

Shared Leadership: Exploring Measurement and Behavioural Optimisation

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Shared Leadership: Exploring Measurement and Behavioural Optimisation

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Bachelor of Psychology (Honours Class I)

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Abstract

Despite the proliferation of research investigating shared leadership practices over the last two decades, there remains little consensus on the appropriate methods to conceptualise and measure these shared influence behaviours. This lack of consistency hinders both the advancement of robust theory regarding the benefits of adopting more shared leadership team dynamics, but also prevents the development of interventions or training designed to enhance specific shared leadership behaviours which result in subsequent organisational and team effectiveness. To this end, the current thesis seeks to identify the specific behaviours which underlie these shared leadership processes.

Initial chapters highlight the problems with historical “command-and-control” leadership practices, whilst demonstrating the growing demand for more shared leadership practices within modern organisations (Chapter 1). Following this, an in-depth review of the historical perspectives regarding effective leadership is conducted (Chapter 2). Despite (some) early attempts to investigate the potential for sharing leadership influence, or research which posited the benefits of adopting a more shared approach to team leadership; this review found limited empirical evidence examining such processes. Following this, the scientific literature focused on *shared leadership* was reviewed (Chapter 3). Exploring contemporary research demonstrated that shared leadership theory could be delineated based on the measures, methods, and conceptualisations used to define the shared leadership construct. These differing approaches included theory drawing on previously researched leadership theory (the *traditional perspective*), theory which used social-network methods to measure shared leadership (the *network-relational perspective*), and theory that adopted a team level problem focused approach to defining shared leadership (the *functionalist perspective*). Despite these competing perspectives, there remained

limited evidence to suggest which of these ‘best captured’ these shared leadership behaviours. Additionally, it was found the literature was characterised by what Kozlowski et al. (2016) termed “idiosyncratic microtheories”, with minimal research building on previous theory to generate insights regarding these important team influence processes.

To ameliorate this gap, an initial study was conducted to test 11 previously validated shared leadership scales to determine which of these best captures these shared influence processes (based on model fit and strength of association with team effectiveness; Study 1). Findings presented in Study 1 were largely inconclusive, with no single measure demonstrating a clear advantage over any other (with the exception of measures drawn from a network-relational perspective which were found to be unsatisfactory). The inadequacy of network-relational measures of shared leadership was surprising given previous meta-analysis had suggested these measures exhibited the strongest relationship to beneficial team outcomes (D’Innocenzo et al., 2016; Nicolaides et al., 2014). These unexpected results were further investigated (Study 2). Study 2 presented an in-depth analysis of different social-network measures of shared leadership and their associations to important team benefits such as team effectiveness, employee engagement, and team adaptivity. Although some significant relationships were observed the effect sizes were found to be small. These limited effects combined with weak associations to the other included measures of shared leadership inferred that these measures were not accurately assessing shared leadership. A series of follow-up post-hoc analyses were conducted to explore these findings, it was tentatively proposed that these social-network measures of shared leadership were assessing a construct of ‘shared leadership visibility’, with recommendations made for future research explore this hypothesis.

Collectively, these measurement analyses (i.e., Study 1 and Study 2) failed to conclusively demonstrate a preferable measure to assess the shared leadership construct. Therefore, it was posited a more parsimonious scale could be developed (Study 3). Utilising 153 items from the 10 measures of shared leadership examined in Study 1 (note that the social network of shared leadership was not included in subsequent analysis), machine learning techniques were employed to identify the six shared leadership behaviours which were most strongly related to perceptions of team effectiveness. These six items were aggregated to form the Shared Leadership Behavioural Scale (SLB-6)

Following the development of the SLB-6, follow-up analyses were performed to validate the psychometric properties on two independent samples (Study 4). In addition to examining the validity of the SLB-6, the relationships exhibited between these shared leadership behaviours and related motivational (i.e., employee engagement) and team effectiveness outcomes (i.e., team potency) was demonstrated. It was found that the SLB-6 provided an excellent goodness-of-fit to the data collected, and was recommended for use in future works to assess shared leadership behaviours (especially when assessing outcomes of team effectiveness). This thesis concludes with a general discussion of these collective findings, including the limitations, and avenues for future advancements in this field (Chapter 9).

Keywords: Shared leadership; distributed leadership; team effectiveness; leadership measurement; scale development; SEM.

Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

(Signed) _____ (Date) 27/08/2022

Jason Spedding

Acknowledgement of Papers included in this Thesis

Section 9.1 of the Griffith University Code for the Responsible Conduct of Research (“Criteria for Authorship”), in accordance with Section 5 of the Australian Code for the Responsible Conduct of Research, states:

To be named as an author, a researcher must have made a substantial scholarly contribution to the creative or scholarly work that constitutes the research output, and be able to take public responsibility for at least that part of the work they contributed. Attribution of authorship depends to some extent on the discipline and publisher policies, but in all cases, authorship must be based on substantial contributions in a combination of one or more of:

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- drafting or making significant parts of the creative or scholarly work or critically revising it so as to contribute significantly to the final output.

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- Appoint one author to be the executive author to record authorship and manage correspondence about the work with the publisher and other interested parties.
- Acknowledge all those who have contributed to the research, facilities or materials but who do not qualify as authors, such as research assistants, technical staff, and advisors on cultural or community knowledge. Obtain written consent to name individuals.

Included in this thesis is a paper in *Chapter 4* which is co-authored with other researchers. My contribution to each co-authored paper is outlined at the front of the relevant chapter. The publication status for these papers including all authors, are:

Currently under review (following major revisions):

Spedding, J., Brough, P., Hawkes, A. J., & Chan, X. W. (under review). The effective measurement of shared leadership: A multi-scale comparison. *Leadership & Organization Development Journal*.

Appropriate acknowledgements of those who contributed to the research but did not qualify as authors are included in each paper.

(Signed) _____ (Date) 27/08/2022

Jason Spedding

(Countersigned) _____ (Date) 31/8/2022

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Chapter 1: The Changing Nature of Work

This chapter introduces the topic of the changing nature of work being conducted in modern organisations, especially in relation to the growing importance of team coordination and team leadership processes. An overview of the whole thesis is presented at the end of this chapter.

Rapid advances in workplace automation have resulted in a reduced need for human labour targeting simple repetitive tasks, and an increased demand for skills related to creativity, persuasion, relationship management, team coordination, and problem-solving capabilities (Autor, 2015). These changing organisational needs are widely known, with 92% of employees surveyed advocating for the redesign of organisational structures (Deloitte, 2016), whilst 50% of respondents observed an increase in the amount of time they dedicated to team coordination processes (i.e., project meetings, responding to co-worker inquiries, or providing critical input on projects; Cross et al., 2016). These trends are expected to accelerate over time (Hawksworth et al., 2018; Taylor et al., 2019). Given these changes, organisations are moving away from rigid formal hierarchal leadership structures to embrace more agile forms of team coordination, including *shared leadership* (Pearce & Conger, 2003). This concept of shared leadership is the focus of this thesis, and will be explored in the context of both an increased demand for effective team coordination and a reduction in the need for human labour to complete formulaic repetitive tasks. Presented here, the changing technological and workforce characteristics which drive demand for increased use of shared leadership processes are examined, followed by an outline of the research conducted to explore the behaviours which underlie these shared leadership processes (Table 1.1).

The realities of technological innovation accompanied by advances in industrial processes and global interconnectivity have resulted in a labour market which is qualitatively different from that experienced mere decades ago (Gekara et al., 2019; Heath, 2016). Key metrics of this shift include the removal of 6.3 million manufacturing positions in the United States (a 36% reduction) in the two decades prior to 2010 (Bacchetta & Jansen, 2011); the continued specialisation of skilled work and demand for employee upskilling (World Bank, 2019); an increased demand for innovation (Brynjolfsson & McAfee, 2014; Grant & Ashford, 2008; Ringel et al., 2020); the casualisation of the workforce, including the rise of the gig economy (Brown et al., 2017; Hawksworth et al., 2018; Lass & Wooden, 2019; World Economic Forum, 2016); and, an increase in the application of workplace automation and artificial intelligence (Brown et al., 2017; Hawksworth et al., 2018; Taylor et al., 2019). These shifting workplace characteristics represent both threats and opportunities for existing organisations. Indeed, the first decades of the 21st century have demonstrated that organisations which effectively integrate emergent technologies and processes into existing workplace systems can gain considerable advantage over their competitors, whilst business models (or entire industries) which fail to adapt to these changes risk becoming obsolescent (Andriole, 2020).

What differentiates the current observed workforce changes is the ubiquity and scale of the potential disruption (Hawksworth et al., 2018). Previous automation of manufacturing targeted front-line assembly and low-skill labour pools, this increased demand for middle tier technical roles, as more human labour was required to supervise and maintain these industrial processes (Autor, 2015; Brown et al., 2017). The current digital revolution differs from previous workforce pressures as these changes can potentially affect all levels within organisational entities. Forecasting the implementation of automation processes over the coming decades is

difficult, however predictions highlight that initial advances will likely target simple repeatable computational tasks, followed by systems to augment human capabilities, and finally the total automation of physical labour (Hawksworth et al., 2018). Australian workforce forecasts predict that by 2030 (compared to 2016) physical/manual labour roles will decline by 11%, and basic cognitive roles will decrease by 2%, whilst demand will increase for roles requiring higher cognitive reasoning (18%), social and emotional intelligence (43%), and roles needing technological proficiency (33%; Taylor et al., 2019). Overall, these trends suggest a continuous increase in the complexity of work roles occupied by human employees as simplistic repetitive tasks are eliminated (Pikos & Thomsen, 2016).

Modern organisations have not been stagnant in response to these pressures. Where feasible, contemporary workplaces have generally adapted to these changing conditions through developing more flexible organisational structures, achieving this through flatter hierarchies and encouraging more employee teamwork and collaboration (Chrobot-Mason et al., 2016; Drescher & Garbers, 2016; Mathieu et al., 2019). Meta-analyses have highlighted that organisations which maintain traditional hierarchal systems suffer from both reduced employee satisfaction and inferior performance (Greer et al., 2018). New organisational designs built around flexible teams have been shown to improve the flow of information and increase access to technical expertise (Mathieu et al., 2019). These trends were also highlighted by Driskell and colleagues, “teams are viewed as the central building blocks to accomplish tasks in a wide variety of applied contexts” (2018, p. 334). Surveying staff across the globe, researchers found 92% of respondents agreed adopting these redesigned organisational processes was important (Deloitte, 2016), whilst Cross et al. (2016) reported a 50% increase in the amount of time dedicated to team-based collaboration processes. Work teams maintain a considerable advantage in these organisational

environments, as highlighted by Stagl and colleagues (2006), “[teams] have a deeper reservoir of social capital, capacities, competencies, experiences, and networks to draw upon” (p. 117). In their sample, Martin and Bal (2006) demonstrated that 91% of managers agreed that occupational teams were central to organisational success. Teams offer many advantages as they enable organisations to effectively align employee skills and knowledge to unique task demands (Mathieu et al., 2019). To remain competitive in a globalised environment, organisations are becoming increasingly reliant on teams to integrate novel information and operate in complex work environments (Wang et al., 2014; Zaccaro et al., 2001).

Katz and Kahn (1978) argued that fundamentally, the purpose of an organisation lies in its ability to coordinate, synchronise, and integrate the contributions of numerous individual members into a coherent collective process. Indeed, when reviewing the published literature investigating team coordination processes, Mathieu and colleagues (2018) found team research was growing exponentially. Previous models of organisational coordination which were effective under traditional organisational paradigms (i.e., linear hierarchical leadership and static bureaucracy) may be insufficient to meet organisational needs given these expanding occupational complexities (Mathieu et al., 2019; Wang et al., 2014). Within modern workplaces, it is increasingly difficult for any one individual (i.e., the formal leader) to maintain sufficient expertise and influence to facilitate optimal achievement of complex team goals (Neck et al., 2006). As outlined by Pearce and Manz (2005), “it is ever more difficult for any leader from above to have all of the knowledge, skills and abilities necessary to lead all aspects of knowledge work” (p. 132). Polling employees and executives across 27 countries found only 44% of those surveyed agreed that the current leadership at their company would likely lead to organisational success (Oxford Economics, 2014). These issues have led leadership scholars to explore more

complex and collective expressions of these leadership processes; it is one such concept defined as *shared leadership* (Pearce & Conger, 2003) that is the focus of this thesis. Following Pearce and Conger's (2003) definition, shared leadership is “a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both” (p. 1). Rather than focusing on the role of the one formal leader, shared leadership theorists are interested in the behaviours exhibited by multiple team members which influence the attainment of team and organisational goals.

To advance knowledge of these shared leadership processes, the research presented in this thesis aims to identify the specific shared leadership behaviours which are related to team members perceptions of team effectiveness. This thesis begins with an exploration of the theoretical underpinnings of these shared leadership processes, initially drawing on historical perspectives of leadership (Chapter 2), followed by an in-depth exploration of contemporary shared leadership theory (Chapter 3). Following this, a comparison of existing measures and conceptualisations of shared leadership processes is presented (Chapter 4, 5, and 6). Finding these existing measures unsatisfying, machine learning processes will be employed to identify the team member behaviours most strongly related to team effectiveness (Chapter 7). Based on this, a measure of shared leadership is developed and validated across independent samples, including an exploration of the specific influence behaviours exhibited by team members, and the mediating processes which influence employee motivational and team effectiveness outcomes (Chapter 8). Table 1.1 summaries the thesis structure and highlights some of the key findings from each chapter.

Table 1.1*Thesis Structure and Chapter Summary*

Chapter	Title	Summary
Chapter 2	Historical approaches to leadership (p. 23)	<p>Summary: This chapter briefly demonstrates the historical approaches to theory regarding leadership practices. Highlighting both the competing conceptualisations of formal leadership processes and the evolution of theory over the last century.</p> <p>Findings: The vast majority of leadership research has ignored the potential of leadership as a process that can emerge from within teams.</p>
Chapter 3	Historical and modern approaches to shared leadership (p. 36)	<p>Summary: Chapter 3 examines the history of shared leadership. This includes early works arguing for the potential of leadership influence to emerge from within groups and modern works attempting to define or measure these processes.</p> <p>Findings: The conceptualisations of shared leadership can be categorised based on their theoretical underpinning (i.e., traditional approaches, social network approaches, and functionalist approaches). Despite two decades of research investigating shared leadership, there is little consensus regarding how to best conceptualise these team actions, or which specific behaviours should be encouraged to achieve the various (i.e., individual, team, and organisational) benefits implied by previous shared leadership research.</p>
Chapter 4 (Study 1 currently under review in <i>Leadership & Organization Development</i>)	The effective measurement of shared leadership: a multi-scale comparison (p. 65)	<p>Summary: This journal article (currently under review) empirically examines measures of shared leadership drawn from the competing perspectives examined in Chapter 3 (i.e., traditional, the social network, and the functionalist approaches). These 11 scales are empirically examined to determine which measurement is most effective (based on model-fit indices, and the strength of their relationship to team effectiveness outcomes [i.e., variance explained in team potency]).</p> <p>Findings: Across these 11 measures, few distinctions were observed. Generally, shared leadership measures which were highly predictive of team effectiveness (based on variance explained) exhibited a mediocre fit to the data (based on model-fit statistics). Inspection of measurement subscales, however, demonstrated that shared transformational leadership behaviours were most strongly related to team effectiveness outcomes. Surprisingly, the social network measure produced the weakest relationship to team effectiveness, despite previous works demonstrating this measure exhibits the strongest relationship.</p>

Table 1.1 (Continued)

Chapter	Title	Summary
Chapter 5	Social network approaches to shared leadership (p. 95)	<p>Summary: This theory chapter focuses on the use of social network measures, both in shared leadership research and more broadly in organisational sciences. Here the different methods employed by social network researchers to describe organisational networks are examined (i.e., metrics of network centrality and network density). Results from research adopting these methods to explore the effects of shared leadership is then compared to findings from research adopting a traditional and functionalist approach (collectively referred to as the aggregate approach).</p> <p>Findings: It is posited that shared leadership researchers utilising social networked measurement methods are capturing different processes compared to others who used an aggregate approach.</p>
Chapter 6 (Study 2)	Exploring social-networked measures of shared leadership (p. 113)	<p>Summary: This exploratory reanalysis of Study 1 seeks to understand the weak relationship observed between social network measures of shared leadership and team effectiveness outcomes (i.e., findings from Chapter 4). Contrary to the current findings, previous meta-analyses have demonstrated these methods to exhibit superior effect sizes (compared to aggregate measures; D’Innocenzo et al., 2016; Nicolaides et al., 2014). Therefore, a series of analyses are performed to examine and explain the weak relationship observed between social network measures of shared leadership and team potency observed previously (Chapter 4).</p> <p>Findings: Despite multiple analyses, these results do not conclusively explain the weak effects observed for social network measures of shared leadership identified in Chapter 4. Neither the specific social network measure employed (i.e., network density or network centrality) nor the potential moderating effects of team context (i.e., team size, team tenure, or team interdependence) explained these divergent findings. However, a comparison of item-level correlations (between various social network coefficients and other aggregate shared leadership items) tentatively suggests that social networked measures of shared leadership are capturing “leadership visibility”, rather than any particular leadership behaviour.</p>

Table 1.1 (Continued)

Chapter	Title	Summary
Chapter 7 (Study 3 in preparation for submission)	Shared leadership: measurement and scale development (p. 146)	Summary: Due to the results presented in Study 1 (Chapter 4), it was hypothesised a more effective measure of shared leadership could be developed. Using data collected from three independent samples, this analysis employs machine learning methods to identify, select, and test the behavioural items collected from a range of shared leadership measures (Study 2). Following this, conventional scale development techniques and processes were utilised. Findings: Machine learning techniques were successful in developing a parsimonious (six items) and effective measure to capture the shared leadership behaviours (SLB-6) related to team effectiveness. This measure demonstrated an excellent fit to the data across multiple samples and displayed discriminate validity against related constructs (i.e., team potency, team interdependence, and formal transformational leadership).
Chapter 8 (Study 4)	Shared leadership nomological network: an exploration of antecedents and outcomes (p. 164)	Summary: Following traditional scale development processes, the nomological relationships between the new measure of shared leadership and related employee outcomes were tested (Study 3). Specifically, the ability of shared leadership to predict employee motivation (mediated via elements of self-determination theory), and its relationship to team effectiveness (including antecedents of organisational learning and formal transformational leadership) were tested. Findings: The new measure of shared leadership displayed a good fit to the data collected, and was shown to support employee motivational outcomes via its effects on employee autonomy and a sense of relatedness. Furthermore, both team learning climates and formal transformational leadership were shown to enhance perceptions of shared leadership behaviours, with these subsequently improving ratings of team effectiveness.
Chapter 9	General discussion and conclusion (p. 189)	Summary: This chapter seeks to discuss the collective findings and contributions of these studies and how these relate to the advancement of theory and practice concerning shared leadership processes. Here the advantages of the specific behaviours captured by the SLB-6 are examined, followed by a discussion of the utility of social network measures of shared leadership. Following this, the overall contributions and limitations of this research are described.

Chapter 2: Historical Approaches to Leadership

This chapter explores the key historical approaches adopted to scientifically examine organisational leadership practices and how these facilitate individual, team, and organisational outcomes. Despite some success in identifying behaviours, traits, and processes related to team effectiveness, early research largely focused on individuals occupying formal leadership positions within highly structured and rigid organisational hierarchies (Dansereau et al., 1975; Hollander, 1978). Little effort was spent investigating similar leadership influence processes observed between team members (i.e., shared leadership). Given the growing complexity of work completed by human employees and the rapid changes observed in modern organisational structures (discussed in Chapter 1; Autor, 2015), it is unclear if these legacy leadership processes remain “fit for purpose” to achieve individual, team, and/or organisational goals (Ensley et al., 2006; Pearce & Conger, 2003; Pearce & Sims, 2002). Before examining contemporary shared leadership theory (Chapter 3), the historical approaches adopted by organisational scholars to investigate leadership processes are presented. Specifically, this review will delineate between (1) theories that adopted a traditional unidirectional perspective of leadership processes, (2) theories which investigated leadership from a leader-follower relational perspective, and (3) theories which adopted a functional perspective to the study of leadership.

“Leadership is a universal aspect of human groups perhaps because group performance is facilitated by the exercise of organizational, directive, and motivational functions” (Levine & Moreland, 1990, p. 612). Leadership is the process of differential goal-directed interpersonal influence, with individuals in the leadership position wielding heightened control and social influence over subordinates (Gronn, 2002; Yukl, 2002). In organisations, leaders are commonly perceived as agents who enact change, or bring about positive organisational outcomes (Marion et al., 2016). The ability for shared leadership

influence to emerge between team members was first explored by Gibb (1954), who argued leadership may not be the product of a single individual but rather could be spread throughout multiple team members. Others highlighted that such influence processes should be guided by individual knowledge and expertise, rather than formal designated roles (Follett, 1924). Despite these early assertions, scientific theories of leadership during the 20th century adopted a hierarchal perspective, focusing on the individual residing in the formal leadership role.

Initial inquiry into formal leadership is often attributed to practices developed by the emerging railroad industry beginning in the 19th century. US rail operators aimed to enhance managerial control and oversight through the development of formal management practices. These were advanced by Daniel McCallum's principles that advocated for a "unity of command" whereby individuals should report to, and be held accountable by, only a single leader (McCallum, 1856, cited in Pearce & Manz, 2005). Other early pioneering works applied a production line mentality to leadership processes, treating employees as "human machines" in a larger industrial system, this scientific management movement assumed simplistic unidirectional leader influence processes (Taylor, 1911). Although leadership research has developed in sophistication since these early theories, the adoption of a leader-centric approach at the expense of shared leadership processes has remained pervasive within the literature.

Traditional Leadership Theory

Early leadership theory

Early scientific inquiry into the leadership construct maintained a focus on two aspects of the formal leader: their personal attributes (the trait approach), and their individual behaviours (the behavioural approach). The earliest of these theories was proposed by Galton (1869), who suggested leadership was a purely hereditary trait, passed down familial lines.

This “great man” theory of leadership persisted within the literature, with many of the early theorists attempting to identify and measure leader traits which would ensure effective leadership (Bowden, 1926; Jenkins, 1947; Mann, 1959). Despite some success in identifying leadership qualities (such as extraversion, assertiveness, and energy), these models failed to predict leadership emergence based on these characteristics (Stogdill, 1948).

Later research shifted attention from the identification of leadership traits to focus on the behaviours exhibited by effective leaders. For example, Lewin and colleagues (1939) distinguished between the effects of authoritarian, democratic, and laissez-faire leadership, and how these styles related to follower aggression. This behavioural approach to investigating leadership effectiveness was progressed with the introduction of two large-scale leadership studies from the Ohio State University and University of Michigan. These research projects identified an extensive list of (potential) effective leader behaviours; factor analysis showed these behaviours could be categorised along two dimensions of *initiating work structure* (production or task orientation) and *consideration for employees* (employee orientation; Fleishman, 1953; Katz & Kahn, 1952; Likert, 1961; Stogdill & Coons, 1957). Additional research from Harvard’s leadership laboratory suggested multiple leaders could fulfil these production-employee considerations (Bales, 1954), these processes were termed “co-leadership” and supported calls to shift the locus of leadership research from the individual to the collective (Bales, 1954). Despite these early findings, no further investigation of these collective leadership processes was conducted. Similar to earlier trait approaches, these behavioural approaches to leadership had some success, but ultimately two dimensions of leader behaviours regarding concern for employee and concern for tasks failed to consistently predict positive organisational outcomes (Uhl-Bien et al., 2014).

These initial static conceptualisations of leadership were challenged by theories which incorporated situational elements to explain the observed differences between leadership

traits, behaviours, and task outcomes (Korman, 1966). Fiedler and colleagues (1963) proposed that these relationships (between leader behaviours and task outcomes) may be contingent on specific occupational contexts. For example, within a military organisation (characterised by obedience and large power distance), a directive autocratic leadership style would likely result in more positive individual and group outcomes. However, these same leader behaviours exhibited within an occupational context requiring innovation or creative problem solving would likely stymie such beneficial outcomes (Fiedler et al., 1963; Korman, 1966). This research led to the construction of the contingency model of leadership, where positive organisational outcomes were contingent on a leader's personal style (i.e., trait and behavioural mechanisms) aligning with subordinate following styles and occupational context (situational variables; Fiedler, 1964; Fiedler et al., 1964). It was posited that an alignment between the leader's behavioural style and the situation (i.e., an autocratic leader in a military setting) would result in positive outcomes. Advances to this contingency approach incorporated additional intervening variables such as employee teamwork, individual motivation, and employee ability; again, the importance of these factors was argued to be dependent on the specific occupational context (Yukl, 1989). Although limited research demonstrated the utility of this contingency model (Fiedler, 1964; Fiedler et al., 1964; Korman, 1966), others failed to find support for this approach (Chemers, 1997). Despite contingency theory representing a paradigm shift towards a more integrated and robust leadership theory, non-leaders were still considered an adjunct situational process to be managed rather than a potential source of leadership influence (Carsten et al., 2014; Gronn, 2002).

The 1970's brought advances in leadership theory primarily by identifying the importance of team members in achieving organisational goals. Based on Vroom's (1965) expectancy theory, path-goal theory explicitly acknowledged the role of leadership in

generating and sustaining follower motivation (House, 1971, 1996). This theory suggests the aim of team leaders is to ensure the saliency of the occupational mechanisms (or paths) through which employees could work to achieve mutually desired organisational and personal goals. This theory was unique in that it explicitly acknowledged the aims of leadership in motivating followers to obtain organisational outcomes. Using path-goal theory, leaders would identify employee strengths and weaknesses, then use their formal position and influence to support follower strengths whilst mitigating weaknesses (House, 1996). Despite the rationality of path-goal leadership theory, empirical investigation yielded inconsistent and conflicting results (Schriesheim & Neider, 1996). Because of these inconsistencies, critics described this era of leadership research as the “doom and gloom period”, citing the disillusionment among scholars who claimed future leadership research was untenable (Hunt, 1999). Although path-goal theory conceptualised the benefits of a synergistic relationship between leaders and their followers, it failed to explore potential peer-to-peer influence processes such as shared leadership exhibited between team members to enhance the attainment of group and organisational goals.

Contemporary leadership theory

Contemporary leadership theory research emerged during the 1980's and early 1990's. These theoretical explanations of leadership combined previous transactional leader-follower processes with a focus on how leaders might transcend these exchange relationships through affective, emotional, and inspirational influence processes (Antonakis & House, 2013; Bass, 1985; Bass & Avolio, 1994). These neo-charismatic conceptualisations of leadership included authentic leadership (Gardner & Avolio, 2005), charismatic leadership (Shamir et al., 1993; Conger & Kanungo, 1998), ethical leadership (Brown et al., 2005), and the full range model of leadership (Bass, 1985; Bass & Avolio, 1994). Rather than focusing on the observable behaviours which result in team effectiveness, collectively these theories

aim to measure leader behaviours which invoke latent inspirational-motivational effects within followers. Of these leadership types, the most widely studied were the combination of transformational and transactional leadership processes which form the full-range model (Bass & Avolio, 1994).

The full-range model of leadership (Bass & Avolio, 1994) includes both transformational (i.e., inspirational and charismatic processes) and transactional components, which work in tandem to explain beneficial organisational outcomes. Transformational leadership was conceptualised as a series of affective-inspirational processes including the provision of idealised influence (through modelling positive work behaviours), inspirational motivation (via communication of meaning and shared vision), intellectual stimulation (by encouraging innovation and creativity), and individualised consideration (through mentoring and empowering followers; Bass, 1985; Bass & Avolio, 1994). Transactional leadership captures leader-follower exchange relationships, including components such as contingent reward (based on economic exchanges), and elements of non-leadership or delayed action such as management-by-exception (passive and active) and laissez-faire behaviours (or the absence of leadership; Bass & Avolio, 1994). Bennis and Nanus (1985) claimed these transformational practices assist the development of vision, commitment, and trust amongst followers, leading to heightened individual and organisational learning.

Transformational leadership processes have been related to numerous benefits such as increased task performance (Bass et al., 2003), more effort and organisational citizenship behaviours (Judge & Piccolo, 2004; Ng, 2017; Yammarino & Bass, 1990), higher satisfaction (Bono & Judge, 2003), and increased innovation (Ng, 2017). More recent meta-analyses demonstrated these processes benefit organisational performance through indirect effects which enhance employee's affect, identification with the organisation, occupational

motivation, social exchange processes, and an employee's sense of organisational justice (Ng, 2017).

Of the theoretical approaches assessing the positive influence leaders have on their followers, the full-range model has been the most widely investigated (Antonakis et al., 2014). Despite the success of this framework, social scientists have debated the universality of these transformational principles (Antonakis & House, 2013; Judge & Piccolo, 2004), whilst others have called for the abandonment of the full-range framework in favour of more precise and well-defined aspects of leadership (van Knippenberg & Sitkin, 2013). This focus on the formal leader's transformational processes was largely at the expense of more collective conceptualisations of leadership, this was despite calls for an exploration of how team members might also utilise similar behaviours to achieve team and organisational goals (Pearce & Conger, 2003; Uhl-Bien et al., 2014). Simultaneous to this traditional hierarchal leadership research, other leadership scholars adopted a relational approach to these same influence processes. That is, rather than focus on specific leader behaviours, relational theorists explored the quality relationships between formal leaders and their followers.

Relational Leadership Theory

Compared to traditional approaches to leadership, research investigating the explicit interactions between team members and leaders, and how these exchanges relate to valued organisational outcomes has only recently emerged. Specifically, research investigating *followership* aims to understand "the nature and impact of followers and following in the leadership process" (Uhl-Bien et al., 2014, p. 84). Like early trait theories of leadership, followership scholars attempted to delineate and categorise team members based on their observable individual traits (Kelley, 1988; Zaleznik & Kets de Vries, 1975). Researchers developed taxonomies of follower "types" which were posited to result in more favourable organisational outcomes. Examples include the exemplary follower (Kelley, 1988), the role-

shifting follower (Howell & Mendez, 2008), and the effective follower (Chaleff, 1997). These follower types are characterised by offering support in pursuit of the leader's vision, whilst being courageous in challenging the leader with unwanted information, or critical feedback (Chaleff, 1997; Uhl-Bien et al., 2014). Despite this investigation of non-leader aspects of the leadership process, early followership research largely echoed the trait approaches to leadership by emphasising team member characteristics which enhance or enable formal leadership processes. Criticising this approach, Rost (1995) commented that "there is no such thing as followership" (p. 133), as leadership was by, definition a relational social process with both leading and following components.

In addition to the investigation of follower traits, scholars also recognised that differences in the types and quality of relationships between leaders and followers could affect organisational outcomes. Historically, leadership research was conducted whilst maintaining two assumptions. First, that subordinates of a single leader exhibit relatively homogeneous behaviours and attitudes; and second, that leader behaviours remain congruent amongst different followers (Dansereau et al., 1975). Hollander (1978) challenged these assumptions and argued leadership research had focused on the position of leader, rather than the process of leadership which included the maintenance of numerous unique interpersonal relationships. This relational view of leadership instead focused on the *resource exchange processes* between leaders and followers at the dyadic level, and, over time, these interactions would result in increased influence, recognition, and legitimacy for the leader (Uhl-Bien et al., 2014).

Other relational approaches have focused on demonstrating that leader-follower relations are not uniform, but instead are dependent on the leader's perceptions of relationship quality (Dansereau et al., 1975). According to vertical dyad theory, leaders would conserve cognitive resources through implicitly categorising followers into positive in-

group and negative out-group dichotomies (Dansereau et al., 1975; Graen & Uhl-Bien, 1995). In-group followers could access additional benefits from the leader including support, trust, and autonomy; these would result in increased positive perceptions and further polarise this dichotomy (Dansereau et al., 1975). Subsequent research has de-emphasised the importance of these in-group/out-group effects, and instead has evaluated the quality of social exchanges within each individual dyadic relationship (Gerstner & Day, 1997). This field of inquiry has specifically focused on individual leader-member relationships, which came to be known as leader-member exchange theory (LMX; Graen & Uhl-Bien, 1995; Keller & Dansereau, 1995).

Leader-member exchange theory posited that leader-follower partnerships could be explained through a series of social exchanges within each dyad (Graen & Uhl-Bien, 1995; Keller & Dansereau, 1995). Accordingly, when leaders provide support to a team member, followers were expected to reciprocate (through performance, motivation, or loyalty; Gerstner & Day, 1997; Maslyn & Uhl-Bien, 2001). This exchange generates positive affect, resulting in more high-quality dyadic relationships (Graen & Uhl-Bien, 1995). High quality leader-member exchanges have been linked to greater employee satisfaction, trust, organisational citizenship behaviours, effectiveness, access to resources, more autonomy, better communication between leaders and followers (Gerstner & Day, 1997; Othman et al., 2010), and increased individual performance (Wayne & Liden, 1995). Failure to establish a high-quality reciprocal relationship results in unfavourable outcomes, such as an economic exchange or transactional leader-follower relationships (Gerstner & Day, 1997; Graen & Uhl-Bien, 1995).

Although high quality leader-member relationships have been linked to positive employee outcomes, some researchers have critiqued the assumption that these high-quality relationships always lead to positive organisational outcomes. For example, asymmetrical

leader-member relationships within a team can promote feelings of favouritism and inequality, leading to discordance among organisational members (Cialdini & Goldstein, 2004; Othman et al., 2010). Similar to the traditional leadership theories discussed above, leader-member exchange theory is strikingly leader-centric, as the formal leader is expected to drive the relationship processes through offers of high-quality relationships (Maslyn & Uhl-Bien, 2001; Uhl-Bien et al., 2000). Additionally, the specific processes that underlie these positive relationships have been debated, with Dienesch and Liden (1986) advocating for dimensions including perceived contributions, loyalty, and affective outcomes, whilst Graen and Uhl-Bien (1995) defined leader-member relationship quality via perceptions of respect, trust, and mutual obligations. Boies and Howell (2006) also criticised leader-member exchange theory for being overly focused on dyadic relationships whilst overlooking collective team processes. However, these collective relationships are especially important in highly interdependent work settings where inputs from multiple team members is required to achieve team outcomes (Kozlowski & Bell, 2001; Nicolaides et al., 2014).

Functional Leadership Theory

Contrasting traditional leadership theory and leader-follower relational leadership theory, functional leadership theory provides an additional lens through which scholars can understand effective leadership processes. Functional leadership is informed by socio-technical systems theory (Katz & Kahn, 1977) and posits that organisations are best understood as a series of overlapping interconnected social and operational systems, which enable the coordination and integration of collective action to achieve valued outputs (Katz & Kahn, 1977). Rather than focusing on traits or styles, functionalist leadership theory is centred on goal-orientated activities which support team effectiveness (Santos et al., 2015). McGrath summarised this theory as: “the functional approach to leadership is that the leader’s main job is to do, or get done, whatever is not being adequately handled for group

needs” (1984, p. 75). Functionalist theorists view leadership as a cognitive-social problem-solving process, which necessitates a variety of unique situational actions implemented to solve issues where multiple solution paths and viable options are present (Zaccaro et al., 2001).

Functionalist approaches differ from previous leadership theory in that they adopt a systems-based perspective (McGrath, 1984). Rather than identify specific effective leader behaviours, functional theorists attempt to understand the leadership functions which enable these problem-solving processes through which effectiveness is achieved (Fleishman et al., 1991). For example, McGrath (1984) posited that these processes could be identified via the dimensions of activity type (from team monitoring to action-taking), and a dimension of activity orientation (i.e., internal, external, or group-orientated). Similarly, Hackman and Walton (1986) proposed that leaders need to maintain certain conditions to enable team effectiveness (i.e., clear direction, supportive group structure and context, available expert coaching, and access to material resources). Whilst others framed leadership through the functions leaders could use to enhance team effectiveness (e.g., information searching and structuring, providing information used to solve problems, managing personnel resources, and managing material resources; Fleishman et al., 1991). In addition to this focus on leadership functions, functional perspectives tend to minimise the effects of individual leader-member interactions and instead focus on wider leader-team exchange processes (Zaccaro et al., 2009). Overtime, this team-centric focus has led functionalist theories to increasingly utilise the more descriptive title of “team leadership theory”. Kozlowski and colleagues (2016) acknowledged this, claiming that “rather than a singular theory, it is represented by a variety of taxonomies intended to identify core team leadership functions and a handful of theories that endeavour to capture how different functions are contingent on a team’s developmental sequence and/or cycles of task engagement” (p. 36).

Owing to this focus on organisational systems, leadership theory derived from a functionalist perspective often exhibits a greater consideration for the effects of specific team temporal processes. In their review for example, Morgeson and colleagues (2010) identified the key functions leaders perform to enhance team effectiveness during each phase of team workflow. For example, during *team transitions phases*, leaders can alter team composition, define their mission, goals, and expectations, train staff, or provide developmental feedback. These are compared with *action phase* leadership functions, which include performance monitoring, managing boundaries, problem-solving, providing resources, and maintaining supportive team climates (Morgeson et al., 2010). Hackman and Wageman (2005) adopted this temporal focus to examine when during a team's action-transition cycle, leaders can target specific functions to enhance team effectiveness. Research demonstrated training leaders in functional leadership methods resulted in improved team productivity and goal attainment (Santos et al., 2015), as did the leaders use of organisational boundary spanning behaviours and intra-team communication (i.e., networking between teams, negotiating team resources, or politically orientated communications; Hirst & Mann, 2004).

However, of the theory examined here, functionalist leadership is the least empirically investigated framework (Drath et al., 2008). As functional leadership theory encompasses a broad range of behaviours and processes, it is challenging to conceptualise as a holistic framework, and is thus, difficult to comprehensively investigate empirically (Kozlowski et al., 2016). Because of this, Drath and colleagues (2008) have criticised the functionalist framework for being overly inclusive and unable to delineate between the effects of organisational systems and organisational practices. Instead of a holistic investigation, functionalist leadership research is often constrained to investigate specific aspects of the socio-technical leadership processes.

Chapter 2 Summary

The literature investigating leadership processes is vast, and replete with leader-centric theoretical models exploring traditional unidirectional influence processes, the relationships between leaders and followers, and theory which focuses on the team and organisational systems that enable effectiveness (Antonakis et al., 2014; Yukl, 2002). Historically, leadership frameworks adopted a command-and-control structure, which aimed to segment organisational entities into smaller sub-units, where rules and policy would drive performance (Fayol, 1917; Taylor, 1911). However, considering the changing nature of modern organisations, it remains unclear if these formal hierarchal leadership processes are sufficient to maintain organisational, team, and individual effectiveness (Pearce & Sims, 2002).

Recent inquiries into shared leadership processes represent attempts to amalgamate existing knowledge from several approaches into a holistic team influence perspective (Pearce & Conger, 2003). Indeed, early research has demonstrated that shared leadership behaviours provide greater benefits compared to formal hierarchal leadership processes (Pearce & Sims, 2002). The nascent study of shared leadership borrows heavily from historical leadership theory. However, shared leadership expands on these explanations by demonstrating how leadership influence processes are not the sole remit of formal leaders, but instead can be shared amongst multiple team members (DeRue et al., 2015; Marion & Uhl-Bien, 2002; Pearce & Conger, 2003).

The next chapter (Chapter 3) provides a detailed investigation of contemporary shared leadership theory and highlights the existing evidence regarding the use of these behaviours and their relationship to organisational effectiveness.

Chapter 3: Historical and Modern Approaches to Shared Leadership

Despite over a century of scientific inquiry into organisational leadership practices, relatively scarce research has explicitly investigated leadership processes shared amongst team members. However, given the changing needs of modern organisations (Autor, 2015) there is increasing demand for the investigation of more effective and shared forms of organisational leadership. Indeed, since the seminal works published by Pearce and Conger (2003), there has been an exponential growth in the production of knowledge regarding these shared leadership processes. This expansion of scientific inquiry into shared leadership has generated many insights regarding both the antecedents and benefits of shared leadership; however, there is a distinct lack of consistency concerning the leadership measures and conceptualisations adopted by these studies (Kozlowski et al., 2016). This absence of deliberate theory-building is a common criticism of shared leadership theories and greatly hinders scientific exploration of these intra-team influence processes (Fitzsimons et al., 2011; Kozlowski et al., 2016; Park & Kwon, 2013; Spillane, 2005; Sweeney et al., 2018; Wu & Chen, 2018; Zhu et al., 2018).

Therefore, the aim of this chapter is to delineate three common perspectives of shared leadership, including: research which adopts a *traditional approach* to shared leadership (i.e., utilises previously validated measures based on formal leadership behaviours), research that adopts a *network-relational approach* (i.e., research which employs methods such as social-network analysis), and research which adopts a *functionalist approach* to shared leadership (i.e., works which aim to identify the specific influence functions and processes employed by team members in achieving team goals). To set the context, the early research that initially hypothesised the utility of adopting a more shared form of leadership is first discussed.

