TEAM COMPOSITION, EMERGENT STATES, AND SHARED LEADERSHIP EMERGENCE ON PROJECT TEAMS: A LONGITUDINAL STUDY

by

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Team Composition, Emergent States, and Shared leadership Emergence on Project Teams: A Longitudinal Study

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DEDICATION

This dissertation is dedicated to my children, Cadence and Travis. Thank you both for keeping me in the moment, every moment. I'm proud to be your mom.

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I would like to thank my family for making this dissertation possible. Thank you to my husband, Julius, for feigning interest while I talked non-stop about shared leadership for the last three years. You make me laugh every day and I am always grateful for your love, friendship, and commitment. Thank you to my children, Cadence and Travis, for being my inspiration. I'm already proud of both of you beyond my wildest dreams. Thank you to my parents, Joe and Stella, for indulging my crazy desire to pursue a Ph.D., and to my brother, Tyson, for always asking about my progress and reminding me that the end will eventually come. Thank you to my in-laws, Joanna and Yang for embracing me as a daughter. I'm proud to call myself a Chen. Thank you to my advisor, Steve. Your advice and sense of humour have been invaluable to me in shaping the next phase of my career. Thank you to my committee member, Paige, for your guidance over the last few years. I am lucky to call you both a mentor and a friend. Thank you to Dr. Tim Curby for getting me off on the right foot with cross-lag panel analysis. I couldn't have written my results section without your help. Finally, thank you to my best friends, the "Princeton 11," for believing in me and for helping me push myself.

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ABSTRACT

TEAM COMPOSITION, EMERGENT STATES, AND SHARED LEADERSHIP EMERGENCE ON PROJECT TEAMS: A LONGITUDINAL STUDY

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Leadership is typically studied from the vantage point of a single leader with a group of followers. However, team members can also share leadership responsibility with each other (Day, Gronn, & Salas, 2004; Gibb, 1954; Morgeson, 2005). While research has suggested that shared leadership may emerge from some emergent states (Carson, Tesluk, & Marrone, 2007) and cause others (McIntyre & Foti, 2013), little is known about the personality variables that cause team members to share in leadership responsibilities and about the causal relationships between shared leadership and other emergent states. The current study uses a longitudinal sample of undergraduate students working on a group project to test hypotheses about (1) team compositional and emergent state antecedents to shared leadership emergence, and (2) emergent states that emerge from collective enactment of leadership behaviors. Results suggest that high team mean levels of psychological collectivism and extraversion or of motivation to lead are found

to predict shared leadership emergence. Cohesion and trust are found to evolve simultaneously with shared leadership and shared leadership is found to predict collective efficacy. Implications for research and practice are discussed.

CHAPTER ONE: INTRODUCTION

The nature of organizational work is becoming increasingly fast paced and uncertain (Barkema, Baum, & Mannix, 2002; Brown & Giolia, 2002; Gronn, 2002; Sirmon, Hitt, & Ireland, 2007). To deal with this uncertainty, organizations are utilizing teams of employees to accomplish tasks (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Bell, 2003; Pearce, Manz, & Sims, 2009). Traditional conceptualizations of leadership may not readily apply to the management of such team-based structures (Hoch, Pearce, & Welzel, 2010; Morgeson, 2005; Morgeson, DeRue & Karam, 2010). One alternate conception is to consider leadership as a shared group activity (Bennett, Wise, Woods, & Harvey, 2003) or as an emergent property of a group (Day, et al., 2004). Shared leadership entails team members mutually influencing each other by engaging in collective leadership behaviors (Pearce & Conger, 2003). The idea that leadership can be shared between group members is 60 years old (Gibb, 1954), but has recently gained steam as a topic of interest to organizational researchers (Denis, Langley, & Sergi, 2012). Recent definitions conceptualize shared leadership as an "outcome of team processes, [which] is then used as a resource in future process and performance episodes" (Day et al.; p. 859), or "as an emergent team property that results from the distribution of leadership influence across multiple team members" (Carson, et al.; p. 1218). These

definitions suggest that shared leadership is a group property that emerges as team members interact with each other.

Recent reviews of the shared leadership literature have identified two specific areas as particularly critical for further study (Denis, et al., 2012). One such area refers to individual differences as antecedents of shared leadership. Differences at the individual level can predict who will choose to participate in a shared leadership arrangement, while differences at the collective level can predict the emergence of shared leadership. A second research gap refers to the dynamic nature of shared leadership emergence in relation to other emergent states (Denis, et al., 2012; Yammarino, Salas, & Shirreffs, 2012). The current study uses a longitudinal design to address both of these gaps in the literature.

Previous research has examined specific individual difference antecedents to shared leadership emergence, such as collectivism (Hiller, Day, & Vance, 2006; Small & Rentsch, 2010) and integrity (Hoch, 2013), or team level antecedents, such as the internal team environment (Carson, et al., 2007). However, no study has developed a model that combines team composition and emergent states as predictors of shared leadership. Using a sample of student teams engaging in a semester-long group project, I test hypotheses pertaining to (a) the effects of team composition and emergent states as antecedents to shared leadership emergence, and (b) emergent states that result from shared leadership enactment. The present study contributes to the shared leadership literature by examining combinations of personality traits to determine if specific patterns are beneficial to the emergence of positive team states and shared leadership development. The pattern

approach to team composition used in this study has not yet been tested in the shared leadership literature and has only received limited attention in the vertical leadership literature (Foti & Hauenstein, 2007). Shared leadership requires individuals to be motivated to engage in leadership behaviors, but also willing to share the leadership responsibilities with other group members, necessitating a pattern of personality variables that predict both leadership emergence and group belongingness.

Further empirical research is also needed to illuminate the causal ordering of particular team emergent states and shared leadership emergence. Previous studies have considered the emergent states that may cause shared leadership (e.g., Carson et al., 2007; Small & Rentsch, 2010) or the emergent states that may be caused by shared leadership (Ensley, Pearson & Pearce, 2003; McIntyre & Foti, 2013), but no study has looked at shared leadership and emergent states at multiple timepoints to test the relationship between shared leadership and emergent states. To this end, the current study will measure emergent states of trust, cohesion, collective efficacy, and shared leadership at three time points. This methodology will enable examination of the dynamic relationship between shared leadership and emergent states, determining whether certain emergent states (such as trust and cohesion) precede shared leadership emergence and others (such as collective efficacy) follow.

This type of multi-stage longitudinal methodology has not yet been used to test hypotheses about the coevolution of emergent states, in either the shared leadership or teams literatures, despite requests for more longitudinal teams research in both these areas (Denis et al., 2012; Mathieu, Maynard, Rapp & Gilson, 2008; Mathieu,

Tannenbaum, Donsbach, & Alliger, 2014; Yammarino et al., 2012). Therefore the current study significantly contributes to the shared leadership literature specifically, as well as to the teams literature more broadly.

Team Emergent States and Shared Leadership Emergence

The present study tests hypotheses about relationships between shared leadership emergence and emergent states over time, recognizing that teams are dynamic entities. Specifically, team emergent states (Marks, Mathieu, & Zaccaro, 2001), have been hypothesized to either predict shared leadership (Carson, et al., 2007), emerge from collective leadership engagement (Ensley et al., 2003; McIntyre & Foti, 2013), or both (Day, et al., 2004; Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009). Although most of this type of work is conceptual, some empirical work has shown that shared leadership does emerge from positive interactions among team members (Carson et al., 2007) and that shared leadership does lead to higher performance through important emergent state mediators, such as team mental models (McIntyre & Foti, 2013) and collective team confidence (Nicolaides, LaPort, Chen, Tomassetti, Weis, Zaccaro, & Cortina, 2014). Theoretical models, supported by empirical evidence, have suggested that a team's affective environment is likely to determine the degree to which teams are willing to engage in shared leadership (Carson et al., 2007; Friedrich et al., 2009; Pearce & Sims, 2002). Two key aspects of shared leadership emergence in such an environment could be team cohesion and trust.

Cohesion

Cohesion has been defined as the "resultant of all forces acting on members to remain in the group" (Festinger, 1950, p. 274). Highly cohesive groups are generally more likely to engage in workload sharing and to participate in group decision making (Hogg, 1992). High levels of cohesion have been found to enhance collective group motivation by heightening the effectiveness of social rewards and punishments (Beal, Cohen, Burke, & McLendon, 2003). Also, Barrick, Stewart, Neubert, and Mount (1998) found that cohesion moderates the relationships between team compositional variables and viability, suggesting that cohesion acts as glue that encourages team members to continue working together. Meta-analytic results have demonstrated that team cohesion facilitates team self-leadership (Beal et al., 2003). A highly cohesive team is likely to have a favorable environment for shared leadership emergence because members are committed to the team and to each other, making the team as a whole more open to multiple sources of leadership. Cohesion makes team members want to stick together and do the difficult work of the team, including team leadership.

Trust

Trust has been defined as the "extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people" (Cook & Wall, 1980, p. 39). Trust can be developed on a team over time by team members acting in a consistent and reliable manner (Zand, 1972). Zand argues that trust is demonstrated by a willingness to influence others and a willingness to accept influence. The willingness to accept mutual influence will lead team members to engage in shared leadership behaviors (Pearce & Conger, 2003). High levels of team trust may predict

shared leadership because when team members trust each other, they are more comfortable attempting to influence and be influenced by each other (Festinger, 1950; Mayer, Davis, & Schoorman, 1995).

Meta-analytic results demonstrate that trust also predicts willingness to engage in risk-taking behaviors (Colquitt, Scott, & LePine, 2007). For an individual to be willing to emerge as a leader, he or she must accept the possibility that leadership attempts may be rejected by the group, risking social rejection and embarrassment (McAllister, 1995). Emerging as a leader carries the risk of potential rejection of ideas from other team members. However, higher levels of team trust may decrease perceptions of risk and increase members' willingness to participate in shared leadership activities (McAllister, 1995; Small & Rentsch, 2010). Along this line, Boies, Lvina, and Martens (2010) found that team trust is positively related to shared transformational leadership and negatively related to shared passive avoidant leadership styles in a cross-sectional analysis, while Small and Rentsch (2010) found trust predicted shared leadership emergence in a longitudinal study of undergraduate business students engaged in a semester long project.

Carson et al. (2007) found that a positive team environment consisting of voice, social support, and shared purpose promoted shared leadership in student project teams. Although internal environment is not an emergent state, emergent states such as trust and cohesion can presumably create this supportive affective environment (Kirkman & Rosen, 1999; Liden, Wayne & Sparrow, 2000). The positive team environment found by Carson et al., (2007) may create the type of interactions among team members which promote emergent states, such as cohesion and trust; however, Carson et al. did not

directly measure trust and cohesion. In fact, no study to date has looked at the effects of both trust and cohesion as predictors of shared leadership. Based on previous theory and research, I hypothesize that trust and cohesion will act as leading indicators of shared leadership.

> H1: *Teams that develop cohesion early in their tenure will experience higher levels of shared leadership at the project midpoint and endpoint.*
>
> H2: *Teams that develop trust early in their tenure will experience higher levels of shared leadership at the project midpoint and endpoint.*

Although previous research suggests that a positive team environment precedes shared leadership emergence (Carson et al., 2007; Small & Rentsch, 2010), an argument can also be made that shared leadership will increase levels of trust and cohesion on the team and that shared leadership could actually be a leading indicator of these other emergent states. For example, Friedrich et al. (2009) argued that shared leadership contributes to the team's affective climate through team leadership processes such as communication and problem setting. Similarly, Ensley et al.'s (2003) conceptual paper proposed that shared leadership promotes cohesion and shared vision in new venture top management teams. Accordingly, in the present study, I measure emergent states and shared leadership at three different time points in order to explore the dynamic relationships between trust, cohesion, and shared leadership, leaving open the possibility that shared leadership may develop first.

Collective Efficacy

Previous research has only tested a unidirectional hypothesis between emergent states and shared leadership (Carson et al., 2007; Small & Rentsch, 2010), and has

generally suggested that emergent states such as cohesion and trust precede shared leadership emergence. However, certain emergent states may also emerge from higher levels of shared leadership. Collective efficacy is "a shared belief in a group's collective capability to organize and execute courses of action required to produce given levels of goal attainment" (Kozlowski & Ilgen, 2006, p. 90), and has been found to mediate the effects of team leadership on performance (Bass, Avolio, Jung, & Berson, 2003; Lester, Meglino, & Korsgaard, 2002).

Ensley et al. (2003) proposed that shared leadership promotes positive emergent states such as shared vision in new venture top management teams. They argue that the sharing of leadership responsibilities by members of top management teams contributes to team motivation and creates a "leadership dynamic" (p. 336) where all team members feel responsible for leadership on the team. The enactment of shared leadership increases connectivity among team members around collective tasks and improves performance (McIntyre & Foti, 2013). They argue that sharing leadership promotes team member motivation and confidence in the team's abilities. In a recent meta-analysis, Nicolaides et al. (2014) found that the relationship between shared leadership and performance was partially mediated by team efficacy. Other previous research has also found that team leadership promotes the development of team efficacy (Kozlowski, Gully, Salas & Cannon-Bowers, 1996; Zaccaro, Blair, Peterson, & Zazanis, 1995), and that collective efficacy improves team performance (Gully, Incalcaterra, Joshi, & Beaubien, 2002). Taken together, these theoretical papers and empirical studies suggest that the sharing of

leadership increases motivation to work for the team as well as the confidence that members feel in each other.

