rather than discrete categories. Correlations or (regression coefficients) relating centrality and density to outcome measures are meaningful if interpreted with knowledge of their individual, limitations and mutual relationship. In particular, three mathematical issues should be considered: (i) the tendency for centrality and density to have a negative relationship; (ii) scores above about 0.6 on both variables (simultaneously) are impossible; and (iii) density scores below $1/n$ are impossible when centrality is 1, (and correspondingly smaller density scores impossible as centrality approaches zero). These constraints are shown graphically in Figure 5.1, which plots all possible centrality-density combinations for groups of four and eight members, as identified by a computer program.
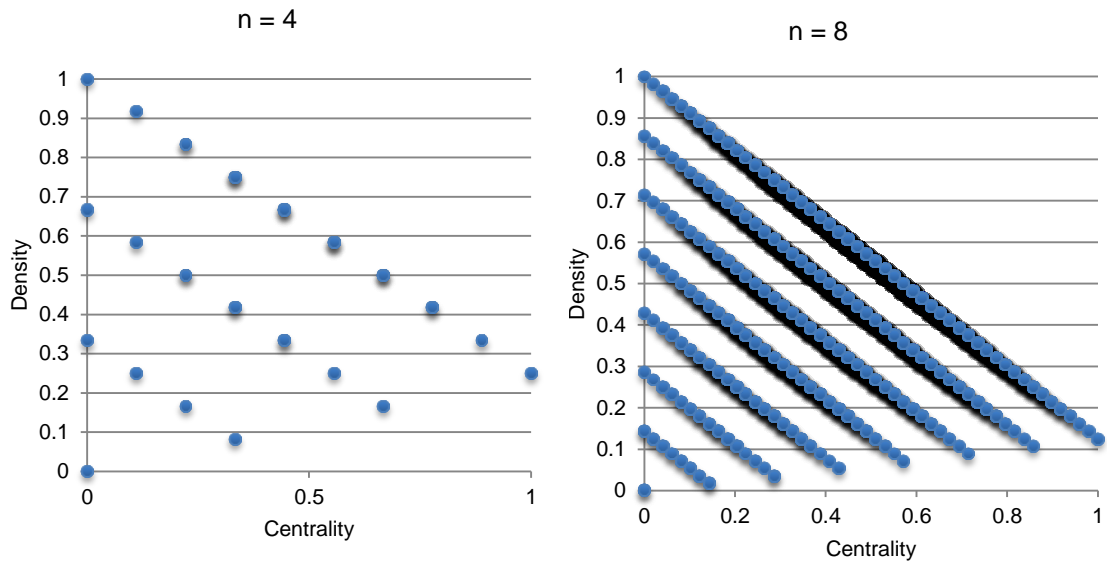
Figure 5.1.   The set of possible centrality and density scores for groups of n = 4 and n = 8. Developed for this thesis. (Source: P. Standen)

Figure 5.1 shows why real-world samples will tend to show negative correlations. In practice, groups tend can be expected to have either high centrality-low density or high density-low centrality combinations. High–high combinations do not exist, and low–low combinations fall outside the scope of studies comparing shared vs hierarchical leadership, although they may be of interest in studies of poor performance, "leadership substitutes" (Kerr & Jermier, 1978) or other contexts in which little leadership is expected.

In general, therefore, researchers should expect samples with moderate to strong negative correlations between centrality and density. They may also need to consider the role of "low leadership" groups in their samples. Here, only two groups had leadership centrality and density scores below 0.5, or four if scores of 0.5 are included (Appendix 2). The five leadership functions had 2, 4, 2, 2 and 3 low leadership groups by the stricter criterion, and one or two more with scores of 0.5. As

Figure 4.1 shows, the low scores were rarely *very* low: only 12% were below 0.2 and 22% below 0.3. This is not surprising as very low centrality and density indicates a group of unconnected individuals.

Future researchers may consider screening out 'low leadership' groups as outliers, or else explicitly compare their performance with more obviously shared or hierarchical groups. They should not accept correlations involving large numbers of them as measures of a construct assuming a continuum between shared and hierarchical leadership. Publication of scattergrams or other summaries of the distributions of centrality and density would be useful.

A final complication in using both centrality and density is the possibility of 'asymmetrical' results. Four of the 18 independent-dependent variable combinations shown in Table 4.22 involved near-significant correlations with density ($p = .05 - .09$) where the corresponding correlation with centrality was much lower ($p = .35 - .46$). This pattern implies sharing is important - higher density produces more feedback, for example - but whether moderate or low levels of it are centralized is not. In this study, asymmetry was observed in some leadership function variables but not in leadership itself, further adding to the case for considering these as qualitatively different constructs of leadership. Symmetry is an interesting topic for future research. For example, if density is consistently found to be more important in global measures of shared vs hierarchical leadership, it may be that leadership itself is more closely tied to its social functions than its directive functions, making the concept of 'hierarchical leadership' something of an oxymoron.

Overall, despite the complications correlating centrality and density with outcome measures has the important benefits of (i) using all the information in centrality and density measures rather than dichotomizing them, (ii) avoiding the problems of associated with identifying a boundary between categories of shared and hierarchical leadership and (iii) increasing the sample size where 'low leadership' groups are close to the two scale midpoints. However, further research on the benefits and limitations of this approach is desirable. Questions of interest include how the two measures covary in samples with more hierarchical leadership or a greater spread on centrality and density, and the effect of different measures of leadership. At the same time, the empirical findings and observations on the centrality-density relationship presented above suggest correlational analysis will often be a more effective approach to measuring shared leadership than categorisation.