Historical Investigations of Shared Leadership

Despite Gibb's (1954) assertions regarding the value of distributed leadership in teams, the empirical investigation of these processes in the 20th century was generally scarce. Some early exceptions included Bales' work (1954), who distinguished between two emergent leader types in self-managed teams, the "task leader" and the "social leader". These co-leadership processes were informed by findings that the group member with the best ideas and solutions to task-specific issues were infrequently rated as the most liked individual within the team (Bales, 1954). Bales found that this gap between task leadership and perceived likeability increased over time, "At the end of the first meeting there is a 1 chance in 2 that the task leader will be the most liked. At the end of the second meeting the chances are reduced to 1 in 4. At the end of the third they are 1 in 6, and at the end of the fourth they are only 1 in 7" (1954, p. 47). Drawing on previous behavioural approaches to leadership, Burke (1971) suggested having different team members specialised in both task (i.e., initiating work structure) and social leadership styles (i.e., consideration for employees) would be highly beneficial. Highlighting that if the task-focused leader produced conflict, such negative emotions were unlikely to be resolved by that same leader, instead the secondary leader (focused on socio-emotional outcomes) would be best positioned to resolve this tension (Burke, 1971).

Challenging these person-centred and task-centred dichotomies of shared leadership, Bowers and Seashore (1966) proposed a multidimensional framework for sharing leadership responsibilities. Aspects such as providing support, assisting in goal-setting, advocating for task optimisation, and facilitating team processes could be handled by both formal and informal leaders (Bowers & Seashore, 1966). Indeed, data showed that when these tasks were shared between team members, performance on team tasks was improved (Bowers & Seashore, 1966). However, Berkowitz (1953) challenged these advantages, demonstrating

that increased leadership participation by group members resulted in reduced group satisfaction and reduced group cohesion. These effects were explained through a process of breaking established social norms, in that the formal leader ought to provide direction and facilitate group processes (Berkowitz, 1953). This view was also supported by Festinger and colleagues (1950), who claimed sharing leadership would result in less agreement and increased conflict. However, McGregor (1960) argued that when employees are intrinsically motivated to achieve organisational goals, then employees could be made responsible for duties traditionally entrusted only to management. Katz and Kahn (1978) also advocated for more shared leadership, claiming that “those organizations in which influential acts are widely shared are most effective” (p. 332).

Collectively, this early research contributed little to the understanding of shared leadership processes. For decades following this initial debate, few works actively investigated shared leadership. Instead, leadership scholars largely reinforced the conventions regarding top-down command and control leadership. Commenting on research during this period, Rost (1993) claimed that leadership was “basically doing what the [formal] leader wants done” (p. 70).

Other research during this period investigated related constructs such as: employee and team empowerment (Blau & Alba, 1982; Kirkman & Rosen, 1999), staff involvement in decision making (Durham et al., 1997; Vroom, 1965), team skill diversity (Goodman et al., 1986; Pearce & Ravlin, 1987), leadership emergence in groups (Hollander & Julian, 1970), leadership substitute theory (Kerr & Jermier, 1978), and self-managed leaderless teams (Barry, 1991; Manz, 1986; Manz & Sims, 1980). Additionally, initial research exploring the multilevel aspects of formal leadership were also advanced (Dansereau et al., 1984; Hunt, 1991). Drawing on Jaques’ stratified systems theory (1986), Hunt and Ropo (1995) posited that as specific leader tasks become increasingly complex at higher levels of an organisation,

leaders in these roles are required to draw on more diverse and distributed sources of knowledge and expertise, thus sharing their influence with other organisational members. Although these paradigms hinted at the possibilities of influence processes residing externally to formally appointed leaders, these theories still strongly adhered to the prevailing leader-centric view of group coordination (Ensley et al., 2006).

Initial Shared Leadership Research

The first contemporary exploration of these shared leadership influence processes began in earnest during the mid-1990's. Yukl and Falbe (1990) explored the use of specific influence tactics between targets residing at higher, lower, or similar organisational levels, finding that staff would indeed utilise different tactics to influence other team members compared to their formal leaders or subordinates. Other early examples explored shared governance in healthcare settings, with interventions aiming to empower healthcare staff with increased decision-making authority and greater participation in organisational systems (Bernreuter, 1993; Moss, 1994). Results from these first examples were positive, with nurses gaining more control over the implementation of practice-oriented decisions, thus removing a level of administrative control and enabling faster treatment outcomes (Moss, 1994; Spooner et al., 1997). Other organisations implemented similar systems, for example the New York public school systems mandated for increased shared leadership and decision-making processes to be utilised in public education (Avolio et al., 1996). Despite theories regarding the potential synergies afforded to teams when they engaged in shared leadership processes, there was minimal empirical evidence to support these outcomes (Barry, 1991; Katzenbach & Smith, 1993).

Organisational scholars increasingly adopted this “shared lens” through which previously established axioms of leadership could be challenged (Beyerlein et al., 1996). Avolio and colleagues (1996) suggested teams adopting a shared sense of purpose and

collective goals had heightened cohesion, efficacy, and a collective locus of control. Similarly, Cox and Sims (1996) advanced the measurement of shared leadership behaviours, linking these to team citizenship, team cohesion, and team effectiveness outcomes. These studies were the first to identify that increased team effectiveness could result from maintaining a shared leadership coordination structure. Beyerlein and colleagues (1996) commented that until these studies, organisational scholars had treated leadership and team processes as mutually exclusive.

Pearce's (1997) first investigations of shared leadership in change management teams identified two behavioural dimensions of shared leadership: catalysing leadership and controlling leadership. Pearce reported that catalysing leadership increased overall team effectiveness and co-ordination during complex tasks, while controlling leadership resulted in reduced team effectiveness. Although these catalysing-controlling dimensions have largely been forgotten within subsequent literature, others have also adopted this shared leadership framework to understand effective team processes. Neubert (1999) for example, tested the effects of informal leaders in manufacturing teams, arguing that groups which exhibited shared leadership were more cohesive, however no relationship was observed for performance outcomes.

Pearce and Sims (2002) tested the effectiveness of shared leadership processes compared to formal hierarchal leadership, finding that shared leadership practices exhibited greater effect sizes for team effectiveness, as compared to formal leadership methods. Drawing on previous traditional leadership theory, Perry and colleagues (1999) categorised the specific shared leader behaviours that team members could utilise to achieve effectiveness, these leader behaviours included transactional, transformational, directive, empowering, and supportive behaviours. Finally, Sivasubramaniam and colleagues (2002) also demonstrated a longitudinal relationship between shared transformational leadership

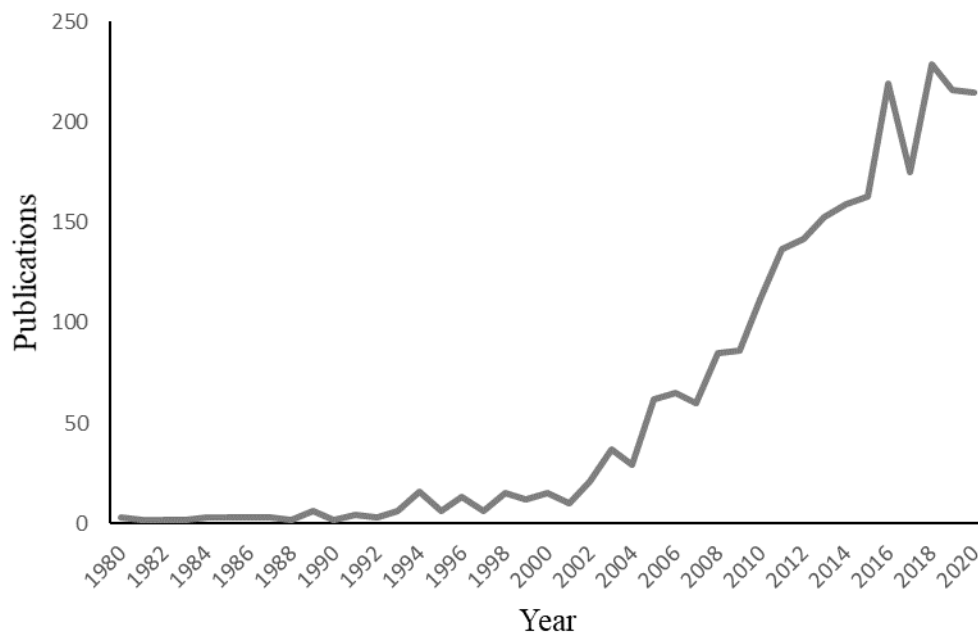
behaviours and increased team potency and performance at follow-up, whilst a lack of shared leadership behaviours (i.e., shared laissez-faire leadership) was negatively related to these outcomes.

Contemporary Investigations of Shared Leadership

Despite the success of these early theoretical advances, the field of inquiry into shared leadership was greatly advanced by Pearce and Conger (2003). Their seminal book which collated a series of essays regarding shared leadership, stimulated the following two decades of scientific investigation (Figure 3.1 [originally produced by Bolden et al., 2011, updated here]). This work also provided the most widely recognised description of shared leadership; following Pearce and Conger's (2003) definition, shared leadership is “a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both” (p. 1). Indeed, this quote highlights the primary theoretical contribution of shared leadership theory in that compared to previous leadership theory, it does not ignore the importance of lateral influence between team members in achieving team outcomes (Mehra et al., 2006; Pearce & Conger, 2003).

Figure 3.1

Publications on Scopus Database for Shared, Distributed, Collective, Collaborative, and Emergent Leadership (adapted and updated from Bolden, 2011, p. 255)



The decades following Pearce and Conger's (2003) work have seen an exponential increase in the nascent literature exploring shared leadership processes, with an especially sharp increase observed in the number of empirical and theoretical articles and meta-analyses (Denis et al., 2012; D'Inncenzo et al., 2014; Dust & Ziegert, 2016; Nicolaidis et al., 2014; Scott-Young et al., 2019; Sweeney et al., 2018; Tian et al., 2016; Wang et al., 2014; Wu et al., 2020; Zhu et al., 2018). Additionally, shared leadership processes have been adopted to predict multiple individual, team, and organisational outcomes including: team performance (Carte et al., 2006; Carson et al., 2007; Hoch & Kozlowski, 2014; Muethel et al., 2012), team innovation (Hoch, 2013; Pearce & Ensley, 2004), team potency (Sivasubramaniam et al., 2002; Pearce & Ensley, 2004; Pearce et al., 2004), job satisfaction (Bergman et al., 2012; Drescher & Garbers, 2016; Wood & Fields, 2007), team satisfaction (Mehra et al., 2006), creativity (Cox et al., 2003; Hooker & Csikszentmihalyi, 2003), self-efficacy (George et al.,

2002; Solansky, 2008), increased positive organisational behaviours (Pearce & Sims, 2000), occupational stress (Wood & Fields, 2007), willingness to expend additional effort (Avolio et al., 1996), flow experiences (Hooker & Csikszentmihalyi, 2003), socialisation (Pearce et al., 2004), team cognitive ability (Solansky, 2008), team cohesion (Bergman et al., 2012; Daspit et al., 2013; Neubert, 1999), team efficiency (Tafvelin et al., 2019), improved quality of problem solving (Pearce, 2004; Pearce et al., 2004), team trust (Bergman et al., 2012; Drescher et al., 2014), supportive culture (Erkutlu, 2012), team mental models (McItyre & Foti, 2013), team effectiveness (Daspit et al., 2013; Pearce & Sims, 2002; Sanders, 2006), team psychological safety (Liu et al., 2014), team learning (Liu et al., 2014), reduced conflict (Acar, 2010; Bergman et al., 2012), team performance orientation (Sanders, 2006), and information sharing (Coun et al., 2019; Resick et al., 2014).

Organisational scholars have also explored the individual, team, and organisational factors which support the development of shared leadership in teams. The most commonly identified antecedents of shared leadership in teams include socio-affective constructs such as employee voice (Carson et al., 2007; Daspit et al., 2013), shared purpose (Serban & Roberts, 2016), social support (Daspit et al., 2013; Serban & Roberts, 2016), team member proximity (Cashman, 2008), organisational identity (Chrobot-Mason et al., 2016), team member integrity (Hoch, 2013), perceived team member warmth (DeRue et al., 2015), team self-reliance (Resick et al., 2014), team familiarity (Cashman, 2008), team trust (Small, 2007), and team collectivism (Small & Rentsch, 2010; Weibler & Rohn-Endres, 2010). Collectively, these findings demonstrate an overall positive effect of shared leadership on a range of team affective, motivational, and performance outcomes. However, despite these findings, the field of inquiry into these shared leadership processes is not without criticisms.

Although there appears to be a general positive trend, such that increased use of shared leadership results in more beneficial team outcomes, there are instances where this is

not observed. For example, when examining just the effects of shared leadership on performance outcomes, several studies have observed non-significant or negative effects of shared leadership. Fausing and colleagues (2013b) found increased shared leadership resulted in reduced performance for half their sample; Hmieleski et al. (2012) showed that increased shared leadership led to a reduction in organisational growth; and Erkutlu (2012) found teams high in shared leadership performed worse in organisations with either a highly bureaucratic or highly innovation culture. The implementation of a shared leadership framework during organisational change processes also led to shared leaderlessness in some groups, resulting in an “entrenched hierarchical authority” and an “atrophy of professional expertise” (Chreim, 2015, p. 527). Similarly, Friedrich and colleagues (2016) showed team performance increases were dependant on the configuration (rather than the density) of shared leadership networks.

Other research has also produced weak or non-significant effects of shared leadership predicting performance outcomes (Boies et al., 2010; Daspit et al., 2013; Drescher et al., 2014; Mathieu et al., 2015; Neubert, 1999; Resick et al., 2014; Serban & Roberts, 2016; Zhang et al., 2012). Highlighting these inconsistencies, a meta-analysis of articles exploring team performance measures found only 83% of articles produced a positive relationship between increased perceptions of shared leadership and performance outcomes (Sweeney et al., 2018).

These conflicting results could be explained through differences in the conceptualisations of the shared leadership constructs. Although each of the studies cited above explored “shared leadership” processes, this term can refer to a range of constructs and perspectives (Fairhurst et al., 2020; Fitzsimons et al., 2011; Kozlowski et al., 2016; Spillane, 2005). These include differences in the style of leadership being shared (i.e., shared transformational, shared directive, shared aversive, shared transactional, or shared empowering leadership; Pearce & Sims, 2002); differences in the measures employed (i.e.,

differences observed using TMLQ measures [Avolio et al., 2003] compared to the Leadership Strategies Questionnaire [Pearce & Sims, 2002]), and/or differences in the methodology employed (i.e., social networked conceptualisations versus aggregate approaches; Zhu et al., 2018). Exploration of the specific boundary conditions which enable (or hinder) these effects is difficult due to the numerous competing operationalisations of the shared leadership construct. Holistically, the field of inquiry into these shared leadership processes lacks consensus (Kozlowski et al., 2016; Spillane, 2005); ironically, it was these same criticisms of hierarchal leadership research in the 70's and 80's which led Hunt (1999) to describe this era as the "doom and gloom period".

Critics highlight that it is difficult for shared leadership research to advance whilst maintaining multiple competing definitions, using diverse measurement methods, and testing numerous theoretical conceptualisations of the shared leadership process (Kozlowski et al., 2016; Zhu et al., 2018). These problems led Kozlowski and colleagues (2016) to critique the field as:

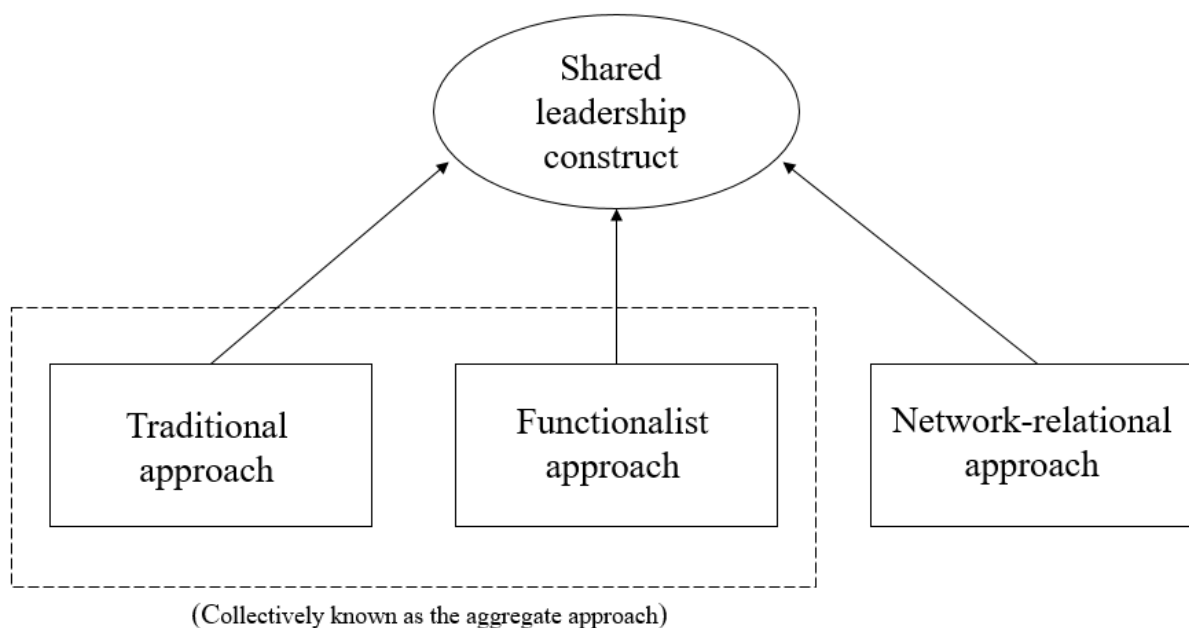
"diverse and broad ranging, largely revolving around idiosyncratic micro-theories used to justify hypotheses. Indeed, the vast majority of moderators have only been examined once, indicating a weak conceptualization and lack of systematic development. This may be because the shared leadership literature lacks a theoretical core; as a result, different researchers are drawing in a piecemeal fashion from different theories to inform potential moderator effects" (p. 35).

This lack of sustained theory-building has hindered attempts to investigate the shared leadership phenomena, as it becomes difficult to aggregate and compare findings across theoretically distinct research. The absence of systematic theory-building has resulted in many diverse conceptualisations of shared leadership (Kozlowski et al., 2016). To better understand these varied conceptualisations, the following sections will explore three board

categories of previous shared leadership research (Figure 3.2). These will include: theory which utilises previously validated traditional leadership theory (and measurement) and aggregates team member responses using a group referent (the *traditional approach*); theory which adopts a relational or social networked perspective (the *network-relational approach*); and finally, theory which adopts a functional perspective of these shared leader behaviours (the *functionalist approach*).

Figure 3.2

Visual Representation of the Differing Conceptualisations of Shared Leadership



Traditional Approach to Shared Leadership

The most common method utilised by researchers to investigate shared leadership processes is to extend previously validated formal leadership concepts and behaviours to a team level analysis. Once conceptualised as a shared team property, it is possible to aggregate individual perceptions to a higher-order shared team property (Klein & Kozlowski, 2000). This commonly occurs by adopting a team-level referent perspective (Chan, 1998), where measures are tailored to target the individual's perception of the team-level construct (i.e.,

how much leadership influence is exhibited by team members), these values are then aggregated to represent the group's shared experience of this phenomena (Chan, 1998; Klein & Kozlowski, 2000). Drawing on social information processing theory (Salancik & Pfeffer, 1978), the team's social context informs team members' actions regarding these shared leadership processes, which over time form a consistent shared team property (Klein & Kozlowski, 2000).

These methods have been utilised to explore other team-level constructs such as team self-efficacy (Gully et al., 2002), organisational engagement (Pugh & Dietz, 2008) collective coping (Kuo, 2013), and both organisational and team safety climate (Zohar & Luria, 2005). Of the shared leadership theories utilising the referent shift methodology, shared transformational leadership is the most widely examined (Kozlowski et al., 2016).

Within hierarchal leadership research, the full-range leadership model (and specifically transformational leadership) is one of the most prolifically researched leadership constructs (Antonakis et al., 2014); these processes have also been investigated as a shared team construct (Day et al., 2004). Avolio and Bass (1995) first theorised that formal leaders' individual consideration for followers (a dimension of transformational leadership), over multiple leader-follower interactions, would diffuse through the team and eventually be adopted as a stable aspect of team culture. Follow-up research specifically investigating these processes found shared transformational leadership was related to team members' additional effort, increased team potency, trust, cohesion, team satisfaction, and subsequently team effectiveness (Avolio et al., 1996). Supporting these findings, increased shared transformational leadership has been related to improved team potency (Boies et al., 2010; Cashman, 2008; Pearce et al., 2010), increased team viability (Small, 2007), more social integration (Pearce et al., 2010), and team effectiveness (Sanders, 2006; Small & Rentsch, 2010). Research has also explored potential moderators and mediators of these benefits,

including processes such as information sharing (Hoch, 2012), team diversity (Hoch, 2012), team type (Fausing et al., 2013b), and team autonomy (Fausing et al., 2013b); or explored the utility of shared transformational leadership training to enhance team adaptability and efficiency (Kleij et al., 2011; Tafvelin et al., 2019).

In addition to shared transformational leadership processes, other previously validated hierarchal leadership constructs have been investigated as a form of shared leadership. For example, Hmieleski and colleagues (2012), explored the effects of shared authentic leadership within management teams. They found a direct relationship between shared authentic leadership and increased organisational performance; however, this effect became negative after controlling for each teams' positive-negative affective tone. Follow-up analysis demonstrated a mediation effect via affective tone, such that teams which exhibited more shared authentic behaviours maintained a more positive team environment, which subsequently resulted in higher organisational growth (Hmieleski et al., 2012).

Other less desirable shared leadership styles have also been investigated; Boies and colleagues (2010) aggregated shared passive-avoidant and shared laissez-faire team member behaviours whilst testing the shared full-range model. These shared passive-avoidant and laissez-faire behaviours were related to a significant decline in team trust, team potency, and team performance outcomes (Boies et al., 2010). Similarly, Sivasubramaniam and colleagues (2002) reported shared laissez-faire but not shared management-by-exception behaviours were each related to reduced team potency and subsequent performance. Researchers have also adapted formal leader-member exchange processes to a team referent to capture team member-to-member exchanges (Sherony & Green, 2002). Unsurprisingly, increases to intra-team trust and mutual respect were related to both greater team satisfaction and commitment, whilst larger differences within team perceptions of member-member exchanges (e.g., where some team members perceive high quality exchanges, while others perceive low quality

exchanges) were linked to a reduction in organisational commitment (Sherony & Green, 2002).

Other research has highlighted the reciprocal nature of shared leadership perceptions with important team processes and outcomes. Sivasubramaniam and colleagues (2002) tracked the reciprocal relationship between shared transformational, shared management-by-exception, shared laissez-faire leadership, team potency, and performance. As expected, Time 1 perceptions of team potency were positively related to Time 1 perceptions of shared transformational leadership. However, potency (at Time 1) was negatively related to subsequent ratings of shared transformational leadership (controlling for Time 1 shared transformational leadership). This unexpected negative relationship was argued to be an effect of a newly formed team's experience of a "honeymoon period" characterised by inflated sense of team potency; over time, this mismatch resulted in teams exhibiting less shared transformational behaviours (Sivasubramaniam et al., 2002). Interestingly, the negative cross-sectional effects of shared laissez-faire leadership on team potency were also significant at Time 2 but not at Time 1. This infers a moderation effect such that during initial team formation an absence of shared leadership may not necessarily reduce the team's collective efficacy, however if shared leadership remains absent (after 10 weeks) team members will exhibit lower collective efficacy (resulting in reduced performance; Sivasubramaniam et al., 2002). Similarly, Pearce and Ensley (2004) focused on a single element of shared transformational leadership, providing a shared team vision. They demonstrated reciprocal effects such that shared vision at Time 1 was related to increased teamwork, courtesy, altruism, and team potency at follow-up. These Time 1 outcomes variables were also related to increased shared vision creation captured at Time 2. In addition to these temporal reciprocal benefits, research has also investigated the role of formal leadership in enabling shared leadership processes.

Because these traditional approaches utilise measures adapted from hierarchal leadership theory, the effects of equivalent leadership styles exhibited by formal leaders and shared amongst team members are frequently compared and contrasted (Fitzsimons et al., 2011). Pearce and Sims (2002) for example, compared the effects of hierarchal and shared leadership processes (specifically aversive, directive, transactional, transformational, and empowering leadership). They demonstrated that controlling for similar hierarchal leadership processes, shared leadership explained additional variance across manager, customer, and self-reported ratings of team effectiveness. In fact, shared leadership processes accounted for more variance than hierarchal leadership (although a significance of $p < .10$ was adopted). Sanders (2006) noted that after controlling for the effects of formal leadership on shared leadership development (i.e., shared transformational and transactional) formal leadership showed no effect on team learning or performance outcomes.

Supporting this, research has demonstrated strong correlations between similar leadership styles exhibited by formal leaders and team members. For example, Pearce and Sims (2002) showed strong effects (correlations greater than .78) between shared and formal aversive, directive, transactional, transformational, and empowering leadership styles; these associations suggest a potential role modelling effect of formal leaders (Cashman, 2008; Hannah et al., 2011; Pearce & Sims, 2002; Sanders, 2006). These effects have been demonstrated through both direct and indirect pathways (Hannah et al., 2011; Hoch, 2013). Both hierarchal empowering and transformational leadership were shown to effect staff innovation directly and through enhancing similar shared transformational and shared empowering behaviours amongst team members (Hoch, 2013). Similarly, Margolis and Ziegert (2016) demonstrated a team's shared strategic vision was predicted by hierarchal empowering leadership processes; and Hannah and colleagues (2011) showed hierarchal authentic leadership promoted similar team behaviours which resulted in improved teamwork

and productivity outcomes. Interestingly, Ishikawa (2012) found an opposite effect such that increased formal transformational leadership resulted in less perceived shared leadership by team members.

As evidenced by this research, adapting traditional formal leadership theory to target team-level shared leadership behaviours is a popular technique to investigate these processes. There are several benefits to adopting the traditional approach. As shared leadership is measured via aggregation of well-established leadership concepts, it enables direct comparisons and delineation to hierarchal leadership processes (Gockel & Werth, 2010). As demonstrated by Pearce and Sims (2002), this enables the relative effect sizes of both hierarchal and shared leadership behaviours to be evaluated. Additionally, compared to the network-relational approaches (presented below), researchers are able to identify the specific types of leadership behaviours being exhibited by team members (i.e., transformational, transactional, or authentic leadership behaviours). Commenting on the traditional approach, Gockel and Werth (2010) highlighted that these methods also provide “a ‘big-picture view’, which focuses more on the forest than on the trees. Team members’ general impression of shared leadership processes in their team might be more important for predicting team outcomes than finding out who exactly influences whom” (p. 173-174). Owing to these benefits, the traditional approach has been widely adopted in shared leadership research (Kozlowski et al., 2016; Sweeney et al., 2018; Zhu et al., 2018).

Despite these advantages, the traditional approach to investigating shared leadership has also received criticism from scholars. The first disadvantage of this approach lies in the use of referent shift processes (Chan, 1998). For example, when responding to survey methods, participants are asked to rate their team’s overall level of shared leadership behaviours; it remains unclear to whom participants reference during this process (i.e., the collective team, the most visible member, or perhaps the most influential member; Gockel &

Werth, 2010; Shondrick et al., 2010). Additionally, the aggregation of team members' scores is argued to "smooth over" differences in contributions made, this results in a loss of information within analyses that adopt the traditional approach (Pearce & Conger, 2003; Sweeney et al., 2018; Wang et al., 2014; Zhou, 2012).

Others have criticised the measures employed to investigate these shared leadership processes. D'Innocenzo and colleagues (2014) for example, suggested the validity of leadership theory based on organisational hierarchy may be compromised when applied to complex team environments. Supporting this, Yammarino and colleagues (2012) advised against researchers simply "transporting" theory grounded in formal leadership dynamics to the team level. Thus, when considering a specific element such as shared transformational leadership, multiple measures have been developed, tested, or simply adapted for a single use (Avolio et al., 2003; Pearce & Sims, 2002; Pearce et al., 2004; Hoch et al., 2010). These problems have hindered the development of robust theory; leading Sweeney and colleagues (2018) to critique these traditional approaches:

"while there is a consistent use of aggregation approaches in researching SL [shared leadership], there appears to be a lack of consistency in terms of what specific measurements should be aggregated, raising the question as to whether researchers have developed a sufficient understanding of what it is they are measuring", (p. 6).

Despite these issues, the traditional approach has been widely adopted by shared leadership scholars to advance our understanding of these team influence processes. However, there are also alternative methods to explore these shared leadership effects.

Network-relational Approach to Shared Leadership

In addition to these traditional approaches, social network methods are an increasingly popular technique to assess shared leadership behaviours (Friedrich et al., 2009). The network-relational approach refers to conceptualisations of shared leadership which utilise

social network methods to assess and analyse the relationship between nodes (team members) and vertices (leadership relationships) within a team network (Mehra et al., 2006). A detailed review of these social network methods is provided in Chapter 5 and 6 of this thesis. Social network methods can offer novel insights into these shared leadership processes, as highlighted by Yukl (1998, p. 458) "...new research methods may be needed to describe and analyze the complex nature of leadership processes in social systems". Indeed, social network methods have grown in popularity and are widely used to explore shared leadership perceptions within teams.

Given the relational nature of shared leadership, social network methodologies are highly relevant to the investigation of these processes. Messages communicated from individuals who maintain numerous leadership network ties with other team members (i.e., are perceived as leaders by other team members) are likely to elicit greater influence compared to individuals with fewer ties (Balkundi & Kilduff, 2006). Network-relational approaches to shared leadership have been linked to a variety of beneficial team outcomes, including team learning (Liu et al., 2014), team cohesion (Mathieu et al., 2015), and performance outcomes (Carson et al., 2007; Ishikawa, 2012; Mathieu et al., 2015; Mehra et al., 2006; Zhang et al., 2012; Zhou, 2012). Indeed, network-relational measures of shared leadership behaviours have previously explained up to 26% of the variance observed in team performance outcomes (Carson et al., 2007).

When measuring shared leadership within a social network the most frequently reported statistic is the overall density of shared leadership ties within a team system (D'Innocenzo et al., 2014). Network density metrics capture the quantity of shared leadership ties, with the most commonly used measure developed by Carson and colleagues (2007). Participants rate every other team member on the single item "*To what degree does your team rely on this individual for leadership?*" (Carson et al., 2007). Shared leadership density

values are calculated by summing these scores and dividing by the maximum number of possible ties within a team. This generates a variable (between 0 and 1) representing the density of these intra-team leadership connections, with values approaching one representing a more saturated shared leadership network. This density measure is common within networked shared leadership research and has been linked to increased team performance (Carson et al., 2007; Zhou, 2012), task satisfaction (Serban & Roberts, 2016), team learning (Liu et al., 2014) and more accurate team mental models (McIntyre & Foti, 2013). In addition to these direct effects, Zhou (2012) demonstrated the relationship between shared leadership density and performance was moderated by team skill diversity. That is, performance for teams with greater skill differentiation was greatly enhanced by adopting more shared leadership practices. Team theorists found similar effects could be explained via the relationship between shared leadership density and team cohesion (Mathieu et al., 2015). However, others have failed to reproduce this shared leadership density to performance relationship after controlling for aspects of task complexity (Serban & Roberts, 2016).

The antecedents of shared leadership network density have also been empirically investigated. Interpersonal dynamics such as perceived competence and warmth have been shown to generate heightened perceptions of shared leadership density within student teams (DeRue et al., 2015). Interestingly, participants who displayed warmth were *less* likely to be rated as exhibiting shared leadership behaviours. Similarly, competence was positively related to emergent leadership within the group; however, when competence was centralised (opposed to distributed), then leadership perceptions coalesced within a few highly competent individuals (DeRue et al., 2015). Meanwhile, Zhang and colleagues (2012) found a positive relationship between shared team vision (using subscales of shared transformational leadership) and increased density of shared leader networks. Chrobot-Mason et al. (2016)

demonstrated heightened organisational (and team) identity was linked to greater perceptions of shared leadership density.

Similarly, White and colleagues (2014) showed shared leadership density increased during organisational change processes, and Ishikawa (2012) found formal leaders who encouraged boundary spanning behaviours resulted in heightened shared leadership density. Interestingly, evidence demonstrates formal transformational leaders can hinder the development of shared leadership networks. Such effects were explained through formal transformational leaders developing stronger group norms and group consensus which resulted in less dense shared leadership networks (Ishikawa, 2012).

In comparison with research assessing shared leadership network density, scarce research has investigated the effects of shared leadership operationalised as network centrality (or more specifically network *decentrality*). While density metrics capture the levels of shared leadership within a closed system, centrality calculations focus on *where* and *how* these ties are located (D’Innocenzo et al., 2014), with more centralised networks representing lower levels of overall shared leadership. Locke (2003) criticised the utility of maintaining decentralised leader networks, warning that decentralised leadership could produce unpredictability in team processes, resulting in disruption, ambiguity, and chaotic systems. However, Mendez (2010) posited such negative effects could be abated by the development of effective shared mental models.

Small and Rentsch (2010) remain as one of the few studies which utilised centrality calculations to empirically explore shared leadership perceptions. Interestingly, they found centrality developed overtime (with medium correlations between centrality rating over time). Small and Rentsch (2010) also reported centrality of shared leader perceptions accounted for 9% of the variance in objective performance. Neubert and Taggart (2004) also

linked centrality in advice networks to leadership emergence, whilst demonstrating differential effects between males and females located within these advice networks.

Pioneering the use of network centrality methods, Mehra and colleagues (2006) were amongst the first researchers to empirically explore social network shared leadership concepts. The authors theorised increased shared leadership network centrality would result in more team participation and communication, leading to improved team performance. Sales team members were asked to identify “leaders” within their work teams (from a complete list of co-workers); interestingly, the centrality of leadership ties was only marginally related to improvements in team performance (Mehra et al., 2006). However, after visually coding these networks (i.e., distributed-coordinated compared to distributed-fragmented), a positive association was found such that when multiple team members were perceived as informal leaders and these individuals also rated each other as exhibiting leadership (i.e., distributed-coordinated) then team performance was enhanced. Conversely, when multiple team members were rated highly but did not perceive each other as exhibiting leadership (i.e., distributed-fragmented) then team performance was not enhanced. Mehra et al. (2006) argued such benefits were driven by the acknowledgement of influence exhibited between the leaders (both informal and formal). Similar network coding was also employed by McIntyre and Foti (2013), who found acknowledgment between various shared leaders resulted in the development of superior shared mental models and performance improvements.

Despite being widely utilised, research has also critiqued network operationalisations of shared leadership. In Small and Rentsch’s (2010) study of network centrality for example, they denounced the use of shared leadership density metrics, and argued these were antithetical to the purpose of exploring shared leadership processes. They suggested that non-binary density values (i.e., those that employ Likert style ratings rather than yes-no responses) fail to capture the dispersion of leadership processes within teams, and instead

form another (albeit more complex) metric of aggregated shared leadership perceptions (Gockel & Werth, 2010; Small & Rentsch, 2010). This position was supported by Mendez (2010, p. 51) who argued that “density is an aggregated measure, and not a measure of dispersion”, and highlighted the importance of utilising multiple metrics to define complex networked relationships.

Although centrality captures the dispersion of shared leadership within a team, it offers limited information regarding the strength of these influence processes (i.e., via valued or directional networks; Carson et al., 2007). There are also risks associated with the use of such one-item measures of shared leadership. These practices increase validity risks associated with measurement error, whilst increase the overall complexity of analysis (especially when structural equation models are employed). Additionally, the use of round-robin team member ratings can lead to participant attrition due to the time requirements of assessing every (other) individual team member (Gockel & Werth, 2010). Zhu and colleague (2018) critiqued these network-relational approaches, arguing that such methods allow researchers to understand the configuration of shared leadership systems but not the content (i.e., the specific behaviours) which are being shared. Indeed, the one-item measure developed by Carson et al. (2007; “*To what degree does your team rely on this individual for leadership?*”), does not target any specific leadership behaviour, but instead draws on naïve interpretations of what constitutes “leadership” (Zhu et al., 2018). Despite these deficiencies, network-relational shared leadership methods do appear to provide several advantages over the alternative approaches.

Much of the work produced by social network scholars critiques the inability of other aggregate shared leadership conceptualisations (i.e., traditional and functionalist approaches) to actually define *where* shared leadership actually occurs within a team system (Small & Rentsch, 2010). Social network methods are argued to generate a richer understanding of

these processes compared to aggregate measurements, with D’Innocenzo et al. (2014) commenting that “this approach allows for a much more nuanced view into the ‘black box’ of shared leadership” (p. 9). Mayo and colleagues (2003) also highlighted this failing of traditional and functionalist approaches; arguing that the effects of shared leadership that is highly distributed but at medium levels (resulting in average level of shared leadership), might exhibit important differences compared with leadership which is exhibited strongly by a few individuals (which may also produce average mean levels when aggregated).

Supporting this approach, studies utilising a network-relational approach to shared leadership often produced stronger effect sizes when predicting performance outcomes compared to studies employing a traditional (aggregate) approach (D’Innocenzo et al., 2014; Nicolaidis et al., 2014). However, it is unclear if these reduced effect sizes are artefacts of the statistical or measurement methods employed (D’Innocenzo et al., 2014), or a result of missing data (Nicolaidis et al., 2014), or due to the issues of smoothing over individual level variance when team scores are aggregated (Sanders, 2006). Given these advantages of social network measures of shared leadership, such methods are becoming more widespread in the literature. Contrasting this, the final approach explored here utilises aggregation methods (similar to traditional approach), but instead focuses on the functions and processes used by team members to achieve individual, team, and organisational goals.

Functionalist Approach to Shared Leadership

Developed in parallel with traditional and network-relational methods, the functionalist approach to shared leadership offers unique insights into these shared leadership behaviours. Where the traditional approach draws on specific hierarchal leadership theories to inform measurement (e.g., transformational leadership, transactional leadership, empowering leadership; Kozlowski et al., 2016); and the network-relational approach models leadership perceptions between team members (using social network analysis; Mehra et al., 2006);

functionalist theories focus on the team states and processes which actually facilitate task completion and organisational outcomes (Morgeson et al., 2010). Adopting a functionalist perspective, Muethel and colleagues (2012) commented that shared leadership “comprises team members’ identification of action needs and the subsequent initiation of action flows to revise and adapt work strategies for team goal achievement” (p. 526).

Functionalist approaches are informed by earlier research assessing leadership theory and team dynamics (McGrath, 1964), and frequently focus on specific team processes or task outcomes. Supporting this, Hoch and Kozlowski (2014) commented that “team members do not need to necessarily perform the same kind of leadership behaviors as their supervisors... Rather, shared leadership can be conceptualized as the extent to which team members behave in ways to prompt the team processes that underlie team performance” (p. 393).

This emphasis on team processes and team effectiveness is an implicit focus of the functionalist approach to shared leadership. Hiller and colleagues (2006) investigated the benefits of shared leadership using both task processes (via team planning, organising, and problem solving) and interpersonal processes (frequency of supporting, mentoring, and developing other team members). Results indicated interpersonal relational processes were more consistently related to team effectiveness compared to task-focused processes. Although it was noted that within their sample (road construction crews) the delegation of specific tasks usually remained the remit of formal team leaders (Hiller et al., 2006). Interestingly, research conducted with hospitality staff found the opposite results: with no significant relationship for consideration-supportive behaviours, whilst shared initiation of task structure was significantly related to team effectiveness (Ziegert, 2005). It remains unclear if these conflicting results are a function of the different measurements utilised or due to external contextual factors unique to each role.

Erkutlu (2012) explored organisational culture as a moderator of team proactive behaviours, finding supportive cultures enhanced the effects of shared leadership (predicting team proactivity). However, Erkutlu (2012) also assessed the effects of innovative and bureaucratic cultures, finding that these moderated the effects of shared leadership, resulting in less team proactivity. Resick and colleague (2014) also assessed similar team process dimensions to code observations of team interactions and found no direct relationship between the frequency of shared leadership behaviours and performance. Instead, these behaviours were mediated through information sharing and information elaboration processes, resulting in improved team performance. Following earlier research which explored the effects of team affective, cognitive, and behavioural processes (Zaccaro et al., 2001), Hoch and Kozlowski (2014) reported that shared leadership collectively explained 18% of the variance observed in virtual team performance. Although interestingly, neither of these scales (shared leadership cognitions, shared leadership affect, or shared leadership behaviours) were individually associated to team performance outcomes (Hoch & Kozlowski, 2014).