> H3: *Teams that develop shared leadership early in their tenure and at the midpoint will experience higher levels of collective efficacy at the project midpoint and end point, respectively.*

As with trust and cohesion, it is still possible that the causal relationship between collective efficacy and shared leadership may be in the opposite direction hypothesized. Although the literature on collective efficacy and shared leadership suggests that shared leadership precedes collective efficacy, this causal ordering has not been tested against the possibility that collective efficacy may be an antecedent to shared leadership. In the current study, shared leadership and collective efficacy are measured at three time points in order to test the causal relationship in either possible direction.

Individual Differences and Shared Leadership

Another area of shared leadership research that has received limited empirical attention is the consideration of team member individual difference characteristics that can promote shared leadership emergence. Pearce and Sims (2000) proposed that team members' dispositions should predict their willingness to engage in shared leadership. Team processes that promote collective direction setting, management of team operations, and collective awareness will help a team develop shared leadership capacity (Zaccaro, Heinen, & Shuffler, 2009). Team members that possess the right composition of individual differences should be able to facilitate the development of these types of processes on a team (Barrick, et al., 1998). Despite research that shows individual

differences can predict team performance (Bell, 2007); to date only three studies have examined hypotheses related to team composition and shared leadership.

Psychological Collectivism

Collectivism is typically considered as one end of the individualism/collectivism continuum used to measure differences among countries (Hofstede, 1980); however, there is also variability within societies on levels of collectivism (Cable & Edwards, 1994). Individuals high in psychological collectivism tend to identify with the groups to which they belong and to prefer group work over independent work (Eby & Dobbins, 1997). Thus, psychological collectivism should foster a greater orientation toward any kind of collective work, including shared leadership. Psychological collectivism is one of the few individual difference variables that have been empirically tested as a predictor of shared leadership (Hiller et al., 2006; Small & Rentsch, 2010). Hiller et al. hypothesized and found that teams with members who endorsed more collectivistic views experienced higher levels of shared leadership because they valued interdependence and favored group goals over individual goals. These results are supported by Small and Rentsch's (2010) finding that collectivism levels predicted shared leadership with a sample of student teams.

Agreeableness

Previous research has also suggested that a high mean level of agreeableness contributes to effective team functioning (Bell, 2007; Barrick, et al., 1998; Morgeson, Reider & Campion, 2005). Bell's (2007) meta-analysis concluded that a high mean level of agreeableness can predict performance. Highly agreeable team members prioritize

collective work and are willing to cooperate (Graziano, Jensen-Campbell, & Hair 1996), which will improve performance on collective tasks.

Prior research has suggested that team members must have an accurate understanding of each other's skills in order to share leadership (Avolio, Jung, Murry, & Sivasubramaniam, 1996) and that shared leadership is more likely to occur in mature teams (Perry, Pearce, & Sims., 1999). Accordingly, it is likely that the effect of individual differences on shared leadership may not be realized until the project mid or end point. Given that prior studies have found that shared leadership requires a willingness to work together in the group, I hypothesize that psychological collectivism and agreeableness will predict shared leadership emergence.

> H4: *Teams with a high mean level of psychological collectivism will experience higher levels of shared leadership at the project midpoint and endpoint.*
>
> H5: *Teams with a high mean level of agreeableness will experience higher levels of shared leadership at the project midpoint and endpoint.*

Compositional patterns leading to shared leadership emergence

In addition to a willingness to work together and share leadership responsibilities, shared leadership also requires team members to emerge as leaders. Psychological collectivism and agreeableness have not been found to predict leader emergence so it is likely that these variables alone are not enough to enable shared leadership emergence. Team members will need to be high in variables that promote group belongingness (such as agreeableness and/or psychological collectivism), as well as high in variables that promote leadership emergence (such as extraversion and/or motivation to lead). A pattern approach us as this may illuminate patterns of compositional variables that boost the

emergence of shared leadership on teams. Compositional patterns have not been explored in the shared leadership literature, or even in the teams literature more broadly. However, some consideration has been given to the interactions among individual difference variables in the leader emergence literature. Foti and Hauenstein's (2007) "pattern approach" (p. 347) defines specific combinations of attributes that leaders must possess in order to be effective. For example, while the link between high general mental ability (GMA) and leadership has received consistent support in the literature (Judge, Bono, Ilies & Gerhart, 2002; Judge, Colbert & Ilies, 2004), an individual who is highly intelligent but lacks the social skills to navigate interpersonal situations may not be an effective leader (Zaccaro, Gilbert, Thor, & Mumford, 1991). This type of thinking can also be applied to an individual's propensity to engage in shared leadership. For example, a team member who is high in extraversion or motivation to lead but low in agreeableness may be capable of emerging as a leader but may not be willing to share in leadership responsibilities (Chen & Zaccaro, 2013). When a team is comprised of such individuals, shared leadership will be unlikely to emerge.

Traits that predict leader emergence may have to be combined with traits that promote group belongingness to determine an individual's propensity to seek the leader role while also be willing to share the leadership role with a trusted teammate. For example, team level extraversion and motivation to lead may interact with team level psychological collectivism to influence emergence of shared leadership. If a team is comprised of several extraverts, having high psychological collectivism may counteract the leadership power struggles they will likely experience (Mohammad & Angell, 2003).

The balance of these types of traits may create a scenario in which individuals are willing to serve as individual leaders but also share in leadership activities.

Extraversion

Individual extraversion has been found to predict leader emergence (Judge, et al., 2002) and therefore represents an important motivational predictor of the extent to which an individual is interested in engaging in leadership. However, highly extraverted individuals may be unwilling to share leadership unless they also possess the desire to work productively in the group, as indicated by a high level of psychological collectivism or agreeableness. The relationship between extraversion and shared leadership is complicated by the fact that extraversion contains both a gregariousness and assertiveness component (Costa & McCrae, 1992), so no direct hypothesis of the relationship between extraversion and shared leadership is made in the present study.

Motivation to lead

Motivation to lead (MTL) is defined as "an individual difference construct that affects a leader's or a leader-to-be's decisions to assume leadership training, roles, and responsibilities and that affects his or her intensity of effort and persistence at leading and persistence as a leader" (Chan & Drasgow, 2001; p. 482). MTL provides a more direct measurement of an individual's ambition to emerge as a leader than extraversion. MTL has been found to predict supervisor ratings of leadership potential in a sample of military recruits (Chan & Drasgow, 2001), and to act as a mediator in the relationship between conscientiousness and leader performance (Van iddekinge, Ferris, & Heffner, 2009). Unlike empirical work on the Big Five personality traits, empirical work on MTL is

much more limited. MTL has been primarily considered as an individual level antecedent to leadership (Hong, Catano & Liao, 2011) and leader performance (Van iddekinge, et al., 2009), but has not been studied in the context of shared leadership. Hendricks and Payne (2007) found that MTL predicts leadership effectiveness over and above the Big Five personality traits in a field study with formal leaders in a manufacturing plant. Hong et al. (2011) found that MTL predicted leadership emergence in leaderless group discussions and that MTL mediated the relationship between emotional intelligence and leader emergence. While MTL predicts the extent to which individuals will emerge as leaders and their performance as leaders, the relationship between MTL and shared leadership remains an empirical question. Given that high team levels of MTL may lead to power struggles rather than shared leadership, no direct hypothesis is made about the relationship between MTL and shared leadership.

H6: *The relationship between team mean levels of agreeableness and shared leadership will be moderated by team mean levels of extraversion such that the relationship will be strengthened when teams are also high in extraversion.*

H7: *The relationship between team mean levels of agreeableness and shared leadership will be moderated by team mean levels motivation to lead such that the relationship will be strengthened when teams are also high in motivation to lead.*

H8: *The relationship between team mean levels of psychological collectivism and shared leadership will be moderated by team mean levels of extraversion such that the relationship will be strengthened when teams are also high in extraversion.*

H9: *The relationship between team mean levels of psychological collectivism and shared leadership will be moderated by team mean levels of motivation to lead such that the relationship will be strengthened when teams are also high in motivation to lead.*

The focus of this dissertation is the antecedents of shared leadership as described above. Given the limited research on shared leadership antecedents and my particular interest in the causal ordering of shared leadership and emergent states, performance was not a main focus of this study. However, shared leadership has been found to have a positive relationship with performance (Nicolaides et al., 2014) so I also collected group project grades after each of the deliverables. Hypotheses and analyses for group project performance are shown in Appendix B.

CHAPTER TWO: METHOD

Participants

Data for this study come from a set of measures that were administered over two semesters in an organizational behavior class. Participants were 882 consenting students enrolled in a semester-long class at a Mid-Atlantic University. Participants were assigned to groups composed of three or four members (M team size = 3.60), with the total number of groups equaling 225. Students were required to complete the class project for their course grade but had the option to consent or decline the use of their data in the current study. Participants ranged from age 19 to age 46 (M age = 23.12) and 49.2% were women. Participants were 35.3% White, 22.1% Asian, 5.0% Mixed Race or Other, 8.7% Hispanic or Latino, 6.9% Black or African American, 0.3% American Indian or Alaskan Native, 3.2% Asian Indian, and 18.5% declined to specify race.

Procedure

The class consisted of 24 recitation sections across two semesters. All sections completed the same group project. Students were assigned to project teams within their recitation sections based on their responses to a team-maker survey tool called Comprehensive Assessment of Team Member Effectiveness (CATME) (Loughry, Ohland, & Moore, 2007) and students were grouped based on their availability to meet. CATME is an online tool that enables instructors to assign students to teams based on a variety of characteristics such as personality or demographics. Instructors can choose the

weighting of various criteria and CATME will recommend team selection. In the present study, the only criterion used to select teams was the meeting availability that students provided. Student schedules were used based on feedback that teams in previous semesters had difficulty scheduling face-to-face meetings. Data were collected at four time points during the semester, at the beginning of the project and after the submission of each of three project deliverables. The project deliverables consisted of three team case assignments which were submitted at approximately weeks 5, 9, and 13 in the semester. Carson et al.'s, (2007) study of shared leadership in student teams measured shared leadership after teams had been working together for approximately two-thirds of the semester. For the present study, I measured shared leadership and emergent states after each of three project deliverables, corresponding to approximately the second, third, and four quarters of the semester. Shared leadership and emergent states require the interaction of team members in order to develop so these measures were taken after the interaction periods I expected to be most intense, given the project requirements. While there is no firmly accepted time period for shared leadership emergence, team members must have an understanding of each other's skills (Avolio et al., 1996). After working together for several weeks on the first deliverable, it is likely that team members had developed a sense of the leadership capabilities of their team members, giving shared leadership a chance to develop.

Team Task

Students in the class were required to work in their groups to solve three business case assignments. The goal of the case assignments was to develop group work skills and

to enable students to apply course concepts to the real-world issues that they may encounter as professionals. The case assignments included a short description of a problem that a fictitious company was experiencing and a list of questions that students were required to answer as a group. Each group submitted one product for each assignment and they were reminded in the assignment that this project should be a collaborative effort. Specific formatting and length guidelines were given to ensure consistency between groups.

Data Collection/Measures

Individual Difference Measures

The first time point (time 0) consisted of a battery of individual difference measures and demographic variables.

Agreeableness. Agreeableness was measured using the 10 item Big Five inventory on the International Personality Item Pool (IPIP) (Goldberg, 1992). Participants were asked to describe how well each item describes them on a five point scale (1 = very inaccurate; 5 = very accurate). An example item from the agreeableness facet is "sympathize with others' feelings."

Extraversion. Extraversion was measured using the 10 item Big Five inventory on the IPIP (Goldberg, 1992). Participants were asked to describe how well each item describes them on a five point scale (1 = very inaccurate; 5 = very accurate). An example item from the extraversion facet is "am the life of the party."

Psychological collectivism. Psychological collectivism was measured using Jackson, Colquitt, Wesson, and Zapata-Phelan's (2000) 15 item measure. Psychological

collectivism consists of the facets of preference for group work, reliance on group members, concern for group members, norm acceptance, and goal priority. Participants were asked to think about groups to which they currently belong or groups to which they have belonged to in the past and indicate how much they agree with items on a seven point scale (1 = strongly disagree; 7 = strongly agree). An example item from the psychological collectivism scale in the preference facet is "I wanted to work with those groups as opposed to working alone."

Motivation to lead. Motivation to lead was measured using Chan and Drasgow's (2001) 27 item measure. Motivation to lead consists of the facets of affective identity, non-calculative, and social-normative. Participants were asked to describe the extent to which they agree with items on a seven point scale (1 = strongly disagree; 7 = strongly agree). An example item from the MTL scale's affective-identity facet is "I usually want to be a leader in the groups that I work in."

Team Emergent State Measures

Team emergent state measures were taken at three time points in the semester (time 1, 2, and 3), corresponding to the deliverable of each of the three team case assignments. Emergent state measures consisted of trust (McAllister, 1995), cohesion (Carless & De Paola, 2000), and collective efficacy (Riggs, Warka, Babesa, Betancourt & Hooker, 1994). Shared leadership was measured at the same time points as the emergent state measures using Hiller et al.'s (2006) functional approach.

Cohesion. Cohesion was measured at time 1, 2, and 3 using Carless and De Paola's (2000) three facet measure consisting of task cohesion, social cohesion, and

individual attraction to the group. Participants responded to 10 items on a seven point scale indicating the extent to which they agree or disagree with each item about their team (1 = strongly disagree; 7 = strongly agree). An example item from the task cohesion facet is "our team is united in trying to reach its goals for performance."

Trust. Trust was measured at time 1, 2, and 3 using McAllister's (1995) two facet measure consisting of affect and cognitive based trust. Participants responded to 11 items on a seven point scale indicating the extent to which they agree or disagree with each item about their team members (1 = strongly disagree; 7 = strongly agree). An example item from the affective trust facet is "we have a sharing relationship. We can freely share our ideas feelings, ideas, and hopes."