5.8   The Effects of Group Size in Shared Leadership Research

A second methodological issue relevant to future research on shared leadership is the effect of group size. The literature includes studies of groups varying in size from three (e.g. Ensley et al., 2006) to 30 (Zohar & Tenne-Gazit, 2008) and even 41 (Emery et al. 2013), although typically the groups have less than ten members (Carson et al., 2007; Pearce & Sims, 2002; Sivasubramaniam et al., 2002; Small & Rentsch, 2010). Although no studies so far have examined the limits of small group research, it seems likely that sharing in much larger groups would be qualitatively different.

From a theoretical perspective, size is expected to influence both the degree and effectiveness of sharing, even in small groups. With too many members, achieving

consensus and hence sharing group leadership becomes harder, while groups with too few members lack diversity, the capacity for members to specialize in areas of expertise, and perhaps also the resilience to cope with sudden increases in workload. In this study, smaller groups had lower creativity and professionalism than larger ones, which may reflect such effects.

A less important methodological consideration is that in small, highly centralized groups density scores are limited by group size as shown in Figure 5.1. While the effect is not great and decreases with group size, it does suggest caution in comparing density figures for small groups (e.g. $n = 3 - 5$) with those for larger ones (e.g. $n > 10$) under hierarchical leadership.

The effects of group size are generally ignored in shared leadership research, but future studies should consider it as an important confounding variable. There is also a need for research on the upper and lower bounds on group size for effective leadership sharing. 'Span of control' and other studies of *hierarchical* leadership suggest some constraints on maximum group size (House & Miner, 1969; Van Fleet & Bedeian, 1977), but shared leadership is likely to have quite different parameters. Small groups may not have much capacity for sharing and large groups make it difficult. Understanding the effects of group size on leadership sharing and group outcomes appears important to the development of shared leadership theory.

5.9   Implications for Research on Shared Leadership

The findings of this study provide qualified support for the prediction that shared leadership increases creativity in small work groups. While shared leadership studies

have attributed a range of benefits to shared leadership, creativity is increasingly important in a highly competitive, rapidly changing business world, and may be one of the most important advantages of this new form of leadership.

Although this is the first direct empirical investigation of this link, five previous studies have indirectly linked shared leadership to creativity. Leana's (1985) experimental study of student groups showed better creative performance in those with participative compared to directive leadership. Pearce and Ensley (2004) found shared goal-setting in product development teams increased their innovation, and Mihalache et al. (2014) similarly found shared leadership in top management teams, measured at the group level, increased innovation. Lee et al. (2011) found shared leadership increased team creativity in virtual student groups. Finally, Hooker and Csikszentmihalyi (2003) propose a theoretical link to creativity through greater psychological 'flow' under shared leadership, but did not test this. The present study extends this small body of knowledge with empirical evidence, using a direct measure of shared vs. hierarchical leadership based on individual-level SNA measures and an independent rather than self-reported measure of product creativity.

This study also improves on studies of shared leadership involving temporary student groups formed for short-term tasks (e.g., Leana 1986; Lee et al. 2011; Sutanto et al. 2011). Student groups are common in shared leadership research due to the difficulty of finding suitable groups in industry and the greater potential for controlling leadership and task parameters in student groups. In the present study students worked together for thirteen weeks, allowing good rapport and the type of group dynamics needed for leadership sharing to develop. As well, the creative movie-making task had very open-ended instructions and was unfamiliar to these business

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students, requiring them to master a variety of new skills and cope with uncertainty. Although the generalisability of student group work to industry environments is always limited, this study had less 'artificial' conditions than many in the shared leadership field.

Explaining the link between leadership sharing and creativity

Future studies of this link might examine two theoretical mediating mechanisms suggested by previous authors. First it appears both shared leadership and creativity work more through *intrinsic motivation* than external direction (Leana, 1986; Lee et al., 2011; Hooker & Csikzentmihalyi, 2003), making explicitly motivational leadership unnecessary. Intrinsic motivation may explain why sharing of the motivational function in this study did not affect performance: group members were already sufficiently motivated.

Second, shared leadership creates a *group climate* in which members feel psychologically safe in sharing personal or original ideas. For example, Hooker and Csikszentmihayli (2004 p. 228) argue that shared leadership does not lead to groupthink, as managers often believe, but rather encourages members to explore new ideas: "shared leadership promotes lower self-consciousness among group members. In the absence of strict hierarchical supervision, employees are able to work on their own, and do things their own way without feeling scrutinized". Leana similarly emphasized psychological safety in explaining why participative leadership groups were less influenced by groupthink and produced more solutions to a problem than directive leadership groups. The levels of creativity, task focus and professionalism in the present study also suggest groupthink was not present here.

Although this study, like Leana's involved student groups, it seems shared leadership is not intrinsically predisposed to problems with group dynamics.

The review of the shared leadership literature in Chapter 2 identified a number of authors who argue that hierarchical leadership reduces intrinsic motivation and creates negative social dynamics such as groupthink. Other intervening variables thought to link shared leadership specifically to creativity include the opportunity to learn from peers (Lee et al., 2011) and autonomy, intrinsic satisfaction, psychological investment in the work and opportunity to take risks (Hooker & Csikzentmihalyi, 2003).