Other research has adopted a more task-centric focus of these shared leadership processes. Woods and Fields (2007) conceptualised shared leadership behaviours as the level of direction, influence, coordination, and communication exhibited by team members. They found increased shared leadership was related to a reduction in work stress and increased job satisfaction (mediated via role conflict and ambiguity). Assessing a student sample, Daspit and colleagues (2013) linked these task-focused measures to increased team effectiveness (but not GPA outcomes). Similarly, Carte et al. (2006) found task focused shared leadership behaviours such as managing task completion and tracking team progress, were associated with improved student performance.

Alternative conceptualisations have delineated the effects of shared leadership behaviours directed at the team and behaviours directed at the self (Muethel et al., 2012). For example, team-directed shared leadership behaviours included instituting new work methods, providing feedback, and improving team efficacy; whilst self-directed shared leadership behaviours included seeking advice, analysing external influences, or seeking team process feedback. Including control variables, these processes explained 23% of the variance observed in team performance; with Muethel and colleagues (2012) highlighting that “decisions regarding work strategies (or necessary adaptations) can be made more quickly and more accurately given a more current and broader information basis provided by team-shared leadership” (p. 532).

Functionalist shared leadership works have also explored the flow of information as an outcome of sharing leadership. Within an education institution, Marion and colleagues (2016) generated a sample of simulated organisational networks based on quantitative and qualitative data collected from staff. Monte Carlo simulations showed that shared leadership processes were related to a greater flow of information within schools; and in simulations where less shared leadership was observed, task accuracy decreased sharply (Marion et al., 2016). Exploring similar processes in surgical teams, research has found that teams who shared information-oriented leadership behaviours (i.e., information collection, information transfer, and problem-solving) and structuring leadership behaviours (i.e., distribution of roles/assigning tasks, decision making, action initiation, and resource management) exhibited heightened performance compared to teams where these processes were centralised (Kunzle et al., 2010).

In a pertinent study, Drescher and colleagues (2014) operationalised shared leadership as behaviours related to information searching, information use, and resources management between team members in an online videogame. Across three time points significant

associations were produced between shared leadership and performance, however additional analysis demonstrated these effects were mediated via the development of trust between team members (Drescher et al., 2014). Hsu and colleagues (2017) also argued high quality information exchanges between team members was a prerequisite of the development of shared goals, values, and subsequent shared leadership development.

Functionalist shared leadership theories have also explored the individual characteristics which effect the emergence of shared leadership in workgroups. Organisational identity was found to enhance these perceptions, such that team members with heightened identity both perceived more shared leadership within their team and were themselves rated as exhibiting more shared leadership behaviours (measured by team ratings of task direction, alignment, and commitment; Chrobot-Mason et al., 2016). Positive team environments (measured through shared purpose, social support, and voice) have also been argued to precede the development of task focused shared leadership perceptions (Daspit et al., 2013). Supporting the benefits of individuals adopting different shared leadership functions, Bergman and colleagues (2012) observed that team members were more likely to favour the use of a single type of shared leader behaviour (either initiation of structure, consideration, providing vision, or boundary spanning behaviours), with increased levels of shared leadership resulting in heightened trust, cohesion, and less conflict.

Other research has focused on specific task elements which effect the development of shared leadership. Friedrich and colleagues (2009) for example, argued specific task characteristics would determine shared leadership outcomes, as the team members who had task relevant information, knowledge, and expertise would naturally adopt an informal leadership role for a given task. Similarly, research demonstrated that the type of task being performed would determine the most appropriate shared leadership style employed, with strategic tasks eliciting greater levels of information sharing, team voice, and feedback

exchanges (compared to innovation task types; Friedrich et al., 2016). Task interdependence between team members has also been highlighted as an important component of shared leadership and team processes (Kozlowski & Bell, 2001; Kozlowski et al., 2016). With previous research highlighting interdependence moderated the effects of shared leadership on performance outcomes (Nicolaidis et al., 2014), whilst others utilised task interdependence as a control in subsequent regression analyses (Muethel et al., 2012; Ziegert, 2005).

Despite the (relatively) limited availability of empirical shared leadership research which adopts a functionalist approach, these works provide insights into these shared leadership processes. A key aim of this perspective is to integrate the scientific literature investigating team processes and team effectiveness with existing knowledge of team level leadership behaviours (Morgeson et al., 2010). Rather than measure traditional hierarchal leadership behaviours exhibited within teams, or assess the relationships between team members, functionalist theories of shared leaderships focus on specific team effectiveness outcomes and/or the team influence processes which enables this effectiveness (Hoch & Kozlowski, 2014; Muethel et al., 2012). This diversity is the primary benefit of the functionalist approach, resulting in a range of shared leadership behaviours related to team effectiveness outcomes (c.f. Morgeson et al., 2010). However, this diversity is also a weakness, with few of these specific shared leadership processes being consistently replicated (Kozlowski et al., 2016). This failure of replication led Drath et al. (2008) to criticise these functionalist approaches for being “overly inclusive”. Similarly, Morgeson and colleagues (2010) argued this was by design, commenting that “it is important to recognize that the functional view of team leadership is deliberately inclusive when it comes to who satisfies these team needs” (p. 8).

Chapter 3 Summary

Despite the abundance of research exploring the benefits of developing a more shared approach to team leadership, much of the literature highlights the need for more consistency in the conceptualisation of the shared leadership construct. As outlined by Park and Kwon (2013) “shared leadership has gained considerable popularity over the past few years, but it remains inconsistently defined and measured” (p. 28). This position is supported by Kozlowski and colleagues (2016) who recommend researchers focus on the development of a coherent and consistent conceptualisation of shared leadership. Indeed, the wide range of possible behaviours which fall under the term “shared leadership” make comparisons across studies particularly difficult. These issues are widely acknowledged within the literature (Gockel & Werth, 2010; Kozlowski et al., 2016; Nicolaides et al., 2014), with Kozlowski and colleagues (2016) commenting that “without a consensus on the nature of the construct, SL [shared leadership] will lack a core set of theoretical principles, and will be less impactful informing team effectiveness research. Thus, progress is needed to understand the nature, content, and dimensionality of SL [shared leadership]” (p. 36). To advance our empirical understanding of these processes, the next chapters explore the multiple instruments which have been designed to measure shared leadership. The next chapter (Study 1, Chapter 4) will provide the first direct empirical comparison of these different measures drawn from the traditional, the network-relational, and the functionalist approaches.

Study 1: The Effective Measurement of Shared Leadership: A Multi-scale Comparison**Statement of Contribution to Co-Authored Published Paper**

This chapter includes a co-authored paper. The publication status of this co-authored paper, including all authors, are:

Spedding, J., Brough, P., Hawkes, A. J., & Chan, X. W. (conditionally accepted). The effective measurement of shared leadership: A multi-scale comparison. *Leadership & Organization Development Journal*.

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My contributions to the paper involved developing and communicating the theoretical questions and findings within this article. Additionally, I was responsible for collection of the data, developing the methods, identifying the measures to be included, and conducting the analyses employed (with feedback from my supervisory team).

(Signed) _____ (Date) 27/08/2022

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Abstract

Design/methodology/approach

This research utilises survey methods ($n = 328$) to test the measurement of shared leadership using 11 previously validated scales. This novel approach uses structural equation modelling techniques (SEM) to compare and contrast multiple measures targeting a single underlying construct.

Purpose

Due to the proliferation of measures (and conceptualisations) employed to assess shared leadership behaviours, it is unclear to researchers and practitioners which specific team behaviours should be encouraged and which measures should be included in research to enhance team effectiveness outcomes. To address this issue, this research tests 11 shared leadership scales to identify which measures and behaviours exhibit the strongest relationship with team effectiveness.

Findings

Across the 11 measures tested (drawn from three theoretical perspectives), no single scale demonstrated a superior ability to assess shared leadership (based on model-fit and effect size exhibited). Nevertheless, the results indicated that measures assessing shared transformational leadership were most highly related to team effectiveness; whilst the shared leadership density measure (using social network techniques) exhibited the weakest relationship.

Research limitations/implications

Limitations of this research include the use of a student sample (although participants were screened based on their current employment in a team environment), and the individual assessment of shared leadership rather than team assessment. These findings indicate that shared transformational leadership behaviours are highly related to perceptions of team

effectiveness. It is recommended future research define and delineate between constructs of interest, including general forms shared leadership (i.e., shared leadership broadly defined) and more specific forms of shared leadership (e.g., shared transformational leadership [narrowly defined]).

Practical implications

It is recommended that interventions and/or training designed to enhance team shared leadership outcomes should specifically target shared transformational leadership behaviours; especially when aiming to increase beneficial team outcomes such as effectiveness or potency.

Originality/value

This research is novel in both advancing our understanding of the shared leadership behaviours needed to enhance team effectiveness; and in methodological approaches comparing and contrasting multiple measures of a single latent construct.

Keywords: Shared leadership; team leadership; team process; leadership measurement; team potency; SEM

The Effective Measurement of Shared Leadership: A Multi-scale Comparison

Changing workforce characteristics have increased the complexity of work completed by individuals and teams (Martin *et al.*, 2018). This rise in complexity drives demand for improved knowledge regarding systems of human coordination. Historically, the use of highly structured organisational hierarchies with formal command-and-control leadership systems were sufficient. However, as modern workplaces move away from these rigid hierarchies, there is a growing need to understand how best to coordinate cooperative action in complex occupational environments (Bligh *et al.*, 2006; Zhu *et al.*, 2018).

Recent managerial research has investigated new dynamic forms of leadership practice, including *shared leadership*. Shared leadership differs from traditional leadership theory in that it does not exclusively focus on a single source of leadership influence; indeed, shared leadership theory posits that teams can exhibit multiple sources of influence to enhance coordination and goal achievement (Bligh *et al.*, 2006; Pearce and Conger, 2003). Shared leadership has positive associations with multiple organisational benefits, including performance (Carson *et al.*, 2007; Hiller *et al.*, 2006; Hoch and Kozlowski, 2014) and team creativity/innovation (Ali *et al.*, 2019; Hoch, 2013; Pearce and Ensley, 2004), whilst explaining variance over and above formal leadership behaviours (Ensley *et al.*, 2006; Wang *et al.*, 2014). However, despite two decades of research, there is no consensus about which specific shared leadership behaviours should be encouraged to enhance team effectiveness (Kozlowski *et al.*, 2016).

Shared leadership scholarship remains fragmented, with authors advancing multiple unique theoretical perspectives. Discussing team leadership processes, Kozlowski and colleagues (2016) characterised the field as ruled by “idiosyncratic microtheories, [with] very little conceptual integration, and no evidence of systematic progressive development” (p. 26). Indeed, with multiple measures employed to quantify a range of diverse shared leadership

behaviours, some have posited that the specific measure/approach used is of little importance (Hoch and Kozlowski, 2014; Martin *et al.*, 2018); whilst others argued that measurement methods moderate the positive effects of shared leadership (D'Innocenzo *et al.*, 2014; Nicolaides *et al.*, 2014). Sweeney and colleagues (2019) questioned this lack of consistency in measurement by asking if researchers had “developed a sufficient understanding of what it is they are measuring” (p. 6). The current research directly addresses these concerns by assessing eleven frequently used quantitative measures of shared leadership. The measures are compared based on their goodness-of-fit results and their ability to explain variance in an unambiguously positive team outcome (team potency). This paper therefore, presents the first empirical assessment of shared leadership measurement, and aims to demonstrate overlap (and differentiation) between these eleven measures in their ability to predict a common outcome.

Competing Conceptualisations: What is Shared Leadership?

Shared leadership is commonly defined as a “dynamic, interactive influence process among individuals in groups, for which the objective is to lead one another to the achievement of group or organisational goals or both” (Pearce and Conger, 2003, p. 1). Despite this definition being widely accepted, there are a plethora of measures used by scholars to assess shared leadership; for an extensive examination of these readers are encouraged to see previous review articles (e.g., D'Innocenzo *et al.*, 2014; Kozlowski *et al.*, 2016; Wang *et al.*, 2014; Zhu *et al.*, 2018). Reviewing the extant literature, Nicolaides and colleagues (2014) delineated between three broad categories of shared leadership assessments: (1) measures where traditional leadership concepts are adapted to a team level; (2) methods that apply social network techniques to explore shared leadership processes; and (3) approaches that adopt a team-level functional leadership perspective.

Traditional Shared Leadership Perspective

The most frequent approach to investigating shared leadership extends hierarchical leadership theory to target group level collective processes (Wang *et al.*, 2014), also referred to as a *referent shift approach* (Chan, 1998). In practice, this involves altering the referent of survey items from an individual target “what are my thoughts, feelings, and actions” to a team-level “what are my teams’ thoughts, feelings, and actions.” Importantly, this changes the underlying construct being examined, from an individual level to a collective perspective. Of these measures, the full-range leadership framework (Bass and Avolio, 1990) is the most widely utilised, it identifies the team behaviours which inspire, influence, and motivate team members to achieve shared goals. This framework consists of five dimensions of shared leadership: *aversive*, *directive*, *transactional*, *transformational*, and *empowering* (Pearce, 1997; Pearce and Sims, 2002). These shared transformational behaviours have been associated with numerous positive outcomes including: improved team problem-solving (Pearce *et al.*, 2004), increased trust (Boies *et al.*, 2010), innovation (Pearce and Ensley, 2004), information sharing (Hoch, 2013), organisational growth (Ensley *et al.*, 2006), and increased team potency (Boies *et al.*, 2010; Pearce *et al.*, 2004).

However, alternative conceptualisations of shared full-range leadership behaviours have also been suggested. The *team-multifactor leadership questionnaire* (TMLQ; Avolio *et al.*, 2003) was adapted from a formal leader referent to target behaviours at a team level. The TMLQ captures team perceptions of inspiring leadership, intellectual stimulation, individualised consideration, management-by-exception, as well as active and passive/avoidant leadership behaviours. Using the TMLQ, Sivasubramaniam and colleagues (2002) for example, demonstrated ratings of shared transformational leadership were related to increased team performance and team potency-performance feedback cycles. Shared transformational behaviours have also been positively associated with team effectiveness

(Cashman, 2008), team performance (Small and Rentsch, 2010), and enhanced through team interventions (Kleij *et al.*, 2011).

Despite these demonstrated beneficial outcomes, these traditional shared leadership approaches have been challenged. For example, D’Innocenzo and colleagues (2014) criticised shared leadership theory grounded in formal leader-follower organisational hierarchies, arguing that such constructs may not be valid when applied to complex team environments. In support, Yammarino and colleagues (2012) advised against researchers simply “transporting” theory grounded in formal leadership dynamics to the team-level. Reviewing the multilevel application of hierarchical leadership theory, Kozlowski and colleagues (2016) argued that “Although this is a methodological advance, it is a modest one as it does not really extend theory” (p. 28).

The extant literature is thus replete with different measures to capture traditional shared leadership behaviours. Even within a narrow focus of the full-range leadership model, multiple measures have been advanced. This raises issues of construct proliferation (Brough and Hawkes, 2019), as to which measure best captures team-level shared leadership processes, and the generalisability of empirical results produced from different measures (Kozlowski *et al.*, 2016). Whilst hierarchical leadership theory is the most commonly utilised approach to explain shared leadership, several other viable approaches do exist and have gained some traction.

Network-Relational Shared Leadership Perspective

Advances to social network methodologies have enabled researchers to investigate leadership as an emergent property of organisational networks. Networks consist of human actors (workers) and their interactions within an organisation over time, including both formal and social exchanges (Contractor *et al.*, 2006). Social network models capture these local individual interactions and assess them via patterns of leading and following

(Contractor *et al.*, 2006; Sloane and O'Reilly, 2019). Social network measures of shared leadership differ from related constructs in that rather than aggregating individual responses, the structural relationships between team members are the focal variables.

Mehra and colleagues (2006) for example, theorised increased shared leadership networks would result in more team participation, heightened communication, and improved team performance. Testing this, employees from 28 sales teams were asked to identify their team "leaders", interestingly the density of these leadership ties did not predict improvements to team performance. However, after visually coding these shared leadership networks (i.e., siloed networks versus siloed-connected networks), a positive association was found, such that siloed-connected networks were predictive of increased team performance (Mehra *et al.*, 2006). Building on this approach, Carson and colleagues (2007) developed a Likert style one-item measure of shared leadership by which all team members were rated (*To what degree does your team rely on this individual for leadership?*). Team density scores were calculated by summing these ratings and dividing the sum by the maximum number of possible connections within a team. This density measure remains widely used in networked shared leadership research and has been associated with increased team performance (Carson *et al.*, 2007; Kukenberger and D'Innocenzo, 2020), task satisfaction (Serban and Roberts, 2016), team learning (Liu *et al.*, 2014), and creativity (Ali *et al.*, 2019).

The use of social network approaches in leadership research has also generated a richer understanding of shared leadership (Mehra *et al.*, 2006). Indeed, studies that adopt a network approach often exhibit heightened effect sizes compared to aggregated measures of shared leadership (D'Innocenzo *et al.*, 2014), although it remains unclear if these increased effects are simply artefacts of the employed statistical and/or measurement methods. However, there are risks associated with social network methodologies. For example, the use of single-item measures increases validity risks associated with measurement error, and

increases the complexity of analysis. Social network theorists have argued such methods differ from aggregation methods, as they capture information regarding the distribution of leadership influence (often, this is cited as their key advantage; Mehra *et al.*, 2006). However, use of density scores (i.e., using non-binary Likert response scales) without centrality values curtails these advantages, and is argued to be no different from other aggregate measures of shared leadership (Gockel and Werth, 2010; Small and Rentsch, 2010). Despite these limitations, the use of social network measures remains widespread, and appears to answer questions not available to other aggregate measures, such as the structural configurations of shared leadership processes.

Functional Shared Leadership Perspective

The functionalist perspective of shared leadership was developed in parallel with traditional hierarchal and social-networked methods. Functional leadership theory questions the assumption that traditional leadership theory (i.e., theory grounded in formal leader-follower power dynamics) can be adapted to a team context (Hiller *et al.*, 2006). Hoch and Kozlowski (2014) reasoned that “Team members do not need to necessarily perform the same kind of leadership behaviours as their supervisors... Rather, shared leadership can be conceptualized as the extent to which team members behave in ways to prompt the team processes that underlie team performance” (p. 393). This focus on team process differentiates these team-based functionalist conceptualisations of shared leadership. Despite decades of attention given to hierarchical functional leadership research (e.g., McGrath, 1964), functional leadership theory was designed to be ‘deliberately inclusive’ such that it can be applied to leadership influence exhibited by individuals other than the formal leader (Morgeson *et al.*, 2010).

Functional leadership theory argues leaders should identify *what* and *how* work tasks need to be completed, then support team members in achieving these outcomes (McGrath,

1964). Adopting a functional perspective, Muethel and colleagues (2012) described two unique shared leadership dimensions: *self-directed* and *team-directed* behaviours. Team-directed behaviours influence collective action to maximise team outcomes (i.e., improving procedures, making constructive suggestions). Self-directed behaviours focus on adapting one's own work processes to align better with other team inputs (i.e., seeking feedback, inquiring about other members' processes). These two types of proactive behaviours were aggregated to produce a team-level shared leadership measure, which significantly predicted performance in virtual team environments (Muethel *et al.*, 2012).

Team leadership scholars have also attempted to operationalise shared leadership based on previously identified effective team processes. Zaccaro and colleagues (2001) reviewed the team process literature and found effective leaders specifically target team behavioural, affective, and cognitive processes. Hoch and Kozlowski (2014) for example, adapted existing measures to assess these team cognitive, affective, and behavioural processes, and demonstrated the validity of their instrument as a composite uni-dimensional measure in predicting team performance outcomes. However, when assessed individually, these three processes were not significantly associated with team performance (Hoch and Kozlowski, 2014).

Although the extant research concurs that shared leadership is an emergent product of team systems, recent investigations rarely draw on existing knowledge regarding team processes and group dynamics to inform their shared leadership research (Kozlowski *et al.*, 2016; Pearce and Conger, 2003). Instead, Kozlowski and colleagues (2016) claimed shared leadership research has predominately focused on shared versus formal leadership influences, whilst largely ignoring team process theory and practice.

Given the diversity of behaviours and approaches adopted to define and measure shared leadership, research assessing the antecedents of shared leadership or the development

of training programs to enhance shared leadership (and subsequent team effectiveness) remain impractical. Debating these issues, research has suggested the choice of measures employed has minimal effect on outcomes (Martin *et al.*, 2018; Wang *et al.*, 2014), whilst others have argued that there is no ‘one-right-way’ to measure shared leadership (Gockel and Werth, 2010; Hoch and Kozlowski, 2014). Although both Nicolaides *et al.* (2014) and D’Innocenzo *et al.* (2014) found social networked measures yielded larger effects compared to aggregated approaches; other measurement comparisons demonstrated that only referent shift aggregation methods were significantly related to beneficial organisational outcomes (Ziegert, 2005). Gockel and Werth (2010) posited these different measures were capturing unique aspects of the same underlying latent shared leadership construct, and that further research is required to clarify these conflicting explanations.

The Current Study

Although shared leadership has been consistently shown to enhance team effectiveness (Cashman, 2008; D’Innocenzo *et al.*, 2014; Nicolaides *et al.*, 2014; Small and Rentsch, 2010), it is unclear which specific team leadership behaviours are the ‘active ingredient’ required to achieve these outcomes. The current research advances the above discussions by comparing eleven measures of shared leadership originating from the three key shared leadership perspectives. As summarised in Figure 1, each measure will be evaluated against two criteria: (a) the extent to which each hypothesised measurement model (H1) and path model (H2) replicate the observed data (based on model-fit statistics); and (b) the extent to which each measure is associated with perceptions of team effectiveness (H3). Taken together, it is hypothesised that:

H1. Measures of shared leadership will differ on their observed fit to the empirical data when comparing measurement models.

H2. Measures of shared leadership will differ on their observed fit to the empirical data when comparing structural models.

H3. Measures of shared leadership will differ in the strength of their association with ratings of team potency.

---INSERT FIGURE 1 ABOUT HERE---

Methods

Participants and Procedure

University research ethics approval for this research was obtained. A research sample was recruited from the university psychology student sample pool, with students receiving course credit for their research participation. Participants were limited to only those who were employed in an occupational team setting (i.e., currently employed as part of a work team). Initial open-ended survey questions asked participants to indicate the team to which they would refer to throughout the survey; participants who indicated a non-occupational team (i.e., their sporting team or student project team) were excluded from the analysis. Participants were invited to respond to an electronic self-report survey containing 260 items targeting a range of shared leadership constructs (see Table 1). Surveys were administered via their email address, with confidential responses ($N = 347$) returned directly to the researchers. Nineteen participants were removed due to inadequate information or non-response across 90% of the survey items, producing a final sample of 328 useable responses. The majority of these respondents were female ($n = 232$; 71%) and aged between 18-54 years, with a mean age of 22.63 years ($SD = 4.76$). Current employment tenure ranged from 1 month to 10 years, with a mean tenure of 2.13 years ($SD = 3.41$), and a mean team tenure of 1.54 years ($SD = 1.74$).

Controls

Control variables were selected based on previous shared leadership and team process research. Research has explored the effects of team size (Pearce and Sims, 2002), team and organisational tenure (Nicolaidis *et al.*, 2014), and team interdependence (Bligh *et al.*, 2006; Kozlowski *et al.*, 2016; Wu *et al.*, 2020). Participant age, gender, and hours worked per week were also measured. Control variables will be retained or removed from the multivariate analyses based on their significant relationship to the dependent variable (Becker, 2005).

Shared Leadership Measures

Table 1 summarises the eleven shared leadership measures included in this study. Of these, six measures were drawn from traditional leadership theory which were converted to target a team referent (Chan, 1998), four measures targeted functional team leadership behaviours. Finally, a single item measure drawn from the social network shared leadership perspectives was also included (Carson *et al.*, 2007).

---TABLE 1 ABOUT HERE---

Team Potency

To simplify comparisons, each measure of shared leadership was assessed by its ability to predict team potency. Team potency is defined as a collective belief that a team can be effective and has been used as both a mediator of shared leadership with performance (Nicolaidis *et al.*, 2014) and a proximal indicator of team effectiveness (Pearce *et al.*, 2002; Gever *et al.*, 2020). Team potency was measured with eight items developed by Guzzo and colleagues (2003) and an example includes “This team feels it can solve any problem it encounters”. Responses were recorded on a 5-point agreement scale, with higher values indicating more agreement (1 = *To no extent*, 5 = *To a great extent*). The measure produced an acceptable level of internal reliability (Cronbach’s alpha = .89).

Data Analysis

Prior to analysis, the data were screened. All variables demonstrated less than 5% missingness and were missing completely at random (MCAR, $p = .62$). Seventeen univariate outliers were observed on the control variables and eight outliers were observed on the shared leadership subscales. Exclusion of these outliers did not substantially alter the correlations between the research variables; thus they were retained in the data analyses. Multivariate outliers, normality of the data, and data residuals were also assessed for each model and the resultant data were tested for any respective changes. No changes in the results were observed, therefore the original data were retained. To reduce potential bias, all analyses employed conservative estimators robust to heteroscedasticity (Antonakis *et al.*, 2010).

To test Hypothesis 1, the measurement model of each shared leadership construct was tested with confirmatory factor analyses (CFA) in Mplus v7.4 (syntax available at github.com/jtspedding; Muthen and Muthen, 2012). Four measures required revisions; two reverse coded items in Hoch and Kozlowski (2014) exhibiting correlated error terms, while Hoch *et al.*'s (2010) measure required two subscales (individual and team empowerment) to be correlated in order for the model to fit the data. Additionally, in order to identify Muethel and colleagues' (2012) model, the subscale factor loadings onto the shared leadership variable were fixed to .74 and .71 (values were obtained from an exploratory factor analysis [EFA]). Pearce and Sims' (2002) measure was modelled as both a third and second order construct. The third order model was retained with two error terms correlated (management by exception and aversive subscales, and two transformational leadership items). Furthermore, in Pearce and Sims' (2002) measure, management by exception passive and active were found to load onto a single management by exception latent variable, rather than the transactional leadership latent variable.

Results

Descriptive Results

Scale descriptives and bivariate correlations of the research variables are summarised in Table 2. It can be seen that the measures of shared leadership, with the exception of Carson and colleagues' (2007) network density measure, exhibited strong intercorrelations (the weakest being $r = .41, p < .001$). Similarly, all shared leadership measures (except Carson *et al.*, 2007) were also strongly associated with team potency. Investigation of the control variables demonstrated only team interdependence was significantly related to team potency, and thus was included in the subsequent SEM analysis (Becker, 2005).

---TABLE 2 ABOUT HERE---

SEM Analysis

The results of the CFA are summarised in Table 3. Most of the shared leadership measures exhibited a satisfactory fit to the data (with CFI $> .90$ and RMSEA $< .08$; Crawford and Kelder, 2019). Shared leadership conceptualised as team-level member-member exchanges (Sherony and Green, 2002) was the only measure to display a clearly unacceptable fit to the data. Only two of the tested measures (Muethel *et al.*, 2012; Pearce *et al.*, 2004) demonstrated a strong fit to the underlying data (i.e., RMSEA $< .06$, CFI $> .95$; Crawford and Kelder, 2019). Factor loadings for each subscale loading onto a higher order shared leadership latent variable are displayed in Table 3. To further delineate between these shared leadership measures and to test Hypotheses 2 and 3, a structural model with each measure predicting team potency was constructed based on Figure 1. Table 4 summarises the fit statistics and total variance explained by the relationship between each shared leadership measure and team potency, controlling for team interdependence.

---TABLES 3 AND 4 ABOUT HERE---

As observed in Table 4, each model explained a significant proportion of variance in the dependent variable of team potency. The effect sizes differed between each scale with Avolio and colleagues' (2003) TMLQ explaining an estimated 43% of the observed variance in team potency, whilst Muethel and colleagues' (2012) proactive team-self behavioural scale explained an estimated 27% of this variance. Pearce and Sims' (2002) structural model displayed an unacceptable fit when compared to a null model (demonstrated through CFI <.90; Crawford and Kelder, 2019). Overall, the average variance explained by these measures collectively was 32.72%, which is a considerable proportion for team process research.

While some differentiation was observed for the variances explained by the 11 shared leadership measures, an in-depth examination of the individual measures' subscales was also conducted. This process sought to demonstrate if specific subscales exhibited stronger relationships with team potency, as compared to other shared leadership components. Table 5 summarises the estimated beta-weights of each subscale (modelled without a higher order shared leadership latent variable) for their association with team potency. The estimated factor loadings of each subscale and R^2 explained by the higher order latent shared leadership factor are also summarised in Table 5.

---TABLE 5 ABOUT HERE---

Discussion

Evaluation of the Shared Leadership Measures

Hypotheses 1 (H1) and 2 (H2) proposed that differences would be observed between the 11 shared leadership measures in relation to their goodness-of-fit estimates. The results indicated H1 and H2 were not supported, such that most of these eleven measures each exhibited a satisfactory fit to the data. The CFAs (H1) demonstrated that seven of the 11 models displayed a satisfactory goodness-of-fit, with two instruments (Muethel *et al.*, 2012; Pearce, Yoo, and Alavi, 2004) demonstrating a strong model fit. Results also indicated that

model fit for some measures could be improved through scale modifications. For example, factor loadings for management-by-exception (Avolio *et al.*, 2003) and directive leadership (Pearce and Sims, 2002) did not significantly load onto their respective shared leadership latent constructs (Table 5). These two measures are based on traditional hierarchal leadership processes, which appear to exhibit different effects when adapted to target team member leadership behaviours (Hoch and Kozlowski, 2012). Removal of these subscales could enhance the goodness-of-fit for each of these two measures, and these refinements are recommended to be assessed by future research. When examining the structural models predicting team potency (H2), each of the measures produced a satisfactory fit. As these measures have each been utilised in published research, it is cogent that each would exhibit acceptable psychometric properties.

The results supported Hypothesis 3, in that differences were observed between the shared leadership measures in their relationship with team potency. Both the Avolio *et al.* (2003) and Pearce and Sims (2002) measures explained a large proportion of variance observed in team potency (42% and 39% respectively; Table 4). Interestingly, the networked-relational measure (Carson *et al.*, 2007) explained only 11% of variance. These small effect sizes do not support the findings of meta-analyses which reported that network-relational measures exhibit larger effects compared to other measurement approaches (D’Innocenzo *et al.*, 2014; Nicolaidis *et al.*, 2014). This small effect might occur due to network-relational measures requiring participants to draw on their own implicit understanding of leadership (rather than rating a specific shared leadership behaviour; Carson *et al.*, 2007). As was discussed by Carson and colleagues “because it neither specified the meaning of leadership nor primed specific behaviors for respondents, it is possible that our measure tapped something other than leadership influence, such as participation and engagement” (2007, p. 1230).

Collectively, few distinctions were observed between the shared leadership measures based solely on their goodness-of-fit (H1 and H2) and predictive utility (H3). Although Muethel *et al.*'s (2012) instrument exhibited the best goodness-of-fit (across both measurement and structural models), its relationship with team potency only explained 27% of the variance observed. Similarly, although Avolio *et al.*'s (2003) measure explained 42% of the variance observed, it only produced a satisfactory fit to the data. This trade-off highlights the difficulty in performing multiple measurement comparisons, such that variance explained can be increased through the addition of more diverse variables, however this subsequent complexity (generally) decreases the model's goodness-of-fit.

To further differentiate between measures, a comparison of the individual shared leadership subscales was also conducted (Table 5). Differences were observed when exploring individual subscales. For example, the aggregated Hoch and Kozlowski (2014) measure explained 34% of the variance in potency, however, none of the measure's subscales were individually significant. Other abnormalities include the small factor loadings exhibited by some subscales, particularly within the traditional leadership measures where multiple diverse leadership behaviours were forced to load onto a single latent shared leadership construct. For example, both the aversive and directive shared leadership subscales (Pearce and Sims, 2002) were not significantly associated with their shared leadership latent variable (directive leadership loading = .05; aversive leadership loading = -.20). These results suggest that these conceptualisations of shared leadership are not unidimensional and would likely benefit from being modelled separately.

It is also apparent that when comparing beta-weights amongst individual subscales predicting team potency (i.e., ranked by effect size), five of the six largest beta-weights were produced by shared transformational leadership subscales. This result lends support to the efficacy of leadership theories which adopt the traditional shared leadership perspective

(Avolio *et al.*, 2003; Pearce and Sims, 2002; Wang *et al.*, 2014); and, more specifically, for measures assessing shared transformational leadership behaviours (Avolio *et al.*, 2003; Pearce and Sims, 2002). Therefore, it is recommended that future research include measures targeting specific shared transformational leadership behaviours. Additionally, it is strongly recommended that future investigations of shared leadership carefully consider, define, and appropriately label the underlying construct of interest. For example, clearly delineating between “shared leadership” (broadly defined) and “shared transformational leadership” (narrowly defined) will directly advance current knowledge in this field to produce a more cohesive research paradigm.

Research Limitations

There are several considerations which limit the conclusions drawn from these findings. First, is the use of individual ratings of shared leadership processes. Research adopting multi-level research designs have highlighted the potential for ecological fallacy, whereby findings at one level (i.e., the individual level) may not be representative at a higher level (i.e., team or organisational levels). Indeed, this focus on a single level of analysis is a common critique of both shared and hierarchal leadership research (Kozlowski *et al.*, 2016), and this point is acknowledged by the current study, especially for the measures of shared leadership network density where usually multiple team member ratings would be aggregated (Carson *et al.*, 2007). Second, the inclusion of a student sample may limit the generalisation of these findings. Although shared leadership research does often include student samples (up to 38% of shared leadership studies employ student participants; Sweeney *et al.*, 2019), and meta-analyses have demonstrated student samples are functionally similar to employee samples in shared leadership research (Sweeney *et al.*, 2019). We acknowledge the inclusion of a student sample in the current study is a limitation, especially in the analysis of network-relational measures of shared leadership which require respondents rate team members based

on their own implicit understanding of leadership (Carson *et al.*, 2007). It is recommended these analyses are replicated within employee samples, to clarify the generalisability of our findings. However, we also acknowledge the challenges of recruiting employees to complete a large battery of items targeting a single research construct.

The final research limitation concerns the inclusion of team potency as a dependent variable. Team potency was included as a proximal indicator of team effectiveness and we note it is also related to other beneficial team outcomes and emergent states (Gevers *et al.*, 2020). However, we acknowledge that the inclusion of an alternative dependent variable (e.g., team performance or job satisfaction) may produce different results and we note this is a valid consideration for future research. Additionally, the use of survey methods limited our ability to control for common-method bias in these analyses. However any common-method bias effects would likely influence all measures similarly, thus potentially biased estimates are of less concern in studies of scale comparisons.

Conclusion

To answer the question ‘does the choice of shared leadership measure matter?’, the current research compared 11 shared leadership instruments based on their model fit (H1 and H2) and associations with team potency (H3). Based on model-fit statistics, the 11 shared leadership instruments each displayed a similar goodness-of-fit and each generally produced a satisfactory fit to the data (Crawford and Kelder, 2019). However, when assessing the relationship between each measure and team potency, differences between the measures were produced. The measures based on traditional hierarchical shared leadership behaviours produced the highest effect sizes (i.e., Avolio *et al.*, 2003; Pearce and Sims, 2002). Investigating the individual subscales of each measure clarified that the specific shared transformational leadership behaviours produced the strongest associations with team potency. These findings support Zhu and colleagues’ (2018) call for more precise

measurement of shared leadership processes, especially through the delineation of the specific leadership behaviours exhibited by team members (i.e., shared transformation, shared empowering, or shared directive behaviours). Therefore, it is recommended that practices aimed at improving team potency focus on behaviours aligned with shared transformational leadership. Future research should also clearly delineate between the characteristics of the specific shared leadership behaviours being investigated, rather than conflating these diverse behaviours under a generic construct of shared leadership.

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Appendices

Figure 4.1

Structural equation model assessing the goodness-of-fit for each shared leadership measure for the prediction of team potency controlling for team goal and task interdependence.

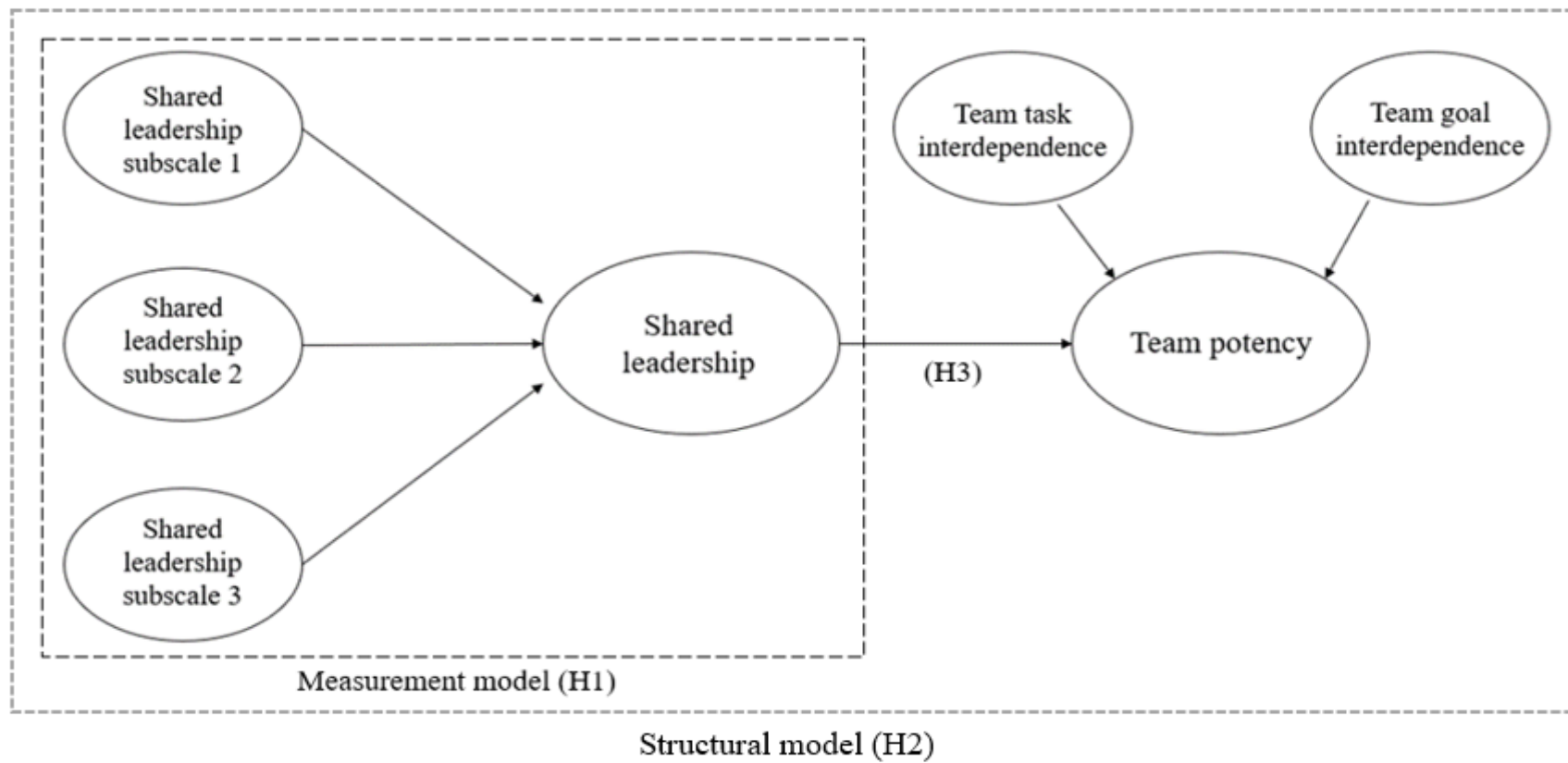


Table 4.1

Scale Descriptives for the Assessed Shared Leadership Measures.