Collective efficacy. Collective efficacy was measured at time 1, 2, and 3 using Riggs et al.'s (1994) scale. Participants responded to seven items on a seven point scale indicating the extent to which they agree or disagree with each item about their team (1 = strongly disagree; 7 = strongly agree). An example item from the collective efficacy scale is "the members of this team have excellent skills."

Shared leadership. Shared leadership behaviors were measured at time 1, 2, and 3 using Hiller et al. (2006) approach. This scale consisted of 25 items in four facets including planning and organizing, problem solving, support and consideration, and development and mentoring. Participants responded on a seven point scale about how often team members share in leadership behaviors (1 = never, 7 = always). An example item from the development and mentoring facet is "helping to develop each other's skills."

CHAPTER THREE: RESULTS

Data Cleaning and Analysis Preparation

In order to prepare the dataset to test my hypotheses, I aggregated individual level responses to both the scale and team level. Scale reliabilities are provided on the diagonal of Table 1 and all reached acceptable cutoff of $\alpha = .70$ (Nunally, 1978). I used either referent shift approach or a direct consensus model to aggregate individual level responses to the team level, depending on the construct of interest (Chan, 1998). In both of these cases, Chan (1998) suggests using an index of within group agreement to justify aggregation. Consistent with previous shared leadership research (e.g., Carson et al., 2007), to justify aggregation to the team level, I calculated r_{wg} to determine within team reliability. This index represents the observed variance in ratings compared to the variance of a theoretical distribution that represents no agreement (James, Demaree, & Wolf, 1993). In the present study, I used the null distribution. The null distribution is recommended based on the fact that no response bias is present, and each response option on a given Likert scale is equally likely to occur (LeBreton & Senter, 2008).

I also justified aggregation to the team level by calculating intraclass correlation coefficient (ICC) ICC(1) and ICC(2) to determine the degree to which team membership accounted for significant variance in responses (ICC(1)), and the level of reliability of team level means (ICC(2)) (Bliese, 2000). Mean rwg for all variables was .84, above the acceptable reliability cut-off of .80 (James, et al., 1993; Lindell, Brandt, & Whitney,

1999). ICC(1) and ICC(2) also reached acceptable agreement levels. Consistent with previous studies, I took the average of my ICC across the variables of interest (c.f. Carson et al., 2007). The average ICC(1) for shared leadership and all team level emergent states reached .52 and the average ICC(2) for shared leadership and all team level emergent states reached .78 (Bliese, 2000), suggesting it was appropriate to aggregate my variables to the team level.

Also consistent with previous shared leadership research (Carson et al., 2007; Small & Rentch, 2010), I included the control variables of team size, gender diversity, and race diversity in my analyses. Mean team size was 3.60, and gender and race diversity were calculated using Blau's (1977) index, which measures how individuals are distributed across categories of a variable (Harrison & Klein, 2007).

Finally, I conducted a post-hoc power analysis using the program G*Power and my sample size of 225 is sufficient to reach a power level of .95 given a medium effect size using Cohen's (1992) conventions for multiple regression.

Correlations Among Study Variables

Means, scale reliabilities, and correlations for all study variables can be found in Table 1. Correlations between study variables generally suggested support for my hypotheses. Individual difference variables correlated with shared leadership at all three time points (e.g., correlation between psychological collectivism and shared leadership at time 3 was $r = .23$, $p < .05$). Individual difference variables also correlated with the emergent state variables at various time points (e.g., correlation between psychological collectivism and time 2 collective efficacy was $r = .16$, $p < .05$). Correlations between

emergent state variables and shared leadership within time point were quite high; at time 1, trust and shared leadership were highly correlated (r = .75, p <.01), and at time 3, trust and cohesion were correlated (r = .78, p <.01). However, these correlations dropped between study time points. For example, time 1 trust correlated with time 3 shared leadership (r = .32, p <.01), and time 1 trust correlated with time 2 collective efficacy (r = .33, p <.01). Each emergent state measure was also correlated across time points. For example, trust at time 1 correlated with trust at time 2 (r = .40, p < .01), and collective efficacy at time 1 correlated with collective efficacy at time 3 (r = .38, p < .01).

Hypothesis Testing

Emergent States and Shared Leadership Emergence

Multiple regression tests using structural equations modeling (SEM). In order to test my first set of hypotheses (H1 – H3) about the relationships between the emergent states of trust, cohesion, and collective efficacy with shared leadership, I conducted a series of multiple regressions using SEM with AMOS (Arbuckle, 2006). To test H1 and H2 (that early cohesion and trust would lead to later shared leadership, respectively), I first built a model with my control variables, and added trust and cohesion at time 1 as predictors of shared leadership at time 2. As summarized in Table 2, cohesion (b = .37, p <.05) and trust (b = .22, p < .05) at time 1 were both significant predictors of shared leadership at time 2. In order to further test H1 and H2, I built a similar model with my control variables, and added cohesion and trust at time 1 as predictors of shared leadership at time 3. A similar pattern of results emerged, with cohesion (b = .35, p <.05) at time 1 significantly predicting shared leadership at time 3 and trust (b = .21, p <.10)

marginally predicting shared leadership at time 3. Finally, I conducted one additional test of H1 and H2, building a model with my control variables and cohesion and trust at time 2 as predictors of shared leadership at time 3. Again, my results provided support for H1 and H2. Both cohesion (b = .54, p <.05), and trust (b = .31, p <.05) at time 2 predicted shared leadership at time 3. Taken collectively, these results indicate support for H1 and H2, suggesting that early levels of team trust and cohesion do contribute to the development of later shared leadership.

I tested H3 (that early shared leadership would lead to later collective efficacy) in a similar fashion, using SEM with AMOS. Again, I built a model with my control variables, but with shared leadership at time 1 as a predictor of collective efficacy at time 2. As summarized in table 3, shared leadership (b = .33, p <.05) at time 1 was a significant predictor of collective efficacy at time 2. In order to further test H3, I built a similar model with my control variables, and added shared leadership at time 1 as predictors of collective efficacy at time 3. Again, shared leadership (b = .39, p <.05) at time 1 significantly predicted collective efficacy at time 3. Finally, I conducted one additional test of H3, building a model with my control variables and adding shared leadership at time 2 as predictors of collective efficacy at time 3. Again, my results provided support for H3. Shared leadership (b = .72, p <.05) at time 2 predicted collective efficacy at time 3. Taken collectively, these results indicate support for H3, suggesting that early levels of shared leadership do contribute to the development of later collective efficacy.

Cross-lag panel auto-regressive model analyses using SEM. Although it is appropriate to test H1 – H3 using the approach described above, my study design allows for a more sophisticated test of the causal ordering of my emergent state variables and shared leadership. As such, I also tested these hypotheses using autoregressive cross-lag panel analysis (Kenny, 1975) under the SEM framework in AMOS (see Figures 1 – 3 as illustrations of the models selected for each hypothesis). I used the control variables of team size, gender diversity, and racial diversity in all my cross-lagged panel analyses.

The models are autoregressive because each emergent state or shared leadership variables is predicted by the same variable at the previous time point, and these unstandardized links are constrained to be equal over time. The cross-lag panel portion of the model refers to the way that a time 1 variable is linked to a time 2 variable. For example, trust at time 1 was used to predict shared leadership at time 2 and trust at time 2 was used to predict shared leadership at time 3. Similarly shared leadership at time 1 was used to predict trust at time 2 and shared leadership at time 2 was used to predict trust at time 3. Testing the cross-lagged relationship allowed me to determine whether the emergent state (trust, cohesion, or collective efficacy) was a leading indicator of shared leadership, or vice versa. Additionally, it allowed me to determine whether the emergent state and shared leadership were actually leading indicators of each other.

In order to test H1 – H3, I created and compared a series of models using chi-square difference tests to test all possible cross-lags between the emergent state (trust, cohesion, or collective efficacy) and shared leadership to determine if any of the models fit the data better than the unconditional (auto-regressive) model, which did not include

the cross-lagged paths. I compared the two possible single cross-lag models: (1) emergent state at time 1 and 2 predicting shared leadership at time 2 and 3, respectively; and (2) shared leadership at time 1 and 2 predicting emergent state at time 2 and 3, respectively, to the auto-regressive model using a chi-square difference. Then I also compared the double cross-lag, which is a combination of the two models described above to the single cross-lag models using a chi-square change test. Thus, combinations of paths from significantly better fitting models were tested to see if models with two sets of paths fit better relative to the best-fitting model with one set of paths.

As mentioned above, the models with one set of cross-lags were compared to the unconditional model using a chi-square difference test. This allowed me to select the best fitting model relative to the unconditional and the other single cross-lag option. I compared the fit of pairs of nested models by looking for statistically significant changes in chi-square values relative to the change in degrees of freedom. If the chi-square difference test was significant between a model with a single cross-lag and the unconditional model, it meant that the model with one of the single cross-lags was a significantly better fit than the unconditional model, justifying the addition of the extra cross-lag paths. I followed a similar procedure when adding the second cross-lag path into the model. Again, a significant chi-square change statistic relative to degrees of freedom indicated that the model with both cross-lagged paths was a better fit than the model with only one cross-lag path, justifying the addition of this extra path. For these tests, a two-tailed alpha level was set at .05.

I also evaluated the absolute fit of my models using two other fit indices: (1) the comparative fit index (CFI), and (2) the root mean square error of approximation (RMSEA). Values higher than .90 on the CFI indicate satisfactory fit, whereas values less than .08 on the RMSEA indicate satisfactory fit (Bentler, 1990; Bentler & Bonett, 1980; Browne & Cudeck, 1993). In many cases, my RMSEA values did not reach the rule of thumb. However, RMSEA is known to be biased against small models (Fan, Thompson, & Wang, 1999), and the values of RMSEA are not germane to my hypotheses because I am interested in determining which variable is a leading indicator, not in the absolute fit of the models to my data. Comparisons between competing models such as the ones in my study are best examined using the chi-square difference tests, not absolute fit indices like RMSEA. Given that my models are small and focused only a few key variables, not explaining all the variance in a larger model, RMSEA is not expected to a good indicator of fit (Fan et al., 1999). Absolute fit is less important to my hypotheses, as comparisons between the chi-square difference tests are more informative given my interest in comparing a series of nested models. However, in the interest of being consistent with current SEM practices, I reported these additional fit statistics, despite their lack of relevance to my hypotheses.

Results from my auto-regressive cross-lag panel analysis using cohesion and shared leadership are fully explained in Figure 1 and Table 4. Results were suggestive that both shared leadership and cohesion are, in fact, leading indicators of each other. The chi-square for the unconditional model of cohesion and shared leadership was (χ^2 = 58.260, *df* = 11, CFI = .961, RMSEA = .137) and served as a comparison point for the

single cross-lagged panel models. The chi-square difference test indicated that the both single cross-lagged panel models were a significant improvement upon the unconditional model. For cohesion as a leading indicator (χ^2 = 39.321, *df* = 10, CFI = .976, RMSEA = .113) and for shared leadership (χ^2 = 40.323, *df* = 10, CFI = .975, RMSEA = .115). The difference between the chi-square value for the unconditional model and the model with cohesion is larger, indicating that the best fitting model with a single cross-lagged path was cohesion as a leading indicator of shared leadership. However, conducting a chi-square difference test after adding in the double cross-lag paths again indicated a significant improvement ($\chi 2$ = 32.584, *df* = 9, CFI = .968, RMSEA = .107), suggesting that the fully cross-lagged panel model was the best fit to the data. The path coefficients in the fully cross-lagged model also suggested support for cohesion and shared leadership as leading indicators of each other, with both lagged paths being statistically significant predictors of the emergent state or shared leadership variable at the next time point. The path predicting shared leadership from cohesion was (b = .20, p < .01) and the path predicting cohesion from shared leadership was (b = .12, p < .01). Figure 1 is an illustration of the fully cross-lagged model and the relationships between the auto-regressive and cross-lagged paths. Control variables are not included in Figure 1 for the sake of clarity, but were included in my analysis.

Results from my auto-regressive cross-lag panel analysis using trust and shared leadership are fully explained in Figure 2 and Table 5. Results were suggestive that both shared leadership and trust are, in fact, leading indicators of each other. The chi-square for the unconditional model of trust and shared leadership was (χ^2 = 64.501, *df* = 11, CFI

= .945, RMSEA = .170) and served as a comparison point for the single cross-lagged panel models. The chi-square difference test indicated that the both single cross-lagged panel models were a significant improvement upon the unconditional model. For trust as a leading indicator (χ^2 = 58.104, *df* = 10, CFI = .964, RMSEA = .145) and for shared leadership (χ^2 = 49.880, *df* = 10, CFI = .970, RMSEA = .132). The difference between the chi-square value for the unconditional model and the model with shared leadership as a leading indicator is larger, indicating that the best fitting model with a single cross-lagged path was shared leadership as a leading indicator of trust. However, conducting a chi-square difference test after adding in the double cross-lag paths again indicated a significant improvement (χ2 = 41.762, df = 9, CFI = .975, RMSEA = .126), suggesting that the fully cross-lagged panel model was actually the best fit to the data. The path coefficients in the fully cross-lagged model also suggested support for both trust and shared leadership as leading indicators of each other, with both lagged paths being statistically significant predictors of the emergent state or shared leadership variable at the next time point. The path predicting shared leadership from trust was (*b* = .19, *p* < .05) and the path predicting trust from shared leadership was (*b* = .21, *p* < .01). Figure 2 is an illustration of the fully cross-lagged model and the relationships between the auto-regressive and cross-lagged paths. Control variables are not included in Figure 2 for the sake of clarity, but were included in my analysis.