More generally, studies of semi-autonomous work-groups and participative or empowering management suggest shared leadership can increase communication, collaboration and support (see 2.4.1-3), which should also improve creativity. Conversely, creativity research identifies a wide range of potential mediators likely to be present under shared leadership. These include dialog, communication and collaboration; a climate of task commitment; trust and affective commitment; fewer social dysfunctions such as evaluation apprehension, production blocking, social loafing, cognitive interference, passivity, conformity, and task avoidance and unproductive conflict. Further potential mediators include greater diversity of ideas; work and team engagement; improved time management capability; mutual team member support; mental stimulation; self-expression; goal sharing; psychological 'flow'; flexibility; and openness to brainstorming, friendly critique or open debate (Section 2.8).

In addition, certain characteristics of creative *individuals,* such as open-mindedness, willingness to take risks or grasp new experiences, tolerance of uncertainty, self-confidence and willingness to grow (2.8.2), are likely to be encouraged by leadership sharing. The broad range of the intervening variables identified in the two fields of research suggests shared leadership and creativity may be highly interconnected.

Observations of the students in this study confirmed the importance of intrinsic motivation and a group climate conducive to psychological safety and hence openness and freedom to take risks, along with peer learning and psychological investment in the work. When participants found the task challenging and enjoyable, and when colleagues developed into trusted friends, groups performed at a high level. Future research should attempt to order and prioritise the wide range of variables raised in the literature, in order to more precisely predict the contexts in which shared leadership might improve creativity. This in turn could be linked to variables already studied in the leadership literature, such as innovation (Pearce & Ensley, 2004; Mihalache et al. 2014).

Finally future research could consider which aspects of hierarchical leadership are less important in the shared context. The present results suggest teams with shared leadership do not need a motivational or team building function because members are already intrinsically motivated and able to collaborate with one another. In shared leadership, many functions important to hierarchical leadership may emerge from the group climate and interaction rather than being specifically enacted by a single leader. This may be one of its biggest advantages.

5.10   Implications for Research on Creativity

Confirmation of this study's findings would also have implications for creativity research, which has so far paid little direct attention to the effect of leadership styles on group creativity. Although many of the variables listed above have been related to individual or group creativity in experimental research, their application to workgroups is largely unexplored. In this context, shared leadership is a new and seemingly important concept with much to offer creativity research by sharpening the distinction, occasionally implied but rarely made explicit, between shared and hierarchical leadership. Studies of shared leadership and creativity in naturally occurring workgroups would particularly add to creativity research.

There is also a need to raise the profile of creativity in management research, which rarely considers it an important dependent variable despite constant acknowledgement of influences of increasing change, uncertainty, complexity, diversity and competition on the work of managers (e.g. Senge 1990). Creativity may be amongst a manager's most important assets, and the personal qualities and environmental conditions that encourage it deserve more prominence in leadership research, which tends to be overly functional - focused on outcomes that are predictable, unchanging, and readily identified in formal plans. Shared leadership research is one avenue for bringing creativity into management theory.

Creativity research can particularly help counter the common perception that leadership sharing is risky because it promotes groupthink, conformity or social loafing, for example (e.g., Milliken et al., 2003). Conversely, much creativity research identifies significant costs of hierarchical management, including conformity and lack of originality (Amabile, 1996; Gilson & Shalley, 2004), intra-

group conflict (Bassett-Jones, 2005), role ambiguity (Beard, 1996) and organisational alienation (Robinson & Stern, 1997). Future researchers might find the creativity literature a useful base for identifying the advantages and disadvantages of both forms of leadership in modern work environments.

Finally, this study offers two direct contributions to research on group creativity. First it highlights the relevance of variables such as *task focus* and *professionalism* that serve to focus creative work in business environments outside the laboratory or classroom. Second, it adds to the evidence for the usefulness of the CAT as a subjective tool for assessing creative *products*. However, the lack of a correlation between judges' ratings and self-ratings raises important questions for future CAT users. If the independent judges' ratings are more objective, did the students not fully understand what was required of them? Conversely, if the students' interpretations better reflect task requirements as experienced over a semester of instruction and feedback from the lecturer and student colleagues, how valid are the independent judges' ratings? While creativity research cannot avoid subjectivity, there is a need to better understand the different perspectives of producers and external judges.

5.11   Study Limitations

Beyond the methodological qualifications discussed in 5.4, the study had a number of limitations that future researchers may wish to consider. First, as noted in the previous section, the discrepancy between judges' and students' ratings of the movies raises questions about the *Consensual Assessment Technique*. Future researchers could give both parties examples of more and less creative movies, or ask them to rate existing movies as a baseline measure. A problem with this is that the

CAT is already inherently time-consuming, since multiple judges must view each movie (Plucker, Holden, & Neustadter, 2008).

A second limitation is the *choice of expert judges*. The reliability of the CAT rests on the characteristics of the judges and the study context (Amabile, 1982); judges need a solid grounding in the creative field under scrutiny (Kaufman et al., 2008). The present judges had expertise in management education but not film-making, and may therefore perceive creativity more as it relates to products of the business world; judges with film-making expertise would have a broader perspective. However, this does not appear a significant constraint on generalizing the present findings to work groups.