Shared Leadership Measure	Items	Subscales	Example item/scale	Cronbach alpha
Traditional Shared Leadership Perspectives				
1. Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	23	Inspiring leadership ($\bar{x} = 3.45, SD = .98$), intellectual stimulation ($\bar{x} = 3.75, SD = .79$), individualised consideration ($\bar{x} = 3.91, SD = .73$), management by exception active ($\bar{x} = 2.92, SD = 1.04$), and passive/avoidant leadership ($\bar{x} = 2.08, SD = .95$).	'My team members allow performance to fall below minimum standards before trying to make improvements.' Captured on a 5-point scale (1 = <i>Not at all</i> , 5 = <i>Frequently, if not always</i>).	$\alpha = .61 - .87$; Avolio et al., 2003.
2. Hoch (2013)	16	Shared transformational leadership ($\bar{x} = 3.71, SD = .66$), individual empowering leadership ($\bar{x} = 3.73, SD = .64$), team empowering leadership ($\bar{x} = 3.89, SD = .75$), and shared participative leadership ($\bar{x} = 3.35, SD = .99$).	"My team members work with me to develop my performance goals", captured on a 5-point scale (1 = <i>Definitely not true</i> ; 5 = <i>Definitely true</i>).	$\alpha = .91$; Hoch, 2013.
3. Hoch, Pearce, & Welzel (2010)	23	Empowering individual leadership ($\bar{x} = 3.73, SD = .64$), empowering team leadership ($\bar{x} = 3.89, SD = .75$), transformational leadership ($\bar{x} = 3.71, SD = .66$), transactional leadership ($\bar{x} = 3.66, SD = .69$), directive leadership ($\bar{x} = 3.35, SD = .99$), and aversive leadership ($\bar{x} = 2.17, SD = 1.10$).	"My team members are driven by higher purposes or ideals", captured on a 5-point scale (1 = <i>Definitely not true</i> ; 5 = <i>Definitely true</i>).	$\alpha = .85$; Hoch et al. 2010.
4. Pearce & Sims (2002)	67	Transactional leadership ($\bar{x} = 3.49, SD = .69$), management by exception ($\bar{x} = 2.58, SD = .89$), transformational leadership ($\bar{x} = 3.66, SD = .59$), empowering leadership ($\bar{x} = 3.66, SD = .60$), directive leadership ($\bar{x} = 3.38, SD = .83$), and aversive leadership ($\bar{x} = 2.17, SD = 1.10$).	'My team members encourage me to learn new things', captured on a 5-point scale (1 = <i>Definitely not true</i> ; 5 = <i>Definitely true</i>).	$\alpha = .73 - .86$; Ensley et al., 2006.
5. Pearce, Yoo, & Alavi (2004)	14	Empowering leadership ($\bar{x} = 3.63, SD = .76$), directive leadership ($\bar{x} = 3.42, SD = .92$), transactional leadership ($\bar{x} = 3.56, SD = .79$), and transformational leadership ($\bar{x} = 3.83, SD = .77$).	"My team members establish my performance goals", captured on a 5-point scale (1 = <i>Definitely not true</i> ; 5 = <i>Definitely true</i>).	$\alpha = .82 - .91$; Pearce, Yoo, & Alavi, 2004.

6.	Sherony & Green (2002)	6	Member-member exchange (adapted from Leader-member exchange scale; Graen & Uhl-Bien, 1995; $\bar{x} = 3.82$, $SD = .61$).	'My team understands my problems and needs', captured on a 5-point Likert scale (1 = <i>Strongly disagree</i> , 5 = <i>Strongly agree</i>).	$\alpha = .87$; Hoch & Kozlowski, 2014.
Network-relational Perspectives					
7.	Carson, Tesluk, & Marrone (2007)	1	Density of shared leadership network ties ($\bar{x} = 3.46$, $SD = .74$). Participants were asked to provide initial(s) for each other team member, then rate their shared leadership using the item provided, forming an individual level rating of their teams' shared leadership density.	'To what degree does your team rely on this individual for leadership?', on a 5-point scale (1 = <i>Not at all</i> , 5 = <i>To a very great extent</i>).	NA
Functional Shared Leadership Measures Perspectives					
8.	Hiller, Day, & Vance (2006)	25	Planning and organising ($\bar{x} = 3.70$, $SD = .88$), problem solving ($\bar{x} = 3.78$, $SD = .81$), support and consideration ($\bar{x} = 4.03$, $SD = .78$), and development and mentoring ($\bar{x} = 3.93$, $SD = .81$).	'How often do team members share in solving problems as they arise?', rated on a 5-point frequency scale (1 = <i>Not at all</i> , 5 = <i>To a great extent</i>).	$\alpha = .93 - .96$; Hiller et al., 2006.
9.	Hoch & Kozlowski (2014)	22	Cognitive leadership processes ($\bar{x} = 3.52$, $SD = .70$), affective team processes ($\bar{x} = 3.76$, $SD = .69$), and behavioural processes ($\bar{x} = 3.82$, $SD = .61$).	'My team really cares about my well-being', answered on a 5-point Likert scale (1 = <i>Strongly disagree</i> , 5 = <i>Strongly agree</i>).	$\alpha = .87 - .92$; Hoch & Kozlowski, 2014.
10.	Muethel, Gehrlein, & Hoegl (2012)	7	External related team behaviours ($\bar{x} = 3.86$, $SD = .71$) and internal related team behaviours ($\bar{x} = 3.91$, $SD = .68$).	'Team members asked other team members for advice', captured on a 5-point Likert scale (1 = <i>Strongly disagree</i> , 5 = <i>Strongly agree</i>).	$\alpha = .79$; Muethel et al., 2012
11.	Ziegert (2005)	19	Initiating structure ($\bar{x} = 3.99$, $SD = .67$), consideration ($\bar{x} = 3.90$, $SD = .74$), monitoring ($\bar{x} = 3.71$, $SD = .78$), contingent reward ($\bar{x} = 3.56$, $SD = .79$), and visionary/inspirational leadership ($\bar{x} = 3.71$, $SD = .77$).	"To what extent does your team check on the quality of work?", responded on a 5-point frequency scale (1 = <i>Never</i> , 5 = <i>Always</i>).	$\alpha = .78 - .96$; Ziegert, 2005.

Note. Subscale mean and sd in parentheses.

Table 4.2
Correlations Between Specific Shared Leadership Measures, Control Variables, and Team Potency.

Variables	1	2	3	4 ^b	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. Gender ^a	-																		
2. Age	-.07	-																	
3. Team tenure	-.03	.30***	-																
4. Workplace tenure ^b	.00	.18**	.45***	-															
5. Hours worked	-.04	.35***	.26***	.18**	-														
6. Team size	.03	.01	-.02	.08	.00	-													
7. Team interdependence	.08	-.16**	-.12*	-.05	-.12*	.11	(.71)												
8. Avolio et al. (2003) ^c	.13*	.05	.02	-.02	.04	.04	.16**	(.82)											
9. Hoch (2013)	-.03	-.08	-.02	-.03	.01	.02	.23***	.58***	(.89)										
10. Hoch et al. (2010) ^d	-.07	-.11	-.05	-.05	.05	.00	.23***	.41***	.91***	(.83)									
11. Pearce & Sims (2002) ^e	.08	-.05	-.03	-.03	-.02	.06	.20***	.76***	.70***	.49***	(.92)								
12. Pearce et al. (2004)	-.01	-.14*	-.05	-.05	.03	.06	.32***	.48***	.81***	.79***	.70***	(.84)							
13. Sherony & Green (2002)	-.01	.04	.10	.01	.07	.06	.17**	.57***	.57***	.47***	.58***	.52***	(.84)						
14. Carson et al. (2007)	.16*	-.16**	-.10	-.08	-.12*	-.21***	.17**	.16**	.19**	.16**	.22***	.20***	.11	-					
15. Hiller et al. (2006)	.00	-.07	-.03	.01	.02	.10	.25***	.68***	.67***	.55***	.72***	.60***	.66***	.19**	(.97)				
16. Hoch & Kozlowski (2014)	.04	.05	.09	-.01	.09	.08	.18**	.68***	.65***	.55***	.69***	.60***	.88***	.16**	.74***	(.91)			
17. Muethel et al. (2012)	.08	-.03	-.05	-.04	.04	.05	.22***	.58***	.68***	.60***	.64***	.62***	.63***	.22***	.76***	.72***	(.89)		
18. Ziegert (2005)	.04	-.06	-.01	-.05	.02	.10	.25***	.62***	.75***	.70***	.70***	.74***	.64***	.18**	.71***	.77***	.70***	(.87)	
19. Potency ^f	.00	.09	.07	.04	.04	.10	.21***	.52***	.42***	.34***	.50***	.41***	.45***	.10	.50***	.48***	.40***	.49***	

Note. Listwise deletion $n = 308$

*** $p < .001$, ** $p < .01$, * $p < .05$, Scale alphas in parentheses.

^a Gender coded 0 = male, 1 = female.

^b Pairwise deletion used $n = 289 - 299$.

^c Passive-avoidant and management-by-exception subscales reversed coded.

^d Aversive leadership subscale reversed coded.

^e Management-by-exception and aversive leadership subscales reversed coded.

^f Potency alpha = .89.

SHARED LEADERSHIP

Table 4.3

Measurement Model of Shared Leadership Measures (H1).

	Shared Leadership Measure	Items	Subscales	<i>df</i>	χ^2	RMSEA	CFI	SRMR
Traditional Leadership Perspectives								
1.	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	23	5	225	565.13***	.07	.91	.09
2.	Hoch (2013)	16	4	100	211.82***	.06	.93	.06
3.	Hoch, Pearce, & Welzel (2010) ^a	23	6	223	463.19***	.06	.91	.07
4.	Pearce & Sims (2002) ^{b,c}	64	6 ^d (18)	1928	3168.32***	.04	.90	.08
5.	Pearce, Yoo, & Alavi (2004)	14	4	73	135.02***	.05	.96	.07
6.	Sherony & Green (2002)	6	1	9	33.08***	.09	.92	.05
Network-relational Perspectives								
7.	Carson, Tesluk, & Marrone (2007) ^e	1	1	-	-	-	-	-
Functional Leadership Perspectives								
8.	Hiller, Day, & Vance (2006)	25	4	271	603.64***	.06	.92	.07
9.	Hoch & Kozlowski (2014) ^f	22	3	185	390.46***	.06	.92	.06
10.	Muethel, Gehrlein, & Hoegl (2012) ^g	7	2	13	21.63	.05	.99	.03
11.	Ziegert (2005)	19	5	147	300.44***	.06	.93	.08

Note.

^a Two empowering subscales were correlated.

^b A 3rd order factor structure was modelled (second order latent variables in parentheses).

^c Aversive intimidate correlated with MBE, two TFL items were correlated.

^d Directive instruction-command and aversive-reprimand subscales removed; MBE was disaggregated from transactional leadership subscale.

^e Fit statistics unavailable for observed variables.

^f Two reversed coded items error terms were correlated.

^g 2nd order factor loadings constrained to identify model.

Table 4.4

Structural Model of Shared Leadership Measures Predicting Team Potency controlling for Team Interdependence (H2 & H3).

	Shared Leadership Measure	Items	R^2 (H3)	df	χ^2	RMSEA	CFI	SRMR
Traditional Leadership Perspectives								
1.	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	23	.42***	618	1145.49***	.05	.91	.07
2.	Hoch (2013)	16	.33***	395	722.64***	.05	.90	.06
3.	Hoch, Pearce, & Welzel (2010) ^a	23	.35***	617	1101.91***	.05	.90	.07
4.	Pearce & Sims (2002) ^a	64	.39***	2895	4723.10***	.04	.87	.08
5.	Pearce, Yoo, & Alavi (2004)	14	.34***	340	589.82***	.05	.93	.07
6.	Sherony & Green (2002) ^b	6	.34***	164	320.50***	.05	.92	.05
Network-relational Perspectives								
7.	Carson, Tesluk, & Marrone (2007)	1	.11*	87	189.81***	.06	.93	.05
Functional Leadership Perspectives								
8.	Hiller, Day, & Vance (2006)	25	.34***	692	1262.85***	.05	.91	.06
9.	Hoch & Kozlowski (2014) ^a	22	.34***	550	964.16***	.05	.90	.06
10.	Muethel, Gehrlein, & Hoegl (2012) ^c	7	.27***	181	296.58***	.04	.95	.05
11.	Ziegert (2005)	19	.38***	484	795.66***	.04	.92	.07

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

^a See Table 3 for variations to original model.

^b Original measurement model fit was unacceptable.

^c Factor loadings were free estimated (compared to the constrained measurement model).

Table 4.5

Shared Leadership Subscales Predicting Team Potency (H3) and Loadings onto Higher Order Shared Leadership Factor (H1), Controlling for Team Interdependence.

		Predicting Team Potency (H3)			Shared Leadership Latent Variable (H1)	
		Items	Est. β	SE	Factor Loadings	R ²
Traditional leadership perspectives						
1	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	23	.58***	.06	-	-
	1. Intellectual stimulation	4	.18	.10	.81	.65***
	2. Pass-avoidant leadership	5	-.17*	.07	-.45	.20**
	3. Inspirational leadership	5	.08	.09	.77	.59***
	4. Individual consideration	5	.40**	.11	.92	.84***
	5. Management by exception	4	-.02	.06	-.12 ^b	.02
2	Hoch (2013)	16	.49***	.07	-	-
	1. Shared transformational leadership	6	.44**	.17	.84	.71***
	2. Individual empowering leadership	4	.24	.23	.96	.92***
	3. Team empowering leadership	3 ^a	-.02	.13	.68	.47***
	4. Shared participative leadership	3	-.20*	.08	.65	.43***
3	Hoch, Pearce, & Welzel (2010)	23	.53***	.06	-	-
	1. Empowering individual	6	.27	.33	.93	.81***
	2. Transformational leadership	3	.40*	.17	.90	.52***
	3. Transactional leadership	3 ^a	-.03	.16	.72	.37***
	4. Directive leadership	4 ^a	-.14	.09	.61	.86***
	5. Empowering team	3 ^a	-.09	.15	.60	.36***
	6. Aversive leadership	4	-.20**	.06	-.21 ^a	.04
4	Pearce & Sims (2002)	64	.55***	.05	-	-
	1. Transactional leadership	6	.22	.29	.88	.77***
	2. Management by exception	10	-.24*	.11	-.38	.14*
	3. Transformational leadership	20	.38	.21	.93	.86***
	4. Empowering leadership	22	-.16	.19	.88	.77***
	5. Directive leadership ^b	3	-.13	.08	.05 ^b	.00
	6. Aversive leadership ^b	3	-.04	.11	-.20 ^a	.04
5	Pearce, Yoo, & Alavi (2004)	14	.54***	.09	-	-
	1. Empowering leadership	4	.09	.05	.42	.18*
	2. Directive leadership	3	-.10*	.05	.42	.18*
	3. Transactional leadership	4	.05	.11	.45	.21*
	4. Transformational leadership	3	.34***	.08	.81	.65***
6	Sherony & Green (2002)	6	.49***	.06	-	-
Network-relational Perspective						
7	Carson, Tesluk, & Marrone (2007)	1	.17	.23	-	-

Note. *** $p < .001$, ** $p < .01$, * $p < .05$,

^a Subscale missing one item. ^b One subscale removed.

Table 4.5 (continued).

Multidimensional Shared Leadership Measures Predicting Team Potency (H3) and Loadings onto Higher Order Shared Leadership Factor, Controlling for Team Interdependence.

		Predicting Team Potency (H3)			Shared Leadership Latent Variable (H1)	
		Items	Est. β	SE	Factor Loadings	R^2
Functional Leadership Perspectives						
7	Hiller, Day, & Vance (2006)	25	.50**	.08	-	-
	1. Planning and organising	6	-.08	.08	.73	.54***
	2. Problem solving	7	.20*	.09	.84	.71***
	3. Support and consideration	6	-.12	.15	.92	.85***
	4. Development and mentoring	6	.29*	.12	.95	.91***
8	Hoch & Kozlowski (2014)	21	.49***	.06	-	-
	1. Cognitive	7	.02	.07	.70	.50***
	2. Affective	7	.13	.13	.94	.88***
	3. Behaviour	7	.43	.27	.95	.89***
9	Muethel, Gehrlein, & Hoegl (2012)	7	.42***	.07	-	-
	1. External related behaviour	4	.35**	.12	.90	.80***
	2. Internal related behaviour	3	.05	.13	.95	.72***
10	Ziegert (2005)	19	.56***	.07	-	-
	1. Initiating structure	4	.11	.10	.67	.44***
	2. Consideration	4	.25**	.09	.74	.54***
	3. Monitoring	4	-.05	.06	.35	.12*
	4. Contingent reward	4	-.03	.07	.49	.24**
	5. Visionary/inspirational leadership	3 ^c	.27*	.11	.83	.70***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$,

^a Subscale missing one item. ^b One subscale removed.

Chapter 4 Summary

To enhance our understanding of the benefits of shared leadership, this article aimed to demonstrate which specific behaviours (measured by the included 11 scales) were most highly related to team effectiveness. However as discussed, no single measure was found to exhibit both a high effect size (ability to explain variance in team potency) and an excellent goodness-of-fit (based on SEM fit statistics). It was therefore hypothesised that an improved measure of shared leadership could be identified and developed (see Chapters 7 and 8). Additionally, the lacklustre relationship observed for the social network measures (predicting team potency) were surprising, especially given previous research has argued these methods would exhibit the largest effect sizes (D'Innocenzo et al., 2014; Nicolaidis et al., 2014). These unexpected findings warrant further investigation. The following chapters will explore these unexpected outcomes, first through an examination of previous uses of social network theory in organisational sciences, including the key metrics used to quantitatively define social networks (Chapter 5). Following this Chapter 6 will empirically re-examine the relationship between social networked shared leadership (i.e., Carson et al., 2007) and key employee outcomes to explore if the larger effect sizes (argued by D'Innocenzo et al., 2014; Nicolaidis et al., 2014) can be recreated.

Chapter 5: Social Network Approaches to Shared Leadership

As evidenced in the shared leadership scale comparison analysis, the social network measure of shared leadership developed by Carson and colleagues (2007) demonstrated a weak relationship to the outcome variable of team potency, explaining only 11% of the variance. These results were surprising, given previous research which suggested social network measures of shared leadership exhibit a stronger relationship to team outcomes compared to other aggregate methods (D'Innocenzo et al., 2014; Nicolaides et al., 2014). Contrasting previous meta-analysis, the social network measure demonstrated the weakest relationship across all the included measures. The following two chapters explore these unexpected findings in greater detail. Collectively, these chapters aim to understand *why* the social network measures exhibited weak effect sizes, and to investigate the potential that these social network measures are assessing different underlying shared leadership constructs (compared to the measures from the traditional and functionalist approaches). First, a review of the social network techniques will be conducted, including both the previous uses of social network methods and the key metrics used in social network analysis. Chapter 6 will empirically re-examine the previous findings using a wider range of social network measures (specifically, the density of shared leadership networks, the centrality of shared leadership networks, and the percentage of binary network ties) and utilise additional outcome variables (specifically, team potency, employee engagement, and team adaptivity). The current chapter will review insights regarding social network methods in both shared leadership research and organisational sciences more broadly, with the aim of exploring the different metrics used by social network researchers to quantify organisational networks.

Advances to social network methodologies have afforded researchers a new lens to explore shared leadership processes (Borgatti & Foster, 2003); from this perspective, shared

leadership behaviours can be defined as an emergent property of organisational networks (Mehra et al., 2006). Organisational networks represent the formal or informal interactions and cognitions exhibited by staff within an occupational setting (Contractor et al., 2006). Networks consist of nodes or vertices (individuals) and edges or ties (the connections between these individuals; Borgatti & Foster, 2003; Mayo et al., 2003). Similar to traditional and functionalist approaches, research adopting a network-relational perspective posits that local interactions between team members will, over time, form consistent and predictable patterns of organisational behaviour, including leading and following (Contractor et al., 2006; Mayo et al., 2003; Mehra et al., 2006).

Network-relational approaches to shared leadership differ from the traditional and functionalist perspectives (collectively known as *aggregate approaches*), in that rather than aggregating individual responses (to form a team-level construct; Chan, 1998), social network approaches examine the structural relationships or connections between team members (Mayo et al., 2003). This is argued to be the key benefit of utilising a social networked methodology (Meindl et al., 2003); unlike aggregate approaches, information regarding the actual patterns of member-to-member leadership influence are preserved (Mehra et al., 2006). Where aggregate shared leadership measures simply sum individual responses to calculate a mean level of shared leadership, social network approaches preserve information regarding the frequency and configuration of individual connections between team members. These shared leadership networks can then be investigated both qualitatively (through visual and thematic coding; Mayo et al., 2003; Mehra et al., 2006), or quantitatively through the calculation of network metrics (i.e., network centrality, network density, or the percentage of connections observed; Carson et al., 2007; Small & Rentsch, 2010). Supporting the use of social network methods, D’Innocenzo

and colleagues (2014) remarked that these approaches “do not assume a convergence of attitudes but, rather, embrace discontinuity and a complex nonlinear emergence of constructs” (p. 8).

Meta-analysis comparing both social network (network-relational perspectives) and aggregate approaches (i.e., traditional and functional perspectives) have demonstrated that social network measures of shared leadership exhibit heightened effect sizes when predicting team effectiveness (D'Innocenzo et al., 2014; Nicolaidis et al., 2014). These claims however were found to be inconsistent in Spedding et al.'s study (under review [Chapter 4]). Comparing both network-relational and aggregate perspectives, they found that social network measures of shared leadership (specifically shared leadership density) exhibited the weakest relationship to perceptions of team effectiveness. Due to these conflicting results, it is unclear if these social network measures and aggregate measures of shared leadership are measuring similar or different underlying leadership constructs. A detailed examination of these relationships is presented in the next chapter (Chapter 6), prior to this the previous applications of social network analysis (SNA) and the common metrics used to operationalise such networks is discussed.

Use of Social Network Methods in Organisational Research

Historically, social network research has been used to assess a range of diverse constructs and social systems. Early research using social network analysis developed protocols to identify leadership and power dynamics within closed social systems (such as prisons or schools; Jennings, 1950; Moreno et al., 1932). Granvetter (1983) used network concepts to explain the organic evolution of social networks and the benefits of maintaining more organisational network ties; whilst Burt (1992) explored how gaps within networks can be leveraged upon within organisational systems. Social network analysis is particularly useful to understand informal or emergent processes, as official organisational structures may not accurately represent

the actual flow of activity within an organisation (Chan & Liebowitz, 2006). Broadly, these methods are used to investigate two distinct types of research question, those related to the *structure* of organisational networks, and questions related to the *function* of organisational networks (also referred to as structural and relational embeddedness; Balkundi & Harrison, 2006; Friedrich et al., 2009; Granovetter, 1992).

Structural questions focus on the connections between networked actors (i.e., the size of the network, the number of connections, observed centrality of a network; Friedrich et al., 2009) or an individual's position within such networks (Blau, 1977; Wellman, 1997). Structural aspects of a social network can be examined to explore both how network ties can be developed (e.g., through physical proximity; Krackhardt, 1994), and/or how configurations of network relationships can be optimised within these systems (Borgatti & Cross, 2003; Burt, 2001; Gargiulo & Benassi, 2000). For example, evidence has linked employee network structures with increased information exchange (Albrecth & Ropp, 1984), better communication in project teams (Gargiulo & Benassi, 2000), or used to identify key project stakeholders (Prell et al., 2009); similarly, intra-organisational network structures can lead to improved organisational innovation (Powell et al., 1996), and growth through connections with external organisational partnerships (Stuart, 2000).

Conversely, questions regarding functional aspects of social networks target the content of these ties and the underlying processes they represent (e.g., boundary spanning behaviours, network knowledge or exposure, or the flow of information; Balkundi & Harrison, 2006; Friedrich et al., 2009). Rice and Aydin (1991) explored how social information is processed through employee networks, finding that connections exhibited between employees and supervisors helped expedite informational flow. In organisational knowledge networks, Rulke

and Galaskiewicz (2000) found groups that maintain high levels of knowledge specialisation are greatly advantaged by more decentralised communications; similarly, Borgatti and Cross (2003) demonstrated ease of access and knowledge regarding sources of expertise resulted in greater knowledge transference. Bowler and Brass (2006) found interpersonal social networks could predict organisational citizenship behaviours and staff altruism. Whilst Burke and colleagues (2006) found boundary spanning behaviours (i.e., maintaining informal relationships across multiple team environments) accounted for 24% of the observed variance in team effectiveness, with Hirst and Mann (2004) showing that boundary spanning was most effective when performed by formal leaders. Social network methods enable researchers to ask questions regarding both the structure and function of organisational interactions (Borgatti & Foster, 2010; Mayo et al., 2003); however, to answer specific formal hypotheses, metrics to describe and quantify network differences are required.

Measurement of Networks

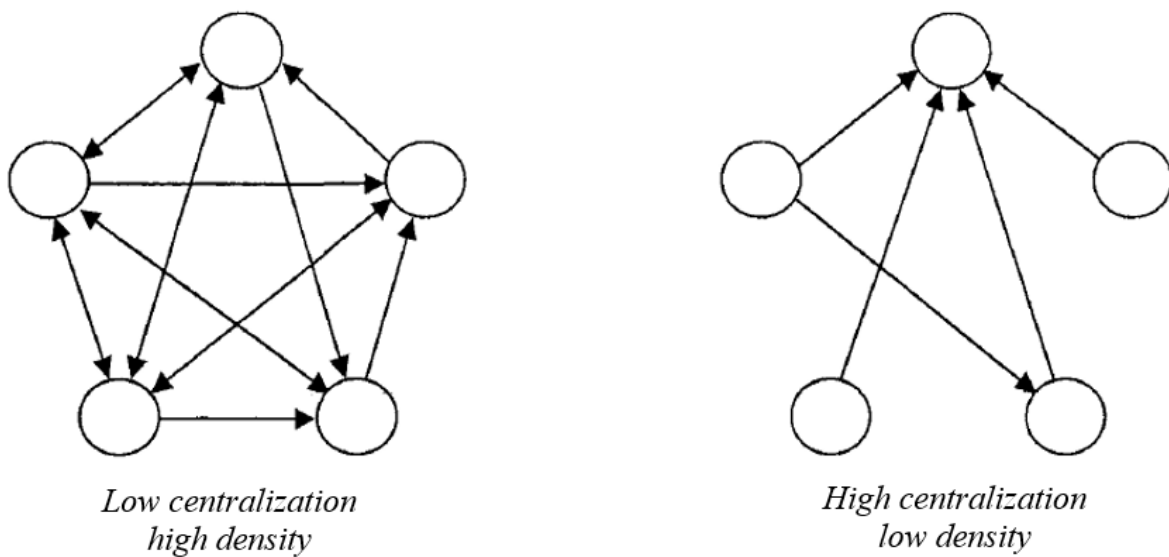
The key difference between social network analysis and aggregate approaches in research is that social networks assess information regarding the unique relationships between individuals, and this information can be encoded and utilised in further analyses (Borgatti & Foster, 2010; Mayo et al., 2003). Figure 5.1 displays a pictorial representation of two differing networked team systems. The connections between nodes could represent any number of person-to-person social processes, for example when modelling advice networks, each node would represent an individual, whilst the pathways connecting these nodes would refer to sources of advice (Sparrowe et al., 2001). Using this example, the first network in Figure 5.1 would represent an egalitarian decentralised knowledge distribution, where an individual might seek out advice from a number of different sources. In contrast, the second network represents a social system with

highly monopolised or centralised knowledge, where most individuals would seek advice from a single source. Comparing these networks, it would be expected that these teams would utilise diverse behaviours and process to remain effective or would likely exhibit distinct outcomes given similar team inputs (Mathieu et al., 2015; Mayo et al., 2003; Mehra et al., 2006). To describe these different patterns, two key social network metrics are discussed, specifically network centrality and network density (Freeman, 2004).

Figure 5.1

A Visual Representation of Social Network Patterns including Network Density and Centrality

(Adapted from Mendez, 2010, p. 50).



Social network centrality

The most commonly explored metric utilised in social network research assesses network centrality (Freeman, 2004). Centrality is a measure of the connectedness of a node to other nodes, this includes both direct connections (degree-centrality) and indirect connections via other nodes (betweenness/closeness-centrality; Freeman, 2000). Centrality specifically refers to the connections initiating or terminating at an individual node, whilst network centralisation refers to

these connections across the total network (although in practice organisational researchers use these terms interchangeably). Centrality can be measured using four indices: degree-centrality (the number of connections a node shares to other nodes), betweenness-centrality (shortest [geodesic] path between all nodes), closeness-centrality (mean distance from a node to every other node), and eigenvalue-centrality (how connected a node is to other highly connected nodes). Of these, betweenness-centrality is the most commonly reported in organisational and managerial research (Balkundi & Kilduff, 2006).

In organisational research centrality is commonly used to represent the social resources available to an individual (e.g., access to information, social ties, or leadership influence; Balkundi & Kilduff, 2006; Borgatti & Foster, 2003; Burt 1992; Sparrowe et al., 2001). For example, network centrality has been previously linked to leadership emergence (Bass, 1990; Mullen et al., 1991; Neubert & Taggar, 2004), access to information (Balkundi & Kilduff, 2006; Lawrence & Lorsch, 1967), heightened influence (Mechanic, 1962), more rapid promotions/compensation (Burt, 1992; Podolny & Baron, 1997), perceptions of charisma (Balkundi et al., 2011), and ability to influence organisational culture (Rogers & Kincaid, 1981). Hossain (2009) demonstrated that an individual's network centrality (rather than their formal position) was related to effective coordination of projects, whilst Rulke and Galaskiewicz (2000) argued decentralised networks were particularly useful when the dissemination of diverse knowledge is required for task performance.

Network centrality is not limited to one level of analysis and can extract information within nested organisational systems (Borgatti & Foster, 2003; Friedrich et al., 2009). Indeed, the effects of network centrality exhibits isomorphic properties. For example, similar to when individuals occupying central nodes within a team network gain access to prestige and resources;

teams located centrally within an organisational network exhibit similar advantages (Balkundi & Harrison, 2006; Borgatti & Foster, 2003; Friedrich et al., 2009). Furthermore, Meagher and Rogers (2004) demonstrated that organisational innovation can be predicted by the company's centrality within intra-organisational support networks. Sparrowe and colleagues (2001) found differential effects, such that centrality in advice networks was associated with individual performance, but overall, negatively related to group performance metrics. This implies that it is personally advantageous to be the sole source of advice in a team, although this centralisation results in poorer team outcomes overall.

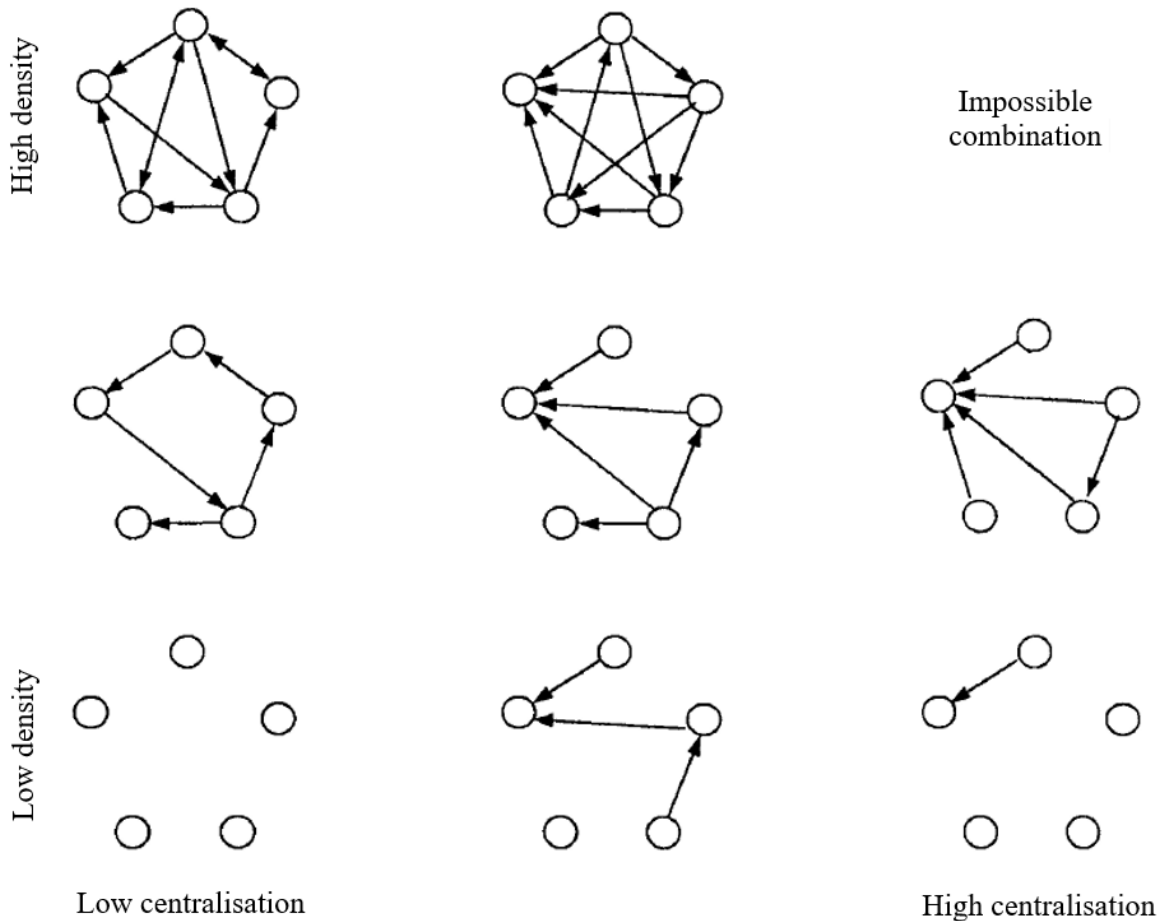
Social network density

The other key metric widely utilised by social network theorists is the density of connections within a network (Freeman, 2004). Density is calculated via the summation of the total observed connections, divided by the maximum possible number of connections available within that network, such that values approaching one represent a saturated network (Sparrowe et al., 2001). Where centrality describes properties of an individual node, density is a measure of the overall network. For example, within a team with high density of advice-giving ties, advice would be rendered quickly and more freely between team members compared to teams with less dense advice ties. Although centrality and density are often communicated as measuring different network configurations, they are not mutually independent from one another (Mendez, 2010). As demonstrated in Figure 5.2, some configurations of centrality/density are not possible, within social networks approaching maximum density, ties must be highly decentralised.

Figure 5.2

Visual Representation of Network Configurations across High and Low Density and Centrality

(Adapted from Mendez, 2010, p. 55)



Structural theorists have posited the relative benefits of maintaining dense as opposed to sparse ties within organisational systems (cf. Adler & Kwon, 2002). Burt (1992) argued for the benefits of sparse but interconnected networks, whilst Coleman (1988) posited increased density would facilitate the development of social norms and trust, resulting in increased social capital. Aggregating findings across several social network studies, Balkundi and Harrison (2006) found that the density of both social ties (i.e., friendships) and instrumental ties (i.e., advice giving) were positively related to team member performance. Additionally, the temporal precedence of

these effects was tested, finding that density of network ties preceded performance (rather than team performance leading to increased perceptions of network density; Balkundi & Harrison, 2006). Formal leaders can actively pursue increased organisational connectedness through encouraging boundary-spanning, by connecting socially isolated subgroups, or through developing an increased sense of organisational identity (Yammarino et al., 2012). Research examining social capital networks have explained how social relationships are linked to performance through more frequent interactions between team members who possessed goal related information, knowledge, and expertise (Burt, 2000; Reagans & Zuckerman, 2001). Whilst, Donati and colleagues (2016) found density of intra-team communications predicted individual innovation behaviours.

Conversely, several researchers have highlighted the potential negative effects of maintaining dense social networks. For example, Hansen (2002) posited that maintaining dense communication networks can be costly (requiring both time and effort); they argued that high density communication networks would likely only be beneficial in teams where diverse knowledge or information are required (for example, on uncertain or complex tasks; Alder & Kwon, 2002). Whilst Sparrowe and colleagues (2001) found non-significant effects for advice network density in predicting group performance; or highlighted potential risks of dense networks such as increased *groupthink* (Janis, 1972), reduced desire to challenge corporate culture (Krackhardt & Kilduff, 1990), or through increased process loss or team inefficiencies (Shaw, 1964). Gargiulo and Benassi (2000) explored teams maintaining strong intra-team communication networks, finding that despite advantages in information flow, these rigid networks were less able to adapt to changing coordination demands, highlighting a potential trade-off between dense embedded ties and organisational flexibility (Gargiulo & Benassi, 2000).

This resurgence in social network methodologies have expanded our understanding of a range of organisational processes and behaviours, of particular interest here is the observed rise in research utilising social network methods to explore shared leadership processes.

Shared Leadership and Social Networks

Increasingly organisational scholars have adopted social network methods to investigate shared leadership processes (Friedrich et al., 2010). Such methods are ideally suited to answering questions regarding both the structure and function of shared leadership processes, as noted by Yukl (1998, p. 458) "...new research methods may be needed to describe and analyze the complex nature of leadership processes in social systems". Supporting this, Balkundi and Kilduff (2006) claimed that messages delivered by individuals who maintain numerous social, instrumental, or leadership network ties would likely elicit more influence compared to individuals with fewer ties. Shared leadership density (as measured by Carson et al., 2007), has been related to increased performance (Carson et al., 2007; Zhou, 2012), task satisfaction (Serban & Roberts, 2016), team learning (Liu et al., 2014), and effective mental models (McIntyre & Foti, 2013). Similarly shared leadership [de]centrality has been related to team performance (Small & Rentsch, 2010), especially when these shared leadership perceptions are congruent amongst team members (McIntyre & Foti, 2013; Mehra et al., 2006). For an extended review of the uses of social network methods to capture shared leadership behaviours, see Chapter 3 (i.e., network-relational approaches to shared leadership).

Researchers employing social networks often argue these methods allow a more in depth understanding of these processes and critique the inability of aggregate shared leadership measures to define *where* shared leadership is being shared within a team (Small & Rentsch, 2010). Others highlight that leadership with low centrality but at medium levels (resulting in an

average mean level using aggregate methods), might exhibit important differences compared with strong leadership ratings that are highly centralised within a few team members (which may also produce average mean levels when aggregated; Mayo et al., 2003). These differences were argued to explain the larger effect sizes observed between social network measures of shared leadership and beneficial team outcomes (D’Innocenzo et al., 2014; Nicolaidis et al., 2014).

The use of social network ratings of shared leadership have also been previously criticised. For example, Small and Rentsch (2010) argued that non-binary density scores (opposed to centrality scores) do not capture the distribution of shared leadership, but instead form another aggregate shared leadership measure (Gockel & Werth, 2010; Small & Rentsch, 2010). Similarly, [de]centrality metrics used to quantify the dispersion of shared leadership within a team offers limited information regarding the overall strength of these influence processes (Carson et al., 2007). Comparing findings between aggregate approaches (i.e., the traditional and functionalist perspectives) and social network approaches is also especially difficult, as such it remains unclear if these are measuring comparable constructs. Attempting to mitigate these limitations, several previous researches have combined both network and aggregate methods by adapting items targeting specific shared leadership styles within a social network framework.

Hybrid Measures of Shared Leadership

In addition to the common one-item shared leadership measure (Carson et al., 2007), social network theorists have developed hybrid measures based on validated leadership scales (i.e., adapted from traditional and functionalist perspectives). These hybrid approaches differ from classic social network approaches in that they utilise multiple items to assess the density or centrality of specific leadership behaviours. Where Carson and colleague’s (2007) measure asks

participants to rate each team member on one item (“To what degree does your team rely on this individual for leadership”), hybrid measures employ multiple items to assess perceptions of team networks regarding a specific leadership style. For example, to assess elements of change-focused shared leader behaviours a scale might ask participants to rate each team member on the item “how frequently was (insert team members name) optimistic about the future of the team” (Small, 2007). Using a hybrid measure, Small (2007) found centrality of leadership ties (across task-focused, relations-focused, and changed-focused leader behaviours) explained 12% of the variance between teams for task performance, while density of network ties explained 22% of observed differences in task performance.

Additionally, interactions between the reported mean levels of shared leadership and the *sharedness* of these perceptions (i.e., inverse centrality) were tested, although no effects were found for task performance, a significant moderation effect was identified for team viability outcomes, such that networks which were both dense and decentralised exhibited the highest ratings of team viability (Small, 2007). However, caution is recommended when interpreting models including both centrality and density metrics, as extreme ratings on both outcomes are mutually exclusive (forming impossible combinations see Figure 5.2). Interestingly, these shared leadership networks were coded based on their levels of density and centralisation into one of four categories (see Mayo et al., 2003; these were then compared via a one-way ANOVA). Teams with both high density and highly decentralised leadership structures demonstrated benefits across a range of the outcomes including objective performance, subjective performance, and team viability (Small, 2007).

The use of hybrid measures allows for interesting comparisons between density and centrality across a range of shared leader behaviours. For example, Mendez (2010) found

comparable levels of density were exhibited across different leadership styles within a team (i.e., charismatic leadership density, directive leadership density, participative leadership density, and supportive leadership density). Such findings potentially infer that a common factor or latent construct (rather than the specific shared leadership behaviour) might underlie sharing processes across a range of leadership behaviours (e.g., a team culture for sharedness or collectivist orientation; Mendez, 2010). Furthermore, each of these density ratings was significantly associated with increased team performance (i.e., density for charismatic, directive, participative, and supportive leadership); similarly, the centrality of these shared leadership behaviours was negatively related to performance (Mendez, 2010). Regression results however were less clear, with Mendez (2010) finding both density and centralisation for participative leadership practices were positively related to performance outcomes (inferring that more participative leadership behaviours exhibited by fewer individuals resulted in beneficial team outcomes). Although Mendez (2010) explained these effects via the benefits of having one person who draws on the participation of other team members; however, these regressions included both density and centrality metrics which are not fully independent. Additionally, Contractor and colleagues (2012) noted that as shared leadership relationships are nested within team processes, a range of individual intra-team connections might contribute to (or confound) the positive effects of maintaining more dense or decentralised shared leadership networks.