The autoregressive cross-lag panel analysis between shared leadership and collective efficacy yielded a different pattern of results than either trust or cohesion and is fully explained in Figure 3 and Table 6. The chi-square for the unconditional model of

collective efficacy and shared leadership was (χ^2 = 65.532, *df* = 11, CFI = .956, RMSEA = .149) and served as a comparison point for the single cross-lagged panel models. The chi-square difference test indicated that both single cross-lagged panel models were a significant improvement upon the unconditional model. For collective efficacy as a leading indicator of shared leadership (χ^2 = 56.707, *df* = 10, CFI = .962, RMSEA = .143) and for shared leadership as a leading indicator of collective efficacy (χ^2 = 53.206, *df* = 10, CFI = .965, RMSEA = .137). The difference between the chi-square value for the unconditional model and the model with shared leadership as a leading indicator is larger, indicating that the best fitting model with a single cross-lagged path was shared leadership as a leading indicator of collective efficacy. Adding in the additional cross-lagged path did not yield a statistically significant improvement in the chi-square difference test (χ^2 = 50.050, *df* = 9, CFI = .967, RMSEA = .141), suggesting that the model with shared leadership as a leading indicator of collective efficacy was the best fit to the data. The path coefficients in the single cross-lagged model also suggested support for shared leadership as a leading indicator of collective efficacy with the lagged path of shared leadership to collective efficacy being statistically significant (b = .19, p < .01). Figure 3 is an illustration of the cross-lagged model with shared leadership as a leading indicator of collective efficacy. Control variables are not included in Figure 3 for sake of clarity, but were included in my analyses.

The results of my auto-regressive cross-lag panel analyses suggest that H1 and H2 are supported, but that the relationship between the emergent states of trust and cohesion, and shared leadership is more complicated than simply early trust or cohesion resulting in

later shared leadership. These variables were all measured at three time points in the project and, with each time point, trust and cohesion were co-evolving with shared leadership, as indicated by the fact that the fully cross-lagged model fit the data with both trust/ shared leadership and cohesion/ shared leadership. H3, (that early shared leadership would lead to later levels of collective efficacy), was supported by the results of the auto regressive cross-lag panel analysis. The model that best fit the data was with the single cross-lag path from shared leadership to collective efficacy, indicating that shared leadership was the leading indicator of collective efficacy, not the other way around.

Compositional Hypotheses

In addition to examining the relationships between shared leadership and the emergent state variables of trust, cohesion, and collective efficacy, I also considered the possibility that shared leadership emergence is predicted by team compositional attributes such as psychological collectivism (H4) or agreeableness (H5). I also tested the more complicated possibilities that shared leadership is predicted by the combining these traits with either motivation to lead or extraversion (H6 – H9). In order to test H4 and H5, I conducted three multiple regressions using the SEM framework in AMOS with shared leadership at each time point as my outcome measure. In general, the pattern of results showed that psychological collectivism is related to shared leadership emergence later in the project. None of my control or compositional variables predicted shared leadership at time 1. Psychological collectivism was a marginal predictor of shared leadership at time 3 ($b = .22$, $p < .10$), but agreeableness did not predict shared leadership at any time point. Full results of these analyses are explained in Table 7. The lack of findings for individual

compositional attributes as predictors of shared leadership may mean that multiple compositional traits are required in order for shared leadership to emerge, as I tested with my interaction hypotheses.

In addition to these straightforward compositional hypotheses, I also posed the hypotheses that compositional variables interact to predict shared leadership emergence. Given that for shared leadership to emerge on teams, individuals must be willing and capable of emerging as leaders themselves, but also sharing these leadership responsibilities with other capable team members, it is possible that multiple compositional traits must work together to foster the emergence of shared leadership.

To test H6 - H9, I conducted a series of moderated regression analyses using the SEM framework in AMOS[1]. Hypotheses six and seven examined whether the relationship between team mean agreeableness levels and shared leadership was moderated by team mean levels of extraversion or motivation to lead, respectively, such that the relationship was strengthened when teams were also high in extraversion or motivation to lead. No support was found for H6 or H7; agreeableness did not interact with either motivation to lead or extraversion to predict shared leadership at any time point.

Hypothesis eight examined whether the relationship between mean team psychological collectivism and shared leadership was moderated by mean extraversion, such that the relationship is strengthened when teams are also high in extraversion. I

[1] I conducted a power analysis to determine if I had sufficient power to conduct a moderation analysis using AMOS that included all the interactions in a single equation. I did not have a large enough sample size to provide enough power for this analysis.

found support for this hypothesis at time 3, with a significant interaction term (b = .08, p < .05) explaining an additional 2% of the variance in shared leadership at time 3. I followed Aiken and West's (1991) method for plotting this interaction in Figure 4. This figure shows that teams that are high in both psychological collectivism and extraversion experience the highest levels of shared leadership at time 3 and that teams that are high in extraversion but low in psychological collectivism experience the least amount of shared leadership at time 3, suggesting that H8 is confirmed. Full results of my moderated regression analysis can be found in Table 8 for hypothesis eight.

Hypothesis 9 examined whether the relationship between mean team psychological collectivism and shared leadership was moderated by mean motivation to lead, such that the relationship is strengthened when teams are also high in motivation to lead. I found support for hypothesis at time 3, with a significant interaction term (b = .12, p < .05) explaining an additional 3% of the variance in shared leadership at time 3. I followed Aiken and West's (1991) method for plotting this interaction in Figure 5. That figure suggests that teams that are high in both psychological collectivism and motivation to lead experienced the most amount of shared leadership at time 3 and that teams that were high in motivation to lead but low in psychological collectivism experienced the least amount of shared leadership at time 3. Full results of my moderated regression analysis can be found in Table 9 for hypothesis 9.

These results suggest that there may be a straightforward relationship between psychological collectivism and shared leadership, but that this relationship takes time to emerge. My moderated regression analyses suggest that the relationships between

compositional variables and shared leadership are more complicated, and teams that are high in certain patterns of compositional attributes, such as psychological collectivism and motivation to lead or extraversion, may in the best position to share in leadership responsibilities, especially at the conclusion of projects.

CHAPTER FOUR: DISCUSSION

The present study used a sample of student project teams working on a semester long project to examine the relationships between the emergent states of trust, cohesion and collective efficacy with shared leadership. It also examined the personality traits of agreeableness, psychological collectivism, extraversion, and motivation to lead as predictors of shared leadership.

This study makes two important contributions to the shared leadership literature. First, this study is the first to look at the coevolution of shared leadership and emergent states and is the first to use cross-lag panel analysis to determine the causal relationships between shared leadership and other emergent states. Cross-lag panel analysis was an appropriate methodological choice to use as a response to calls from recent reviews of the teams and shared leadership literature to consider the dynamic nature of teams (Denis et al., 2012; Mathieu, et al., 2008; Mathieu, et al., 2014; Yammarino et al., 2012). This type of methodology allowed me to directly examine the causal relationships between shared leadership and other emergent states and to test a series of competing models in a way, which is new to the shared leadership literature in particular and to the teams literature more broadly.

Second, this study also examined patterns of individual difference variables that lead to shared leadership emergence. Specifically, the combinations of variables that

predict leadership emergence and group belongingness were tested to determine if they interact to facilitate shared leadership. As predicted, the relationship between individual differences and shared leadership is nuanced; patterns of compositional attributes are needed for shared leadership to emerge. My findings suggest that examining individual difference variables individually is not enough to explain shared leadership, but the interactions between individual difference variables reveal powerful relationships between personal and shared leadership emergence. Shared leadership emergence requires a high team level of psychological collectivism and either extraversion or motivation to lead. This balance will enable team members to emerge as leaders but also share leadership responsibilities with capable teammates. Compositional patterns have not been empirically studied in shared leadership research or teams research more broadly, and thus the compositional patterns tested in this study represent a significant contribution to the literature.

My findings also suggest that shared leadership takes time to emerge (Avolio et al., 1996; Perry et al., 1999) and teams that had high levels of both psychological collectivism and either motivation to lead or extraversion experienced the highest levels of shared leadership by the end of the project.

Emergent States and Shared Leadership

In the current study, the emergent states of trust and cohesion emerge at the same time as shared leadership. High levels of team trust and cohesion encouraged team members to do the difficult and risky work of sharing in leadership. Sharing leadership responsibilities also encouraged team members to trust each other and to increased team

cohesion; shared leadership is evolving at the same time as teams are developing trust and cohesion, suggesting a rapidly iterating mechanism is at work between these emergent states and shared leadership. Trust and cohesion act as a reinforcing systems with shared leadership. Team members continue to have positive interactions with each other, promoting the development of trust, cohesion, and shared leadership simultaneously.

Unlike trust and cohesion, in the current study shared leadership was a leading indicator of collective efficacy. Collective efficacy emerges as teams share in leadership responsibilities, as hypothesized. Collective efficacy is a team's belief in its own ability (Kozlowski & Ilgen, 2006). Sharing leadership requires a commitment to both taskwork and leadership work on the team. Team members must put in the effort not only to complete the work but also to emerge as leaders while accepting the leadership of their team members. When teams do this difficult work of sharing leadership, it creates the sense that the team can accomplish its collective goals, and raises the level of collective efficacy on the team. Even with measurements at only three time points, shared leadership emerged as a leading indicator of collective efficacy suggesting that shared leadership clearly creates the sense of belief in the team's ability, and not the reverse.

Individual Differences and Shared Leadership

Overall, results suggested that individual difference variables alone are not particularly strong predictors of shared leadership, but the combination of the desire to belong to the group, and the motivation to emerge as a leader work together to produce shared leadership. The consideration of a pattern of team traits has not yet been examined

as a shared leadership antecedent. This approach is an extension of Foti and Hauenstein's (2007) pattern approach to leader emergence and represents a new way to think about the relationship between personality and shared leadership. This pattern approach, when extended to the team level, demonstrates that specific configurations of personality traits on a team will promote shared leadership. Chen and Zaccaro (2013) argued that personality characteristics that promote effective teamwork will create the collaborative team environment (e.g., psychological collectivism will mean that team members have the interest in working together) needed for shared leadership (Carson et al., 2007), while motivational attributes will determine the extent to which individuals are willing to emerge as leadership (e.g., the assertiveness subfacet of extraversion) (Costa, 1994). The drive to emerge as a leader, created by a high level of extraversion of motivation to lead must be tempered by the desire to work collaboratively in order to create the balance on a team that will lead to shared leadership emergence. The results of my study also suggested that the effects of these compositional variables take time to facilitate shared leadership development as the interaction did not predict shared leadership until the final project phase. I tested interactions of the individual difference variables at all three time points. Consistent with shared leadership theory (e.g. Avolio et al., 1996; Perry et al., 1999), it was not until the final phase of the project that these interactions emerged to predict shared leadership. It is likely that team members were still getting to know each other's capability and motivation for shared leadership during the first two project deliverables. Toward the end of the semester, for the final group project deliverable,

team members were confident in the ability and motivation of each other to engage in shared leadership and thus, the interactions emerged.

Agreeableness was not found to predict shared leadership at any of the time points and did not interact with extraversion or motivation to lead to predict shared leadership at any of the time points. However, psychological collectivism was a marginal predictor of shared leadership at the final time point, taken when teams submitted their final products. While there were not clear, direct relationships between individual difference variables and shared leadership, it appears that multiple individual differences work together to determine the likelihood a team will share leadership.

Although I hypothesized that high team levels of agreeableness could interact with extraversion or motivation to lead to facilitate shared leadership, this was not the case. Psychological collectivism was the key group belongingness variable that predicted shared leadership in this study. Agreeableness did not directly predict shared leadership at any of the three time points, while psychological collectivism was a marginal predictor at the end of the project. Psychological collectivism is a five facet construct developed by Jackson et al. (2006) to capture an individual's tendency to cooperate in group contexts (Chen, Chen & Meindl, 1998; Earley & Gibson, 1998). As such, psychological collectivism may determine the extent to which individual team members identify with their groups and prefer group work, making collectivism particularly important in a collaborative work environment (Kozlowski, Gully, Nason, & Smith, 1999). Highly collective individuals tend to prioritize group goals over their own, identify strongly with

their in-group, and are likely to be motivated to maintain the norms of their in-groups (Triandis, 1995).

By contrast, highly agreeable people are kind, sympathetic, cooperative, warm, and considerate (Thompson, 2008). Agreeableness does tend to predict an individual's desire for cooperation and social harmony (Graziano & Eisenberg, 1997) and three meta-analyses have found agreeableness to relate to higher team performance (Barrick et al., 1998; Bell, 2007; Prewett, Walvoord, Stilson, Rossi, & Brannick, 2009), but an earlier meta-analysis (Barrick & Mount, 1991) found no relationship between agreeableness and interpersonally oriented jobs such as sales and management. Primary research has also revealed mixed findings about agreeableness as a predictor of team performance. O'Neill and Allen (2011) found that agreeableness did not relate to team performance in a study of intensely interdependent engineering design teams, but Tasa, Sears, and Schat (2011) found that agreeableness did predict interpersonal teamwork behavior in a sample of student teams involved in an eight week simulation project. Agreeableness does not specifically measure team orientation or teamwork; it also includes additional factors such as warmth and kindness. Given that shared leadership requires team members to contribute over and above task work, psychological collectivism is likely a better predictor than agreeableness as psychological collectivism specifically measures team orientation and preference for group work. In a divergent validity study, Jackson et al. (2006) found that while psychological collectivism and agreeableness were significantly correlated, psychological collectivism was a stronger predictor of task performance, citizenship behavior, reduced counterproductive work behavior, and reduced member

withdrawal behavior for employees working in highly interdependent groups than any of the Big Five personality traits.