A third limitation is that both shared leadership and creativity *emerge over time* as trust and communication develop in a group (Perry, Pearce, & Sims, 1999). While thirteen weeks is long in the context of shared leadership research, a longer study may show even more sharing and hence creativity. As shared leadership has not been examined over time, the optimal period for group development is unknown. Teamwork research shows groups go through stages of development such as forming, storming, norming, and performing, which suggests group climate may develop over a longer timespan than three months (Bonebright, 2010; Miller, 2003). How shared leadership develops over time is another topic worthy of future research.

A fourth limitation is that the study groups were *self-selected*, which appears to be rare in a business world where staff are usually assigned to groups with appointed leaders (Perry, Pearce, & Sims, 1999). Self-selection may benefit the development of shared leadership if individuals gravitate to those they think they can best work with.

This may aid creativity by increasing collaboration, or reduce it by reducing diversity. Self-selection is known to minimize conflict (Chapman, Meuter, Toy, & Wright, 2006) but also to increase groupthink (Goins & Mannix, 1999). The lecturer observed a generally harmonious and productive atmosphere in the study groups, but whether they had optimum diversity for creativity is unknown.

A fifth limitation is in the *generalisability* of student groups to industry contexts. The classic trade-off in laboratory or experimental research is greater control over the study context at the cost of reduced generalizability. Here, the class context meant group members could be given unconstrained choice in leadership arrangements, 'working' conditions were more controlled than workplace equivalents, and each group could be conveniently observed and assessed. As noted above, shared leadership is often studied in student groups, and much creativity research is conducted in classrooms or laboratories. Many studies of creativity in students are considered generalisable to creative business environments (e.g., Awang & Ramly, 2008; Karpova, Marcketti, & Barker, 2011; Lassig, 2009; Lewis, 2009; Matheson, 2006; McWilliam & Haukka, 2008).

An important aspect of generalizability is the high level of shared leadership observed here, since it appears fully autonomous work-groups are unusual in industry (Cogliser et al., 2013; Gupta, Huang & Yayla, 2011). Empirical evidence on the variation in leadership sharing in industry would help the field of shared leadership research. This study may more closely approximate conditions in creative industries, where highly shared leadership appears more acceptable. A related question is whether groups in work environments that permit high levels of sharing tend to 'naturally' favour shared leadership, hierarchical leadership, or a broad range

between these extremes. Further, the work context and personality or cultural variables may influence this. As the measurement of sharing improves through the use of SNA indices, such issues will affect researchers' ability to generalize findings.

A final limitation is that *correlational* evidence of a link between shared vs hierarchical leadership and creativity does not necessarily imply the former *causes* the latter. More creative individuals may have been attracted to each other, and may be more likely to share leadership. Reverse causality can only be fully ruled out by assigning participants to shared and hierarchical experimental conditions, as Leana (1985) did, but this eliminates the theoretical advantage of allowing members to choose their arrangement. Future research can employ controlled experiments or statistically control for a wider range of confounding variables than size alone.

Chapter Six
Conclusion

6.1   Contribution to the Literature

Shared leadership is a relatively new area of leadership research that challenges the traditional model of a single hierarchical leader. Recent studies suggest leadership sharing in small groups can improve a range of productivity and group process variables, but so far its effect on creativity has not been directly studied. Creativity is increasingly important in today's competitive business environment, and much research identifies preconditions for creativity that appear to be met more by shared than hierarchical leadership, including personal autonomy, participation in decisions affecting one's work, and having a supportive and collaborative work-group.

This study provides the first direct evidence linking shared leadership to creativity. In several tests the student groups with more shared leadership had greater creativity as assessed by both independent judges or group members. Although each test is qualified by aspects of the methodology, together they suggest future researchers should further examine this relationship. Creativity may be one of the most important benefits of shared leadership, but remains understudied in the management literature.

This study also identified some deficiencies in previous research on shared leadership, a field at an early stage of development. First, while most authors define shared leadership in opposition to hierarchical leadership, existing methods for differentiating shared and hierarchical groups have serious limitations. Some authors aggregate members' ratings of the level of leadership *in the group as a whole,* assuming a high level of leadership in a group reflects sharing. However, low

aggregate levels are compatible with both shared and hierarchical leadership: group-level measures do not directly assess the *distribution* of interpersonal influence. Other studies use Social Network Analysis, in which each group member rates each other. The SNA indices of centrality and density have a maximum value of one for a fully hierarchical or a fully shared group, respectively, but their minimum value of zero is ambiguous in regard to the alternate concept. This means both measures must be used. However, previous studies have used only centrality *or* density to assess shared vs hierarchical leadership.

Using two measures to assess leadership sharing raises the question of how to interpret their combinations. Mayo et al.'s (2004) framework is widely cited as a guide, but does not correctly describe the relationship between these measures. A more conceptually and mathematically valid model (Figure 2.2) identifies shared leadership with high density and low centrality, and hierarchical leadership with low density and high centrality. The high-high combination discussed by previous authors is mathematically impossible, and the low-low combination, called here 'low leadership', is not of direct theoretical interest.

When the framework identified in Figure 2.2 was used to separate sample groups into two categories, the shared leadership groups had higher mean group creativity than the hierarchical leadership groups, as judged by an independent expert panel. However, deficiencies in this method lead to a second test in which centrality and density were correlated with creativity. This showed the hypothesised relationships at $p = .09 - .11$. A third test, in which centrality and density were correlated with *self-rated* creativity, showed the hypothesised relationships at $p < .01$. Although these findings are qualified by the small sample size and the possibility of common

method bias in the latter result, together they suggest the effects of shared leadership on creativity are worthy of future study.