Attempts to combine measures of shared network and aggregate referent shift measures of shared leadership have yielded mixed results. Sanders (2006) collected both team networked influence density (via a one-item measure where each team member was rated as *very influential* to *not influential at all*) and team level full-range leadership information (specifically transformational behaviours/characteristics and transactional team behaviours). Attempts to

combine these scores via confirmatory factor analysis (CFA) demonstrated that the networked measures of shared leadership did not fit with other aggregate measures of shared leadership. For the included social network items, the latent shared leadership construct only explained 8% of variance in these social network items (compared to 80–92% for the aggregate shared leadership items). Although Sanders (2006) argued for the inclusion of both aggregate and network measures (aiming to unite these two streams of shared leadership research), their analysis failed to fit these two conceptualisations to their data (Sanders, 2006). These inconsistencies between aggregate and social network measures of shared leadership highlight the need for better understanding of what specifically these social network scales are measuring.

One explanation given for these results resides in the use of “influence density” rather than “leadership density” in the wording of the included social network items (i.e., as assessed by the Carson et al. [2007] one-item measure; Sanders, 2006). Sanders (2006) argued raters might attribute different emotional connotations to being “influenced” compared to the more descriptive transformational behaviours assessed by the other items. Collectively, these hybrid measurements exhibit strange relationships when compared to the aggregate measures of shared leadership. These hybrid studies raise concerns regarding whether social networked and aggregate measures of shared leadership are assessing aspects of the same construct, or if these are indeed different underlying processes. This hypothesis that social network measures are assessing a different form of shared leadership would explain the lack of convergence found across studies utilising both social network and aggregate measures of shared leadership (Mendez, 2010; Sanders, 2006; Small, 2007).

Comparing Social Network and Aggregate Measures of Shared Leadership

The literature in this field includes few studies which explicitly collect both aggregate and networked measures of shared leadership processes. One exception is Ziegert (2005) who specifically compared aggregate (both referent shift and direct consensus measures) and networked leadership methods. They asked participants to rate co-workers on a binary (yes/no) one-item measure “does this person play a leadership role in the restaurant”. Scores were transformed to form a percentage of co-workers who exhibited leadership influence, while several aggregate shared leadership measures (i.e., shared consideration, initiating structure, contingent reward, visionary inspiration, shared monitoring) were also administered (Ziegert, 2005).

Interestingly, this networked operationalisation of shared leadership exhibited unusual relationships for both the outcome variables and the other measures of shared leadership. Firstly, contrasting previous research, higher percentages of perceived shared leadership were found to be negatively associated with subjective measures of performance. Furthermore, no significant relationships were observed between the social network measures and aggregate shared leadership measures. Due to this lack of convergence between the networked and aggregate methods, Ziegert (2005) concluded that “more research is needed to determine the reasons for this lack of convergent validity; however, I tentatively conclude that the personal and percentage measures were poor assessments of shared team leadership” (p. 59). Additionally, because of their consistent positive relationship to both team and organisational outcomes, it was argued that the aggregate referent shift approaches were superior to both the percentage network measure and the other direct consensus methods of measuring these shared leadership processes (Chan, 1998; Ziegert, 2005). Again, these oddities occur when comparing the predictive ability of social

network and aggregate measures, hence further research is needed to explore these varied measurement techniques.

Chapter 5 Summary

From this review, it is clear the use of social networked approaches to leadership research is becoming more common (Borgatti & Foster, 2003). Despite evidence linking social network measures of shared leadership to key individual, team, and organisational outcomes, it remains unclear if shared leadership operationalised through the density and centrality of network ties are measuring the same construct compared to aggregate methods of quantifying shared leadership processes (i.e., measures drawn from the traditional and functionalist approaches). Indeed, many authors would argue that these are not equivalent, with shared leadership scholars criticising the use of network density scores of shared leaderships (compared to network centrality; Small & Rentsch, 2010). However, due to only a few studies including both social network and aggregate measures, direct comparisons is difficult. For example, Sanders (2006) found inclusion of measures from both social networked and traditional perspectives in a single confirmatory factor analysis did not fit the underlying data. Whilst meta-analytic reviews (opposed to direct comparisons) conducted by D’Innocenzo and colleagues (2014) found that social network measures of shared leadership exhibit greater effect sizes compared to aggregate measures, stating that social network items “removes the mental arithmetic that referent shift-approaches require of respondents” (p. 9). However, other research which empirically compare both measurement approaches demonstrate the opposite, finding that aggregate measures of shared leadership explained more variance in team outcomes (Spedding et al., under review; Ziegert, 2005). Comparing both methods, Mendez (2010) claimed that aggregate measures were best suited (compared to hybrid and social network measures) to assess these underlying shared

leadership process. Despite these findings, more information regarding the similarities and differences in these measurements is required. The next chapter (Chapter 6) seeks to clarify these questions through examining in detail the predictive utility of three networked measures of shared leadership, namely network density, network centrality, and a binary percentage measure of network ties (Mendez, 2010).

Study 2: Exploring Social-networked Measures of Shared Leadership (Chapter 6)

Social network methodologies are currently experiencing a renaissance in organisational and managerial research (Borgatti & Foster, 2003) and have been employed to answer a wide range of questions regarding organisational social processes. Of specific interest here are the ways social network methods have been employed to operationalise leadership processes exhibited between individual team members, irrespective of formal leadership roles or status. These intra-team coordination processes are commonly known as shared leadership (Pearce & Conger, 2003). Despite research supporting the associations between social network measures of shared leadership and beneficial team outcomes (Carson et al., 2007; D’Innocenzo et al., 2014; Liu et al., 2014; McIntyre & Foti, 2013; Nicolaides et al., 2014; Serban & Roberts, 2016; Zhou, 2012), comparisons of different shared leadership measures have highlighted that social network measures may exhibit the weakest effects on team effectiveness outcomes (Chapter 4). This chapter describes a study (Study 2) which empirically re-examines these social network measures, with the aim of testing if these small effects remain consistent across different measures of social networked shared leadership (i.e., network density, network centrality, and the percentage of binary network ties), and across different beneficial employee outcomes (i.e., team potency, employee engagement, and team adaptivity).

Importantly, social network methods are not the only strategy used to assess shared leadership perceptions. Comparing both social network and aggregate approaches (i.e., traditional and functionalist approaches), theorists have argued social network metrics are the only way to capture the actual effects of shared leadership configurations within a team (Small & Renstch, 2010). Similarly, both D’Innocenzo and colleagues (2014) and Nicolaides and colleagues (2014) meta-analytically compared multiple methods of measuring shared leadership

and found that social network operationalisations of shared leadership exhibit heightened effect sizes compared to aggregate approaches.

Study 2 follows conclusions drawn from the comparison of shared leadership scales presented in Spedding et al.'s study (under review [Chapter 4]). Previous meta-analyses have found social networked measures to exhibit stronger associations with team effectiveness compared to aggregate measures of shared leadership (D'Innocenzo et al., 2014; Nicolaides et al., 2014). However, results from Spedding et al. (under review) challenge this, demonstrating a weak association between social network measures of shared leadership (specifically network density) and team potency outcomes. To better understand these inconsistent findings, this study provides an in-depth exploration of the relationship between three social network measures of shared leadership and a range of beneficial employee outcomes. Specifically, outcomes including team potency, employee engagement, and team adaptivity, will be tested against shared leadership measured via the density of shared leadership connections (both valued [i.e., 5-point Likert responses] and binary calculations [dummy coded 0 or 1]) and via the (de)centralisation of shared leadership connections (i.e., more distributed perceptions of shared leadership). Additionally, the potential moderating effects of team context (measured via team tenure, team size, and team interdependence) is also tested. Finally, additional post-hoc analyses tests are conducted to examine if network density, centrality, or percentage of binary ties, moderate the observed associations between aggregate measures of shared leadership and team potency outcomes.

Shared Leadership and Team Potency

Team potency is a collective sense regarding a team's capability and effectiveness (Gully et al., 2002); this generalised form of collective self-efficacy refers to beliefs and cognitions that

the team (as a whole) can be effective in achieving goals within an organisational system (Gully et al., 2002; Guzzo et al., 1993). Research investigating team potency has linked this emergent state to multiple beneficial outcomes such as team satisfaction and effort (Lester et al., 2002), social support and cooperation (Campion et al., 1996), and team performance (Gully et al., 2002). Early team research identified potential positive feedback loops, whereby effective teams form mental models regarding their own ability to effect organisational change, which subsequently cause teams to exert additional effort and motivation thus fulfilling these beliefs (Sayles, 1958). Subsequent research demonstrated similar links between team potency and team effectiveness across multiple studies (Gully et al., 2002), including reciprocal longitudinal effects (Mathieu et al., 2015; Pearce et al., 2002), and these effects were conditional on positive early group experiences (Lester et al., 2002).

Shared leadership has been shown to influence perceptions of team potency. Using aggregate measures, researchers have demonstrated a significant positive relationship between shared leadership and team perceptions of potency (Boies et al., 2010; Cashman, 2008; Pearce et al., 2004; Sivasubramaniam et al., 2002). Similarly, Pearce and colleagues (2004) found elements of aggregate shared leadership were related to potency (i.e., directive, transformational, and empowering), and once controlling for formal leadership, these shared leadership processes explained an additional 43% of the variance observed in team potency. Despite these large positive relationships between shared leadership and team potency, less research has explored these team potency effects using a social network operationalisation of shared leadership.

Shared Leadership and Employee Engagement

Compared to team effectiveness outcomes, little is known regarding the effects of shared leadership on levels of employee engagement. Employee engagement refers to an affective-

cognitive state that is characterised by high levels of energy, experiencing enthusiasm, pride, challenge, whilst being fully absorbed in one's workflow (Schaufeli et al., 2006). Previous studies have linked aspects of formal leadership to increases in self-reported engagement via the enhancement of personal resources (Biggs et al., 2013; Tims et al., 2011). As team members generally work in closer proximity to each other (compared to formal leaders), such processes should exhibit a similar, if not stronger effect on these same outcomes. Other leadership-to-follower affective outcomes have been explained via a positive contagion process, whereby formal leader's positive affect is transferred to other team members (Barsade, 2002).

Commenting on the potential benefits of maintaining a decentralised shared leadership network, Contractor and colleagues (2012) posited teams would "benefit from greater member engagement and enhanced coordination as members come to understand the nature of their interdependencies" (p. 1008).

Shared Leadership and Team Adaptivity

Another key antecedent of team effectiveness is the ability to quickly adapt to occupational challenges. Team adaptivity refers to the "process by which a team is able to use information gathered from the task environment to adjust strategies through the use of compensatory behaviour and reallocation of intrateam resources" (Cannon-Bowers et al., 1995, p. 344). Team adaptivity has previously been identified as an important skill for high-performing teams, and is becoming more valued given the fluidity of modern organisational environments (Burke et al., 2003; Mathieu et al., 2019). Exploring the relationship between leader behaviours and team adaptivity, Charbonnier-Voirin and colleagues (2010) found formal transformational leadership enhanced individual adaptive behaviours. Similarly, shared transformational leadership training programs have been demonstrated to enhance team member adaptive

responses by 10% (Van der Kleij et al., 2011). Although these previous studies focused on aggregate conceptualisations of shared leadership, little is known regarding similar effects when operationalised through social network measures.

Shared Leadership Interaction Effects

In addition to these proposed direct effects, this study provides an opportunity to test the potential interaction effects observed between shared leadership and aspects of team context which may enhance such processes. These team contextual variables include team tenure, team size, and team interdependence.

Team tenure is the first contextual variable which we expect to moderate the effects of shared leadership. Team tenure can affect these relationships via two mechanisms, the first being accuracy of shared leadership perceptions. It is posited that participants residing within a team will overtime form more accurate representations regarding the shared leadership processes produced by individual team members, and thus give a more accurate rating of these outcomes (Cannon-Bowers et al., 1995). The second process through which team tenure might affect shared leadership involves the process of team entrainment (McGrath et al., 1984). Entrainment refers to the convergence of team cognitive, affective, and behavioural processes; through multiple action-transition cycles team members learn to adapt their behaviours to more effectively work with colleagues to achieve desired outcomes (Marks et al., 2001). These mutual behavioural processes cause alignment and cohesion within teams (Mathieu et al., 2015). Testing a similar effect, Mathieu and colleagues (2015) demonstrated networked shared leadership processes were indeed related to team performance outcomes via increased team cohesion.

Team size is also expected to moderate the effects of shared leadership with the dependent variables. Naturally as team size increases so too does the frequency of team

coordination challenges (Mehra et al., 2006); however, the opportunities to exhibit informal or shared leadership practices also increases (Friedrich et al., 2016). Additionally, smaller teams have been argued to be more effective, more cooperative, and more satisfied (Pearce et al., 2004). Previous investigation of networked shared leadership revealed a positive relationship between team size and density of leadership ties (Carson et al., 2007). Research using aggregate measurements revealed only specific types of shared leadership were related to team size (e.g., shared directive leadership; Boies et al., 2010; Ensley et al., 2006), while others claimed no significant relationship between team size and shared leadership emergence (Nicolaidis et al., 2014).

Team interdependence captures the level of interaction exhibited amongst team members in competing their tasks and how much overlap is perceived between individual and team goals (Campion et al., 1993). Mathieu and colleagues (2005) categorised team interdependence based on the complexity of workflows needed for task completion, with less complex work requiring only the *pooled efforts* of several individuals (individual contributions), followed by *sequential work* (e.g., assembly line work), *reciprocal work* (where tasks are passed back and forth), and the most highly interdependent workflows termed *intensive work* (where members work intensely together in real time; Mathieu et al., 2005). Interestingly, Shea and Guzzo (1987) noted that as teams are self-organizing systems; members often exert control over levels of team interdependence, and thus will adjust this as required to complete team tasks. The level of interdependence required to optimise team outcomes has been argued to moderate important team leadership processes (Kozlowski et al., 2016). Given this team self-regulation, it is logical that interdependence would be related to both increased shared leadership processes, but also an increased need for shared leadership.

Hypotheses

Hypothesis 4a. Shared leadership measured through social network density will be associated with increased team potency, employee engagement, and team adaptivity.

Hypothesis 4b. Shared leadership measured through social network [de]centrality will be associated with increased team potency, employee engagement, and team adaptivity.

Hypothesis 4c. Shared leadership measured through the percentage of binary social network ties will be associated with increased team potency, employee engagement, and team adaptivity.

Hypothesis 5. Team contextual variables (team tenure, team size, and team interdependence) will moderate the associations between the social network measures and the dependent variables, such that the benefits of shared leadership will increase for more tenured, larger, and more interdependent teams.

Study 2 Method

Participants

Participants were collected accessing a first-year psychology student subject pool, with students receiving course credit for survey participation. The study was advertised to students who were currently employed within a workplace team setting. Initial questions in the survey asked for open responses describing their current team, this information was used to exclude those who were not currently working in a team, or were referring to a sports or non-occupational team. Previous meta-analyses exploring the effects of student samples in organisational research demonstrated few practical differences between student and employee samples (Wheeler et al., 2013). From this sample, data was collected from 328 participants.

Listwise deletion techniques employed reduced this sample to 280 usable responses retained for the final analysis.

Demographic Variables

Demographic variables were included based on previous shared leadership and team process research. In addition to workplace team tenure (in years $M = 1.78$, $SD = 1.54$), team size ($M = 6.61$, $SD = 2.88$), and team interdependence ($M = 3.69$, $SD = .64$), participant age ($M = 22.62$ years, $SD = 4.68$), gender (male = 75 [27%], female = 205 [73%]), work tenure ($M = 2.14$ years, $SD = 3.49$), and hours worked per week ($M = 16.22$, $SD = 9.52$) were included in the analysis. Selection and retention of these demographic variables in the subsequent analyses is decided based on their significant relationships with the research variables (Becker 2005).

Shared Leadership Density

Shared leadership density data was collected in three steps. Initially, a question was included in the survey “excluding yourself, how many members does your team have”. Participants indicated their responses on an 11-point scale, ranging from “one other member” to “more than ten other members”. Participants then rated each team member (up to ten team members) on the one item social-network measure of shared leadership developed by Carson and colleagues (“To what degree does your team rely on this individual for leadership?”; 2007). Responses were recorded on a 5-point Likert scale (1 = *Not at all*, 5 = *To a very great extent*). Density scores were calculated by summing all Likert responses, then dividing this by the maximum possible value for the network given their team size, producing a coefficient between 0 and 1, with higher values representing a more saturated network (Sparrowe et al., 2001).

Shared Leadership Centrality

Network centrality is a measure of the absence of shared leadership, it refers to the extent leadership is concentrated within a few individuals (i.e., highly centralised leadership) compared to many individuals (i.e., highly shared leadership; Sparrowe et al., 2001). Centralisation was calculated by the sum of differences between the most central member compared to each other team member, divided by the maximum sum of differences (Freeman, 1979). Centralisation values are generated with possible values ranging from 0 (all members exhibit identical level of shared ties) to 1 (where one member exhibits the highest value and all others exhibit no leadership ties).

Centrality has been criticised due to the ambiguity in scores, such that a centrality rating approaching one can demonstrate both a network with maximum shared leadership (every member rates everyone else as shared leaders) or an absence of shared leadership (no one identifies anyone as a leader; D’Innocenzo et al., 2014). To ameliorate this, centrality scores and rater responses were visually inspected. Abnormalities were only observed for small teams with few team members (e.g., teams with two or three members). A second centrality variable was created (see data screening below) with these small teams recoded as missing (all analyses were conducted with both centrality calculations, however unless results differed only the original variable is reported). It should be noted that centrality and density metrics are not mutually exclusive, for example high centrality will always result in lower density coefficients. However, the reverse is not true, such that networks can exhibit low centrality and both low or high level of network density (Mendez, 2010; Wasserman & Faust, 1994).

Shared Leadership Percentage of Binary Ties

Given the criticisms of the density approach to network measures of shared leadership (Small & Rentsch, 2010), an additional binary metric of shared leadership density was generated. These calculations are informed by previous research in which dichotomised binary network values were utilised (Mendez 2010; Small & Rentsch, 2010). Responses were dummy coded on the one-item social network measure, specifically ratings of “*to some extent*” and “*to a very great extent*” were recoded as one with the remaining responses coded as zero (Carson et al., 2007). Scores were summed and divided by the maximum possible value given the team size to generate a percentage of team members who were perceived to have demonstrated leadership (Wasserman & Faust, 1994).

Team Potency

Team potency was measured by eight items developed by Guzzo and colleagues (1993). These questions captured a collective sense of generalised team efficacy (e.g., “This team can get a lot done when it works hard”), with team members rating the extent to which they perceived these collective cognitions (1 = *To no extent*, 5 = *To a great extent*). Referent shift processes were included so that items targeted a team referent (Chan, 1998). Previous research has demonstrated acceptable levels of validity and reliability for this measure ($\alpha = .88$; Guzzo et al., 1993), as did the current sample ($\alpha = .89$, $M = 4.09$, $SD = .64$).

Employee Engagement

Individual engagement was assessed with the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). This nine-item scale measures engagement via three subscales of work vigor, dedication, and absorption, as well as a composite work engagement score (e.g., “When I get up in the morning, I feel like going to work”). Responses are recorded on a five-point

frequency scale (1 = *Never*, 5 = *Always*), with higher scores representing heightened levels of engagement. The UWES has demonstrated acceptable model fit and reliability across several countries ($\alpha = .92$). Similarly, the current sample exhibited acceptable psychometric properties ($\alpha = .92$, $M = 3.31$, $SD = .84$).

Team Adaptivity

Team member adaptivity was measured by the Team adaptivity subscale (Griffin et al., 2007). This scale consists of three items to assess how team members respond to unique and novel work practices. Scale items include “team members dealt effectively with changes affecting your work unit”. Perceived frequency of behaviours were rated on a five-point scale (1 = *Never*, 5 = *Always*). This scale has been shown to provide a good measurement fit and reliability ($\alpha = .91$; Griffin et al., 2007). The current data also demonstrated acceptable reliability ($\alpha = .88$, $M = 3.89$, $SD = .77$).

Study 2a Results

Data Screening

Prior to analysis the data were screened. Missing values were found to be missing at random (Little’s MCAR chi-square = 341.78, $df = 323$, $p = .23$), therefore listwise deletion processes were employed. Normality was inspected prior to analysis. Density and percentage of network ties appeared normally distributed, histograms for network centrality were normal except for a spike in responses at zero (47 participants rated their teams shared leadership ties as perfectly distributed). Transformations did not curtail this non-normality. Inspection of the data showed this was largely due to respondents in small teams (i.e., those with only one other team member, or respondents with two other team members rated identically). To curtail this, we generated a second centrality variable where any responses rating only one other team member,

or giving identical responses to two team members, was coded as missing. This coding reduced the bimodality of the data (with 24 responses identifying their team was perfectly distributed on this new variable). All analyses were conducted with both variables; however, unless significant differences were observed only the original centrality metrics are reported. Prior to regressions analysis the residuals were inspected. Multivariate outliers were identified via visual inspection of residual plots and Mahalanobis distance statistics. One multivariate outlier was identified via residual scatterplots and removed; two data exhibited Mahalanobis statistics beyond cut-offs ($p < .001$). Analysis was performed including and excluding these individuals, this made no significant difference and were therefore retained in the final analysis.

Scale Descriptives

Correlations between the research variables were generated to examine the relationships between the social network measures of shared leadership and the dependent variables. Table 6.1 summarises the correlations and reliability coefficients of the research variables. Only density of leadership ties and percentage of perceived shared leadership were significantly related to the team potency dependent variables ($r = .12, p = .04$, and $r = .13, p = .03$, respectively). Additionally, these measures were significantly related to team interdependence, inferring that individuals who perceived their team as maintaining more dense leadership connections also rated their team's work as more interdependent. Centrality of leadership perceptions was negatively related with employee engagement ($r = -.13, p = .03$). Interestingly, the size of the rater's team was significantly related to all three social networked measures; such that larger teams exhibited less dense ($r = -.21, p < .001$) and more centralised shared leadership perceptions ($r = .24, p < .001$). Only two control variables (team size and team interdependence) produced a

Table 6.1

Correlations Between Social Networked Shared Leadership Measures, Proposed Controls, Team Potency, Engagement, and Team Adaptivity.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Density	-												
2. Centrality	-.76***	-											
3. Percentage	.87***	-.66***	-										
4. Gender ^a	.14*	-.02	.09	-									
5. Age	-.13**	-.01	-.07	-.05	-								
6. Team tenure	-.13*	.05	-.10	-.04	.33***	-							
7. Organisational tenure	-.07	.04	-.09	.00	.17**	.45***	-						
8. Hours worked	-.11	.09	-.11	-.04	.32***	.30***	.17**	-					
9. Team size	-.21***	.23***	-.20**	.06	.02	-.02	.08	.00	-				
10. Team interdependence	.12*	.02	.14*	.09	-.13*	-.11	-.04	-.11	.12	(.71)			
11. Team adaptivity	.12*	-.03	.09	.11	-.04	-.04	-.00 ^b	.02	.22***	.20**	(.88)		
12. Engagement	.14*	-.12*	.13*	-.03	.10	-.04	-.11	-.02	.03	.11	.34***	(.93)	
13. Team potency	.14*	-.05	.15*	.03	.06	.08	.04	.02	.11	.22***	.45***	.31***	(.89)

Note. Listwise deletion $n = 280$.

*** $p < .001$, ** $p < .01$, * $p < .05$, Scale alphas in parentheses.

^a Gender coded 0 = male, 1 = female, ^b Coefficient = .004.

significant relationship with the dependent variables, and thus were included in the regression analyses (Becker, 2005).

Multivariate analysis

To assess the proposed research hypotheses, a series of moderated multiple regression analyses were performed for each of the social network shared leadership measurements. Control variables were entered at Step 1, with network density, centrality, and percentage, independently entered in Step 2a, Step 2b, and Step 2c (H4a, H4b, and H4c). This produced regression coefficients controlling for team size and team interdependence, but not the other social network variables. The regression results are summarised in Table 6.2.

Table 6.2

Standardised Regression Coefficients for the Included Control Variables, and Social Network Density, Centrality, and Percentage Predicting Team Potency, Individual Engagement, and Team Adaptivity (H1a, H1b, and H1c).

	Team potency		Individual engagement		Team adaptivity	
	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1 ^a		.06***		.01		.08***
Team size	.08		.02		.20**	
Team interdependence	.21***		.11		.18**	
Step 2a Density	.15*	.02*	.14*	.02*	.16**	.02**
Step 2b Centrality	-.08	.01	-.13* ^b	.02*	-.08	.01
Step 2c Percentage	.13*	.02*	.13*	.02*	.11	.01

Note. $n = 280$.

*** $p < .001$, ** $p < .01$, * $p < .05$.

^a Control variables β 's vary $\pm .04$ between steps one and two.

^b When excluding small teams shared leadership centrality is $\beta = -.16^{**}$, $\Delta R^2 = .03$.

Step 2a $R^2 =$ Team potency .08; Individual engagement .03; Team adaptivity .10.

Step 2b $R^2 =$ Team potency .07; Individual engagement .03; Team adaptivity .09.

Step 2c $R^2 =$ Team potency .08; Individual engagement .03; Team adaptivity .09.

Table 6.2 indicates the social networked measures of shared leadership were significantly associated with team potency, individual engagement, and team adaptivity. Density of team

shared leadership ties was significant across the three dependent variables, whilst centrality of shared leadership ties was only related (negatively) to engagement outcomes. Although density was the strongest predictor, it only accounted for 2% of the variance across each of the dependent variables, whilst collectively the included control variables explained between 3% and 8% of the variance observed.

Following these regressions, the moderating effects of team contextual variables (i.e., team interdependence, team size, and team tenure) was examined (H5). These analyses explored slightly different questions compared to the previous regression analysis. For example, rather than “do dense networks predict higher levels of team potency controlling for team interdependence?” these new analyses ask “are dense networks more advantageous to teams with highly (or low) interdependence work tasks?”. To test the hypothesised moderation effects of team tenure, team size and team interdependence on the shared leadership to team potency pathway (H5), a hierarchal regression was performed. During Step 1, team contextual moderator (either team tenure, team size, or team interdependence) were entered. Following this, a single social network measure (either network density, centrality, or percentage) was entered. In the final step the centred product term of the variable examined during steps one and two was entered into the model. Table 6.3 displays the beta-weights and change in variance explained during this final step.

Table 6.3

Final Step(s) in the Moderation Analysis of the Social Network Shared Leadership Measures

Predicting Team Potency, Individual Engagement, and Team Adaptivity (H2).

	Team potency			Individual engagement			Team adaptivity		
	β	ΔR^2	R^2	β	ΔR^2	R^2	β	ΔR^2	R^2
Step 3a. Density									
Density x team tenure	-.01	<.001	.03	-.01	<.001	.02	.02	<.001	.02
Density x team size	.13*	.02*	.05	.11	.01	.04	-.04	.001	.08
Density x interdependence	.001	<.001	.06	-.05	.002	.02	-.08	.01	.06
Step 3b. Centrality									
Centrality x team tenure	-.02	<.001	.01	-.03	.001	.02	-.03	.001	.003
Centrality x team size	-.20***	.04***	.06	-.16*	.02*	.04	-.08	.01	.06
Centrality x interdependence	-.06	.01	.06	.02	<.001	.03	-.01	<.001	.04
Step 3c. Percentage									
Percentage x team tenure	-.002	<.001	.03	-.05	.003	.02	-.05	.003	.01
Percentage x team size	.14*	.02*	.06	.08	.01	.03	-.07	.01	.07
Percentage x interdependence	-.01	<.001	.06	.02	<.001	.03	-.05	.002	.05

Note. $n = 280$.

*** $p < .001$, ** $p < .01$, * $p < .05$.

Step 1: team tenure, or team size, or team interdependence.

Step 2: density, or centrality, or percentage.

As demonstrated in Table 6.3, some small effects were found of team context moderating the relationship between social networked measures of shared leadership predicting both team potency and individual engagement. Specifically, team size significantly moderated all of the predictors of team potency, such that as teams grow larger in size, they benefited from maintaining more dense shared leadership networks ($\Delta R^2 = .02^*$, +1 *SD* density $\beta = .13$, $p = .04$). Additionally, these results show as team size increases it is advantageous to decentralise these leadership perceptions such that leadership is less monopolised within a few individuals (ΔR^2

= .04***, -1 SD centrality $\beta = -.20, p < .001$). Figure 6.1 and Figure 6.2 demonstrates the moderation effect of network density, network centrality, and team size.

Figure 6.1

Interaction Effects of Team Size and Density of Shared Leadership ties in Predicting Perceptions of Team Potency.

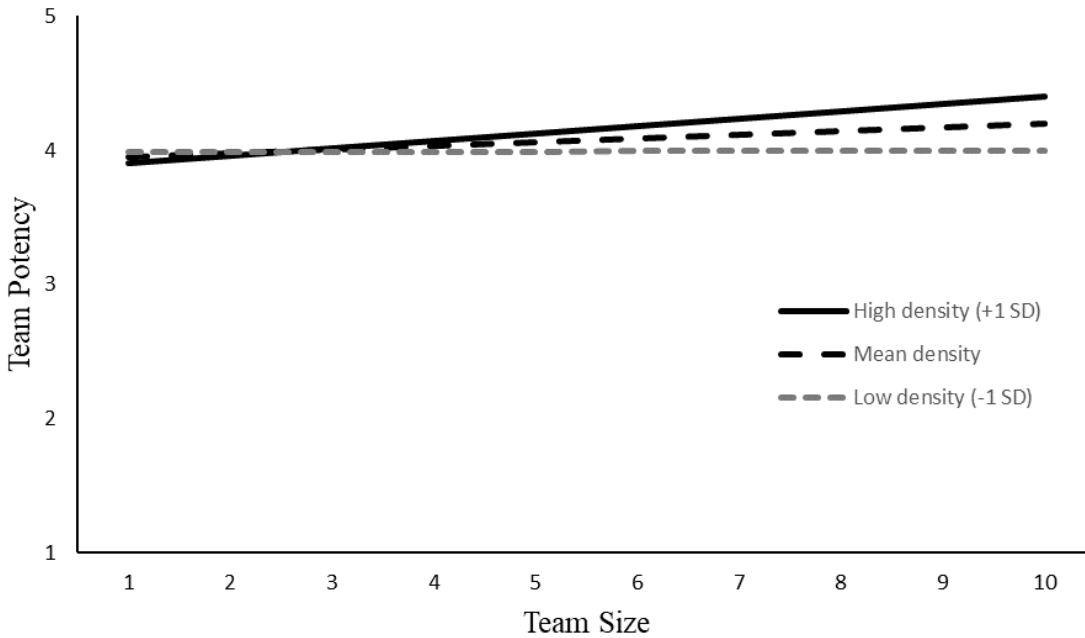
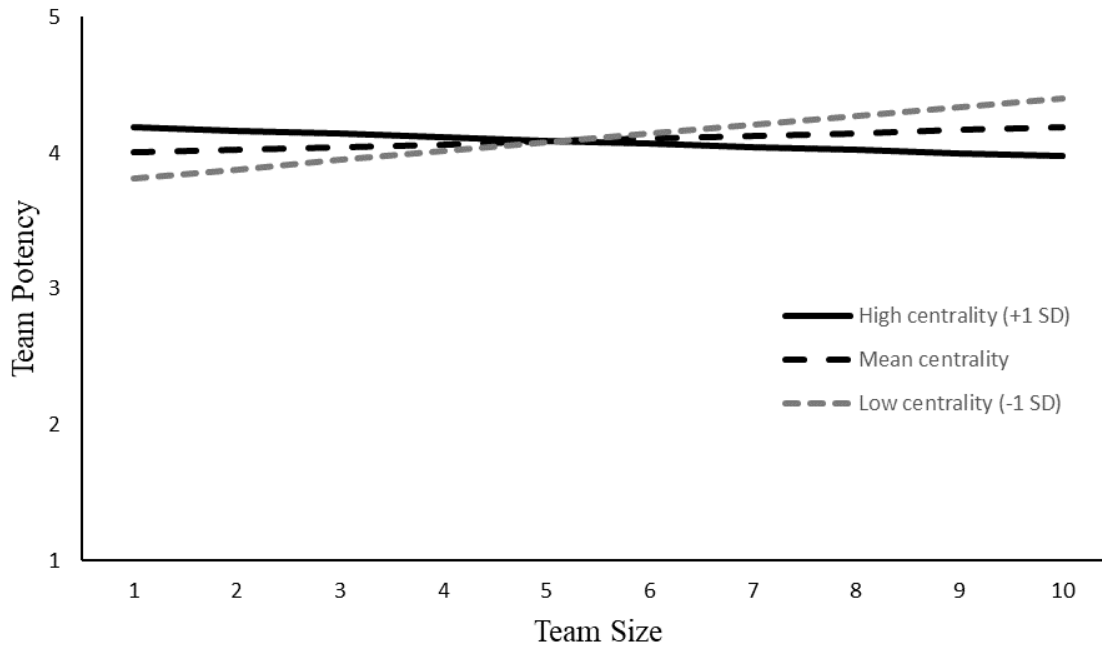


Figure 6.2

Interaction Effects of Team Size and Centrality of Shared Leadership ties in Predicting Perceptions of Team Potency.



Study 2a Discussion

Results from these analyses lend limited support to the relationship between these social network measures of shared leadership and beneficial individual and team outcomes. The binary percentage measure of shared leadership ties (Mendez, 2010) was positively related to both engagement and potency (partially supporting H4c), whilst centrality of leadership ties was only related to a reduction in employee engagement (partially supporting H4b). After controlling for team size and team interdependence, density was associated with positive growth across all three dependent variables (supporting H4a). Additionally, the positive effects of more dense and less centralised leadership practices were more pronounced in larger teams (Figure 6.1, Figure 6.2, and Table 6.3); these moderation effects benefited both team potency and employee engagement outcomes in larger teams (partially supporting H5).

Despite some significant findings, the results presented here are somewhat disappointing. Although social network measures of shared leadership have been reported to exhibit heightened effect sizes compared to aggregate measures (D’Innocenzo et al., 2014), the effect reported here pales in comparison to the other aggregate measures presented previously (see Chapter 4). These small effect sizes could be an artefact of adopting an individual level referent to capture these networked effects (compared to team level ratings). As previously mentioned, such ecological fallacies are a threat to team level research (Mathieu & Chen, 2011). However, such limitations are reduced through utilising a referent shift across both independent and outcomes variables (Chan, 1998). In conclusion these results were not satisfying and pose more questions than they answer. Two questions specifically to be considered by these findings are, “*why are these effect sizes so much smaller compared to other aggregate measures of shared leadership*”, and “*what aspects of shared leadership are these network operationalisations actually assessing?*” The next section will examine several exploratory post-hoc analyses aiming to generate insights regarding the relationship between shared leadership density, centrality, percentage, team potency, and the other aggregate measurements of shared leadership (for details on these aggregate measures see Chapter 4).

Study 2b Results

To answer our initial questions regarding the small effect sizes found for these social network measures, it is posited that these social networked measures might represent a team contextual variable. Rather than effecting team outcomes directly, shared leadership density, centrality, and percentage could potentially moderate specific styles of shared leadership behaviours to effect beneficial team outcomes (Sparrowe & Liden, 2005). For example, teams which collectively exhibit both heightened levels of shared transformational leadership

(measured via aggregation of survey responses), together with an increased density of these naïve shared leadership ties (measured via the one item social network measure; Carson et al., 2007), might also display levels of team potency over and above that predicted by each construct independently. To test this a hierarchal regression was modelled with Step 1 containing (only) one social network measure (either density, centrality, or percentage) and team interdependence. Following this an aggregate measure of shared leadership was entered into Step 2 (i.e., measures from either the traditional or functionalist perspectives of shared leadership; see Chapter 4 for in-depth exploration these aggregate measures of shared leadership). The final step in each regression contains the centred product term of the aggregate measure and the social network measure. For simplicity, these regressions equations were conducted for team potency only. Tables 6.4 for density, Table 6.5 for centrality, and Table 6.6 for percentage each display the variance in team potency explained by these moderation effects.

Table 6.4

Variance Explained in Team Potency Explained by Network Density, Team Interdependence, Aggregate Leadership Measures and Centrality-Aggregate Interactions.

		Step 2 ΔR^2	Step 3 ΔR^2	R^2
Aggregate shared leadership measures				
1	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	.29***	.002	.35***
2	Hoch (2013)	.24***	.01	.30***
3	Hoch, Pearce, & Welzel (2010)	.27***	.01	.33***
4	Pearce & Sims (2002)	.30***	.02	.37***
5	Pearce, Yoo, & Alavi (2004)	.19***	.02*	.26***
6	Sherony & Green (2002)	.17***	.001	.22***
7	Hiller, Day, & Vance (2006)	.23***	.02	.30***
8	Hoch & Kozlowski (2014)	.21***	.002	.26***
9	Muethel, Gehrlein, & Hoegl (2012)	.14***	.001	.19***
10	Ziegert (2005)	.23***	.01	.29***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

Step 1: team interdependence and network density ($R^2 = .06$ ***).

Step 2: shared leadership aggregate measure.

Step 3: interaction term (density x aggregate measure).

For the regression exploring the moderation effects of social network density, the initial step containing team interdependence and network density did explain significant variance in team potency ($R^2 = .06$). With both the slopes of both the team interdependence variable ($\beta = .20, p < .001$), and the density measures being significantly different from zero ($\beta = .12, p = .046$). All of the aggregate measures of shared leadership were significant predictors of team potency (Step 2). However, of these only one model demonstrated a significant R^2 change once the interaction terms was added (Pearce et al., 2004). In that model, the interaction term between the empowering leadership subscale and network density did predict additional variance in the dependent variable ($\beta = -.13, p = .02$), although the direct effects of empowering leadership was only marginally significant (Step 2 $\beta = .10, p = .05$).

Table 6.5

Variance Explained in Team Potency Explained by Network Centrality, Team Interdependence, Aggregate Leadership Measures and Centrality-Aggregate Interactions.

	Step 2 ΔR^2	Step 3 ΔR^2	R^2
Aggregate shared leadership measures			
1 Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	.29***	.01	.34***
2 Hoch (2013)	.24***	.002	.28***
3 Hoch, Pearce, & Welzel (2010)	.27***	.003	.31***
4 Pearce & Sims (2002)	.30***	.004	.34***
5 Pearce, Yoo, & Alavi (2004)	.19***	.01	.24***
6 Sherony & Green (2002)	.17***	.01	.22***
7 Hiller, Day, & Vance (2006)	.24***	.01	.29***
8 Hoch & Kozlowski (2014)	.21***	.01	.26***
9 Muethel, Gehrlein, & Hoegl (2012)	.15***	.01	.20***
10 Ziegert (2005)	.23***	.03*	.30***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

Step 1: team interdependence and network centrality ($R^2 = .04$ ***).

Step 2: shared leadership aggregate measure.

Step 3: interaction term (centrality x aggregate measure).

Table 6.5 summarises the regressions performed to explore the effects of shared leadership measured by network (de)centrality. At Step 1, centrality showed no relationship to

team potency ($\beta = -.04, p = .48$), whilst team interdependence was significant ($\beta = .21, p < .001$). The only model to display a significant interaction was Ziegert’s measure of shared leadership (2005); in the final step the interaction terms for both the initiating structure interaction ($\beta = -.14, p = .02$), and monitoring behaviours ($\beta = .19, p = .02$) displayed a significant interaction effect.

Table 6.6

Variance Explained in Team Potency Explained by Network Percentage of Perceived Leadership, Team Interdependence, Aggregate Leadership Measures and Percentage-Aggregate Interactions.

	Step 2 R^2	Step 3 ΔR^2	R^2
Aggregate shared leadership measures			
1 Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	.29***	.01	.35***
2 Hoch (2013)	.24***	.01	.30***
3 Hoch, Pearce, & Welzel (2010)	.27***	.01	.33***
4 Pearce & Sims (2002)	.30***	.01	.36***
5 Pearce, Yoo, & Alavi (2004)	.19***	.02	.26***
6 Sherony & Green (2002)	.17***	<.001	.22***
7 Hiller, Day, & Vance (2006)	.23***	.01	.29***
8 Hoch & Kozlowski (2014)	.21***	.001	.26***
9 Muethel, Gehrlein, & Hoegl (2012)	.14***	<.001	.19***
10 Ziegert (2005)	.23***	.001	.28***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

Step 1: team interdependence and network percentage ($R^2 = .05$ ***).

Step 2: shared leadership aggregate measure.

Step 3: interaction term (percentage x aggregate measure).