Practical Implications

The finding that psychological collectivism and a corresponding leadership emergence motivation trait such as MTL or extraversion are needed to facilitate shared leadership is informative when selecting team members. If managers wish to promote shared leadership emergence, they need to consider these traits in tandem, rather than just selecting for generic teamwork skills or agreeableness. Additionally, the finding that individual difference predictors didn't facilitate shared leadership immediately, yet did so over time through the interactions between team members, suggests that managers may need to be patient and give teams time to work together before expecting them to be willing to share in leadership responsibilities. Shared leadership is difficult and risky work (Colquitt, et al., 2007; Small & Rentsch, 2010) and managers need to give their teams the time required for shared leadership to occur.

Limitations and Further Directions

Although the methodology of this study is strong, it still utilizes a student sample and, as with all research conducted using student samples, the potential for generalization may be limited. However, these students were working as mock consulting teams, hopefully increasing the generalizability of the results to the workplace. While measuring emergent states and shared leadership at three time points is an improvement above previous studies, it still may not be enough to capture the causal relationships between shared leadership and emergent states. It is possible that with additional measurement

time points, the causal ordering of shared leadership with trust and cohesion may not be completely reciprocal as we found in the current study, but one would have emerged as a leading indicator. An extension of this study would be to use an experience sampling method (Larson & Csikszentmihalyi, 1983) to further tease out the dynamic relationships between these emergent states and shared leadership.

There are also some limitations of cross-lag panel analysis. Cross-lag panel analysis lacks an explicit theory of change. It does not consider the variable means and change in these means over time (Hertzog & Nesselroade, 1987). However, my interest in the present study was not to examine the change in shared leadership over time, but to determine whether shared leadership development preceded the development of emergent states and vice versa. Cross-lag panel analysis is an appropriate method to determine whether cross-lagged effects occur in both directions, as I found for shared leadership and both trust and cohesion. Selig and Little (2012) argue that cross-lag panel analysis is especially useful for the initial research on the effects of one variable on another. Given that this study is the first examination of the relationship between shared leadership and emergent states over time, cross-lag panel analysis was the appropriate methodological choice to test these relationships.

Cross-lag panel analysis also constrains the auto-regressive links to be equal between time periods. One of the assumptions of cross-lag panel analysis is that the same external variables are affecting the variables of interest at each time point, and that only one variable at a time should be allowed to vary in order to conduct informative chi-

square difference tests. Figures 1 – 3 show that the auto-regressive links and cross-lags are constrained to be equal between time periods.

I considered conducting a confirmatory factor analysis (CFA) to distinguish between cohesion and trust at the team level, as these variables were highly correlated within time point. However, there are several valid arguments against conducting a CFA for cohesion and trust in the present study. First, even if I used sub item-parcels to conduct the CFA, this analysis would still be under-powered given my N of 225. Second, these constructs are considered partially isomorphic so conducting a CFA at the individual level would resolve my sample size issue, it is not an appropriate alternative (Avolio & Bass, 1998). Finally, the focus of this dissertation is on the relationship between emergent states and shared leadership, not the relationships between these emergent states and I am not arguing that each emergent state has distinct effects on shared leadership. It is possible that cohesion and trust could be considered aspects of a supportive team environment, similar to the framing that Carson et al., (2007) used. Carson et al. included the constructs of shared purpose, voice, and social support as the supportive team environment that facilitated shared leadership. Carson et al., found similar correlations between these constructs in their study and aggregated them to create a single team environment variable. Given that I am not arguing for specific, unique effects on shared leadership of trust and cohesion, a CFA is not necessary as trust and cohesion could be considered as part of a supportive team environment.

Notwithstanding these limitations, this study makes contributions to the shared leadership research both from theoretical and methodological standpoints. It advances our

understanding of emergent states and shared leadership, as well as individual differences and shared leadership.

Conclusion

The emergent states of trust and cohesion were found to emerge simultaneously with shared leadership, but shared leadership predicted the development of collective efficacy. Teams that consisted of individuals high in psychological collectivism, as well as extraversion or motivation to lead, experienced the highest levels of shared leadership by the end of the project.

CHAPTER FIVE: FIGURES

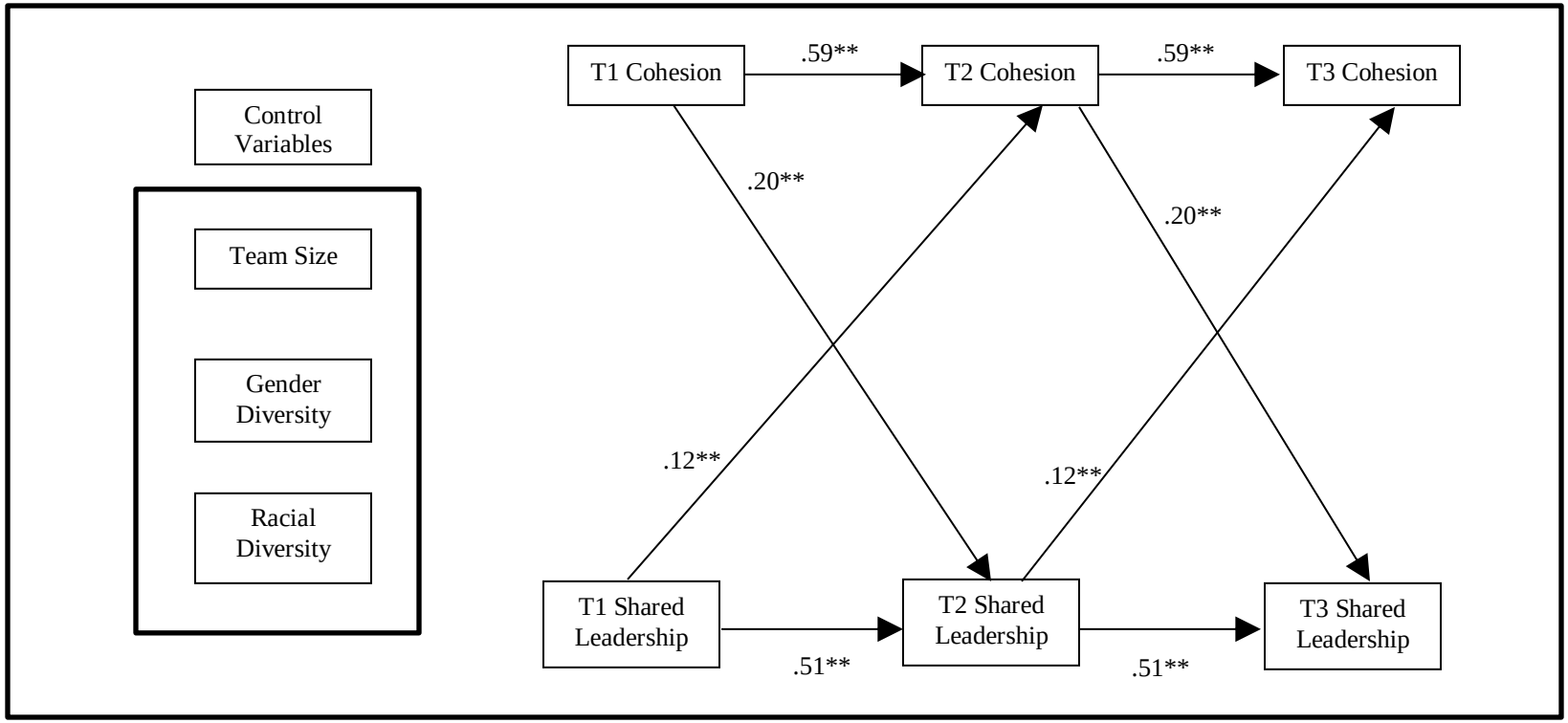

Figure 1. Auto-regressive cross-lag panel analysis of cohesion and shared leadership
** = path significant at the two-tailed p <.01 level; * = path significant at the two tailed p < .05 level. N = 225 teams.

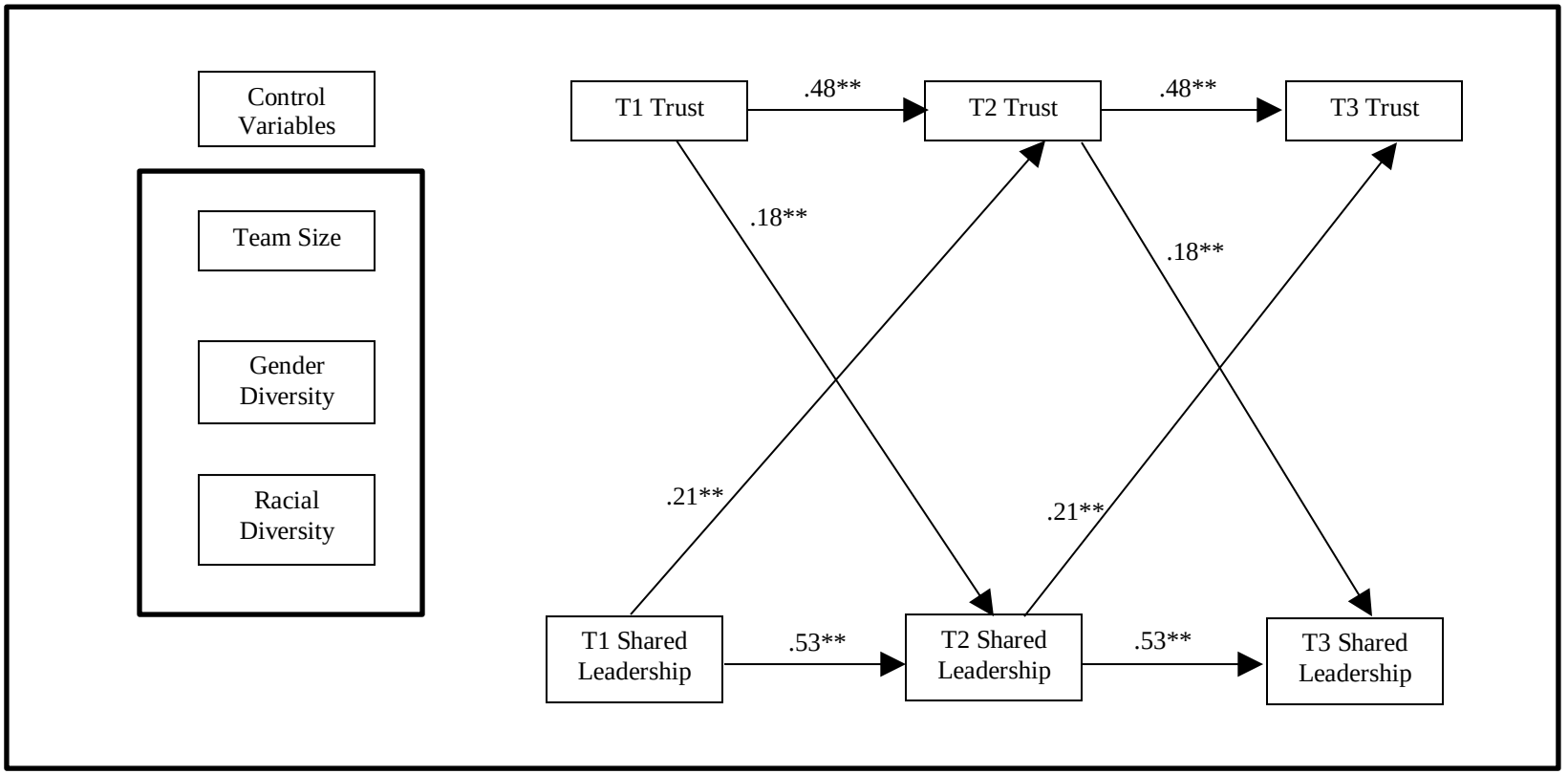

Figure 2. Auto-regressive cross-lag panel analysis of trust and shared leadership
** = path significant at the two-tailed p <.01 level; * = path significant at the two tailed p < .05 level. N = 225 teams.