A second concern with previous studies is their use of constructs of leadership developed for hierarchical contexts. Where hierarchical leadership relies on the formal authority and interpersonal influence of a single fixed individual, shared leadership works more through social dynamics and leaders may emerge according to the group's needs rather than having a fixed position. As a group-level phenomenon, shared leadership may have quite different characteristics to hierarchical leadership. Shared leadership is more than just sharing of the behaviours identified in constructs such as transformational leadership.

This is practical as well as a theoretical problem. Studies using traditional leadership constructs employ multi-dimensional measures of shared leadership that are practically feasible when participants rate their group as a whole, but not when each member must be rated. SNA studies therefore use global measures of leadership, but controversy exists over their psychometric rigour. This study therefore used both a global measure and measures of five generic leadership functions identified from a comprehensive literature review (Bass & Bass, 2008). The latter were measured with single items but provide a complementary perspective to the global measure.

In contrast to the results for leadership itself, sharing of the five leadership functions was generally not related to the judges' ratings of creativity, with one exception that appears to have little theoretical significance in the absence of a corresponding result for *centrality*. In contrast, these five variables were significantly related to *self-reported* creativity, but the possibility of common method artefacts such as social

desirability bias or a halo effect suggests the judges' ratings are reliable. The tentative conclusion is therefore that sharing of the leadership functions is does not improve creativity.

The Effect of Shared Leadership on Task Focus and Professionalism

Two other dependent variables were included as checks on the nature of the creativity produced by the groups, and did not reveal any problems with the professionalism of the movies or their relevance to the lecturer's instructions ('task focus').

Task focus and professionalism also appear to benefit from shared leadership when measured globally: the correlations with centrality and density had significance levels similar to those for creativity (p = .02 - .11). However sharing of the *leadership functions* had mixed effects. Sharing of goal clarification and developmental planning improved professionalism as predicted (at p = .02 - .09) but the other hypotheses were only marginally supported for density or not supported. The conclusion is, again, that leadership sharing improves the dependent variables but sharing of leadership functions in general does not.

6.2   Theoretical Implications

Evidence that leadership sharing increases creativity of group outcomes should encourage future research into the benefits of shared leadership in a wider range of work environments. While this study involved a specifically creative project, many areas of business have a high need for creativity and innovation, including R&D, product development and design, sales and marketing, strategic planning, the application of new technology to improve existing systems or to restructure the

business, and the management of staff in the face of ambiguity or change. Shared leadership may be more than just a more efficient or effective means of achieving high performance in small groups; it may help organisations adapt and thrive in environments where stability and certainty cannot be assumed.

The results, if confirmed, also have implications for creativity research both in and out of the workplace. Creativity in individuals or groups has been related to individual autonomy, participation in group decisions, intrinsic motivation, a supportive group climate based on trust and affective commitment, and opportunity for collaboration and communication. While shared leadership is expected to provide these conditions more readily than hierarchical leadership, it has not been directly studied in the creativity literature, which tends to focus on individual creativity. Future creativity research can use the construct of shared leadership as a more specific contrast to traditional management practices. The measures of shared vs. hierarchical leadership and creativity used here can be used in such studies, in and out of the workplace.

The results also have implications for the theoretical construct of shared leadership. The differences between the global measure and the measures of sharing in leadership functions would, if confirmed, suggest Bass and Bass's construct does not represent leadership as fully as intended. On the other hand, these variables correlate with leadership itself, and with each other. While the functions are related to leadership, it appears they may not capture important aspects that affect creativity, and in some cases task focus and professionalism as well. Several potential explanations for this were identified. Possibly, group members' can judge or recall leadership in other members better than the leadership functions. Alternatively, the

latter might be lower-level constructs, or might describe a form of leadership relevant only to hierarchical contexts. Future research on these possibilities could shed light on the nature of shared leadership, a concept more often assumed to involve sharing of traditional leadership behaviours than to be a separate 'species' of leadership of interest in its own right.

On the other hand, some leadership functions may be usefully shared in creative work. Sharing of goal clarification and developmental planning appears to improve professionalism (assuming the $p = .09$ for density is not due to sampling error). These task-focused functions are perhaps more relevant to professionalism than creativity itself, since professionalism involves familiar and easily codified standards while creativity involves open-ended, exploratory and original thinking. In contrast sharing of motivation and team building did not improve any of the dependent variables. In shared leadership, group members may not need to explicitly enact these psycho-social roles, rather they may emerge as members contribute to the evolving group climate.

If confirmed in future studies, the present findings suggest researchers should not only distinguish shared and hierarchical leadership more clearly, but should also separate sharing of leadership from sharing of specific roles or behaviours associated with it. Further, they should separate these roles, perhaps into task-focused and relationship-focused categories (Fielder 1964), and consider the relevance of each to different work contexts. This points to a general need for shared leadership researchers to better conceptualise its differences from hierarchical leadership. The proposition that shared leadership differs in being not only distributed but emergent (rather than fixed over time) and informal (rather than formal) is a starting point, but

there is also room be more specific about what forms of interpersonal influence are shared, and their context-sensitivity.