Table 6.6 summarises the variance explained for the percentage network measure of shared leadership. Congruent with the findings from the other social network measures, percentage of binary leadership ties did not interact with any of the other aggregate shared leadership measures. Collectively, these results highlight an ongoing theme of a lack of variance explained by the social network measures in predicting team potency. Despite some small significant results (specifically between network density and Pearce, Yoo, and Alavi’s measure [2004]; and, network centrality and Ziegert’s measure [2005]), it was largely concluded there

was no interaction effect of the network variables and the aggregate measures of shared leadership in predicting levels of perceived team potency. Although these post-hoc analyses are exploratory in nature (thus conclusions are drawn tentatively), the absence of these moderating effects belies the question regarding what elements of the shared leadership process are these network measures actually assessing?

Correlations Between Social Network and Aggregate Measures

To highlight which aspects of the shared leadership processes are actually being assessed by network density, centrality, and percentage, the correlations between these constructs and the other aggregate measures of shared leadership were examined. Subscales from ten measures designed to assess various aspects of team shared leadership were correlated against each of the network leadership measures (Table 6.7). These correlations were then ranked from strongest to weakest to generate insights regarding which aspects of shared leadership these network variables were most strongly related to (Table 6.8).

Table 6.7

Correlations Between Network Density, Centrality, and Percent of Shared Leadership with the Aggregate Shared Leadership Subscales.

	Items	Density	Centrality	Percentage	
Aggregate shared leadership measures					
1	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)	23			
	1. Intellectual stimulation	4	.18**	-.16**	.15*
	2. Pass-avoidant leadership	5	-.15*	.08	-.14*
	3. Inspirational leadership	5	.10	-.04	.09
	4. Individual consideration	5	.13*	-.04	.14*
	5. Management by exception	4	-.03	-.003	-.05
2	Hoch (2013)	16			
	1. Shared transformational leadership	6	.18**	-.07	.16**
	2. Individual empowering leadership	4	.10	.01	.08
	3. Team empowering leadership	3	.11	-.02	.09
	4. Shared participative leadership	3	.19**	-.14*	.15*
3	Hoch, Pearce, & Welzel (2010)	23			
	1. Empowering individual	6	.10	.01	.08
	2. Transformational leadership	3	.18**	-.07	.16**
	3. Transactional leadership	3	.10	-.06	.07
	4. Directive leadership	4	.19**	-.14*	.15*
	5. Empowering team	3	.11	-.02	.09
	6. Aversive leadership	4	-.09	.09	-.07
4	Pearce & Sims (2002)	64			
	1. Transactional leadership	6	.11	-.06	.08
	2. Management by exception	10	-.09	.09	-.06
	3. Transformational leadership	20	.14*	-.03	.13*
	4. Empowering leadership	22	.17**	-.08	.12*
	5. Directive leadership	3	.26***	-.03	.19**
	6. Aversive leadership	3	-.06	.07	-.06
5	Pearce, Yoo, & Alavi (2004)	14			
	1. Empowering leadership	4	.06	-.01	.04
	2. Directive leadership	3	.24***	.03	.19**
	3. Transactional leadership	4	.10	-.09	.08
	4. Transformational leadership	3	.11	.003	.11
6	Sherony & Green (2002)	7	.12*	-.09	.09

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 6.7 (continued).

Correlations Between Network Density, Centrality, and Percent of Shared Leadership against the Aggregate Shared Leadership Subscales (n =280).

	Items	Density	Centrality	Percentage
Aggregate shared leadership measures				
7	Hiller, Day, & Vance (2006)	25		
	1. Planning and organising	.15*	-.09	.11
	2. Problem solving	.19**	-.15*	.12*
	3. Support and consideration	.12	-.05	.07
	4. Development and mentoring	.22***	-.13*	.13*
8	Hoch & Kozlowski (2014)	21		
	1. Cognitive	.16**	-.14*	.14*
	2. Affective	.13*	-.07	.11
	3. Behaviour	.12*	-.09	.09
9	Muethel, Gehrlein, & Hoegl (2012)	7		
	1. External related behaviour	.25***	-.15*	.18**
	2. Internal related behaviour	.16**	-.05	.11
10	Ziegert (2005)	19		
	1. Initiating structure	.13*	-.11	.10
	2. Consideration	.17**	-.10	.08
	3. Monitoring	.10	.01	.13*
	4. Contingent reward	.10	-.08	.08
	5. Visionary/inspirational leadership	.3	-.08	.11

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

When relationships with perceived shared leadership network density were assessed, significant correlations were identified for 25 of the 40 subscales. Of these the strongest relationships were demonstrated between directive leadership ($r = .26, p < .001$; Pearce & Sims, 2002; Pearce et al., 2004), external related behaviours ($r = .25, p < .001$; Muethel et al., 2012), development and mentoring ($r = .22, p < .001$; Hiller et al., 2006), shared participative leadership ($r = .19, p = .001$; Hoch, 2013), directive leadership ($r = .19, p = .001$; Hoch et al., 2010), and problem solving ($r = .19, p = .001$; Hiller et al., 2006).

Compared to shared leadership density, network centrality exhibited fewer significant relationships with the aggregate measures. Only seven of the relationships between shared

leadership centrality and aggregate measures were significant, of these intellectual stimulation was the strongest ($r = -.16, p = .008$; Avolio et al., 2003), followed by external related behaviours ($r = -.15, p = .01$; Muethel et al., 2012), problem solving behaviours ($r = -.15, p = .01$; Hiller et al., 2006), shared participative leadership ($r = -.14, p = .02$; Hoch, 2013), and directive leadership ($r = -.14, p = .02$; Hoch et al., 2010). The binary percentage metric was most strongly correlated with shared directive leadership ($r = .19, p = .001$; Pearce & Sims, 2002; Pearce et al., 2004) and external related behaviours ($r = .18, p = .003$; Muethel et al., 2012). Interestingly the comparing the binary and density variables highlights that across (almost) all of these correlations, the density variable exhibited a stronger relationship to the shared leadership subscales. Table 6.8 displays the five strongest correlations observed for each network measure.

As displayed in Table 6.8, the network density construct appears related to aspects of directive and participative shared leadership processes. Items from these subscales target behaviours such as giving instructions (Pearce & Sims, 2002; Hiller et al., 2006), assigning goals (Hoch, 2013; Hoch et al., 2010; Pearce et al., 2004), or initiating team actions (Muethel et al., 2012). Similarly, both network centrality and percentage were also related to shared directive leadership (Hoch, 2013) and external related behaviours subscales (Muethel et al., 2012), while centrality ratings were also associated with Avolio and colleague's intellectual stimulation scale (2003).

Table 6.8

Ranked Correlations Between Network Density, Centrality, and Percentage Coefficients and Various Aggregate Shared Leadership Subscales.

Aggregate shared leadership subscale	<i>r</i>	Reference
Network density		
1. Directive leadership	.26***	Pearce & Sims (2002); Pearce, Yoo, & Alavi (2004) ^a
2. External related behaviour	.25***	Muethel, Gehrlein, & Hoegl (2012)
3. Development and mentoring	.22***	Hiller, Day, & Vance (2006)
4. Shared participative leadership	.19**	Hoch (2013); Hoch, Pearce, & Welzel (2010) ^a
5. Problem solving leadership	.19**	Hiller, Pearce, & Vance (2006)
Network centrality		
1. Intellectual stimulation	-.16**	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)
2. External related behaviour	-.15*	Muethel, Gehrlein, & Hoegl (2012)
3. Problem solving	-.15*	Hiller, Day, & Vance (2006)
4. Shared participative leadership	-.14*	Hoch (2013); Hoch, Pearce, & Welzel (2010) ^a
5. Shared cognitive processes	-.14*	Hoch & Kozlowski (2014)
Network percentage		
1. Directive leadership	.19**	Pearce & Sims (2002); Pearce, Yoo, & Alavi (2004) ^a
2. External related behaviour	.18**	Muethel, Gehrlein, & Hoegl (2012)
3. Transformational leadership	.16**	Hoch (2013); Hoch, Pearce, & Welzel (2010) ^a
4. Intellectual stimulation	.15*	Avolio, Sivasubramaniam, Murry, Jung, & Garger (2003)
5. Shared participative leadership	.15*	Hoch (2013); Hoch, Pearce, & Welzel (2010) ^a

Note. *** $p < .001$, ** $p < .01$, * $p < .05$.

^a Similar subscales are grouped and reported together.

To further explore these relationships, in particular to identify if an underlying factor could explain these relationships; the 44 items from these scales were entered into an exploratory factor analysis with the three network measures. Results suggest that network density, centrality, and percentage are indeed different from these other included scales. Density, centrality, and percentage formed a single factor which explained 36% of the total variance across the items (ML extraction factor loadings: density = .99, centrality = -.77, percentage = .87). Across all the items retained in this analysis only three others weakly loaded onto this common factor (the strongest item loaded at .29, “how often do team members share in instructing poor performers

on how to improve"; Hiller et al., 2006). It is therefore, suggested that these network operationalisations of shared leadership (density of network ties, centrality of ties, and percentage of binary ties) likely form a single factor, which is weakly related to the other aggregate measures of shared leadership and team effectiveness broadly.

Study 2 General Discussion

Partial support was found for the hypothesis that shared leadership (operationalised through the density of network ties, the [de]centralisation of these ties, and the percentage of binary ties) was indeed related to the positive team outcomes of team potency, team adaptivity, and individual outcomes of employee engagement (H4a, H4b, and H4c). Results from the regression analysis demonstrate teams which encourage more dense shared leadership ties exhibit more team efficacy, are more engaged with their work, and more adaptive and flexible when solving problems which require new work patterns or processes (supporting H4a). Additionally, when these ties are distributed widely within the team (opposed to centralised in fewer individuals) employees become more engaged with their work (partially supporting H4b). Similarly, binary measures of social network density were also associated with increased employee engagement and team potency, but not team adaptivity (partially supporting H4c). Moderation analysis showed these positive effects on team efficacy (and between centrality scores and engagement) were increased within larger teams, suggesting coordination processes administered from a single source become less effective as teams grow in size (supporting findings from Carson and colleagues [2007]).

However, despite these small significant effects the overall results presented here are generally quite weak. Controlling for team size and team interdependence, density of shared leadership ties explained only 2% of the differences observed across team and individual

outcomes. Compared to previous research these effects are statistically significant, yet practically insignificant. For example, while investigating group performance Carson and colleagues (2007) found density of shared leadership ties explained an additional 26% of the variance in team performance after controlling for team size, project demands, and supportive team environment. Similarly, centrality of shared leadership ties has been shown to explain 9% of the variance in objective performance (Small & Rentsch, 2010); and, D’Innocenzo and colleagues (2014) identified studies in which density and centrality measures of shared leadership explained an additional 24% of the variance observed in performance effect sizes (compared to aggregate measures of shared leadership).

Although studies demonstrating large significant effects of social network shared leadership measures are highly cited within the literature, other research has produced less conclusive results. For example, Neubert investigating the distribution of leadership in teams, failed to find a significant relationship between leadership centrality and performance (Neubert, 1999; Serban & Roberts, 2016), whilst Mehra and colleagues (2006) initial analysis obtained only marginal significance for these variables. Sanders (2006) attempted to combine aggregate shared leadership measures with social network density measures (via confirmatory factor analysis); this however, failed to fit their underlying data and subsequently led to the removal of density measures from their model. Similarly, Ziegert (2005) used a binary percentage measure of shared leadership density and found strong negative correlations with team performance ($r = -.45$). This led Ziegert (2005) to encourage more research to explore what actual experiences are being captured by these network measures. These findings support arguments by Carmeli and Schaubroeck (2006) that simply providing “more” leadership is never sufficient, but how this leadership is used and integrated within a team is where value is added.

Following the small relationship observed between network density, centrality, percentage and the outcome variables, several exploratory post-hoc analyses were performed (Study 2b). These analyses extend Ziegert's (2005) findings to identify the aspects of organisation experiences that these social networked methods are actually assessing. First, the potential for social network measures to moderate the relationship between aggregate measures of shared leadership onto team potency were tested. Previous works had found centrality within advice networks moderated the effects of leader-member exchange (Sparrowe & Liden, 2005). Similarly, it was posited density, centrality, and percentage metrics might describe a team environment more conducive to the effects of certain shared leadership styles (i.e., moderating the effects of traditional and functionalist measures). Results from these moderation analyses (Table 6.4, Table 6.5, and Table 6.6) revealed only two of the 30 models tested displayed a significant moderation effect, given these significant effects only accounted for 2-3% of the variance in the outcome variables these relationships were not further examined.

The second set of post-hoc analysis assessed if these social networked measures were differentially related to certain types (or styles) of shared leadership behaviours. One cited advantage of social network measures is that they are not anchored to specific leader behaviours, instead drawing on naïve or implicit leadership perceptions (Lord et al., 2001; Shondrick et al., 2010). The one-item measure most frequently adopted requires the participant to define leadership themselves ("to what degree does your team rely on this individual for leadership?"; Carson et al., 2007). The analysis conducted to explore if these measures were related to certain types of shared leader behaviours demonstrated some interesting insights. All of the network measures were related to aggregate measures of external related behaviours (Muethel et al., 2012) and shared participative leadership (Table 6.8; Hoch, 2013; Hoch et al., 2010). The

external behaviours subscales contain items capturing team members actions to improve team processes, or taking actions to make the team more effective (Muethel et al., 2012); whilst the shared participative leadership scale targets team use of collective goal setting (Hoch, 2013; Hoch et al., 2010). Additionally, shared directive leadership (which exhibited the strongest correlation with density and percentage measures) related to goal setting and providing direction or commands to other team members (Pearce & Sims, 2002; Pearce et al., 2004).

Collectively, these actions represent a range of overt leadership behaviours; it is possible social network measures of shared leadership may be a proximal indicator of highly visible or conspicuous shared leadership behaviours. This is congruent with other research exploring implicit cognitions of leadership whereby individuals draw on social information, salient traits/features, and existing schema to inform their mental representations of leadership (Lord et al., 2001). Interestingly, other research exploring hybrid measures of network shared leadership (i.e., using network methods to rate all team members on various specific leadership behaviours) found density and centrality measures of both participative and directive shared leadership styles were significantly correlated with team performance outcomes (with participative leadership density correlating with performance at $r = .59$; Mendez, 2010). Although this does little to strengthen the argument that social network measures capture shared leadership visibility, it remains serendipitous. It is strongly recommended that future research using social network shared leadership constructs is conducted with the consideration that such measures are actually assessing shared leadership visibility (rather than shared leadership influence).

Conclusions

Although support was generated for the hypothesis that social networked measures of shared leadership would predict team and individual outcomes, congruent with previous results

(Chapter 4) these effects remained small. Team potency was related to the density of shared leadership network ties (both valued network density and the percentage of binary ties); however, these only contributed an additional 2% of variance explained once controlling for team size and team interdependence. Furthermore, employee engagement was significantly associated with all three measures of networked shared leadership, however each of these measures only explained 2% of the differences observed between individual ratings of work engagement. Compared to previous findings, these effects although statistically significant—are practically insignificant; this generated further questions regarding why these analyses produced such small effect sizes. Exploratory post-hoc analyses were conducted to gain a better understanding of potential relationship between these social networked measures and various leadership styles used in aggregate measures of shared leadership. These revealed that density and centrality of shared leadership networks were more related to certain leadership behaviours such as goal setting, issuing instructions/directions, and initiating actions or suggestions to improve team processes. Building on implicit leadership theory and research exploring leadership prototypes (Lord et al., 2001), it is tentatively posited that these network measures are actually capturing aspects of leadership visibility rather than distribution. It is recommended that further inquiry test these propositions more thoroughly using social network methodology.

Chapter 6 Summary

Owing to the small effect sizes observed for the social network measure of shared leadership, no further inquiry of network-relationship perspectives will be conducted within this thesis. Although it is advised that future research explore the potential that such measures are assessing shared leadership visibility rather than shared leadership behaviours or influence. Due to these findings, and results from previous chapters comparing different measures of shared

leadership (Chapter 4), it was posited a new measure of shared leadership could be developed.

Given previous criticisms that the field of shared leadership research lacks integration or replication (Kozlowski et al., 2016), rather than developing a new measure, it was decided that

the current research will utilise items from these existing measures to form a new shared leadership scale based on the ability of these behaviours to predict increased team effectiveness.

The following chapter (Chapter 7) will utilise an inductive machine learning process to develop a measure of shared leadership based on the key shared leadership behaviours identified by previous research.

Study 3: Shared Leadership Behaviour: Measurement and Scale Development (Chapter 7)

Given unsuccessful attempts to identify the most robust measure of shared leadership (based on model-fit and observed relationship to team effectiveness; Chapter 4) and the small effects displayed by social network measures of shared leadership (Chapter 6); it was posited that a better measure to assess these shared leadership processes could be developed. This chapter describes the development of a new scale designed to assess the specific team member shared leadership behaviours that are most strongly related to team effectiveness. Rather than developing new items to assess these shared leadership constructs, the six item Shared leadership behaviour scale (SLB-6) builds on previous work by adapting published measures to form a unique scale which assesses the specific behaviours linked to increased team effectiveness. This chapter describes the novel inductive item selection techniques and the scale validation processes employed in the creation of the SLB-6.

The challenges presented to both organisational scholars and practitioners through maintaining a diverse range of measurement approaches has been debated in the literature. In their review of the shared leadership literature, Wang and colleagues (2014) found no support for any moderating effect of measurement methods employed. Similarly, Hoch and Kozlowski (2014) argued that “there is no ‘one best way’ to measure shared leadership” (p. 393); whilst Martin, Cormican, Sampaio, and Wu (2018) posited that “regardless of the specific method for measurement deployed, the importance of shared leadership factors on team performance is evident” (p. 677). Other scholars however, have challenged this; in their meta-analysis of early shared leadership research, D’Innocenzo and colleagues (2016), for example, demonstrated a significant moderation effect of methodology employed. Specifically, the relationship between shared leadership and team performance was strongest in research which adopted a social

network approach to measuring shared leadership (D’Innocenzo et al., 2016; Wu et al., 2020). Similarly, Nicolaidis and colleagues (2014) found that articles employing social network methods provided increased validity compared to other techniques. However, Mendez (2010) failed to replicate such effects: after empirically comparing different approaches they found no differences between the type of shared leadership behaviours measured. Supporting this, scale comparison analyses have displayed that these social network methods may exhibit the weakest relationship between shared leadership and team effectiveness (Chapter 4).

Despite these differences in conceptualisation and measurement, shared leadership processes are consistently related to beneficial outcomes such as team performance and team effectiveness (Hoch & Kozlowski, 2014; Sanders, 2006; Wu et al., 2020; Zhou et al., 2015). However, owing to the diversity of measurement in the literature it is extremely difficult to identify the most parsimonious shared leadership framework; nor is it possible to detect the specific behaviours that team members should exhibit to obtain these team benefits or guide the development of shared leadership behavioural interventions. Therefore, Study 3 has two related aims: 1) to identify the specific shared leadership behaviours most related to team effectiveness outcomes, and 2) to develop a brief psychometrically reliable scale to assess these shared leadership behaviours. To amend this gap, this analysis will collate shared leadership scale items from 10 previously published measures to generate a large item pool of potential shared leadership behaviours. Machine learning techniques (specifically LASSO regression) are employed to identify and select the specific items of shared leadership behaviours which are most likely to result in increased team effectiveness (specifically team potency). These selected scale items are tested and validated to produce a parsimonious and psychometrically sound tool (the Shared Leadership Behaviour scale; SLB-6).

Measurement Development

The development of the SLB-6 follows the processes outlined by DeVellis (2016). First a pool of relevant items is generated from 10 existing measures of shared leadership. Items are selected based on both their relationship to team potency (i.e., using LASSO regression; Sample 1); and then retained based on their fit to the data collected from the initial and follow-up samples (Sample 1 and Sample 2). The divergent validity of the final scale is also evaluated against three related yet distinct constructs: team potency, team interdependence, and formal transformational leadership (Sample 3). Contrasting other scale developmental processes, items are selected and retained based on inductive principles and utilising novel machine learning techniques (Hastie et al., 2015). These inductive techniques differ from deductive measurement development processes in that rather than creating (another) unique conceptual framework to define shared leadership processes, then writing a battery of items to capture these latent behaviours (Ketokivi & Mantere, 2010); these inductive techniques “let the data speak for themselves” (Hinkin, 1995). Starting from the position that these items are capturing aspects of “shared leadership”, rather than (re)defining, (re)validating and circulating more idiosyncratic measures to assess shared leadership; Study 3 aims to reduce and optimise, limiting the initial item pool to only those behaviours which are most highly associated with team effectiveness (Yarkoni & Westfall, 2017).

Study 3 Method

Sample Recruitment

In order to comprehensively develop and test the shared leadership behaviour scale, three independent research samples were collected. Sample 1 and Sample 2 were obtained using psychology undergraduate students who were currently employed in workplace teams. Sample 3

contained a selection of full-time (non-student) employees, also currently employed in occupational teams. Sample 1 was employed to select items for inclusion (using LASSO regression predicting team potency). The second sample was employed to assess and exclude scale items which exhibited inadequate factor loadings or produced correlated error terms (identified through modification indices). The final independent sample was employed to demonstrate the model fit of the final measure within an employee sample. The divergent validity of the final measure was also assessed with team potency, team interdependence, and formal transformational leadership.

Participants

Table 7.1 highlights the demographics for each sample. Between sample comparisons highlight that in general the student samples were both younger and less diverse in age compared to the employee sample. Across samples, the gender ratios remained equivalent (roughly 30% of each sample was male), whilst organisational and team tenure differed between samples.

Table 7.1

Descriptives and Demographics Information for the Collected Samples

	Sample 1 (<i>n</i> = 328)		Sample 2 (<i>n</i> = 196)		Sample 3 (<i>n</i> = 158)	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
Age	22.63	4.76	24.88	7.86	42.60	13.09
Gender	95 males (29%) 232 females (71%) 1 unspecified		57 males (29%) 135 females (69%) 4 missing		47 males (30%) 111 females (70%)	
Team tenure	18.5 months	20.88	37.4 months	31.76	19.5 months	20.86
Organisational tenure	25.6 months	40.92	38.6 months	32.61	29.4 months	27.17
Sample type	Students in occupational teams		Students in occupational teams		Employees in occupational teams	

Measures

Shared Leadership Item Pool. Items from 10 published measures of shared leadership were included in the initial item pool. These measures included items developed to capture both traditional shared leadership behaviours (i.e., Avolio et al., 2003; Hoch, 2013; Hoch et al., 2010; Pearce & Sims, 2002; Pearce et al., 2004; Sherony & Green, 2002) and functionalist shared leadership behaviour (Hiller et al., 2006; Hoch & Kozlowski, 2014; Muethel et al., 2012; Ziegert, 2005). For a full review of these measures see Chapter 4 (Table 4.1). Scale items which required a social network methodology were excluded from the item pool (see Chapter 6). Items from two control variables were also included, specifically team adaptivity (Griffin et al., 2007) and team interdependence (Campion et al., 1993).

Team Potency. Team potency was measured with Guzzo and colleagues' (1993) eight-item scale. An example includes "This team feels it can solve any problem it encounters". Responses were recorded on a 5-point agreement scale, with higher values indicating more agreement (1 = *To no extent*, 5 = *To a great extent*), these items exhibited an acceptable level of internal reliability (Cronbach's alpha Sample 1 = .89; Sample 2 = .97).

Formal Transformational Leadership. Participants rated their formal team leader on the perceived levels of transformational leadership they he/she exhibited. These transformational leaderships behaviours were assessed with four subscales of Podsakoff et al.'s (1990) Leader Behavior Scale namely, their ability to articulation vision, foster team goals, provide intellectual stimulation, and individual support. Responses were measured on a 5-point frequency scale (1 = *Very little*, 5 = *Very much*), with higher ratings indicating more occurrence of transformational behaviours. An example item includes "My leader has stimulated me to think about old problems

in new ways”. The internal reliability of this scale was found to be acceptable (Sample 2 Cronbach’s alpha = .92).

Team Interdependence. Team interdependence was measured with six items capturing both team task and goal interdependence (Campion et al., 1993). An example includes “I cannot accomplish my tasks without information or materials from other members of my team”.

Responses were recorded on a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*), with higher values representing more interdependent teams. The composite scale exhibited an acceptable level of internal reliability (Cronbach’s alpha Sample 1 = .71; Sample 2 = .89).

Team Adaptivity. Team adaptivity was assessed with Griffith and colleague’s (2007) three-item measure. An example items is “Team members responded constructively to changes in the way your team works”. Items were rated on a 5-point frequency scale (1 = *Never*, 5 = *Always*). This scale demonstrated an acceptable level of internal reliability (Cronbach’s alpha Sample 1 = .87).

Study 3 Results

Data Screening

Data were screened and assumptions checked prior to final analysis (for description of Sample 1 screening/cleaning see Chapter 4). Both independent samples 2 and 3 were collected through convenience sampling. In total, 209 responses were received for Sample 2 of these 13 responses were removed for non-responses (i.e., completed less than 33% of items), leaving a final sample size of 196 participants for Sample 2. Similarly, 234 responses were received for Sample 3. A total of 64 responses were removed for non-responses (i.e., completed less than 33% of items), and a further 12 participants failed to respond to the shared leadership scale items. Removal of these responses provided a final sample size of 158 participants for Sample 3.

Data Analysis

Both regression and exploratory factor analyses were conducted in SPSS (IBM v.25), the structural equation modelling was conducted in Mplus (v.7.2, Muthen & Muthen, 2015), and LASSO regressions were completed in R Studio (caret package; Kuhn, 2020). The analyses were conducted in five steps:

- 1) Item inclusion was determined based on the strength of their relationship to team potency using LASSO regression analysis on the shared leadership item pool (156 individual items), resulting in 30 items measuring various shared leadership behaviours.
- 2) An exploratory factor analysis was used to determine both item retention and the underlying factor structure of the retained items (Sample 1). Exclusion of items exhibiting small factor loadings or high cross-loadings resulted in 19 items being retained.
- 3) An initial confirmatory factor analysis was conducted to test factor structure and obtain modification indices (Sample 1), based on these results eight items were removed (resulting in 11 items retained).
- 4) A secondary confirmatory factor analysis was performed on the resulting 11 items with Sample 2. Six scale items which exhibited a strong factor loading (factor loadings $>.60$) were retained.
- 5) A final confirmatory factor analysis was performed on the third independent sample (Sample 3) to demonstrate the fit of the six-item shared leadership behaviour scale. Additionally, the divergent validity and common method effects were tested on this final sample.

Item Inclusion (LASSO regression)

LASSO regression (least absolute shrinkage and selection operator regression) is a form of regression commonly used in machine learning and data science applications (Hastie et al., 2015; Tibshirani, 1996; Yarkoni & Westfall, 2017). LASSO differs from other ordinary least squares regression, as it aims to identify the variables (and subsequent coefficients) which minimise the models prediction error when generalised to the wider population from which the initial sample was drawn (Ranstam & Cook, 2018). LASSO does this by adding a penalty term (shrinkage) based on the sum of absolute values for each item's associated b-weight (L1 regularisation); this penalty reduces the value of the association between the independent and dependent variables with many of the least predictive variables being eliminated from the model (i.e., having their coefficients reduced to zero). Compared to ordinary-least-squares regression, this penalty term forces LASSO models to balance (i.e., to minimise the cost function) the competing processes of minimising the sum-of-squares errors, whilst also maintaining the smallest absolute sum of coefficients. Therefore, the estimated coefficient for each variable is only retained (i.e., not shrunk to zero) if its "incremental utility is sufficiently large to offset the increment to the penalty" (Yarkoni & Westfall, 2017, p. 1113). This ability to reduce unimportant parameter estimates enables variable selection in larger models with multiple independent variables and reduces both model multicollinearity and subsequent model over-fit (Tibshirani, 1996). As outlined by Yarkoni and Westfall (2017), "under such conditions, OLS tends to grossly overfit the training data, whereas a regularized approach like lasso regression will tend to perform much better for almost any reasonable value of the penalty parameter" (p. 1114).

Syntax for the following analysis is available online (github.com/jtspedding). First, the data set was randomly split with 80% of the data assigned to train the LASSO model and 20%

used to evaluate the model's performance (Yarkoni & Westfall, 2017). To find the best penalisation value (i.e., lambda value), a k -fold cross-validation technique was used ($k = 10$); this technique partitions the training data into k equal sized samples, with $k - 1$ of these samples testing 500 random values of lambda, and the 10th sample reserved for model validation (Ranstam & Cook, 2018). This process is repeated k times (with each partition being selected as the validation sample against the other nine). Results across these trials are aggregated to find the value of lambda which exhibited the smallest root mean squared error (RMSE), this value was subsequently employed as the penalisation term while training the LASSO regression model.

The non-zero shared leadership item coefficients (after penalisation) were subsequently used to predict the team potency outcomes in the evaluation data set, this enabled fit statistics to be generated for model predictions within the independent data for which the LASSO regression model had not been optimised. This complete process was repeated 1,000 times, to generate multiple samples where only the best predictor items were retained. Item b-weights across these 1000 resamples were averaged and ranked by importance. Across these 1,000 (re)samples the model R^2 was consistently high (mean $R^2 = .36$, $SD = .08$). From the initial pool of 156 items the top 40 items (based on their relationship to team potency) were inspected; of these, seven were removed due to copyright (these were initially included to give the TMLQ items the ability to contribute to the overall model), a further two control items were removed (one targeting team adaptivity and another team interdependence), and an item from Hoch and Kozlowski (2014) scale was removed as this did not target shared leadership behaviours ("Would you characterize your working relationship with your team as effective?"). The remaining 30 items were selected for inclusion in subsequent analysis (Table 7.2).

Table 7.2

Initial Shared Leadership Items Extracted from the Item Pool

	Item Label	Subscale	Importance
-	Control Item	Team adaptivity	80.08
1	My team members approach a new project or task in an enthusiastic way.	Inspirational communication	67.31
2	My team members spend time “putting out fires.”	MBE active	65.12
-	Copyrighted Item	Individual consideration	56.84
-	Control Item	Team interdependence	52.18
3	My team members strive towards higher purposes or ideals.	Idealism	51.72
-	Copyrighted Item	Individual consideration	47.30
4	My team members give me positive feedback when I perform well.	Personal Reward	40.64
5	My team members delay taking action until problems become serious.	MBE passive	39.80
6	How often do team members share in instructing poor performers on how to improve.	Developing/mentoring	39.77
7	My team members give me instructions about how to do my work.	Instructional command	35.66
8	My team members stress the importance of our team to the larger organization.	Inspiration communication	32.58
9	I know where I stand with my team... I usually know how satisfied they are with what I do?	Team member exchange	28.88
10	My team members advise me to look for the opportunities contained in the problems I face.	Opportunistic thinking	26.54
-	Copyrighted Item	Passive-avoidant	23.63
-	Not Behavioural Indicator	Team member exchange	22.26
11	My team cares about my general satisfaction at work.	Affective support	21.23
12	My team members seek a broad range of perspectives when solving problems.	Problem solving	18.84
13	My team members encourage me to learn by extending myself.	Encourage self-development	15.49
-	Copyrighted Item	Passive-avoidant	15.23
14	Providing helpful input about the team's work plans.	Internally directed behaviours	13.86
15	My team members are driven by higher purposes or ideals.	Idealism	12.58
16	My team members provide a clear vision of who and what our team is.	Vision	10.69
-	Copyrighted Item	Intellectual stimulation	10.39
17	My team members expect me to perform at my highest level.	Performance expectations	9.66
18	My team members aren't afraid to “buck the system” if they think it is necessary.	Challenging status-quo	8.50
19	To what extent does your team encourage the use of standard procedures?	Initiating structure	8.32

Note. MBE = Management-by-exception.

Table 7.2. (continued)*Initial Shared Leadership Items Extracted from the Item Pool*

	Item Label	Subscale	Importance
20	How often do team members share in developing solutions to problems?	Problem solving	7.46
21	How often do team members share in solving problems as they arise?	Problem solving	7.37
-	Copyrighted Item	Passive-avoidant	7.37
22	Because of my team members, I have a clear vision of our team's purpose.	Vision	7.32
23	How often do team members share in helping out when a team member is learning a new skill?	Developing/mentoring	6.76
24	My team members urge me to work as a team with other individuals who are part of the team.	Encourage team work	6.43
25	To what extent are team members friendly and approachable?	Consideration	6.36
26	We invite people from outside the team to present information or have discussions with us.	Team learning	6.05
27	My team members have a strong personal dedication to higher purposes or ideals.	Idealism	5.37
-	Copyrighted Item	Intellectual stimulation	5.35
28	We regularly take time to figure out ways to improve our team's work processes.	Team learning	5.34
29	My team members provide a clear vision of where our team is going.	Vision	4.77
30	My team members encourage me to go above and beyond what is normally expected.	Performance expectations	4.36

Item Reduction

The data were assessed with exploratory factor analysis to examine the underlying factor structure of these 30 shared leadership behaviours. In total, seven factors were extracted with an eigenvalue greater than one, these collectively explained 60.30% of the item variance. As displayed in Table 7.3, many of the items included in the principal component analysis loaded onto the initial factor extracted, supporting the presence of a single underlying shared leadership factor (Sample 1). Following similar scale development processes (Avolio et al., 2003), items which failed to load onto the first factor (factor loadings $<.45$), or those displaying cross-loadings with other factors (factor loadings $>.30$) were excluded (Avolio et al., 2003). This produced a total of 19 items retained.

Table 7.3

Factor Loadings of the Included 30 Items using Principal Component Analysis.

Item	Factors Extracted						
	1	2	3	4	5	6	7
Item 1	-	-	-.43	.45	-	-	-
Item 2	-	.41	.42	-	-	-	-
Item 3	.74	-	-	-	-	-	-
Item 4	.45	-	-	-	-	-	-
Item 5	-.41	.42	.45	-	-	-	-
Item 6	.54	-	-	-	-	-	-
Item 7	-	-	-	.47	-	.50	-
Item 8	.42	-	-	-	.65	-	-
Item 9	.61	-	-	-	-	-	-
Item 10	.61	-.42	-	-	-	-	-
Item 11	.73	-	-	-	-	-	-
Item 12	.66	-	-	-	-	-	-
Item 13	.64	-	-	-	-	-	-
Item 14	.48	-	.45	-	-	-	-
Item 15	.73	-	-	-	-	-	-
Item 16	.66	-	-	-	-	-	-
Item 17	.71	-	-	-	-	-	-
Item 18	-	-	-	-	-	-	-
Item 19	-	-	-	.52	-	-	-
Item 20	.65	-	-	-	-	-	-
Item 21	.56	-	-	-	-	-	-
Item 22	.73	-	-	-	-	-	-
Item 23	.63	-	-	-	-	-	-
Item 24	.43	-	-	-	-	-	.56
Item 25	.49	-.47	-	-	-	-	-
Item 26	.59	-	-	-	-	-	-
Item 27	.76	-	-	-	-	-	-
Item 28	.63	-	-	-	-	-	-
Item 29	.64	-	-	-	-	-	-
Item 30	.46	-	-	-	-	-	-
Variance explained	31.76%	6.94%	5.30%	4.60%	4.39%	3.74%	3.47%

Note. Bolded items were retained (loadings >.45 and cross-loadings <.35; Avolio et al., 2003).

To confirm the underlying structure of the data and assess modification indices, a confirmatory factor analysis (CFA) was conducted with the 19 items loading onto a single shared leadership factor in the initial sample (Sample 1). Although these items exhibited acceptable

loading onto a single factor (Avolio et al., 2003; Gorsuch, 1990), the goodness-of-fit statistics indicated this model was not representative of the underlying data ($\chi^2 = 551^{***}$, $df = 152$; RMSEA = .09; TLI = .79; CFI = .81; SRMR = .07). Investigation of the model modification indices indicated multiple correlated error-terms for several items which were deleted to reduce scale misfit. The resulting 11 items were again tested with CFA and demonstrated an improved fit to the data tested ($\chi^2 = 67.69^*$, $df = 44$; RMSEA = .04; TLI = .96; CFI = .97; SRMR = .04).

A second CFA was performed with 11 items utilising the second independent student sample ($n = 196$). The CFA conducted on this second sample did not demonstrate an acceptable fit to the data ($\chi^2 = 101.94^{***}$, $df = 44$; RMSEA = .08; TLI = .86; CFI = .89; SRMR = .06), additionally several items demonstrated only moderate factor loadings (factor loadings $< .60$) onto the shared leadership latent variable (see Table 7.4). Removing these five items resulted in a final scale of six items, four of which targeted transformational leadership behaviours (specifically transformational vision, idealism, and performance expectations; Pearce & Sims, 2002), one item was focused on transactional leadership behaviours (personal reward; Pearce & Sims, 2002), and one item was focused on problem-solving behaviours (Hiller et al., 2006). Significant correlations were observed between the error terms of both transformational vision behaviours, inspection highlighted similar construct wording in both items (i.e., “Because of my team members, I have a clear vision of our team’s purpose” [Item 22] and “My team members provide a clear vision of where our team is going” [Item 29]), allowing these to covary improved the model’s fit in this student sample. This six-item scale now demonstrated a strong fit to the data (Sample 2), including non-significant chi-square statistics ($\chi^2 = 13.71$, $df = 8$; RMSEA = .06; TLI = .95; CFI = .97; SRMR = .04).

Table 7.4

Confirmatory Factor Analysis of the retained eleven variables onto shared leadership factor.

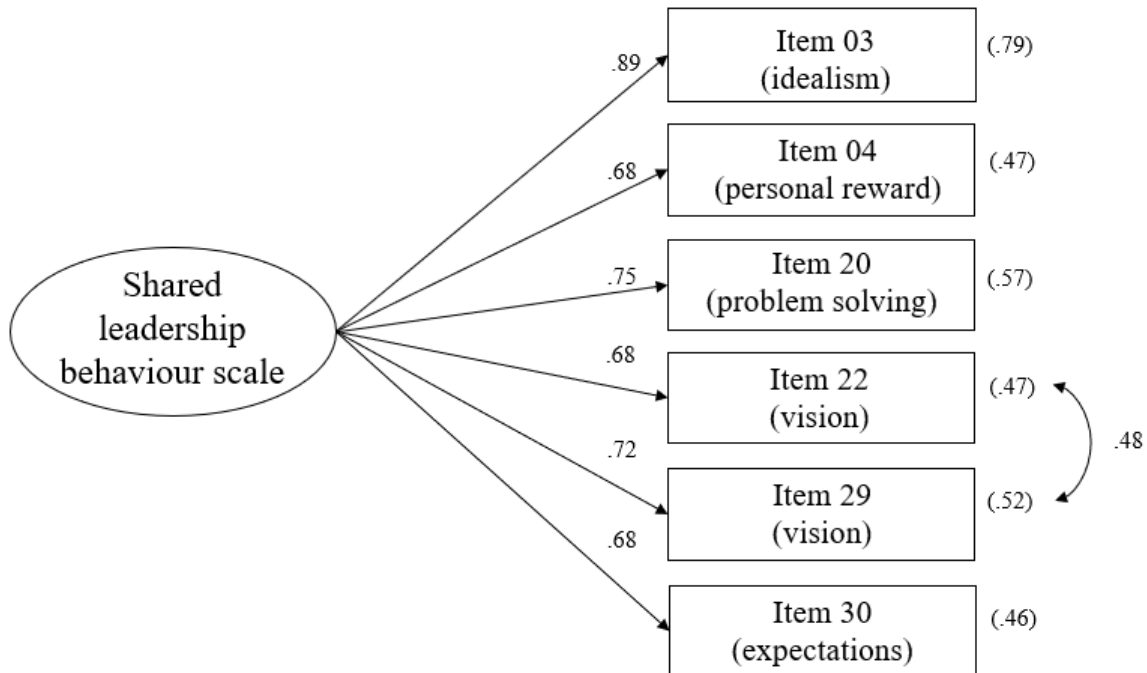
Item	Item label	Factor loading	Subscale
22	Because of my team members, I have a clear vision of our team's purpose.	0.78	Vision
20	My team members share in developing solutions to problems.	0.70	Problem solving
04	My team members give me positive feedback when I perform well.	0.70	Personal reward
03	My team members strive towards higher purposes or ideals.	0.67	Idealism
30	My team members encourage me to go above and beyond what is normally expected.	0.66	Performance expectations
29	My team members provide a clear vision of where our team is going.	0.61	Vision
09	I know where I stand with my team... I usually know how satisfied they are with what I do?	0.59	Team member exchange
21	My team members share in solving problems as they arise?	0.56	Problem Solving
28	We regularly take time to figure out ways to improve our team's work processes.	0.49	Team learning
26	We invite people from outside the team to present information or have discussions with us.	0.40	Team learning
17	My team members expect me to perform at my highest level	0.39	Performance expectations

Note. Bolded items were retained (loadings >.60)

The structure of the developed Shared leadership behaviour scale was finally tested via CFA on a third independent employee only sample (Sample 3). The CFA results demonstrated a strong fit to the data ($\chi^2 = 8.19$, $df = 8$; RMSEA = .01; TLI = .98; CFI = .99; SRMR = .02) and exhibited a non-significant chi-square test. These results are summarised in Figure 7.1.