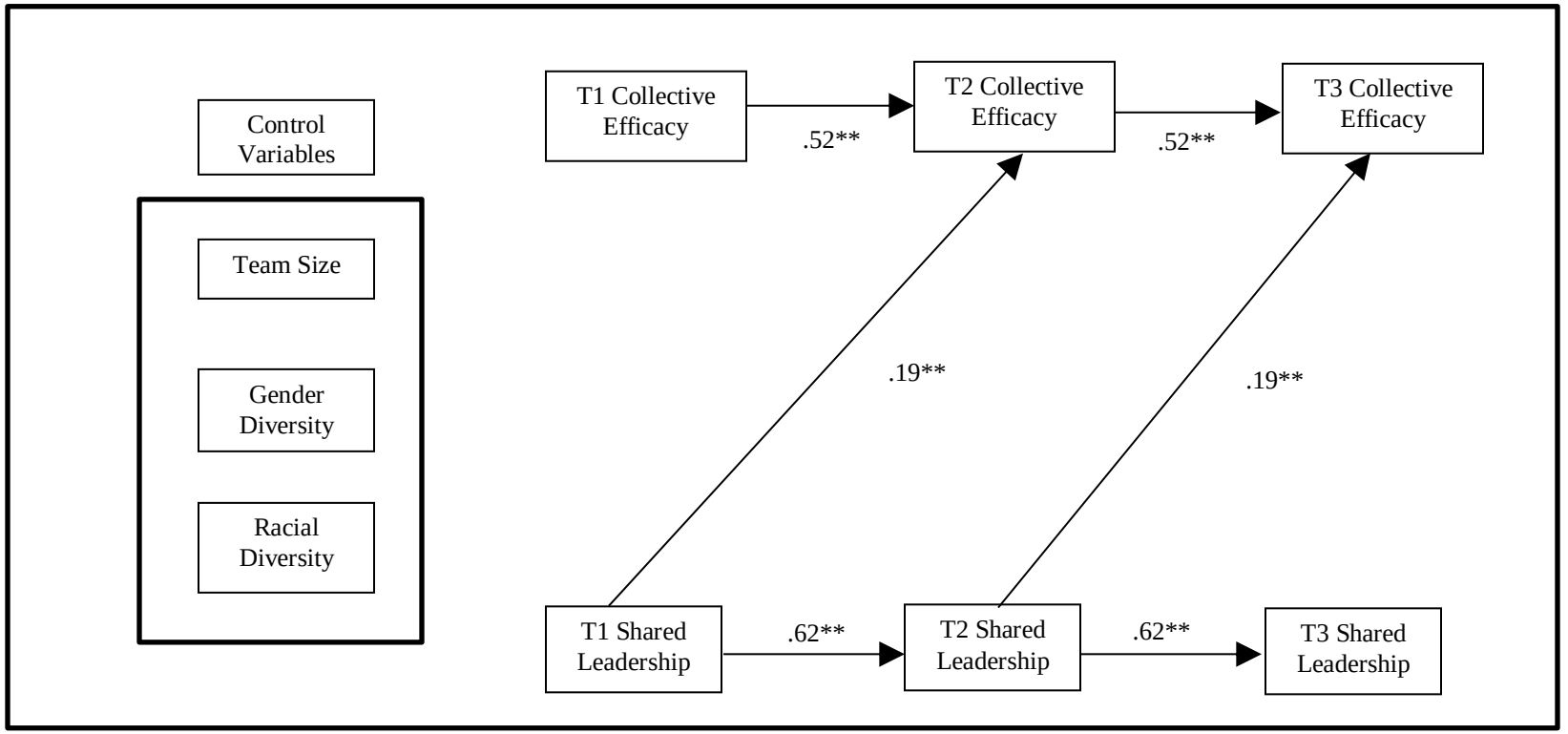

Figure 3. Auto-regressive cross-lag panel analysis of collective efficacy and shared leadership
** = path significant at the two-tailed p <.01 level; * = path significant at the two tailed p < .05 level. N = 225 teams.

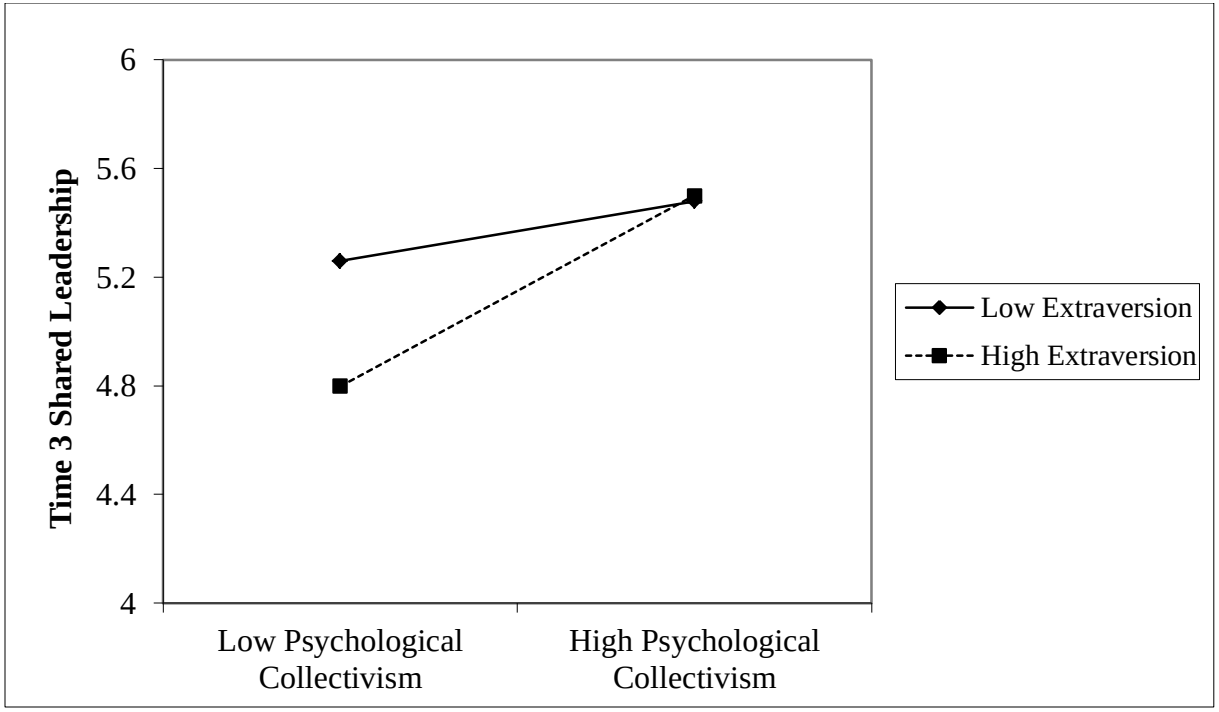

Figure 4. Moderating effect of extraversion on relationship between team mean levels of psychological collectivism and time 3 shared leadership

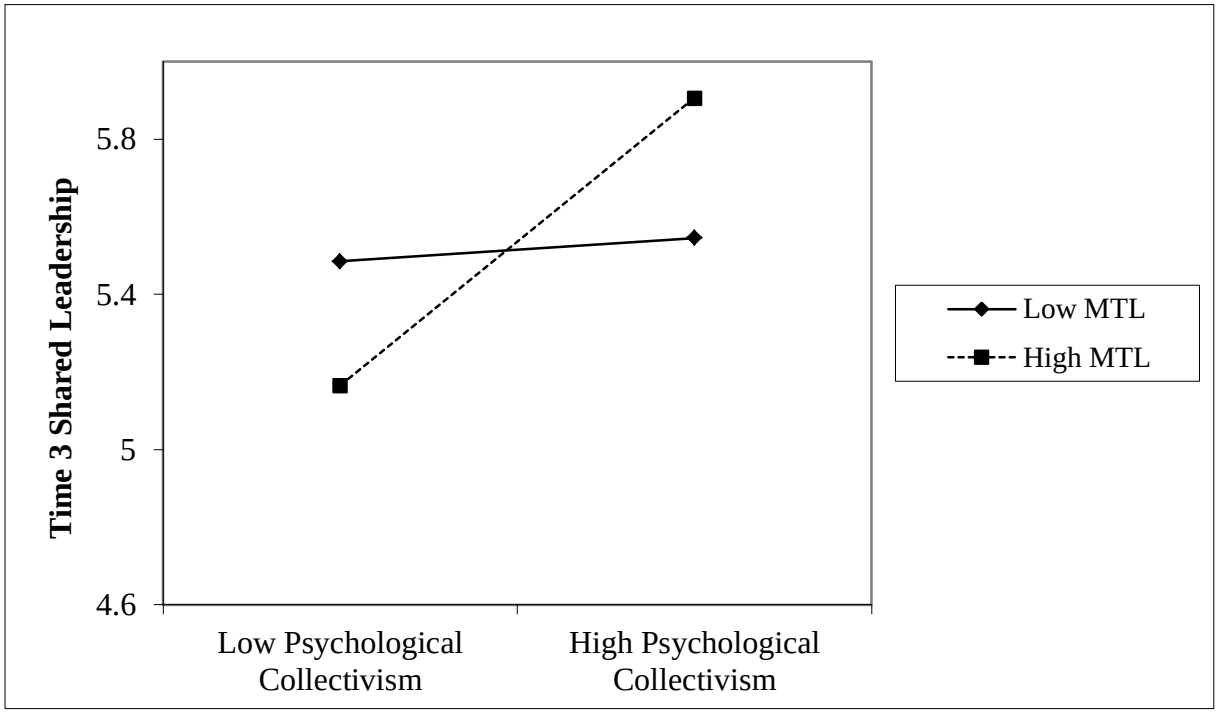

Figure 5. Moderating effect of motivation to lead on relationship between team mean levels of psychological collectivism and time 3 shared leadership

CHAPTER SIX: TABLES

Table 1. Means and Correlations Among Study Variables

	Mean	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. Agree.	3.74	.80																		
2. Extra.	3.42	.43**	.92																	
3. PsyCol	5.28	.23**	.12	.91																
4. MotLea	4.78	.48**	.60*	.11	.89															
5. TeamSize	3.60	-.01	.03	.13*	.07	--														
6. Gender Div.	.34	.10	-.04	.25**	-.02	.31**	--													
7. Race Div.	.49	.09	-.06	.29**	-.05	.30**	.29**	--												
8. T1 Trust	5.72	.07	.11	.27**	.11	.03	.09	.08	.91											
9. T2 Trust	5.67	.06	-.03	.27**	.04	.20**	.07	.09	.40**	.91										
10. T3 Trust	5.64	.01	-.15*	.27**	-.06	.10	.09	.11	.41**	.74**	.92									
11. T1 Coh.	5.62	.08	.03	.29**	.05	.08	.10	.07	.73**	.38**	.40**	.78								
12. T2 Coh.	5.67	.02	.01	.27**	.08	.13*	.03	.06	.39**	.72**	.63**	.48**	.79							
13. T3 Coh.	4.11	-.07	-.15*	.25**	-.05	.11	.01	.06	.33**	.61**	.78**	.43**	.74**	.82						
14. T1 SL	5.57	.06	.03	.18**	.01	.05	.09	.08	.75**	.37**	.38**	.69*	.39**	.68**	.98					
15. T2 SL	5.49	.04	-.02	.19**	.07	.18	.03	.04	.38**	.70**	.67**	.40**	.65**	.59**	.48**	.98				
16. T3 SL	5.54	.08	-.10	.23**	.02	.11	.06	.07	.32**	.61**	.77**	.35**	.55**	.68**	.47**	.70**	.98			
17. T1ColEff	5.81	.09	-.06	.15*	.06	.04	.12	.10	.75**	.35**	.36**	.70**	.35**	.27**	.37**	.27**	.37**	.93		
18. T2ColEff	5.70	.02	-.01	.17*	.07	.16*	.05	.06	.31**	.79**	.67**	.29**	.67**	.55**	.31**	.51**	.51**	.38**	.93	
19. T3ColEff	5.62	.01	-.12	.16*	-.01	.14*	.07	.07	.37**	.68**	.83**	.32**	.54**	.71**	.60**	.68**	.68**	.75**	.76**	.94

1 = mean team level agreeableness; 2 = mean team level extraversion; 3 = mean team level psychological collectivism; 4 = mean team level motivation to lead; 5 = team size; 6 = gender diversity; 7 = racial diversity; 8 = time 1 trust; 9 = time 2 trust; 10 = time 3 trust; 11 = time 1 cohesion; 12 = time 2 cohesion; 13 = time 3 cohesion; 14 = time 1 shared leadership; 15 = time 2 shared leadership; 16 = time 3 shared leadership; 17 = time 1 collective efficacy; 18 = time 1 collective efficacy; 19 = time 3 collective efficacy.

Scale reliabilities (Cronbach's α) on the diagonal.
** = correlation significant at the two-tailed p <.01 level; * = correlation significant at the two tailed p < .05 level. N = 225 teams.

Table 2. Results of SEM Analysis for Trust and Cohesion Predicting Shared Leadership

	T2 Shared Leadership	T3 Shared Leadership
	b	b
Variables		
Team Size	.12	-.02
Gender Diversity	-.14	-.19
Racial Diversity	.19	.11
T1 Cohesion	.37*	.35*
T1 Trust	.22*	.21†
T2 Cohesion	--	.31*
T2 Trust	--	.54*

Note. * = $p < .05$, † = $p < .10$ two tailed *N = 225 teams*

Table 3. Results of SEM Analysis for Shared Leadership Predicting Collective Efficacy

	T2 Coll. Efficacy	T3 Coll. Efficacy
	b	b
Variables		
Team Size	.20*	.13†
Gender Diversity	-.22	.08
Racial Diversity	.27	.13
T1 Shared Leadership	.33*	.39*
T2 Shared Leadership	--	.72*

Note. * = $p < .05$, † = $p < .10$ two tailed *N = 225 teams*

Table 4. Results of Auto-regressive Cross-lag Panel Analysis for Cohesion and Shared Leadership

Model	χ^2	*df*	$\Delta\chi^2$	Δdf	*p*	CFI	RMSEA
Unconditional	58.260	11	--	--	< .01	.961	.137
Cohesion → SL Cross-lag[a]	39.321	10	18.939	1	< .001	.976	.113
SL → Cohesion Cross-lag[a]	40.323	10	17.937	1	< .001	.975	.115
Fully Cross-lagged[b]	32.584	9	6.737	1	< .01	.968	.107

SL = shared leadership CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation. a = compared to unconditional model; b = compared to Cohesion → SL cross-lag model. *N* = 225 teams.

Table 5. Results of Auto-regressive Cross-lag Panel Analysis for Trust and Shared Leadership

Model	χ^2	*df*	$\Delta\chi^2$	Δdf	*p*	CFI	RMSEA
Unconditional	84.505	11	--	--	< .01	.945	.170
Trust → SL Cross-lag[a]	58.104	10	26.401	1	< .001	.964	.145
SL → Trust Cross-lag[a]	49.880	10	34.625	1	< .001	.970	.132
Fully Cross-lagged[b]	43.613	9	6.267	1	< .05	.960	.129

SL = shared leadership. CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation. a = compared to unconditional model; b = compared to SL → Trust cross-lag model. *N* = 225 teams.