Another theoretical implication of this study concerns the possibility that different group members specialize in different aspects of leadership. The evidence here is limited by the relatively high levels of sharing, but future studies could examine this possibility in more hierarchical groups. Specialisation cannot be detected by aggregated measures of leadership, and SNA data need to be plotted as sociograms to reveal it. Mehra et al. (2006) used sociograms to study shared leadership, but did not compare different networks in a single group. Sociograms could also show whether different members take leadership roles, or change such roles, over time, revealing the emergent nature of shared leadership.

A final implication is that defining shared leadership in contrast to hierarchical leadership appears to be theoretically justified, since it is possible to measure defining properties of both 'ideal types' and place groups on a continuum between them. This approach appears to uphold theoretical predictions from the literature relating shared leadership to creativity, as further discussed below.

6.3   Methodological Implications

The Use of SNA Measures

This study provides several lessons for future attempts to measure shared leadership. First, although their relationship has been misunderstood, the SNA indices do capture both the pattern and degree of sharing in a group where aggregated measures describe only degree (Mayo et al. 2003; Gockel & Werth, 2010; Small & Rentsch, 2010). SNA measures are easy to administer, and allow more sophisticated visual

analysis through sociograms showing, for example, specialization in different facets of leadership or changes in leadership over time.

However, since centrality and density are each partial indicators of the assumed continuum between shared and hierarchical leadership, their joint use involves decisions by the researcher. Mayo et al.'s (2003) framework is often cited as a guide, but needs the revisions shown in Table 2.2. Researchers using their dichotomization approach also have to justify a cutoff between shared and hierarchical. In practice this may involve a tradeoff between group size and the theoretical aptness of the boundary, whether scale midpoint, mean or median (see 5.7). Such choices are to some extent arbitrary, and may need to take into account both the range of centrality and density scores in a sample and their expected range in the population a researcher wishes to generalize to. As well, dichotomization may consign some groups to a third category of 'low leadership', which is not allied to either end of the shared-hierarchical continuum. Further refinement of the practicalities of the dichotomization approach is desirable.

These and other difficulties point to the advantages of correlating centrality and density with dependent variables. Researchers should expect an inverse relationship between centrality and density if the sample groups tend to fall on a continuum between shared and hierarchical. In this study, this condition was met for all six 'networks' studied. However, groups falling into a third 'low leadership' category will tend to confound these correlations and their presence should be investigated. The mathematical relationship between centrality and density shown in Figure 5.1 should inform users of this approach to measuring shared vs. hierarchical leadership.

The correlational approach appears to be effective since the measures of *leadership* centrality and density showed the expected inverse relationships with the three dependent variables (albeit at marginal p values). In eleven of the fifteen hypothesis tests of *leadership functions*, centrality and density were negatively related to each other and either both significant (or close to it) or both clearly insignificant. The other four showed a near-significant result for density and a clearly insignificant one for centrality. This asymmetrical result requires further investigation as it raises the possibility that sharing is more important than hierarchy for some leadership functions, questioning the applicability of the 'continuum' model to these.

In general, however, the use of both SNA measures appears to advance research on shared leadership by more precisely distinguishing it from hierarchical leadership. Further investigation of how these measures relate in different samples, and of the other issues identified above, may help refine this approach.

Group Size in Shared Leadership Research

Future researchers should consider the effect of group size on study outcomes. Shared leadership has been studied in groups with anywhere from 4 to 40 members, but it seems unlikely to be qualitatively similar at the ends of this range. Above a certain size, members may be unable to share adequately, and in very small groups the lack of diversity or spare capacity may limit the value of leadership sharing. Future researchers might draw on small group studies to identify boundaries, and should consider size when comparing studies. Group size should be routinely related to dependent variables controlled and for in hypothesis tests where it may be a confounding variable.

Assessing Creativity of Work Products

Amabile's Consensual Assessment Technique was found to be a useful method for reducing subjectivity in assessing the creativity of work products. The judges showed good inter-rater reliability and their ratings met theoretical expectations in important areas. However, their ratings did not correlate with students' self-ratings of movie quality. Self-ratings of performance are widely used in leadership research, but there is little direct study of their accuracy despite acknowledgement of the wide range of biases that can enter into them (e.g., Podsakoff et al., 2003). It is also possible that the both sets of ratings are reasonably accurate but reflect different criteria in use by experts and students, which suggests a more complex approach to assessing creative products might be needed. The observed discrepancy suggests an important topic for future creativity research.

The Timeframe of Group Development

Many shared leadership studies use student groups, some recently formed (e.g. Leana, 1986; Lee et al., 2011; Sutanto et al., 2011), and others use work groups whose history is unknown. The group formation literature shows groups go through stages of psycho-social integration, and recently-created groups may therefore not provide a good test of shared leadership. The groups here worked together for three months and appeared to be well-integrated in the latter part of this period. However, whether sharing was fully developed even then is unknown. Since shared leadership can change according to situational demands which may change over time, the concept of 'fully developed' is itself limited. Future research should put more emphasis on longitudinal assessment of the pattern of leadership sharing. SNA measures and sociograms are valuable tools for this.

6.5 Implications for Management

Hierarchical leadership continues to be the predominant model in the business world despite decades of investigation into shared leadership and related practices such as self-managed work groups and participative management. The present results, although requiring confirmation in workplace settings, add to the evidence that shared leadership has benefits of value to managers and does not necessarily lead to dysfunctions such as groupthink, social loafing, poor communication, conflict or loss of task focus and professionalism. In particular, shared leadership in small groups appears to lead to greater creativity, a valuable asset in a changing, highly competitive and pressured business environment.