Figure 7.1

CFA Standardised Estimates for the Shared Leadership Behaviour Scale (SLB-6; Sample 3, n = 158). Note. R² for Observed Variables Reported in Parentheses



Discriminate Validity

As items from the Shared leadership behaviour scale were selected and retained based on their ability to explain variance in team potency outcomes, demonstrating the discriminate validity of the SLB-6 (particularly to the team potency construct) is essential. The discriminate validity of the SLB-6 was tested against team potency and two other related yet distinct constructs: team interdependence and formal transformational leadership. To evaluate the divergence between these constructs the heterotrait-monotrait ratio of correlations was calculated (Henseler et al., 2015). This test generates a ratio comparing the total within-construct correlations against the total between-construct correlations. The shared leadership behaviour scale exhibited ratios below the .90 cut-off the values for all three tests (with formal

transformational leadership $HTMT_{90} = .64$; team interdependence $HTMT_{90} = .25$; and team potency $HTMT_{90} = .35$), indicating acceptable levels of discriminate validity between the SLB-6 and these three constructs (Henseler et al., 2015).

Additionally, a separate test of discriminate validity proposed by Fornell and Larcker (1981) was also conducted. This test compares the average variance extracted by the SLB-6 items against the correlations observed between the latent variables (i.e., correlations between SLB-6 items compared to team interdependence, transformational leadership, and team potency; Fornell & Larcker, 1981). Similar to the previous test, this displayed a discriminate validity between the Shared leadership behaviour scale and the other three constructs with the average variance extracted by the SLB-6 items at .58. This within construct variance exceeded the relationships exhibited with the other variables (i.e., interdependence = .07, transformational leadership = .40, and team potency = .35). Additionally, the correlations between these constructs fell short of levels determined to allow construct interchangeability ($r = .70$; Nunnally, 1967).

Study 3 Discussion

Study 3 successfully developed and validated a parsimonious scale to capture the specific team member shared leadership behaviours related to increased perceptions of team effectiveness. Through the use of machine learning methodologies and confirmatory factor analysis, the initial sample of 153 unique shared leadership behaviours, was reduced to the six behaviours exhibited by team members most likely to increase team effectiveness. These included behaviours regarding providing a sense of vision and direction (Item 22 and Item 29), sharing in problem-solving (Item 20), providing feedback to team members (Item 4), encouraging high performance/developmental expectations (Item 30), and striving towards idealised outcomes (Item 3). Collectively, these six items which were optimised within two

student samples, demonstrated a strong fit to the independent employee data (Crawler & Kelder, 2019).

Of the behaviours captured in the SLB-6, four referred to actions related to shared transformational leadership (Items 3, 22, 29, and 30). This is unsurprising given the robust history of research showing formal transformational leadership behaviours ability to affect beneficial individual, team, and organisational outcomes (Avolio et al., 2003; Ng, 2017). Research assessing shared transformational leadership have found these behaviours to be associated with perceptions of trust and team potency (Boies et al., 2011) and friendliness and emotional empathy (Hensel et al., 2018). Focusing on behaviours related to shared transformational vision creation, Pearce and Barkus commented that “shared vision is an especially important manifestation of shared leadership... the creation of a shared vision to be the most important leadership idea of the twentieth century” (2004, p. 53). Behaviours related to shared team vision can enhance team innovation and information sharing (Hendriks, 2019), increase informal leadership emergence (Zhang et al., 2012), increase goal commitment (Chai et al., 2017), and generate team perceptions of potency (Pearce & Ensley, 2004; Pearce et al., 2004).

In comparison, the results for the two items targeting transactional leadership (Item 4) and problem-solving behaviours (Item 20) were less expected. Traditionally, transactional leadership behaviours are viewed as less desirable, compared to more affective focused behaviours (i.e., transformational leadership; Pearce & Sims, 2002). Despite this, previous evidence often supports the combination of both formal transformational and transactional leadership styles to enhance team outcomes (Bass, 1985). This *augmentation effect* was first forwarded by Bass (1985), and has received some support (Bass et al., 2003; Schriesheim et al.,

2006; Vecchio et al., 2008). Schriesheim and colleagues (2006) found evidence to suggest that the benefits of formal transformational behaviours were greatly enhanced for employees when transactional leadership was also perceived as high (contingent reward). Research assessing shared transactional leadership behaviours have shown similar benefits, with Ensley and colleagues (2006) linking these to organisational growth, whilst Pearce et al. (2004) supported the ability of shared transactional leadership behaviours to enhance both team effectiveness and problem-solving quality.

The final scale item assessed team problem-solving processes. This shared leadership item was designed to target “sharing in identifying and diagnosing task-related problems, carefully using a team’s combined expertise to analyse problems, and arriving at effective solutions” (Hiller et al., 2006, p. 390). It is unsurprising such team behaviours would be related to perceptions of team potency, however, it is interesting that this is the only item included which was developed from a functionalist perspective (Hiller et al., 2006).

The results supported the future use of the SLB-6 scale to capture shared leadership behaviours. The latent shared leadership construct represented by these six shared leadership behaviours, was shown to differ from formal transformational leadership processes, and both team interdependence and team potency. It is recommended the six-item Shared Leadership Behavioural Scale (SLB-6) be used to capture team member shared leadership behaviours in future research investigating team effectiveness or other individual, team, or organisational outcomes.

Chapter 7 Summary

This chapter examined a novel approach to scale development utilising inductive processes and the application machine learning models. Specifically LASSO regression was used

to optimise scale development through the selection of shared leadership behaviours which were most highly related to increased team effectiveness. The next chapter (Chapter 8) builds on these findings through the use of more traditional scale validation processes (Cronbach & Meehl, 1955; DeVellis, 2016). Chapter 8 aims to demonstrate the validity of the SLB-6, through examining the nomological relationships of these shared leadership behaviours to both potential antecedents and outcomes of shared leadership.

Study 4: Exploration of the Antecedents and Outcomes of Shared Leadership (Chapter 8)

As previously demonstrated the Shared Leadership Behaviour scale (SLB-6) provided an excellent fit to the data collected, and demonstrated divergence from a series of related yet distinct psychological constructs (Chapter 7). However, before advocating for the adoption of the SLB-6 in leadership research and practice, the nomological network of this construct requires examination (Cronbach & Meehl, 1955; DeVellis, 2016). As outlined by Cronbach and Meehl (1955), following scale development processes the nomological network or relationships between the new measure and existing constructs should be explored. This chapter aims to demonstrate how the developed measure of shared leadership behaviours (SLB-6) relates to both employee perceptions of team effectiveness (measured through team potency; Guzzo et al., 1993) and individual motivational outcomes (measured through work engagement; Schaufeli et al., 2006). To understand these antecedents of team effectiveness and employee motivation, two theoretical approaches are adopted; specifically, a self-determination framework will be used to investigate employee motivational outcomes (Deci & Ryan, 1985), whilst team effectiveness will be examined through a lens of organisational learning (Marsick & Watkins, 2003).

Antecedents of Shared Leadership Behaviours

Organisational Learning

Organisational learning refers to a series of systems or cultural processes within an organisation which collect, interpret, distribute, and store useful information (Wang & Ahmed, 2003); with learning occurring “when individuals within an organisation experience a problematic situation and inquire into it on the organisations behalf” (Schon & Argyris, 1996, p. 16, cited in Wang & Ahmed, 2003). When problems are encountered, effective teams collect, critically evaluate, and adapt their behaviours in response to new information (Lewin, 1946;

Marsick, 1988), such processes provide a competitive advantage for modern organisations (Amarakoon et al., 2018). Conceptualisations of organisational learning frequently adopt a systems theory approach (Katz & Kahn, 1978), delineating these processes across three distinct levels, including individual learning, team learning, and organisational learning (Marsick & Watkins, 2003; Wang & Ahmed, 2003). From an individual perspective, organisational learning includes employee perceptions of how the organisation values or rewards self-directed learning. Despite the benefits of individual learning practices, Marsick and Watkins (2003) claimed that “learning must be captured and embedded in ongoing systems, practices, and structures so that it can be shared and regularly used to intentionally improve changes in knowledge performance” (p. 133). These collective systems of learning can be explored as features of broader team and organisational environments.

Team learning refers to the behaviours “through which team members seek to acquire, share, refine, or combine task-relevant knowledge through interaction with one another” (Van Der Vegt & Bunderson, 2005, p. 83). Such behaviours are becoming increasingly important in modern organisations where agility and adaptability are required (Porter et al., 2010). Team learning enables the identification of new insights, solutions, or adaptation of previous team processes to achieve valued outcomes (Van der Vegt & Bunderson, 2005). These team learning behaviours augment individual learning strategies to enhance learning outcomes (Yoon & Kayes, 2016), and have been previously shown to explain 18% of the variance observed in managerial ratings of team performance (Van der Vegt & Bunderson, 2005). Team learning, growth, and development is a fundamental outcome of formal leadership processes, and is argued to differentiate between *team leadership* and *team management* (Avolio & Bass, 1995; Sivasubramaniam et al., 2002). Formal transformational leadership has been shown to enhance

team creativity and knowledge sharing (Dong et al., 2017); with meta-analyses highlighting that differences in formal leadership styles explained one-fifth of the variation observed in team learning outcomes (Koeslag-Kreunen et al., 2018). Additionally, the types of tasks being performed moderated these effects, such that for both routine and innovative tasks, team learning was enhanced through person-centred leadership styles, whilst task-focused leadership styles were only related to team learning on routine tasks (Koeslag-Kreunen et al., 2018).

Similar to the effects of formal leadership on team learning, it is posited team learning will produce team environments conducive to shared leadership behaviours (Burke et al., 2003). This is especially true for teams operating in complex knowledge environments where unique solutions to occupational problems must be generated (Day et al., 2004), or within workplaces characterised by change, innovation, or organisational transformation (Ilgen et al., 2005). Commenting on these team environments, Avolio and Bass (1995, p. 201) highlighted that leaders who “continuously focuses on developing follower potential will create group norms that encourage colleagues to focus on helping each other continuously learn and develop.”

Conversely researchers have posited team learning follows norms of shared leadership. Within self-managed project teams, Wang and colleagues (2017) proposed a reciprocal relationship between shared leadership and team learning. Interestingly, these relationships were strongest at the beginning of projects when teams were required to solve problems and learn to function as a unit; following these initial phases, although shared leadership cognitions remained consistent, team learning was significantly reduced (Wang et al., 2017). Xie’s (2019) systematic review supported this relationship, arguing that increased reflection on team processes and communication would result in both improved team learning and greater shared influence between team members. Finally, sampling from Chinese technology organisations, Liu and

colleagues (2014) found learning outcomes were predicted by shared leadership perceptions, with these enhancing both individual and team learning outcomes.

The final level of organisational learning explores how workplace systems and cultures can influence their members' ability to maximise learning outcomes. Adopting an information processing perspective, organisations systems enable the acquisition, dissemination, and interpretation of information within their employee networks (Khan & Khan, 2019; Templeton et al., 2002). These processes provide a major competitive advantage to organisations (Amarakoon et al., 2018), through enhancing employee innovation (Vargas, 2015), increasing customer satisfaction (Rebelo & Gomes, 2017), and improving change management outcomes (Greiling & Halachmi, 2013). Examining these benefits, Khan and Khan (2019) found that increased formal transformational leadership resulted in heightened organisational learning and subsequent employee innovation. Presbitero et al. (2015) found that both inter-team (team boundary spanning) and intra-team processes (e.g., coordination, information exchange, and cooperation) were predictive of organisational learning outcomes. These boundary spanning behaviours have been linked to perceptions of shared leadership, with Chrobot-Mason and colleagues (2016) commenting that "boundary spanning, engaging in behaviours to share information and resources with diverse others, has been associated with higher performance and is likely a critical success factor in organizations that have adopted a shared or dispersed view of leadership" (p. 309).

Likewise, Wang and Ahmed (2003) posited the weaknesses of rigid formal organisational hierarchies, arguing that these were "anti-learning" and would undermine organisational survival in increasing competitive markets. Given how closely organisational, team, and individual learning outcomes are linked to team processes, it is expected increases to organisational learning will enhance employee perceptions of shared leadership. Additionally, these shared

leadership outcomes are posited to enhance employee perceptions of team effectiveness (Figure 8.1). It is therefore hypothesised that:

Hypothesis 6a. Individual learning will exhibit a positive effect on shared leadership behaviours which will subsequently enhance perceptions of team potency.

Hypothesis 6b. Team learning climate will exhibit a positive effect on shared leadership behaviours which will subsequently enhance perceptions of team potency.

Hypothesis 6c. Organisational learning culture will exhibit a positive effect on shared leadership behaviours which will subsequently enhance perceptions of team potency.

Formal Transformational Leadership

In addition to organisational learning, formal transformational leadership is also posited to precede the development of shared leadership practices. Across diverse measures of shared leadership, a persistent positive relationship has been observed between formal and shared leadership outcomes (Cashman, 2009; Coun et al., 2019; Ensley et al., 2006; Hoch, 2013; Pearce & Sims, 2002; Sanders, 2006). Multiple mechanisms for these effects have been suggested, including the ability of formal leaders to design, allocate, and structure tasks (Perry et al., 1999; Seibert et al., 2003), the improved selection and retention of team members (Sanders, 2006), and creating opportunities (or barriers) for shared decision-making (Tian et al., 2016).

Similar effects are posited to occur through role modelling mechanisms, such that team members who observe positive interactions between their formal leader and other team members subsequently exhibit equivalent shared leadership behaviours (Hoch, 2013; Pearce & Sims, 2000). Supporting this Pearce and Sims (2002) found similar types of formal-shared leadership styles tended to correlate (e.g., formal aversive leadership was related to heightened shared aversive leadership); whilst early research found construction foremen adapted their own

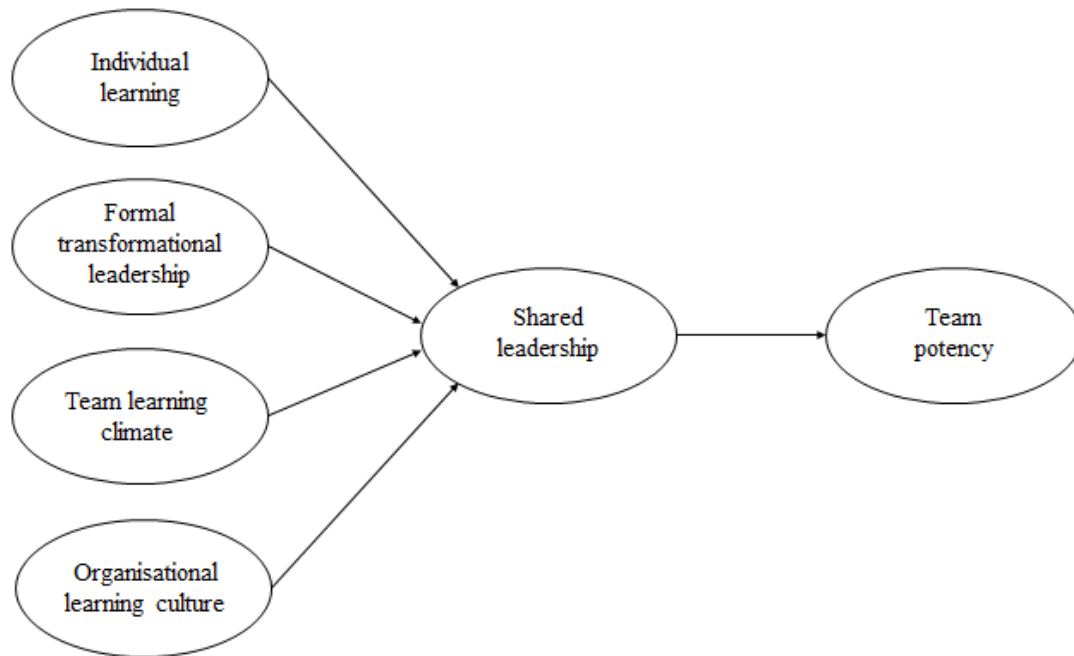
leadership style to align with their own managers leadership behaviours (Fleishman, 1953). Investigating shared transformational leadership, Cashman (2009) demonstrated formal transformational leadership could enhance team perceptions of shared leadership, resulting in improved ratings of team potency. Sanders (2006) observed similar effects with formal transformational leadership styles being strongly related to shared leadership emergence at both the individual and team level of analysis.

Other researchers, however, have challenged these findings, arguing that effective shared leadership emerges in team environments due to an absence of formal leadership (Balkundi & Kilduff, 2006). Using a social network measure, Ishikawa (2012) found increased rating of formal transformational leadership actually reduced perceptions of shared leadership in Japanese research teams. Ishikawa (2012) argued that highly transformational leaders generated stronger team norms for following formal leaders' advice and directions, thus diminishing the need for shared leadership emergence. Despite these findings, a positive relationship has been consistently demonstrated between formal transformational leadership and increased shared leadership perceptions. Therefore, it is hypothesised that:

Hypothesis 6d. Formal transformational leadership will exhibit a positive effect on shared leadership behaviours which will subsequently enhance perceptions of team potency.

Figure 8.1

Hypothesised Antecedents of Shared Leadership Behaviours.



Outcomes of Shared Leadership Behaviours

Self-determination Theory

Early motivational theory explored the features of activities which result in increased task directed behaviours, positing that activities an individual finds interesting, challenging, or aesthetically pleasing will result in increased motivation (Deci & Ryan, 1985). Similarly, job tasks without these characteristics are unlikely to be performed until an external motivating force is applied (Ryan & Deci, 2002). Research has delineated between two competing sources of motivation: intrinsic motivation (internal wants, goals, and passions) and extrinsic motivation (rewards and punishments; Deci & Ryan, 1985).

These more internally directed or intrinsic motivational processes have been related to a range of positive employee, team and organisational outcomes. The benefits of intrinsic motivational processes include increased employee commitment (Gagne et al., 2008), improved

performance (Kuvaas, 2009), the provision of support (Roth et al., 2007), increased effort (De Cooman et al., 2013), greater persistence (Deci & Ryan, 2008), lower turnover (Williams et al., 2014), and more creative problem-solving (Liu et al., 2011). Extrinsic motivation exhibits no relationship to these outcomes and can indeed hinder these benefits (Deci & Ryan, 2000; Gagne & Deci, 2005). Given these observed advantages of more intrinsic regulation processes, research has aimed to understand “what are the social conditions that nurture versus inhibit internalization and integration?” (Ryan & Deci, 2000, p. 73).

Emergent research has explored the potential antecedents or contextual factors that promote these beneficial self-determined autonomous regulation processes. This subcomponent of self-determination theory (or *organismic integration theory*; Deci & Ryan, 1985) identified three social needs which preceded these self-determined and intrinsic regulation processes: a need for relatedness, a need for autonomy, and a need for competence (Cerasoli et al., 2016; Deci et al., 2017; Slemp et al., 2021).

Relatedness refers to feelings of belonging, connectedness, being valued, respected, or perceived as important to others (Baumeister & Leary, 1995; Deci & Ryan, 2000). Individuals will more readily approach individuals, tasks, and situations that support feelings of relatedness, whilst avoiding those that hinder these needs (Reeve, 2009). Additionally, motivation is more frequently internalised when actions are promoted by an individual who maintains a close relationship with the target (e.g., a formal leader or colleague; Ryan et al., 1994). Perceptions of relatedness have been found to reduce employee depersonalisation and enhance a sense of personal accomplishment, and mediate the benefits of social support with these outcomes (Fernet et al., 2013). A meta-analysis of 108 studies linked relatedness to employee performance

(Cerasoli et al., 2016). Similarly, need for relatedness has been shown to precede employee ratings of organisational identification (Kumar & Jauhari, 2016).

The need for autonomy refers to an individual's sense of volitional control and agency over their own actions within their environments (Cerasoli et al., 2016). If individual autonomy for a task is thwarted (e.g., through punishment, micro-management, or manipulation), then intrinsic motivational regulation will also be reduced, thus increasing perceptions of control regulations (Cerasoli et al., 2016). A developed sense of autonomy has been shown to mediate the effects of job control, role overload, and social support on employee burnout (Fernet et al., 2013), while also increasing employee wellbeing, work-life balance (Fotiadis et al., 2019), and performance outcomes (Cerasoli et al., 2016; Dysvik & Kuvaas, 2011).

The final need shown to precede autonomous motivational regulation is perceptions of competence and mastery. The need for competence refers to a desire to demonstrate ability and develop skills related to valued outcomes (Cerasoli et al., 2016). Research exploring employees' need for competence has shown that satisfaction mediates the effects of job control and role ambiguity onto personal accomplishment (Fernet et al., 2013), increases employee ratings of wellbeing (Fatiadis et al., 2019), and leads to improved performance outcomes (Cerasoli et al., 2016). Additionally, workplace competence has been linked to increased organisational commitment and work process improvement (Kim et al., 2016). As meeting these needs for competence, relatedness, and autonomy have been linked to a range of beneficial outcomes, organisational research has begun to explore how specific leadership processes can lead to an enhanced satisfaction of these needs.

Organisational leadership processes have been shown to enhance employee satisfaction of needs for competence, relatedness, and autonomy outcomes (Gagne & Deci, 2005; Jungert et

al., 2017; Van den Broeck et al., 2013). For example, transformational leadership styles have been associated with employee satisfaction across these three needs (Hetland et al., 2011; Kovjanic et al., 2012; Wang & Gagne, 2013). Kovjanic and colleagues (2012) highlighted the effects of formal transformational leader behaviours in predicting ratings of employee commitment, these outcomes were fully mediated through an employees' sense of relatedness to their leader. Similarly, charismatic and servant leadership styles were revealed to enhance employee needs for relatedness and belonging (De Cremer & van Knippenberg, 2002; Den Hartog et al., 2007). Other works found the benefits of servant leadership (i.e., increased organisational citizenship behaviours) were mediated through an employees' sense of relatedness (Chiniara & Bentein, 2016). While formal leaders who supported employee, autonomous actions have been shown to increase employee engagement, wellbeing, and performance (Baard et al., 2004; Deci et al., 2001; Lynch et al., 2005).

Adopting a full-range leadership perspective, behaviours related to management-by-exception (active) have hindered employee needs satisfaction, with these effects being strongest for employees' sense of autonomy (Hetland et al., 2011); while contingent reward behaviours were related to an increased sense of relatedness and competence (Afshari & Gibson, 2016). Rahmadani and colleagues (2019) demonstrated that the benefits of inspiring and empowering leadership on employee engagement were mediated via employee needs of autonomy, relatedness, and competence. Supporting these findings, a large-scale meta-analysis found perceived needs satisfaction was related to range of leadership behaviours, but also the quality of relationships exhibited between formal leaders and their followers (measured through LMX outcomes; Van den Broeck et al., 2016).

Despite much research exploring the role of leaders and team members in enhancing employee needs satisfaction, little research has identified how shared leadership processes might affect similar outcomes (Coun et al., 2019). As formal transformational leader behaviours have been shown to support employee needs satisfaction (Hetland et al., 2011; Kovjanic et al., 2012; Wang & Gagne, 2013), it is expected shared leadership processes (especially those including transformational behaviours) will also enhance employee needs satisfaction. Indeed, such effects are likely to be stronger given the reduced social distance exhibited between colleagues compared to formal leaders (Roth et al., 2009). It is therefore hypothesised that:

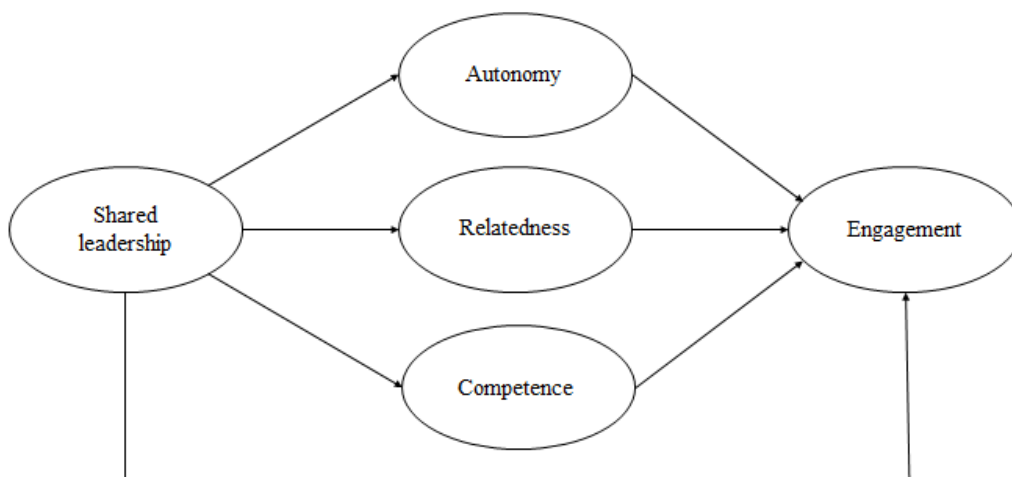
Hypothesis 7a. The effects of shared leadership on employee engagement will be mediated through team members perceptions of autonomy.

Hypothesis 7b. The effects of shared leadership on employee engagement will be mediated through team members perceptions of relatedness.

Hypothesis 7c. The effects of shared leadership on employee engagement will be mediated through team members perceptions of competence.

Figure 8.2

Hypothesised Outcomes and Mediation Effects of Shared Leadership to Employee Engagement.



Study 4 Method

Participants

Participants for the current study were sampled through convenience sampling methods and through social media advertisements. Recruitment was limited to employees who were employed full-time within a team environment. In addition to the research variables, demographic information was also collected. These included participants age ($M = 42.60$, $SD = 13.09$), gender (female = 111 [70%], male = 47 [30%]), their tenure within their current team ($M = 19.5$ months, $SD = 20.86$) and organisational tenure ($M = 29.4$ months, $SD = 27.17$). Participants were incentivised for their responses with an opportunity to enter into a prize draw.

Measures

Shared Leadership Behaviours. Shared leadership behaviours were measured through the Shared Leadership Behavioural Scale (SLB-6) described in Chapter 7. Participants rated their responses on a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*). An example includes “My team members provide a clear vision of where our team is going” (Pearce & Sims, 2002). This scale reliability for this sample was acceptable (Cronbach’s alpha = .87).

Employee Needs Satisfaction. Drawing on self-determination theory, employee needs satisfactions was measured using three satisfaction subscales from the need satisfactions and frustration scale (NSFS; Longo et al., 2016). Each subscale included three items measured on a 5-point response scale (1 = *Strongly disagree*, 5 = *Strongly agree*). Example items are: “I feel free to decide what to do” (autonomy satisfaction), “I feel the people I interact with really care about me” (relatedness satisfaction), and “I feel I am very good at the things I do” (competence satisfaction). Each of these subscales demonstrated an acceptable reliability (Cronbach’s alpha autonomy = .81, relatedness = .76, and competence = .75).

Organisational Learning. Organisational learning was captured using the short-form dimensions of learning organisation scale (DLOQ; Marsick & Watkins 2003). This measure captures cognitions and behaviours related to perceptions of organisational learning across the individual (6 items), team (3 items), and organisational levels (10 items). Responses were measured on a 5-point frequency scale (1 = *Almost never*, 5 = *Almost always*), with higher values representing increased perceptions of organisational learning. Example items across each level include “In my organisation, people are rewarded for learning” (individual learning), “In my organisation, teams/groups revise their thinking as a result of group discussions or information collected” (team learning), and “My organisation makes its lessons learned available to all employees” (organisational learning). Reliability coefficients for these subscales were all acceptable (Cronbach’s alpha individual learning = .93, team learning = .89, and organisational learning = .95).

Formal Transformational Leadership. The current study utilised four subscales of transformational leader behaviour developed by Podsakoff et al. (1990). Employees rated their formal leaders on a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*) regarding their leaders’ ability to identify and articulate vision (5 items), foster an acceptance of group goals (4 items), provide individualised consideration and support (4 items), and to provide intellectual stimulation (4 items). Behavioural item stems began with “My leader...” with examples including “Has a clear understanding of where we are going” (articulates vision), “Fosters collaboration among work groups” (fosters group goals), “Behaves in a manner thoughtful of my personal needs” (individual consideration), and “Asks questions which prompt me to think” (intellectual stimulation). Each subscale demonstrated an acceptable reliability

(Cronbach's alpha for articulates vision = .91, fosters goals = .93, individual consideration = .91, and intellectual stimulation = .93).

Employee Engagement. For scale description see Study 2 (Chapter 6). This scale demonstrated an acceptable reliability within the current sample (Cronbach's alpha = .84).

Team Potency. For scale description see Study 1 (Chapter 4). These items exhibited an acceptable reliability in the current sample (Cronbach's alpha = .89).

Study 4 Results

Data Screening

Data and regression assumptions were checked prior to these analyses. During recruitment 234 responses were received from full-time employees, of these 64 were removed for non-responses (i.e., opening the survey but not completing), whilst another 12 participants were removed due to failing to respond to the shared leadership scale items. Removal of these provided a final sample of 158 individuals.

Data Analysis

Assumption checking and correlations were completed using SPSS (IBM v.25), whilst both confirmatory factor analysis (CFA) and path analysis were performed in Mplus (v7.2, Muthen & Muthen, 2015). Correlational relationships between the research variables are presented in Table 8.1. Initially, confirmatory factor analysis (CFA) was used to fit the measurement model for each construct individually, following this the larger structural model (including dependent and mediating pathways) was tested. Although a CFA was conducted for each measure as part of the SEM, due to space and relevance only the results from the SLB-6 scale are reported. The shared leadership behaviour scale demonstrated a strong fit to the

underlying data, exhibiting a non-significant chi-square value ($\chi^2 = 8.19$, $df = 8$; RMSEA = .01; TLI = .98; CFI = .99; SRMR = .02).

The initial structural equation model (Figure 8.3) was used to model the effects of formal transformational leadership and organisational learning to enhance perceptions of shared leadership, with these influencing subsequent ratings of team potency. This model presented a reasonable fit to the underlying data ($\chi^2 = 1880.17^{***}$, $df = 1156$; RMSEA = .06; TLI = .88; CFI = .89; SRMR = .07), although the fit indices that compare hypothesised and null models were just below acceptable cut-offs (i.e., TLI >.90, CFI >.90; Crawford & Kelder, 2019).

As demonstrated in Figure 8.3, both formal transformational leadership and team learning were significantly related to shared leadership behaviours, with increases to these resulting in heightened perceptions of team potency. Whilst the pathways for individual learning outcomes and perceptions of organisational learning, were non-significantly related to shared leadership behaviours. In total, this hypothesised model explained 35% of the variance observed in employee ratings of team potency. An alternative model was tested (not reported in full here) with organisational learning modelled as a second order latent construct (i.e., with individual, team, and organisational learning loading onto a single latent variable; Coun et al., 2019). This alternative model provided a good fit and showed a significant relationship to shared leadership behaviours. However, to enable inspection of the individual learning pathways, latent variables for each subscale were employed in these tests.

Table 8.1

Correlations between Shared Leadership Behaviours and Proposed Antecedents and Outcome Variables.

Variables	<i>M</i> ^c	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender ^a	71.2%	-															
2. Age	42.1 (13.1)	.07	-														
3. Organisational tenure	2.53 (2.30)	-.09	-.04	-													
4. Team tenure	1.61 (1.70)	-.09	.12	.47***	-												
5. Shared leadership behaviours	3.59 (0.84)	-.02	.03	-.05	.04	(.87)											
6. NS autonomy	5.09 (1.20)	.06	.02	.04	.10	.27***	(.81)										
7. NS competence	5.69 (0.85)	-.03	.12	.17	.20*	-.02	.41***	(.75)									
8. NS relatedness	5.25 (1.11)	-.06	-.03	.01	.10	.44***	.43***	.33***	(.76)								
9. Articulates vision	5.27 (1.38)	.17*	.01	-.05	.01	.61***	.32***	.09	.35***	(.91)							
10. Fosters goals	5.59 (1.39)	.09	-.02	-.05	.01	.60***	.34***	.07	.32***	.80***	(.93)						
11. Individual consideration	5.82 (1.31)	-.01	-.01	-.04	.02	.41***	.38***	.16	.30***	.59***	.72***	(.91)					
12. Intellectual stimulation	5.15 (1.43)	.08	.02	-.07	-.04	.60***	.33***	.07	.35***	.82***	.75***	.67***	(.93)				
13. Individual learning	4.05 (1.19)	.04	-.08	-.17*	-.06	.64***	.27**	.01	.48***	.52***	.55***	.55***	.50***	(.93)			
14. Team learning climate	3.98 (1.26)	.05	-.06	-.12	-.02	.69***	.44***	.11	.48***	.64***	.68***	.60***	.63***	.82***	(.89)		
15. Organisational learning culture	3.95 (1.23)	.06	-.12	-.10	-.03	.65***	.31***	.03	.43***	.62***	.63***	.61***	.65***	.85***	.84***	(.95)	
16. Employee engagement	5.35 (1.13)	-.11	.19*	-.17*	-.00	.34***	.38***	.32***	.44***	.37***	.34***	.36***	.40***	.47***	.53***	.48***	(.84)
17. Team potency ^b	4.02 (0.64)	-.01	-.02	.01	.02	.57***	.22**	.22**	.37***	.36***	.39***	.46***	.40***	.50***	.51***	.46***	.32***

Note. Listwise deletion reported *n* = 150, NS = needs satisfaction,

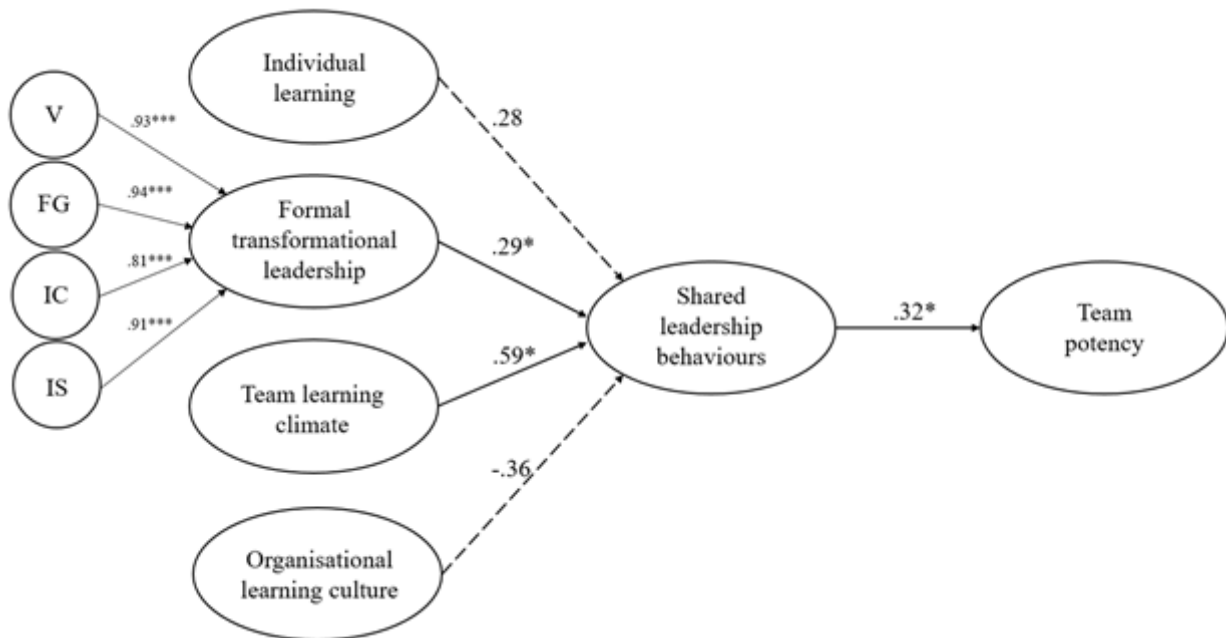
^a Percentage of female participants,

^b Team potency alpha = .89,

^c Standard deviation reported in parenthesis.

Figure 8.3

Hypothesised Mediation Model of Organisational Learning and Formal Transformational Leadership Enhancing Team Potency via Increased Shared Leadership Behaviours

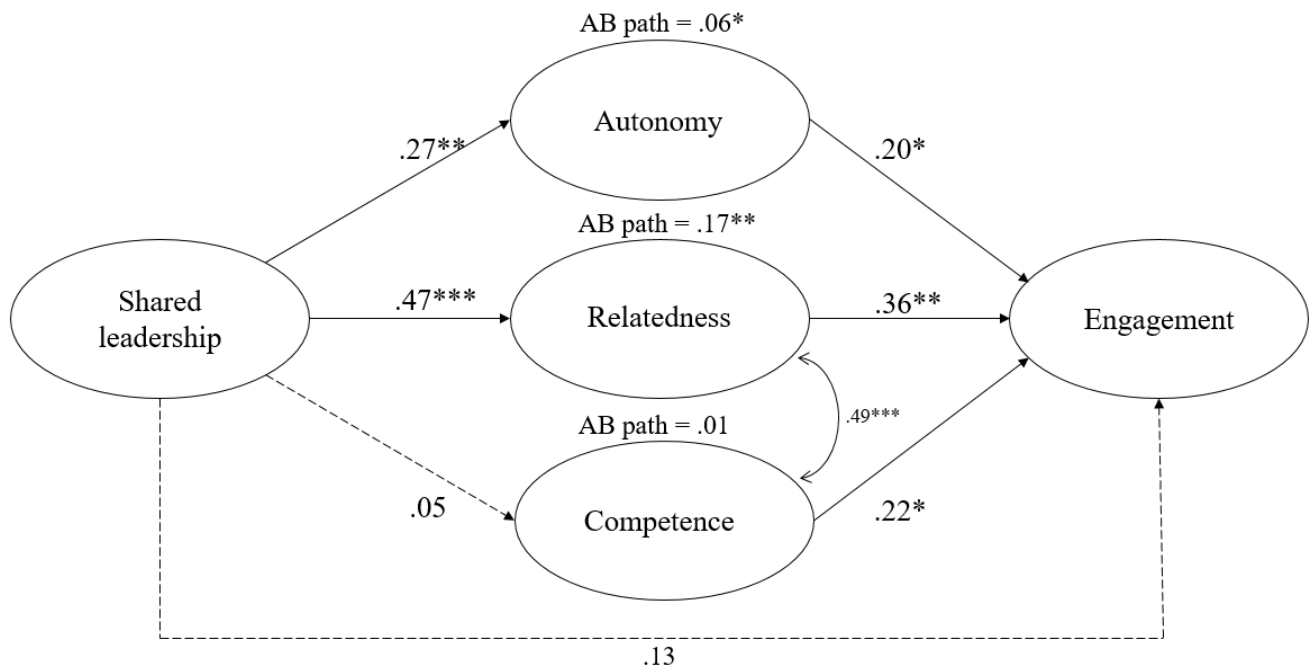


Note. V = articulates vision, FG = fosters goals, IC = individual consideration, IS = intellectual stimulation.

The SLB-6 scale was then included in analyses to test the relationships between shared leadership behaviours and employee motivational processes, specifically the mediation effects through staff members sense of autonomy, relatedness, and competence onto employee engagement. To enable the model convergence several modifications were applied. For example, the error term from one needs item was allowed to correlate with two other needs items. Additionally, the competence and relatedness needs subscales were allowed to co-vary. Figure 8.4 highlights the hypothesised mediation effects of shared leadership behaviours enhancing employee motivation via needs satisfaction.

Figure 8.4

Hypothesised Mediation Model of Shared Leadership Enhancing Employee Engagement via Employee Needs Satisfaction



The path analysis used to explore the mediation effects of shared leadership onto employee engagement outcomes displayed a good fit to the data ($\chi^2 = 187.95^{***}$, $df = 126$; RMSEA = .05; TLI = .93; CFI = .94; SRMR = .09). Both mediation pathways for autonomy and relatedness exhibited significant effects in enhancing employee reported levels of engagement. Interestingly, no mediation effect nor direct effect was found for the ability of shared leadership to enhance ratings of competence whilst controlling for the other needs variables. Additionally, the inclusion of the autonomy, relatedness, and competence reduced the strength of the indirect effects of shared leadership, such that this was no longer significantly related to employee engagement. In total, the mediation model explained 38% of the variance observed in employee engagement.

Study 4 Discussion

The results presented provide support for several of the proposed hypotheses (i.e., H6b, H6d, H7a, and H7b). Investigating the antecedents of shared leadership behaviours,

both perceptions of team learning climates and formal transformational leadership exhibited a significant positive relationship to shared leadership behaviours, with these enhancing perceptions of team potency (H6b & H6d). Similarly, testing the motivational outcomes of shared leadership, enhanced autonomy, and a greater sense of relatedness were related to perceived shared leadership behaviours, with these subsequently improving ratings of employee engagement (H7a & H7b).