Table 6. Results of Auto-regressive Cross-lag Panel Analysis for Collective Efficacy and Shared Leadership

Model	χ^2	*df*	$\Delta\chi^2$	Δdf	*p*	CFI	RMSEA
Unconditional	65.532	11	--	--	< .01	.956	.149
CE → SL Cross-lag[a]	56.707	10	8.825	1	< .01	.962	.143
SL → CE Cross-lag[a]	53.206	10	12.326	1	< .001	.965	.137
Fully Cross-lagged[b]	50.050	9	3.156	1	*ns*	.967	.141

SL = Shared Leadership, CE = Collective Efficacy, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation. a = compared to unconditional model; b = compared to SL→ CE cross-lag model. *N* = 225 teams.

Table 7. Results of SEM Analysis for Compositional Variables and Shared Leadership at Three Time Points

Variable	Shared Leadership Time 1 (b)	Shared Leadership Time 2 (b)	Shared Leadership Time 3 (b)
Step 1			
Team Size	.06	.21†	.09
Gender Diversity	-.16	-.22	-.48
Racial Diversity	.02	.30	.26
Agreeableness	.05	.09	.04
Psychological Collectivism	.10	.14	.22†
R^2	.01	.04	.06

Note. † = $p < .10$, two tailed $N = 225$ *teams*

Table 8. Results of SEM Analysis of Shared Leadership at Time 3 on Interaction of Psychological Collectivism and Extraversion

Variable	Shared Leadership Time 3 (b)
Team size	.08
Gender Diversity	.00
Racial Diversity	.00
Psychological Collectivism	.19**
Extraversion	-.09*
Psychological collectivism x extraversion	.08*
R^2	.09

Note. * = $p < .05$, † = $p < .10$, *N = 225 teams*

Table 9. Results of SEM Analysis of Shared Leadership at Time 3 on Interaction of Psychological Collectivism and Motivation to Lead

Variable	Shared Leadership Time 3 (b)
Team Size	.08
Gender Diversity	.00
Racial Diversity	.00
Psychological Collectivism	.16**
Motivation to Lead	.01
Psychological Collectivism x Motivation to Lead	.12**
R^2	.06

Note. * = $p < .05$, † = $p < .10$, *N = 225 teams*

CHAPTER SEVEN: APPENDIX A DISSERTATION PROPOSAL LITERATURE REVIEW

Introduction

The nature of organizational work is becoming increasingly fast paced and uncertain (Barkema, Baum, & Mannix, 2002; Brown & Gioia, 2002; Gronn, 2002; Sirmon, Hitt, & Ireland, 2007). In order to deal with this uncertainty, organizations are utilizing teams of employees to accomplish tasks (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Bell, 2003; Pearce, Manz, & Sims, 2009). In order to manage these team-based structures, traditional conceptions of leadership must be adjusted (Morgeson, 2005; Morgeson, et al., 2010; Hoch, Pearce, & Welzel, 2010). One such adjustment is to consider leadership as a shared group activity (Bennett, Wise, Woods, & Harvey, 2003) or as an emergent property of a group (Day, Gronn, & Salas, 2004). Shared leadership entails team members mutually influencing each other by engaging in collective leadership behaviors. The idea that leadership can be shared between group members is almost 60 years old (Gibb, 1954), but it has been studied in a fragmented matter. Pearce and Conger's (2003) review of the shared leadership literature revealed that no fewer than 10 different frameworks have been used to examine shared leadership and related concepts. This divergent conceptualization of shared leadership has left several significant gaps in the literature.

Recent reviews of the shared leadership literature have identified three specific areas as particularly critical for further research: (1) our knowledge of shared leadership antecedents, (2) our understanding of the dynamic nature of shared leadership emergence, and (3) the dynamic relationship between shared leadership and performance (Denis, Sergi, & Langley, 2012; Yammarino, et al., 2012). Previous research has examined specific individual difference antecedents to shared leadership emergence, such as collectivism (Hiller, Day, & Vance, 2006; Small & Rentsch, 2010) and integrity (Hoch, 2013) or team level antecedents, such as the internal team environment (Carson, Tesluk & Marrone, 2007), but no study has developed a model that combines team composition and emergent states as predictors of shared leadership. Using a sample of student teams engaging in a semester-long group project, the current study tests hypotheses pertaining to (a) the effects of team composition and emergent states as antecedents to shared leadership emergence, and (b) emergent states that result from shared leadership enactment.

The current study also seeks to address a second gap identified in the shared leadership literature; the dynamic nature of the relationships between shared leadership emergence and other variables. Shared leadership, emergent states, and performance are measured at three time points during the project enabling the examination of causal ordering between emergent states and shared leadership, and how shared leadership relates to team performance over time. This type of multi-stage longitudinal methodology has not yet been used to test hypotheses about how shared leadership relates to emergent

states and performance, and therefore the current study significantly contributes to the shared leadership literature, as well as to the teams literature more broadly.

Defining Shared Leadership

The study of shared leadership has progressed in a haphazard and disjointed manner (Pearce & Conger, 2003). Given that the theoretical development of shared leadership has been informed by many categories of leadership and teams research, it is unsurprising that there is disagreement in the literature about how to best define and measure this form of leadership. Although there is now widespread recognition that leadership behaviors can be carried out by any number of group members, not just an external leader (Avolio, Jung, Murry, & Sivasubramaniam, 1996; Carson, et al., 2007; Pearce, 2004; Pearce & Sims, 2002; Yukl, 2007), shared leadership has been defined (and measured) differently depending on whether leadership is considered as a "style" as in research by Pearce and colleagues (c.f. Ensley, Hmieleski, & Pearce, 2006; Hoch, et al., 2010), or as a set of behaviors grounded in functional leadership theory (Day et al., 2004; Hiller et al., 2006). Although these methods of defining and measuring shared leadership are distinct from one another, they agree that shared leadership highlights the importance of influence between team members.

Defining Shared Leadership as a Leadership Style

Pearce and Conger (2003) define shared leadership as "an interactive influence process among individuals in work groups in which the objective is to lead one another to the achievement of group goals. This influence process often involves peer, or lateral, influence, and at other times involves upward or downward hierarchical influence" (p. 1).

Studies that have used this definition typically have measured shared leadership with a modified version of a leadership style questionnaire that changes the referent of each of the leadership styles from leader to team and then compare the influence on performance of shared and vertical leadership. For example, Pearce and Sims (2002) created a leadership questionnaire that broke out leadership styles into aversive, directive, transactional, transformational, and empowering. In their empirical study, participants were asked to respond to a set of items about each of the leadership styles with the question stem changing from "my team leader" for vertical leadership to "my team members" for shared leadership. This style of questionnaire is the most frequently used in the shared leadership literature, as evidenced by several empirical studies using this approach (e.g., Ensley et al., 2006; Hoch 2013; Pearce & Sims, 2002). In general, findings suggest that shared leadership contributes to team performance over and above vertical leadership (Pearce & Sims, 2002; Hoch et al., 2010; Ensley et al., 2006) and that the use of aversive or directive leadership styles is detrimental for both team leaders and members, while the use of transformational and empowering leadership styles is beneficial when used by team leaders and members (Hoch et al., 2010, Pearce & Sims, 2002).

Defining Shared Leadership as an Emergent Group Property

Day et al. (2004) conceptualize shared leadership as an "outcome of team processes, [which] is then used as a resource in future process and performance episodes" (p. 859) and Carson et al. (2007) define shared leadership "as an emergent team property that results from the distribution of leadership influence across multiple team members"

(p. 1218). These definitions suggest that shared leadership is a group property that emerges as team members interact with each other, as opposed to a leadership style (such as transformational, transactional, etc.) that individual members can enact.

Shared leadership as an emergent group property is rooted in functional leadership theory (McGrath, 1962) where the leader fulfills needs of the team as they arise. Functional leadership theory views leadership as oriented around team need satisfaction, and any individual within the team (or external to the team) who performs leadership behaviors that contribute to the team's success can be seen as fulfilling a leadership role. Functional leadership theory has been an influential and prominent model of leadership and has been the subject of several taxonomic efforts to identify leadership behaviors (c.f Fleishman, Mumford, Zaccaro, Levin, Korotin & Hein, 1991; Zaccaro, Rittman & Marks, 2001).

Functional leadership research is typically focused on the behaviors enacted by an external leader, but the theory does not exclude the possibility that leadership behaviors can be enacted by any team member (Morgeson et al., 2010). In particular, when multiple team members are engaging in the leadership behaviors, leadership is being shared on the team. Morgeson et al. examined the types of behaviors that are best fulfilled by internal team members who are not in a formal position of leadership. These behaviors included structuring and planning, providing feedback, performing team task, solving problems, and supporting the team's social climate. Hiller et al. (2006) found that sharing relationship oriented behaviors improved team performance more than sharing task

oriented behaviors, suggesting that certain leadership behaviors are more appropriate to share than others.

Conceptualizing shared leadership as an emergent group property recognizes that teams are changing entities and that leadership is not a static style but a dynamic process in which leadership roles are enacted by various team members as the need arises (Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009). Given the dynamic nature of teams and the diversity present in organizations, members will perform leadership behaviors when their particular skill set is suited to the situation. Because individuals bring different skills and individual differences to their team, in an ideal situation, teams will have a varied set of leadership skills to draw from and individuals will perform the leadership behaviors they are best suited for as required by the situation. The present study explicitly tests hypotheses about relationships between shared leadership and performance over time, recognizing the dynamic nature of teams. To that end, the current study measures shared leadership using the functional and social network approaches consistent with previous research in this tradition.

Historical Roots of Shared Leadership

The lack of consensus about how to define shared leadership may stem from diverse theoretical traditions that inform this research stream. Historically, leadership has been conceptualized from the viewpoint of a single leader and the traits or behaviors that make that leader successful while the role of followers has received limited attention. According to most of these early top-down perspectives, individuals became leaders based on their intelligence, energy and moral force (Dowd, 1936) as determined by their

genetics. As a result, most of the leadership literature did not considered leadership as a mutual influence among multiple individuals within a team. Despite this overwhelming focus on the vertical leader, a few theoretical frameworks have conceptualized leadership as something that can be shared. Each of these theories has made a unique contribution to the study of shared leadership as we know it today.

Foundations of Shared Leadership

Gibb (1954) is credited with providing one of the first explanations of what it means for group members to share leadership responsibilities stating "leadership is probably best conceived as a group quality, as a set of functions which must be carried out by the group. This concept of 'distributed leadership' is an important one" (p. 884). Gibb suggested that rather than thinking about leadership as the influence an individual can have on a group, it should be thought of as the influence processes between individuals in their work groups and could actually be considered as a group activity. During the 1970s, several theoretical frameworks were developed to explain the possibilities for leadership taking on forms other than that of a vertical leader and to lay the groundwork for the explosion in shared leadership research that began in the early 2000s.

Leader-member exchange. In the mid 1970s Graen and colleagues (Graen, 1976; Graen & Scandura, 1987) introduced the theory of leader-member exchange (LMX), arguing that leaders should use different styles of leadership for different subordinates. For example, when followers are in the leader's "inner circle," this relationship is characterized by reciprocal influence, and mutual trust and liking (Dansereau, Graen &

Haga, 1975). This positive dynamic leads to improved performance and subordinates engaging in less routine activities (Graen & Cashman, 1975). While LMX does not suggest that followers may also take on leadership responsibilities, in accordance with notions of shared leadership, it does recognize that formal leaders may be influenced by their followers and that followers can impact the behavior of leaders. LMX has informed shared leadership theory by recognizing that subordinates can play a role in determining the leadership process, and that followers in the leader's in-group have increased autonomy, possibly encouraging them to engage in leadership behaviors.

Transformational leadership. Transformational leaders motivate their followers to achieve beyond the followers' expected performance levels (Burns, 1978). Transformational leadership consists of three factors (1) charisma, (2) intellectual stimulation, and (3) individualized consideration (Bass, 2008). According to the literature on transformational leadership, leaders and followers are in a reciprocal relationship with the goal of achieving higher performance and employee morale (Bass, 2008). Although transformational leadership is still focused on the vertical leader, leaders who enact high levels of individualized consideration help their followers reach higher levels of development (Bass, 1998) and this could empower subordinates to engage in leadership behaviors. Transformational leaders also delegate more broadly, enabling subordinates to step-up and take on additional leadership responsibility (Edwards & Gill, 2012). When subordinates are empowered to engage in leadership, they may be acting in a way that is consistent with conceptualizing leadership as behaviors enacted by team members.

Participative decision making. Vroom and Yetton's (1973) theoretical model suggested that there are specific conditions under which a leader should involve his or her subordinates in the decision making process. In general, Vroom and Yetton argue that subordinates should be involved in decision making when there is a higher need for decision quality, when subordinates have knowledge that is unique from the supervisors, or when subordinate decision acceptance is important. Specifically, when a leader decides to use a group-based decision making procedure, the group works through the decision together and followers collaborate with the leader to come to a final decision. In this case, the leader relies on followers to make the decision and does not make the decision alone. Participative decision making informs the development of shared leadership theory by recognizing that there are certain circumstances in which team member's involvement in leadership may be beneficial and that leaders may choose to collaborate with group members, rather than imposing a unilateral decision.