This study offers several lessons for managers interested in trying shared leadership. First, developing it was not difficult. Most of the study groups preferred highly shared arrangements, and none sought a single leader. Sharing seemed to evolve naturally amongst groups with considerable diversity in culture, work experience and motivation: the lecturer did not need to exert 'managerial' authority to create good group processes and outcomes. This may be an important advantage in workplaces, particularly where creativity and innovation are important. However, managers also need to consider managerial values, cultural expectations and the diversity of employees, which can act against acceptance of sharing if not appropriately managed. Communication, education and role-modeling are amongst the ways of creating acceptance for a practice that can strongly challenge long-held beliefs about management and leadership.

Second, this study suggests shared leadership groups do not gain creativity at the expense of task focus or professionalism, which may allay managers' concerns that unconstrained group dynamics will lead to outcomes such as social loafing, conflict or loss of direction that act against business outcomes. Concerns about the negatives of shared leadership should also be weighed against the disadvantages of hierarchical group dynamics identified in Chapter 2, including dependence, groupthink, production blocking, evaluation apprehension social loafing and cognitive interference.

Shared leadership also has potential negatives, but in many contexts these may be outweighed by the benefits of individual autonomy, participation in decision-making, mutual support and a positive group climate. These variables are particularly helpful to creativity, but may improve work outcomes in many other areas where group members need to solve complex problems, including many aspects of professional work. Such benefits are consistent with many basic theories of motivation and psychological functioning that have been applied to workplaces. For example, Social Determination Theory (Deci & Ryan 1985) relates individual achievement to intrinsic motivations for competence, autonomy, and psychological relatedness. Shared leadership improves autonomy and relatedness, and encourages greater use of group members' competence. It can therefore raise the level of employees' achievements.

Managers considering shared leadership should also recognize its limits. Contingency and situational theories of hierarchical leadership suggest group members' maturity, skills and willingness to cooperate (Fiedler 1964; Hersey & Blanchard, 1977) must fit the leadership approach. The university student groups

studied in many shared leadership studies appear to have appropriate levels of these, but some workplace contexts may not be conducive to leadership sharing. Employees must be willing to accept that responsibility for group outcomes lies with the group and that they have limited ability to change that. They must be believe they have the skills to motivate each other, create collaboration and resolve conflicts, set and manage the group towards goals, address poor performance and perform other relevant functions of leaders and managers. Junior or inexperienced staff, those with different cultural backgrounds, and some personality types may be less suited to shared leadership. Therefore it is important managers implement shared leadership in groups where members have appropriate characteristics.

A fifth advantage is that shared leadership allows group members to *develop* leadership competence, since each can practice relevant skills. This could raise the overall level of leadership in the group and also prepare members for leadership roles in future positions. Although longitudinal measures were not used in this study informal observation suggested group members significantly developed their leadership skills over the three months of the study. Managers may find shared leadership a valuable adjunct to other forms of leadership development.

Finally, shared leadership may be less relevant in some organisational contexts. Sharing can only work if members accept it, and it must be supported by the organisation generally, even if employed only in some areas. Of course, organisational managers must be prepared to relinquish a degree of control to the group, and may need to consider how reward and management systems deal with the

group rather than individuals. Corporate cultures must therefore be amenable to shared leadership.

The type of work may also offer constraints. For example, where rapid results are required or the task may change suddenly, sharing may be too slow. If a single leader is needed to represent the group to other internal of external stakeholders on a regular basis, this may constrain the degree of sharing.

Although shared leadership, like all management practices, must fit the group and the context, it is likely most managers interested in improving creativity will be primarily concerned with "letting go of control". Much research shows shared leadership can work in the right context, where it offers many benefits including greater creativity.

6.6   Conclusion

This study provides evidence that sharing leadership amongst group members improves the creativity of group outcomes in a creative task, along with their task focus and professionalism. While further studies are needed to confirm and extend the findings, they should encourage researchers and managers to further examine the benefits of shared leadership. Creativity may be one of its most important benefits in today's rapidly changing and competitive business environment.

This study used a new method for measuring of shared leadership with SNA measures of centrality and density. Investigation of the relationship between these indices lead to a revised conceptual model of how they jointly reflect the shared-hierarchical leadership distinction, and identified a number of issues future

researchers seeking to use both indices should consider. Although other authors have called for the use of both measures, in practice this is not as straightforward as it appears. However, the empirical findings suggest this approach offers a valuable methodological improvement to shared leadership research, and supports the common assumption that shared and hierarchical leadership can be conceptualized as endpoints of a continuum. Correlation or regression tests of research hypotheses appear preferable to dividing groups into discrete shared or hierarchical categories. Given the significant limitations of current approaches, the present findings should improve future researchers' capacity to rigorously test the many hypothesized benefits of shared leadership.

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Appendix A

LEADERSHIP III FILM-MAKING PROJECT SURVEY

Note: This survey will have no influence on your final grade for the unit.