As expected, formal transformational leadership processes were found to enhance perceptions of shared leadership behaviours (H6d). Multiple mechanisms have been posited to explain the ability of formal leaders to affect team shared leadership perceptions, including the ability to design and structure tasks (Seibert et al., 2003; Perry et al., 1999), using team coaching (Carson et al., 2007), via team empowerment (Margolis & Ziegert, 2016), and through developing strong leader-follower relationships (Zhang et al., 2012). Of these mechanisms, formal transformational leadership has consistently been shown to result in heightened perceptions of shared transformational leader (Ensley et al., 2006; Hoch, 2013; Pearce & Sims, 2002; Sanders, 2006). Ensley and colleagues (2006) examined the effects of both formal and shared transformational leadership finding these were strongly correlated with each other, while Sanders (2006) modelled formal leadership practices as preceding the development of shared leadership in teams. Similarly, Hoch (2013) demonstrated a flow-on effect of formal transformational and empowering leadership, such that these enhanced shared leadership ratings and subsequent team innovation outcomes. Given a key outcome of transformational leadership is to develop follower potential and to “create group norms that encourage colleagues to focus on helping each other continuously learn and develop” (Avolio & Bass, 1995, p. 201), such outcomes are expected, and indeed are supported by these results.

Other antecedents of shared leadership behaviours were explored including individual, team, and organisational learning. However, only team learning behaviours exhibited a significant relationship to shared leadership behaviours (H6b). Recent research has posited the effects of team learning to enhance shared leadership behaviours. For example, Day and colleagues (2004, p. 869-870) argued that “Learning is often a precursor to adaptation... being motivated and able to learn is a prerequisite for effective leadership and at the team level learning would provide an important means of developing leadership resources”. Using a social network approach, Liu and colleagues (2014) found that the positive relationships observed between team learning and shared leadership were mediated via perceptions of team psychological safety. Whilst Hoch and Kozlowski (2014) utilised a team learning subscale in their measure of shared leadership, citing the benefits of teams’ seeking feedback, discussing errors, and seeking additional information (Edmondson, 1999). As the shared leadership measure employed contains items targeting behaviours of co-developing solutions, encouraging positive feedback, and going beyond expectations, it is unsurprising team environments characterised by empowerment and increased learning would result in both increased shared leadership behaviours but also result in a heightened sense of team potency.

Less expected were the non-significant relationships found between individual and organisational learning and shared leadership behaviours (H6a & H6c). It is posited these non-significant results were due to controlling for other learning outcomes and formal transformational leadership processes. As displayed in Table 8.1, the pairwise correlations between these variables are all strong and significant (with all subscale relationships exceeding $r = .50, p < .001$). Furthermore, previous research has successfully explored the effects of formal leadership on team learning processes. For example, Kahn and Kahn (2019) found formal transformational leadership was predictive of organisational learning within the

public sector. Similarly, Xie's (2019) systematic review found multiple instances of organisational learning was related to formal transformational leadership practices. It is therefore, posited that these non-significant effects were caused through controlling for these highly related processes, although further research is recommended to directly assess these potential overlapping relationships.

In addition to testing the antecedents of these shared leadership behaviours, the current study explored how these processes could increase perceptions of team potency and enhance engagement through the satisfaction of employee needs. The results support the hypotheses that shared leadership behaviours increase perceptions of work engagement through supporting employee needs for autonomy, and relatedness (H7a & H7b), but not competence (H7c). Supporting previous self-determination theories of motivation (Deci & Ryan, 2000), employees who were more engaged with occupational tasks were more likely to rate their individual needs of autonomy, competence, and relatedness as being met.

Congruent with research exploring the ability of formal leaders to enhance satisfaction of these needs (Afahari & Gibson, 2016; Rahmadani et al., 2019), heightened ratings of shared leadership were shown to increase satisfaction of employee's sense of autonomy and relatedness, with the latter demonstrating the strongest relationship with employee engagement. Investigating the effects of shared leadership on employee self-determination (from a functionalist perspective), Coun and colleagues (2019) found similar significant relationships between shared leadership and satisfaction of both employee autonomy and relatedness. It seems cogent certain shared leadership behaviours would be related to increased perceptions of team member relatedness. For example, the provision of positive feedback, or assisting in developing solutions to problems are likely to generate a sense of relatedness between team members. Additionally, Jungert and colleagues (2017) highlighted that a sense of relatedness is strongly associated with team membership

(compared to needs of autonomy and competence), with team membership explaining 20% of the variance observed in employees' sense of relatedness.

The relationship between shared leadership, increased autonomy, and subsequent employee engagement was also found to be significant. Kozlowski and Bell (2013) highlighted how autonomy enables teams to more efficiently utilise their existing knowledge or adapt current processes to solve emerging problems. Given the cross-sectional nature of the current study, it is unclear if these perceptions of autonomy are generated via these shared leadership behaviours; or conversely, if a certain level of autonomy is required prior to the emergence of shared leadership behaviours. While the lack of significant effects observed between shared leadership and employees' need for competence was unexpected, similar results have been previously demonstrated. For example, whilst examining the mediating effects of shared leadership through employee competence onto team learning behaviours, no relationship was found between shared leadership and employee competence (Coun et al., 2019). Utilising student work groups Mathieu and colleagues (2015) found no relationship between shared leadership and student competence (measured through current GPA). Similarly, investigations of formal transformational leader behaviours and employee needs, demonstrated that needs related to competence exhibited the weakest relationship (although these remained significant; Hetland et al., 2011; Kobjanic et al., 2012).

These analyses support the use of the shared leadership behaviour scale in future research and when examining the ability of shared leadership behaviours to effect positive individual, team, and organisational outcomes. The antecedents and outcomes of team shared leadership behaviours (as assessed by the SLB-6) were examined, including the positive effects of maintaining a positive team learning environment, or having a transformational formal team leader. Additionally, the benefits of shared leadership behaviours on employee motivational outcomes were inspected using a self-determination framework, highlighting

that shared leadership can enhance ratings of relatedness and autonomy which result in more intrinsic motivational outcomes and a heightened sense of work engagement.

Chapter 8 Summary

Despite the growth of academic literature investigating shared leadership processes over the previous decades, scarce research has integrated theoretical perspectives or explored the specific team member behaviours which underlie these observed benefits. The current study aimed to demonstrate the relationships between the newly developed Shared leadership behaviour scale (SLB-6) and the beneficial outcomes of team potency and employee engagement. Both self-determination theory (Deci & Ryan, 2000) and organisational learning theory (Edmondson, 1999) were employed to explore the antecedents and outcomes of shared leadership behaviours. These analyses highlight that team learning processes, and perceptions of formal transformational leadership were related to increased perceptions of shared leadership, with these enhancing subsequent ratings of team potency. Additionally, the effects of shared leadership behaviours to enhance employee motivational and engagement process through developing an increased sense of relatedness and autonomy was also demonstrated. Although further research utilising the SLB-6 scale is recommended, these analyses demonstrate the validity of the SLB-6 scale as an effective measure of shared leadership behaviours and highlight the potential benefits of engaging in these behaviours within organisational team environments.

This concludes the empirical component of this thesis, the following chapter will discuss these collective findings and outline avenues for future research examining both shared leadership broadly and the use of the SLB-6.

Chapter 9: General Discussion and Conclusion

This thesis has examined the measurement and conceptualisation of team member influence processes known as shared leadership. This final chapter presents a general discussion of the findings and their implications for the advancement of both shared leadership theory and practice. Firstly, a high-level overview of the thesis findings is reported, followed by an in-depth examination of how these discoveries contribute to our understanding of these team shared leadership processes. Finally, the limitations and potential avenues for future research are discussed.

Summary of Findings

Chapter 3: Shared Leadership Literature Review

This thesis presented an in-depth examination of the team member influence processes commonly referred to as shared leadership. Prior to the empirical assessment of these shared leadership processes, a review was conducted to highlight the diverse theoretical approaches used by previous research to conceptualise shared leadership. From this review the differing perspectives of shared leadership were categorised based on the theoretical and methodological frameworks applied. This process delineated between three contemporary perspectives of shared leadership, specifically the traditional perspective, the network-relational perspective, and the functionalist perspective.

Despite the differences in methods and conceptualisations employed across the traditional, the network-relational, and functionalist perspectives of shared leadership, it remains unclear which of these approaches best captures shared leadership processes. Nor is it obvious which of these diverse behaviours should be encouraged or targeted by interventions to enhance team effectiveness. Commenting on this Park and Kwon (2013) argued that shared leadership remained “inconsistently defined and measured” (p. 28). Additionally, Kozlowski and colleagues (2016) suggested that “progress is needed to

understand the nature, content, and dimensionality of SL [shared leadership]" (p. 36).

Therefore, to advance scientific understanding regarding these diverse shared leadership behaviours and their relationship to beneficial team outcomes, an empirical comparison of the most common measures of shared leadership was conducted.

Study 1: Shared Leadership a Multi-scale Comparison

This study aimed to compare and contrast shared leadership responses utilising 11 measures drawn from a range of differing perspectives, with the goal of identifying the "best" developed scale (or broadly the best types of scales) to define and measure these shared leadership influence processes. Specifically, measures were compared based on 1) their observed fit to the data collected (i.e., goodness-of-fit across both structural and measurement models), and 2) their ability to predict perceptions of team effectiveness (i.e., team potency). Comparisons included six scales drawn from the traditional shared leadership perspectives (Avolio et al., 2003; Hoch, 2013; Hoch et al., 2010; Pearce & Sims, 2002; Pearce et al., 2004; Sherony & Green, 2002), four measures adopting a functionalist perspective (Hiller et al., 2006; Hoch & Kozlowski, 2014; Muethel et al., 2012; Ziegert, 2005), and the single item measure widely used in network-relational studies of shared leadership (Carson et al., 2007).

Collectively, the results of these scale comparisons failed to identify the "best" measures of shared leadership. Model-fit comparisons revealed that most of the shared leadership scales displayed a mediocre fit to the data (Crawford & Kelder, 2019). Although differences were exhibited between individual scales in their ability to predict team effectiveness (ranging from 11% to 42% of the variance explained), these findings were inconclusive. For example, from the traditional leadership perspective the team multifactor leadership questionnaire (Avolio et al., 2003) explained 42% of the variance in perceptions of team effectiveness; however, despite this strong relationship to team effectiveness this scale produced one of the poorest fits to the collected data. Conversely, from the functionalist

perspective the measure developed by Muethel and colleagues (2012) demonstrated an excellent fit to the data, yet only explained 27% of the variance in individual ratings of team effectiveness. This general trend was observed across multiple measures, such that the more complex measures (those containing more items or multiple subscales targeting more diverse leadership behaviours) generally exhibited heightened effect sizes but also demonstrated a poorer fit; whilst the inverse was true for shorter measures or those targeting fewer leadership behavioural processes. Additional analysis conducted at the subscale level demonstrated that measures containing items designed to target shared transformational leadership behaviours exhibited a strong relationship to team effectiveness.

Post-hoc analyses ordering these subscales by the strength of their correlations with team effectiveness, found that five of the top six subscales included measures of shared transformational leadership. It was therefore, concluded that shared transformational leadership behaviours were an especially prominent feature of shared leadership, and a critical component of the relationship between shared leadership and team effectiveness.

Study 2: Social Networked Shared Leadership

Following the analyses comparing shared leadership measures from different perspectives, it was observed that the included network-relational scale (i.e., Carson et al., 2007) explained the least amount of variance in team effectiveness. These findings challenged previous research where social network measures were shown to exhibit the strongest relationship to beneficial team outcomes; although it remained unclear if these findings are an artefact of the statistical or measurement methods employed. To better understand this, an examination of the most common metrics describing differences in social networks was conducted (Chapter 5). The frequently used measures of social networks coefficients (network density, network centrality, and the percentage of binary network ties)

were calculated and used to predict employee outcomes of team adaptivity, employee engagement, and team potency.

Results from these analyses were congruent with those reported in Study 1. Specifically, it was found all three measures used to describe the network of shared leadership relationships were poor predictors of both team and individual employee outcomes. Despite some significant effects (e.g., density of shared leadership networks was associated with employee engagement, team potency, and adaptivity), these effect sizes were considered small (with social network metrics explaining roughly 2% of variance across these outcomes; Study 2). Following these results, it was posited that internal team environments could moderate the relationships between social network density, centrality, percentage values, and employee outcomes. Moderated regressions were conducted to explore these team contextual effects (specifically team tenure, team size, and work interdependence). Although team size was found to moderate the associations between all three independent variables and team potency, and the relationship between shared leadership network centrality and employee engagement, again these relationships were small (between 2% and 4% variance explained).

These findings for networked shared leadership effects were surprising; despite expectations that these measures would exhibit the strongest effect sizes on team outcomes (D'Innocenzo et al., 2014; Nicolaidis et al., 2014), the results suggest the opposite occurs. Indeed, these findings raised further questions regarding what are these social network measures of shared leadership actually assessing? Subsequently, the correlations between these three-social network metrics and other measures of shared leadership (drawn from the traditional and functionalist perspectives) were assessed. Of the included measures of shared leadership, network measures exhibited the strongest relationship to shared directive leadership (Hoch et al., 2010; Pearce & Sims, 2002) and externally directed team shared

leadership behaviours (Muethel et al., 2012). Given these relationships, it was tentatively posited that social network measures of shared leadership were capturing aspects of team leadership “visibility”, rather than shared influence behaviours. These findings are congruent with work exploring implicit leadership theory, where it is posited employees draw on naïve or implicit perceptions when rating an individual’s leadership behaviour (Lord et al., 2001; Shondrick et al., 2010).

Collectively these empirical scale comparisons attempted to identify the most robust measure of shared leadership (i.e., Study 1 and Study 2). Despite these efforts, few advantages of any single particular scale or underlying theoretical approach was identified. Although the behaviours examined by measures developed from a traditional shared transformational leadership perspective exhibited the strongest effects on perceptions of team effectiveness (i.e., Avolio et al., 2003; Pearce & Sims, 2002). Following these results, a more effective measure of shared leadership was developed.

Study 3: Development of the Shared Leadership Behaviour Scale (SLB-6)

Adapting items from the ten previously published measures of shared leadership, the shared leadership behaviour scale (SLB-6) was developed using novel machine learning techniques. The SLB-6 contains six items loading onto a single factor which captures the specific shared leadership behaviours most associated with team effectiveness. Specifically, the SLB-6 includes four team member shared leadership behaviours related to transformational leadership, namely the promotion of team vision, providing direction, encouraging high performance expectations, and maintaining idealised goals and purpose (Pearce & Sims, 2002). Additionally, two items were selected targeting both transactional leader behaviours (i.e., the provision of feedback regarding performance) and team problem-solving behaviours. Collectively these items were a strong fit to the data, and demonstrated

divergent validity to three associated constructs such as formal transformational leadership, team task and goal interdependence, and importantly team potency.

Study 4: Validation of the Shared Leadership Behaviour Scale (SLB-6)

To test the validity of the SLB-6, it was evaluated against two critical employee outcomes: team potency and employee engagement. A self-determination theory (Deci & Ryan, 1985) and organisational learning (Wang & Ahmed, 2003) theoretical framework was adopted to evaluate both the impacts and antecedents of these shared leadership behaviours.

Results from these investigations supported the studies' aims (Study 4). In the structural equation model generated to test these antecedents, formal transformational leadership exhibited a significant path to shared leadership behaviours, with these behaviours subsequently enhancing ratings of team performance (Figure 8.3). The relationship observed between organisational learning and shared leadership was complex, with only team learning (and not individual or organisational learning) being significantly related to shared leadership. Although it remains cogent that teams who "seek to acquire, share, refine, or combine task-relevant knowledge through interaction with one another" (Van Der Vegt & Bunderson, 2005, p. 83), would likely also report more shared leadership behaviours; the non-significant relationships observed between shared leadership and both individual and organisational learning were unexpected. It is speculated that these non-significant results are due to controlling for the other elements of organisational learning. Evidence such as the strong correlations observed between individual, team, and organisational learning, and shared leadership supports this conclusion.

Whilst examining the ability of increased shared leadership behaviours measured by the SLB-6 to enhance employee engagement, a self-determination theory of motivation was adopted (Deci & Ryan, 1985). Self-determination theory highlights that motivational forces are more likely to be internalised when employee needs are satisfied, including satisfaction of

individual needs for autonomy, relatedness, and mastery (Cerasoli et al., 2016; Deci et al., 2017). It was posited increased shared leadership would result in an enhanced satisfaction of employee needs for autonomy, need for relatedness, and need for competence, and that these processes would mediate the effects of shared leadership onto employee engagement. The results partially supported these outcomes. Shared leadership behaviours exhibited a significant positive relationship with both autonomy and relatedness, with both of these mediating the effects of shared leadership onto employee engagement. Although the satisfaction for the need of competence was related to employee engagement, this was not associated with shared leadership. Previous research highlighted similar effects whereby shared leadership behaviours (using a functionalist conceptualisation) showed no relationship with employees' need for competence (Coun et al., 2019); whilst investigations of formal leadership behaviours also found the relationship between formal leader behaviours and need for competence to be the weakest relationship (compared to relatedness and autonomy; Hetland et al., 2011).

These results demonstrate the robust functioning of the SLB-6 as a measure of shared leadership behaviours. These relationships between key organisational outcomes highlights the utility of both shared leadership more broadly and also the six behaviours outlined by the SLB-6, with these six behaviours explaining 35% of the variance in team potency and 38% of participant differences in ratings of employee engagement. Given the strength of these associations with important organisational outcomes, and the superior fit of the SLB-6 measurement model to the underlying data, it is recommended that future research adopt the SLB-6 as a brief and effective measure of team shared leadership behaviours. Additionally, as the SLB-6 specifically targets team member behaviours (as opposed to individual cognitions or implicit leadership perceptions), this enables the development of interventions and team

processes to specifically target these behaviours, enhancing both shared leadership processes but also subsequent beneficial organisational outcomes.

Theoretical Contributions

This thesis contributes to the study of leadership within the broad organisational sciences literatures in several ways. Firstly, this thesis presents an in-depth exploration of team member shared leadership processes, including: previous conceptualisations and theoretical underpinning of current shared leadership theory; a critical evaluation of the measures and methods employed to assess shared leadership; an empirical comparison of various measures previously used to evaluate shared leadership; and, the identification of key team member shared leadership behaviours which contribute to overall team effectiveness. Additionally, this thesis contributes to the advancement of shared leadership theory through identifying the issues related to research employing social network measures of shared leadership; highlighting the benefits of team member's shared transformational leadership behaviours; development and advancement of a parsimonious scale to assess shared leadership behaviours; and, through the use of novel machine learning methods in the development of psychological measurements. The theoretical and practical contributions of these findings are discussed in detail below.

Scale Comparison and Social Network Variables

Given the competing conceptualisations of shared leadership, this thesis initially aimed to demonstrate which of the existing measures (or theoretical approaches) best captured these dynamic team influence behaviours. However, rather than finding the "best" measures utilised, instead these scale comparisons highlighted measures to be avoided or used with additional considerations. Through comparison of 11 different measures collected from three differing perspective of shared leadership, results supported arguments forwarded by Martin and colleagues that "regardless of the specific method for measurement deployed,

the importance of shared leadership factors on team performance is evident” (2018, p. 677). Indeed, the results presented support for the beneficial effects of teams maintaining more shared leadership practices, with every included scale exhibiting a positive relationship between shared leadership and team effectiveness. Importantly however, differences were observed in the magnitude of these positive relationships, specifically when comparing social networked and aggregate measures of shared leadership (i.e., traditional and functionalist measurement approaches).

Differences between scales were especially prominent when comparing traditional and functionalist measures to those used to describe shared leadership from a social network perspective. Research utilising social network methods commonly includes the one-item scale developed by Carson et al. (2007). This method is argued to result in accurate findings due to the removal of “mental arithmetic” inherent in aggregate shared leadership measures that require participants to rate their team as a whole (e.g., through a referent-shift approach; Crawford & LePine, 2013; D’Innocenzo et al., 2014). Despite these hypothesised benefits of social network measures of shared leadership, the scale comparison analysis demonstrated weak effects, with this measure only explaining 11% of the variance in participants ratings of team effectiveness. This was substantively smaller than the variance explained by the other included measures (ranging from 27% to 42% of variance explained). This was of particular interest as previous meta-analysis of shared leadership measures have argued that social network measures exhibit the strongest relationship to team performance outcomes (D’Innocenzo et al., 2014; Nicolaides et al., 2014).

In addition to these weak associations with team effectiveness outcomes, small correlations were also observed between the social network and other measures of shared leadership. Comparing these inter-scale relationships, a significant but small effect was demonstrated between the social network shared leadership measure and both team

effectiveness and all other measures of shared leadership (Table 4.2). This raised concerns regarding *what* precisely is this measure assessing? Interestingly, this point was echoed by the scale's developers, claiming that "Because it neither specified the meaning of leadership nor primed specific behaviors for respondents, it is possible that our measure tapped something other than leadership influence" (Carson et al., 2007, p. 1230).

Although tentative, the findings that the one-item measures of shared leadership used by social network research is capturing aspects of leadership visibility is supported by previous works. For example, as the single-item scale does not reference any specific leader behaviour or process, respondents are forced to draw on their own naïve interpretation of what constitutes "leadership" (Carson et al., 2007). Such mental representations align with previous works exploring the cognitive processes that precede formal leadership perceptions. Implicit leadership theory posits that cognitive representations of prototypical leadership behaviours drive individual perceptions regarding *who* and *what* effective leadership is (Lord & Maher, 1991; Shondrick et al., 2010). Within a shared leadership framework, these implicit leadership cognitions can hinder measurement accuracy as leadership is (generally) associated with a formal role or position (Shondrick et al., 2010).

To the authors knowledge no previous research has explicitly examined implicit cognitive representations of shared leadership processes. Commenting on this, Shondrick et al. (2010) argued that "a shared or distributed leadership perspective raises several important questions for understanding the role of implicit theories in guiding leadership processes... it creates substantial methodological problems for individuals attempting to measure leadership" (p. 972). These tentative findings that social network measures are capturing implicit shared leadership representations (i.e., being seen to give directions or adapting team processes), provides evidence to challenge current understandings of these social network measures and their relationship to shared leadership processes and outcomes.

Revisiting seminal social network shared leadership research with this understanding explains some of the observed unexpected results. For example, Mehra et al. (2006) found no support for the direct effects of shared leadership network centrality and team performance; but found these effects were conditional on the mutual leadership perceptions between team members who exhibited shared leadership (referred to as distributed-coordinated or distributed-fragmented; Mehra et al., 2006). When imagining a team with two (or more) individuals who both exhibit highly visible leadership behaviours, it remains cogent that teams where these two (or more) individuals recognise each other's leadership behaviours would exhibit heightened performance, compared to teams where these individuals do not acknowledge each other's influence (it is posited that such teams would become highly dysfunctional).

Similarly, this leadership visibility hypothesis explains the small factor loadings exhibited by social network metrics when combined with aggregate methods. For example, Sanders (2006) attempted to conduct a confirmatory factor analysis including both aggregate (i.e., shared transformational and shared transactional leadership) and social networked measures. However, they observed small negative factor loadings for their social network metrics (factor loading = $-.28^*$; $R^2 = .08$) and these social network measures were subsequently removed from their analysis. The authors suggested that definitional issues (specifically item wording regarding "influence" compared to "leadership") resulted in this lack-of-fit; however, reinterpreted as a measure of shared leadership visibility, such misfit is to be expected.

Additionally, research examining shared leadership density within Japanese research and development teams found formal transformational leadership resulted in reduced emergence of shared leadership perceptions (Ishikawa, 2012). Ishikawa's (2012) negative relationship between formal transformational leadership and shared leadership was

unexpected given numerous studies supporting the link between formal transformational leadership and heightened perceptions of shared leadership (Cashman, 2008; Coun et al., 2019; Ensley et al., 2006; Hoch, 2013; Pearce & Sims, 2002; Sanders, 2006). However, on inspection none of these previous studies adopted a social network perspective, or the authors removed these scales due to poor model-fit (i.e., Sanders, 2006). Such findings lend support for the divergent validity of social networked measures of shared leadership (specifically those that rely on implicit participant representations of leadership) from other traditional and functionalist perspectives; future research is cautioned in using such social network operationalisations of shared leadership without careful consideration of these implications.

Although further investigation to verify these finding is warranted, these results tentatively suggest that social network measures of shared leadership are assessing shared leadership *visibility*, rather than any particular shared leadership behaviour. The potential for implicit cognitive representations of shared leadership to include behaviours such as providing instruction, directive advice, suggesting process improvements, mentoring other team members, or other highly visible behaviours presents a novel avenue for future research. Such research would inform works adopting a network-relational perspective of shared leadership and develop new knowledge regarding implicit cognitions regarding informal leadership processes exhibited between team members.

Scale Comparison and Shared Transformational Leadership Behaviours

Additional insights generated from the scale comparison study (Study 1) included the observed relationship between shared transformational leadership behaviours and increased team effectiveness. For example, when comparing all 41 subscales ranked by their relative effect sizes (i.e., beta-weights), shared transformational leadership subscales produced five of the six largest effect sizes in predicting team potency. Although less “surprising” than other findings presented, this position that shared transformational leadership behaviours exhibited

between team members is the “active ingredient” in the relationship between shared leadership and team effectiveness is a major contribution of this thesis. Indeed, from a formal leadership perspective the literature is replete with research linking formal transformational leader behaviours to a range of beneficial team outcomes (Antonakis et al., 2014; Ng, 2018; Nielsen & Daniels, 2012). Similarly, shared transformational leader behaviours has been shown to predict multiple beneficial organisational outcomes (Boies et al., 2010; Cashman, 2008; Pearce & Ensley, 2004; Pearce et al., 2010; Sivasubramaniam et al., 2002; Small, 2007). With meta-analysis suggesting a moderation effect; such that shared transformational leadership behaviours exhibit stronger relationships with team effectiveness compared to task directed shared leadership behaviours (Wang et al., 2014).

Although interventions designed to enhance shared leadership behaviours are rare, shared transformational leadership is amenable to training. For example, Tafvelin and colleagues (2019) found leadership training offered to all organisational members (rather than just formal leaders), can enhance perceptions of both formal and shared transformational leadership, with the latter being associated with improved team efficiency. Similarly, Kleij et al. (2011) found brief transformational leadership training offered to team members (in addition to leaders) resulted in better team adaptation to unexpected changes during team decision making simulations. These findings that shared transformational leadership can be augmented through training and is related to improved team effectiveness represent an important discovery in this field. It is recommended both scholars and practitioners target shared transformational leader behaviours (in particular those assessed by the SLB-6) in future endeavours, especially when aiming to enhance outcomes such as team effectiveness.

Development of the Shared Leadership Behaviour Scale (SLB-6)

Another key contribution outlined in this thesis relates to the identification of six key shared leadership behaviours shown to enhance both team effectiveness and employee

engagement. These shared leadership behaviours include: striving towards a higher purpose, providing performance feedback, collectively developing solutions to issues, communicating team purpose, providing team direction, and encouraging high performance expectations. The development and validation of the Shared leadership behaviour scale (SLB-6) is the primary outcome of this thesis, and represents a short, psychometrically sound measure which aggregates shared leadership behaviours drawn from a variety of previously explored leadership processes. The scale development and validation processes highlight the relationship between these six shared leadership behaviours and beneficial outcomes such as increased team potency and improved employee engagement. The divergent validity of the SLB-6 was also investigated. As machine learning processes were used to select items to maximise their relationship to team potency, concerns were raised that this scale would simply become a proxy for team potency. This however, was not observed, with the SLB-6 demonstrating a divergent validity with task interdependence, formal transformational leadership, and importantly team potency. Given the increased importance of teamwork and team coordination in contemporary organisations investigation of these team processes is critical (Cross et al., 2016; Driskell et al., 2018).

Furthermore, several antecedents and outcomes of these shared leadership processes were investigated (Chapter 8). It was demonstrated that both formal transformational leadership and team climates of learning preceded the development of shared leadership measured through the SLB-6; additionally, the ability for increased shared leadership to enhance employee engagement through the satisfaction of needs for autonomy and relatedness was also observed.

It should be noted that initially the identification of the most appropriate shared leadership scale (rather than the development of an adapted scale) was the initial aim of this thesis. However, the development of the SLB-6 naturally emerged given the mixed findings

demonstrated through comparisons of existing shared leadership measures (Study 1). Although further work is required to fully examine these six shared leadership behaviours, (i.e., examining relationships exhibited at a team level [see limitations below]), the SLB-6 represents the first steps in understanding the specific team shared leadership behaviours which enhance team effectiveness. Given the increased importance of teamwork and team coordination in contemporary organisations (Cross et al., 2016; Driskell et al., 2018), continued work on this topic will likely yield greater insights into occupational team processes and the design of organisational interventions to enhance team productivity and performance.

Inductive Scale Comparison and Development Methods

In addition to the theoretical advances in developing our understandings of these dynamic shared leadership processes, this thesis research also contributed to several methodological advances in organisational sciences, through the use of inductive scale comparison and development techniques. To the authors knowledge, the measurement comparison analyses (Study 1), was the first to empirically examine and compare numerous quantitative measures targeting a single latent organisational construct without employing meta-analytical techniques. The need for this initial comparison of various measures and conceptualisations of shared leadership was highly relevant given the current debates in the literature (Grille & Kauffeld, 2015; Kozlowski et al., 2016; Zhu et al., 2018). Whilst other scholars argue that the choice of measurement employed has little effect over findings (Martin et al., 2018); or that there is no “one-right-way” to assess shared leadership behaviours (Gockel & Werth, 2011; Hoch & Kozlowski, 2014).

Debate regarding variable measurement and construct proliferation are not unique to the field of shared leadership (Brough & Hawkes, 2019). Although the scale comparison analyses failed to definitively demonstrate a single measure that most effectively captured

these shared leadership processes; it is recommended that future research exploring similar organisational variables (i.e., where multiple measures are reported to assess a single construct) could employ similar inductive data-driven comparison processes. Such comparisons are especially warranted when researchers are required to identify and select the most appropriate measurement, to dismiss measures which fail to align with the data collected, or to convert/compare effects across diverse measurements of a single construct.

Another novel advancement presented by this thesis was the use of machine learning protocols to enhance scale development procedures. Use of LASSO regression techniques to deconstruct these shared leadership processes and identify the behaviours specifically linked to team effectiveness also represents an exciting avenue for future development within organisational research methods. The least absolute shrinkage and selection operator regression technique (LASSO regression) is used to minimise the prediction error of a deployed machine learning model (Ranstam & Cook, 2018). It is especially useful in models with numerous predictor variables or those that exhibit strong multicollinearity (i.e., models including many highly related predictor variables; Tibshirani, 1996). Given recent critiques of construct proliferation within organisational sciences (Brough & Hawkes, 2019), such methods appear highly applicable to other organisational concepts and can be used to highlight (or reduce) the critical elements that predict important organisational outcomes.

These novel approaches are aligned with the current need for the use of more diverse methods in leadership research, including methods employed by other fields such as computer science or econometrics (Antonakis, 2017; Garretsen et al., 2020). For example, future research that repeats these methods to empirically demonstrates the “best” behaviours related to improved employee engagement, employee wellbeing, turnover, or adherence to safety protocol is likely to be both highly valuable to practitioners and repeatedly cited by scholars.

Research Limitations

The three key research limitations are discussed here, namely: the potential ecological fallacies, the use of student sampling methods, and inclusion of more diverse outcome variables.

Ecological Limitations and Multilevel Analysis

The primary limitation of this thesis was the absence of testing these shared leadership behaviours within a hierarchical multilevel framework. As shared leadership is largely considered a team level emergent construct, analysis and scale validation should be conducted at the team level to reduce potential ecological fallacies (Rousseau, 1985; Yammarino & Dansereau, 2011). Although a large-scale team-based study sampling over two thousand IT professionals from a government organisation was planned, this study was withdrawn in 2020 due to concerns regarding the COVID-19 pandemic. As such the current findings have only been examined at an individual level of analysis.

Within the organisational literature these concerns regarding potential ecological fallacy were first advanced by Rousseau (1985) who outlined the problems inherent in testing multilevel constructs. This *ecological fallacy* holds that relationships between variables at one level of analysis should not be generalised to another level (i.e., an effect observed at a group level should not be interpreted at an individual level; Kozlowski & Chao, 2012; Rousseau, 1985; Yammarino & Dansereau, 2011). Ignoring such multilevel effects further complicates these relationships, as effects may be non-significant or reversed in direction when observed at a different level of analysis (Klein & Kozlowski, 2000). For example, the members of a high performing team might individually exhibit low task self-efficacy, yet collectively team efficacy can emerge through team interactions and belief in the skills and capability of other team members (Gully et al., 2002). Even within a single measure the appropriate level of analysis can differ between subscales, with Wang and Howell (2010)

demonstrating that facets of formal transformational leadership such as individual consideration and intellectual stimulation were best measured at the individual level, whilst idealised influence and inspirational motivation were more related to effectiveness at a team level.

Where possible referent-shift consensus processes were employed to align the target of scale items to focus on team level processes (Chan, 1998). Referent-shift methods are employed to develop items targeting multilevel constructs through shifting lower order individual perceptions to a higher unit of analysis (Chan, 1998). For example, an item targeting formal leadership processes “my leader talks optimistically about the future”, can be abstracted to a team level referent “my team talks optimistically about the future” (Bass & Avolio, 1990; Chan, 1998). Once aggregated across team members this new variable represents a new construct which can be qualitatively different from that measured at the individual level of measurement. The importance of shifting these referents has been previously challenged. For example, in their meta-analysis Wang and colleagues (2014) found no discernible effects of the specific referent employed. Wang et al. (2014) claimed that “regardless of which measurement approach researchers adopt, the overall positive relationship between shared leadership and team effectiveness is likely to stay essentially the same... our meta-analysis thus suggests that the referents used do not alter the relationship between shared leadership and team effectiveness” (p. 191).

Despite these concerns, research adopting an individual level of analysis is not uncommon in shared leadership. A systematic review of team level leadership processes demonstrated that roughly 8% of articles investigated shared leadership exhibited at an individual level (Kozlowski et al., 2016). Testing these effects across levels has demonstrated the invariance of these relationships between individual and team level measurement. For example, Sanders (2006) found the positive relationship between shared transformational

leadership and team effectiveness was consistent across both individual ($\beta = .57$) and team level analysis ($\beta = .80$). Discussing the effects of leadership measured across levels Kozlowski and colleagues (2016) stated that “Nevertheless, the majority of these studies simply demonstrate that the processes and outcomes that have historically been examined at the individual level can be generalized appropriately to the team level” (p. 28).

More recent research has highlighted the utility of adopting an individual level for the assessment of shared leadership. For example, Klasmeier and Rowold (2020, p. 916) argued that as “shared leadership develops from individual cognition, affect, and behavior of the team members, so a consideration of factors that influence these individual characteristics would provide meaningful insights for promoting shared leadership”. Although such insights support the use of individual level investigation, it is still strongly recommended that where applicable future research adopts a multilevel framework to explore shared leadership. Further, it is recommended future research exploring the psychometric properties of the SLB-6 examine validate these beneficial outcomes within multilevel analysis.

Use of Student Samples

An additional concern regarding these findings lies in the inclusion of student samples within the measurement comparison analysis. Although participants were screened such that only those who currently worked in an occupational team were included, there remains potential for student samples to introduce systematic bias. For example, comparing participant age ranges across the samples showed that both student samples contained significantly younger participants (Sample 1 M age = 22.63, SD = 4.76, Sample 2 M age = 24.88, SD = 7.86) compared to the non-student employee sample collected (Sample 3 M age = 42.60, SD = 13.09). Although age was only significantly related to two of the included shared leadership measures (Study 1), there remains potential that these samples differ in other systematic ways not assessed by these control variables.

However, it is acknowledged that the use of student samples is widespread in shared leadership research. Studies such as Gupta et al. (2010) included student teams to explore the reciprocal relationship between shared transformational leadership and team performance outcomes. Boies and colleagues (2010) demonstrated shared leaderships could enhance student team trust; whilst DeRue and colleagues (2015) examined how warmth and competence could enhance the development of shared leadership social networks in student teams. Seminal works by Carson and colleagues (2007) also employed student teams to investigate the effects of team environment and shared leadership on performance outcomes.

Indeed, review articles have argued for consistent patterns of relationships between shared leadership and outcomes regardless of the sample employed. For example, Sweeney and colleagues (2018) stated that of the studies included in their analysis, 38% utilised student samples. Furthermore, their analysis found that of their total sample 83% of studies exhibited a positive relationship between shared leadership and team performance; when examined separately, 78% of these student-only samples reported positive effects of shared leadership, whilst 86% of employee samples reported similar effects (Sweeney et al., 2018). Supporting this D'Inncenzo et al. (2014) argued that “teams sampled from classroom and laboratory settings yielded lower average effect sizes as compared to teams sampled from field settings... students competing in complex simulations or completing classroom projects offer conservative settings for testing the effects of shared leadership on team performance” (p. 20). Although this evidence suggests comparable effects between student and employee samples, these sampling limitations are acknowledged, and it is recommended where available future works explore these shared leadership processes within organisational settings.

Dependent Variable of Team Potency

The final limitation of this thesis research is the use of team potency as the primary outcome variable. Owing to the complexity of investigating multiple measures assessing a single latent construct, it was decided that the range of outcomes investigated should be curtailed. Team potency refers to a shared belief that collectively the team can be effective and maintains the required capabilities to be successful (Guzzo et al., 1993). Due to its broad definition and previous use as a proximal indicator for team effectiveness, it has been utilised as an outcome in multiple studies investigating shared leadership processes (Boies et al., 2010; Cashman, 2008; Sivasubramaniam et al., 2002; Pearce & Ensley, 2004; Pearce et al., 2004; Cashman, 2008; Ziegert, 2005).

Team potency was specifically selected as it remains a proximal indicator of team effectiveness and maintains a strong relationship to a range of beneficial team and individual outcomes (Gevers et al., 2020; Gully et al., 2002). Team potency has also been shown to correlate with both affective team outcomes and objective measures of team performance (Gevers et al., 2020; Gully et al., 2002; Pearce et al., 2002a), therefore, making it an ideal dependent variable to explore these team influence processes. However, some caution should be applied as previous meta-analyses have demonstrated a moderation effect, such that ratings of shared leadership tend to exhibit stronger effects with subjective compared to objective performance outcomes (Nicolaidis et al., 2014), and more strongly related to attitudinal and behavioural outcomes (compared to performance measures; Wang et al., 2014). Additionally, Pearce and Ensley (2004) demonstrated a reciprocal relationship between shared leadership and team potency, which limits casual interpretation of these cross-sectional findings.

Within these studies team potency and team effectiveness have been used interchangeably, however others have advocated for a more nuanced perspective of team

effectiveness. For example, Pearce (1997) outlined seven different facets of team effectiveness, including: output effectiveness, quality effectiveness, change effectiveness, organising/planning effectiveness, interpersonal effectiveness, value effectiveness, and overall effectiveness. Although considered unlikely, it is acknowledged that the use of a different team effectiveness facets in this research, could change the interpretations made. In addition to the use of team potency as an outcome of shared leadership, it is recommended additional performance metrics (both subjective and objective) are included in future research investigating the benefits of increased shared leadership.

Conclusion

I was once told that “nobody knows what their PhD thesis is about until they hit submit”; and indeed, at the outset of this thesis I never expected to provide a comprehensive analysis of the different measures employed to operationalise shared leadership behaviours. However, initial research demonstrated that the field of shared leadership was largely occupied by what Kozlowski et al. (2016) termed “idiosyncratic microtheories”, and that few works demonstrated consistent theory building or advancement. Commenting on the wide range of theoretical approaches used to understand shared leadership, Zhu and colleagues (2018) noted that “Although these theories helped enhance the knowledge of shared leadership, there appears to be little consensus regarding a unifying theory of shared leadership” (p. 13).

This thesis represents a systematic approach to integrate multiple diverse theoretical perspectives of shared leadership. This process included: a comprehensive review of the existing literature; a comparison of previous shared leadership theory and measurement; the identification of the broad theoretical approaches that underlie scientific inquiry into shared leadership; a critical evaluation of social networked measures of shared leadership; and the identification and validation of six specific shared leadership behaviours most strongly

related to team effectiveness. Through these insights, it is recommended that future research seeking a parsimonious scale which captures the specific shared leadership behaviours related to team effectiveness utilises the SLB-6; or conversely, adopts a theoretical approach examining the emergence of team influence behaviours through a shared transformational leadership perspective. Additionally, as shared leadership research does not hold a monopoly on these issues of construct proliferation; it is hoped that future researchers attempting to delineate between multiple competing measurements of a single underlying construct, are able to adopt the inductive methodologies outlined within this thesis, to assist in the development and advancement of robust scientific theory.

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