Name: _____

Student Number: _____

Date: _____

1. Is English your first language?   Yes   No

2. Are you a fluent English speaker?   Yes   No

3. Have you ever taken a film-making course or participated in training sessions on film making?   Yes   No

In the following questions consider the team members with whom you have been working on the Leadership Film-Making Project. Write the first name of each other student in the space, then circle the response that is closest to your opinion:

    1 = Strongly Disagree   2 = Disagree   3 = Neither Agree nor Disagree

    4 = Agree   5 = Strongly Agree

4. To what degree does your team rely on each member for leadership?

Name	Demonstrated Leadership Behaviour				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

5. How much does this person clarify your team's missions and goals?

Name	Setting and Explaining the Team's Aims				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

6. To what degree does your colleague motivate you to perform well in the project?

Name	Motivating You				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

7. To what degree does your colleague help you to contribute to the project?

Name	Helping You to Contribute to the Project				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

8. To what degree does your colleague help to build team agreement?

Name	Helping to Build Team Agreement				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

9. To what degree does your colleague give you with constructive feedback?

Name	Giving Constructive Feedback				
	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
Student 1…………………………	1	2	3	4	5
Student 2…………………………	1	2	3	4	5
Student 3…………………………	1	2	3	4	5
Student 4…………………………	1	2	3	4	5
Student 5…………………………	1	2	3	4	5

In the questions below, circle the response that is closest to your opinion.

		Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
10.	My team was well-organised.	1	2	3	4	5
11.	My team produced a high-quality movie.	1	2	3	4	5
12.	My team worked effectively together.	1	2	3	4	5
13.	My team made a creative movie.	1	2	3	4	5

Appendix B

Group Size, Centrality and Density Scores for Sample Groups

		Leadership		Goal		Motivation		Develop		Team Bldg		Construct	
	n	C	D	C	D	C	D	C	D	C	D	C	D
Alpha	6	0.04	0.97	0.36	0.70	0.08	0.93	0.00	1.00	0.00	1.00	0.28	0.77
Anvil	3	0.33	0.75	0.22	0.83	0.44	0.67	0.22	0.83	0.44	0.67	0.67	0.50
Bolero	5	0.13	0.90	0.50	0.60	0.44	0.65	0.50	0.60	0.19	0.60	0.13	0.90
Bravo	4	0.33	0.75	0.22	0.83	0.11	0.92	0.22	0.83	0.22	0.83	0.11	0.92
Causeway	4	0.44	0.67	0.44	0.67	0.33	0.75	0.33	0.75	0.44	0.67	0.22	0.83
Charlie	5	0.44	0.33	0.33	0.42	0.22	0.50	0.33	0.42	0.11	0.92	0.22	0.17
Delta	4	0.22	0.83	0.22	0.83	0.11	0.92	0.11	0.92	0.22	0.83	0.22	0.83
Dishpan	4	0.22	0.50	0.33	0.75	0.33	0.75	0.00	1.00	0.33	0.75	0.00	1.00
Echo	4	0.31	0.50	0.56	0.55	0.44	0.40	0.38	0.70	0.31	0.75	0.25	0.55
Eskimo	4	0.11	0.58	0.44	0.67	0.11	0.58	0.56	0.58	0.22	0.50	0.44	0.33
Feline	5	0.38	0.70	0.19	0.85	0.13	0.40	0.19	0.85	0.06	0.70	0.25	0.55
Foxtrot	3	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Golf	4	0.36	0.50	0.32	0.73	0.28	0.77	0.20	0.83	0.24	0.80	0.20	0.63
Gymnast	5	0.13	0.40	0.38	0.45	0.19	0.35	0.50	0.35	0.44	0.40	0.31	0.50
Hotel	4	0.31	0.75	0.31	0.50	0.19	0.85	0.25	0.80	0.38	0.70	0.19	0.85
India	5	0.56	0.58	0.56	0.58	0.22	0.50	0.33	0.42	0.11	0.25	0.44	0.33
Juliet	4	0.06	0.95	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Kilo	5	0.56	0.55	0.63	0.50	0.56	0.30	0.63	0.50	0.38	0.70	0.75	0.40
Longbow	5	0.11	0.58	0.11	0.92	0.33	0.75	0.11	0.92	0.33	0.75	0.33	0.75
Mike	4	0.31	0.75	0.44	0.65	0.38	0.45	0.19	0.85	0.50	0.60	0.25	0.80

Moonbeam	4	0.00	0.50	0.00	1.00	0.00	1.00	0.75	0.50	0.00	1.00	0.00	1.00
November	3	0.19	0.85	0.19	0.85	0.19	0.85	0.19	0.60	0.19	0.85	0.31	0.75
Oscar	5	0.11	0.92	0.22	0.83	0.33	0.75	0.33	0.75	0.22	0.83	0.22	0.83
Quebec	4	0.00	1.00	0.22	0.83	0.11	0.92	0.00	1.00	0.00	1.00	0.00	1.00
Scallywag	5	0.25	0.80	0.06	0.70	0.06	0.95	0.38	0.70	0.38	0.70	0.00	1.00
Sierra	3	0.75	0.50	0.00	1.00	0.25	0.83	0.75	0.50	0.00	1.00	0.25	0.83
Tango	5	0.22	0.83	0.33	0.75	0.11	0.58	0.44	0.67	0.22	0.83	0.22	0.83
Uniform	6	0.50	0.67	0.50	0.67	1.00	0.33	0.25	0.83	0.50	0.67	0.25	0.83
Whiskey	5	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.25	0.83	0.00	1.00
X-Ray	5	0.19	0.85	0.13	0.90	0.19	0.85	0.31	0.75	0.00	1.00	0.13	0.90
Zulu	4	0.63	0.50	0.25	0.80	0.25	0.80	0.25	0.55	0.44	0.65	0.25	0.80