Substitutes for leadership. The substitutes for leadership theory (Kerr & Jermier, 1978) begins to move away from the focus on a vertical leader. Substitutes for leadership suggests that there are conditions in which formal leaders are not required. For example, when subordinates have high ability, expertise, training and knowledge, they may neutralize the need for task oriented leadership; when subordinates have a high professional orientation, they may neutralize the need for both relationship and task oriented leadership (Kerr & Jermier, 1978). If followers are actively involved and engaged in their work, they may require less from their formal leader and engage in more leadership behaviors themselves. This idea speaks directly to the emergence of shared

leadership as a set of behaviors. Morgeson, et al. (2010) argued that team members are best suited to engage in specific leadership behaviors such as providing feedback, supporting the team's social climate, and solving problems, promoting the idea that when appropriate team members may be able to act as a substitute for the formal leader.

Self-leadership. Manz and Sims (1980) built on Kerr and Jermier's (1978) ideas about substitutes for leadership to suggest that self-management or self-leadership can replace formal leadership when subordinates are both capable of and motivated to complete the work tasks. In this case, formal leaders are not required to closely monitor and direct subordinates. Bligh, Pearce and Kohles' (2006) paper considered the theoretical and empirical linkages between self and shared leadership. They argued that self-leadership is an antecedent to shared leadership on teams and predicts the development of individual trust, self-efficacy, and individual commitment, which will then enable these individuals to work together effectively and promote the expression of shared leadership. In this case, a formal leader may not need to be actively involved in the management of the team. In Bligh et al.'s theory, self-leadership enables team members to develop the skills necessary to engage in shared leadership behaviors.

Self-managing work teams. Research on self-managing work teams (SMWTs) (Manz & Sims, 1987; 1991; Stewart & Manz, 1995) has been the closest relative to shared leadership. However, the literature on SMWTs has focused on the team's external leader, and not on the leadership behaviors enacted by team members. For example, Morgeson (2005) was interested in how external leaders could promote effective functioning in SMWTs and found that formal leaders who intervened at the wrong

moment, would have a negative effect on performance. Individuals on SMWTs that were effective in their self-management did not require the assistance of a formal leader unless the team went through a change or a disruption. Research on SWMTs has not systematically analyzed how and why team members can engage in managerial tasks but has focused on how an external leader can facilitate effectiveness on SMWT (Morgeson, 2005; Manz & Sims, 1987; Stewart & Manz, 1995).

Development of Shared Leadership Theory

The perspectives described above all influenced the study and development of shared leadership as a construct. Drawing from these alternative perspectives of leadership, the study of shared leadership began to surge in the mid-1990s, with several researchers coming to similar theoretical conceptualizations of leadership as a collaborative decision making process in which group members mutually influence each other with the intention of helping a team achieve shared goals (Avolio, et al., 1996; Pearce & Conger, 2003; Seers, 1996). In the early 2000s, quantitative studies of shared leadership focused on distinguishing it from vertical leadership (Ensley, et al., 2006; Houghton, Neck & Manz, 2003) and argued that shared leadership accounts for additional variance in performance across a variety of settings such as new product development teams (Cox, Pearce, & Perry, 2003; Hoch, 2013), change management teams (Pearce & Sims, 2002), new venture growth teams (Ensley, et al., 2006), and project teams (Erez, LePine, & Elms, 2002). Shared leadership research to date has focused on four main areas (1) the relationship between shared leadership and performance, (2) the contribution of shared leadership to performance over and above

vertical leadership, (3) the relationship between team level process and emergent states, and (4) some limited work has examined specific compositional antecedents to shared leadership. Although research on shared leadership has gained steam in the last decade, there are still important gaps that require further conceptual and empirical work. The major gaps identified in the shared leadership literature by recent reviews (Denis et al., 2012; Yammarino et al., 2012) include (1) compositional antecedents to shared leadership emergence, (2) the dynamic relations between shared leadership and team emergent states, and (3) the dynamic relationship between shared leadership and performance.

Shared leadership, vertical leadership, and team effectiveness. In order to promote shared leadership as an important construct to study and understand, several studies have been focused on demonstrating that shared leadership predicts team performance over and above vertical leadership. For example, Pearce and Sims (2002) conducted a longitudinal study with 71 change management teams in an automotive manufacturing plant and found that both vertical leadership (defined as the appointment of a formal leader) and shared leadership (defined as leadership that emerged from group dynamics) impacted perceptions of team effectiveness. This study suggested that vertical and shared leadership are not mutually exclusive and that both can have a positive effect on team performance. Notably, this study's methodology required participants to respond to leadership questions about five different leadership styles (aversive, directive, transactional, transformational, and empowering) and found that aversive and directive

leadership styles have a negative effect on team performance, regardless of whether the source of the leadership is vertical or shared.

In another study examining the relationships between vertical and shared leadership, Ensley et al. (2006) found that new ventures benefit from top management teams using a shared leadership style. However, both vertical and shared transformational, transactional, and empowering leadership styles contributed positively to firm performance. Taken collectively, these studies suggest that leadership can be shared between group members and that certain styles of shared leadership can improve team performance over and above vertical leadership. The goal of this set of studies was to legitimize shared leadership as an important construct by demonstrating that it is a measurable phenomenon and can explain unique variance in important team outcomes.

Shared leadership and team performance. Recent reviews of the shared leadership literature suggest that shared leadership can positively impact performance. Denis et al., (2012) assert that shared leadership leads to both higher team and firm performance, that shared leadership can improve team functioning over and above vertical leadership, and that shared leadership is a "valuable instrument for goal attainment" (p. 19). Many empirical studies have found that shared leadership leads to higher performance. According to Carson et al. (2007) "when team members offer their leadership to others and to the mission or purpose of their team, they should experience higher commitment, bring greater personal and organizational resources to bear on complex tasks and share more information" (p. 1224). Accordingly, several studies have

found that shared leadership improves team performance (e.g., Hoch et al., 2010; Pearce et al., 2004; Small & Rentsch, 2010).

Although we know from previous research that shared leadership can improve performance, the dynamic relationship between shared leadership and performance has yet to be empirically examined. Yammarino et al. (2012) recognize that "the right people need to be tapped at the right time in the correct manner in order for a team to be successful" (p. 390) but to date, no research effort has examined how establishing shared leadership at different time points in a team's lifecycle can impact performance. Prior studies have not yet utilized longitudinal designs that measure shared leadership and performance at multiple time points. In the teams literature, previous research has found that establishing teamwork and taskwork norms early in a team's tenure lead to sustained performance (Mathieu & Rapp, 2009). Likewise, establishing shared leadership early on in a team's life may lead to improved performance over time. The current study will measure shared leadership and team performance at three different time points in order to empirically test whether establishing an early precedent for shared leadership impacts a team's level and/or slope of performance.

Team processes, emergent states, and shared leadership. Another area of shared leadership research that has received attention over the last decade is the role of team level variables that predict shared leadership emergence, or that mediate the relationship between shared leadership and performance. One such set of variables, team emergent states (Marks, Mathieu, & Zaccaro, 2001), have been hypothesized to both predict shared leadership (Carson, et al., 2007), and emerge from the collective leadership engagement

(Ensley et al., 2003; McIntyre & Foti, 2013) or both (Day, et al., 2004; Friedrich, et al., 2009). Although most of this type of work is conceptual, some empirical work has shown that shared leadership does emerge from positive interactions among team members (Carson et al., 2007) and that shared leadership does lead to higher performance through important mediators such as team mental models (McIntyre & Foti, 2013).

Carson et al.'s (2007) study was the first empirical test of the relationship between team level variables and shared leadership. It found that a team environment consisting of social support, shared purpose, and voice (measured at time 1) promoted shared leadership emergence (measured at time 2) and that shared leadership predicted performance. Carson et al. also found that external team coaching can compensate and improve performance when the team does not develop an internal environment favorable to shared leadership. Supporting the finding than an internal team environment can foster shared leadership, Small and Rentsch (2010) conducted another study using students engaged in a semester long group project and found that high levels of trust on teams led to higher levels of shared leadership and that shared leadership predicts performance. Taken together, these studies suggest that a productive team climate predisposes team members to engage in shared leadership. Prior research has also suggested that team members must have an accurate understanding of each other's skills in order to share leadership (Avolio et al., 1996) and that shared leadership is more likely to occur in mature teams (Perry, Pearce & Sims., 1999).

Other studies have suggested that shared leadership can actually lead to the types of team environments that Carson et al., 2007 and Small and Rentsch 2010 found

promoted shared leadership. For example, McIntyre and Foti's (2013) study used a sample of undergraduate computer science teams in a programming competition and found that engaging in shared leadership increased the similarity of the team's shared mental model and in turn promoted more accurate performance. Conceptual arguments have also been made that shared leadership can promote emergent states such as cohesion and collective vision (Ensley et al., 2003), although these ideas have yet to be empirically tested. Solansky (2008) used a cross-sectional design in a laboratory study and found that teams with higher levels of shared leadership also had higher levels of collective efficacy and transactive memory and hypothesized that shared leadership promoted these emergent states.

If shared leadership is construed as team members engaging in leadership behaviors to satisfy team needs, these complementary behaviors should increase team confidence and collective efficacy. Collective efficacy is "a shared belief in a group's collective capability to organize and execute courses of action required to produce given levels of goal attainment" (Kozlowski & Ilgen, 2006, p. 90) and has been found to mediate the effects of team leadership on performance (Bass, Avolio, Jung & Berson, 2003; Lester, Meglino, & Korsgaard, 2002). A recent meta-analysis on the relationship between shared leadership and performance found that team efficacy (a combination of collective efficacy and potency) partially mediates the relationship between shared leadership and performance (Nicolaides, et al., 2014). These authors suggest that shared leadership acts to increase team member confidence and motivation which in turn leads to increased team performance. Further empirical research is needed to illuminate the

causal ordering of particular team emergent states and shared leadership emergence. To this end, the current study will measure emergent states and shared leadership at three time points. This methodology will enable examination of the dynamic relationship between shared leadership and emergent states, determining whether certain emergent states such as trust and cohesion precede shared leadership emergence and others such as collective efficacy follow.

Individual differences and shared leadership. Another area of shared leadership research that has received limited empirical attention is the consideration of team member individual difference characteristics that can promote shared leadership emergence. Pearce and Sims (2000) proposed that team members' dispositions should predict their willingness to engage in shared leadership. Team processes that promote collective direction setting, management of team operations and a collective awareness will help a team develop shared leadership capacity (Zaccaro, Heinen & Shuffler, 2009), and team members that possess the right composition of individual differences should be able to facilitate the development of these types of processes on a team (Barrick, Stewart, Neubert & Mount, 1998).

Despite research that shows individual differences can predict team performance (Bell, 2007), to date only three studies have examined hypotheses related to team composition and shared leadership. Two of these studies demonstrated that team mean levels of psychological collectivism predict shared leadership emergence. Psychological collectivism refers to an individual's propensity to be concerned with in-group harmony and cohesion (Earley & Gibson, 1998). Hiller et al. (2006) conducted a field study with

teams engaged in winter road maintenance and found that when such teams had higher mean levels of collectivism, they had higher levels of shared leadership and supervisor rated performance. Small and Rentsch (2010) also found that collectivism predicted shared leadership emergence in a sample of student project teams. Collectivism is typically considered as one end of the individualism/collectivism continuum used to measure differences among countries (Hofstede, 1980); however there is also variability within societies on levels of collectivism (Cable & Edwards, 1994). Individuals high in psychological collectivism tend to identify with the groups to which they belong and to prefer group work over independent work (Eby & Dobbins, 1997). Thus, psychological collectivism should foster an greater orientation toward any kind of collective work, including shared leadership.

The third study to examine the relationship between a compositional attribute and shared leadership (Hoch, 2013) found that team member integrity predicted shared leadership emergence and innovative behavior in a field study of 43 work teams across two different companies. Team integrity was hypothesized as a shared leadership antecedent because team members who are high in integrity are also reliable and trustworthy, making them less likely to engage in social loafing and more likely to engage in shared leadership (Hoch, 2013). These three studies each focused on a single compositional variable (collectivism or integrity) and represent the extent of our field's empirical tests of team composition as a predictor of shared leadership emergence to date.

The literature on teams has recognized that there are important individual differences that determine an individual's propensity to engage in teamwork and predict

the extent to which individual will be a productive team member (see Jackson & Joshi, 2002 for a review). Our collective knowledge of team composition research has also demonstrated that team member characteristics can have a powerful influence on the processes and emergent states of teams (Kozlowski & Bell, 2003; Morgeson, Reider, & Campion, 2005). Given that such a limited set of compositional variables have been considered, and that team composition impacts team performance, testing the effects of a larger set of compositional variables as predictors of shared leadership emergence is an important extension of this work and one that recent reviews have recognized as necessary (Denis et al., 2012; Yammarino et al., 2012). The current study examines a set of individual difference variables to begin to answer questions about what types of individuals are best suited to be willing to and capable of engaging in shared leadership.

CHAPTER EIGHT: APPENDIX B

Additional Analyses

As part of this dissertation, I tested a range of other hypotheses and research questions based on previous research. I also conducted a number of additional analyses to test all of the hypotheses and research questions originally included in my dissertation proposal. The main goal of my study was to examine shared leadership antecedents but the study also contained other variables that could be related to shared leadership. For example, shared leadership has been found to have a positive effect on performance (Nicolaides et al., 2014) but this relationship is moderated by task interdependence, team tenure, and the type of performance measurement used.

Given that I had project grades from each of the three deliverables, I also analyzed the relationship between shared leadership and performance and found that shared leadership did not predict performance at any of the study time-points. Results from my analyses of shared leadership and performance, as well as other analyses that I conducted to explore other potential relationships with shared leadership are described in Appendix B. In this appendix, hypotheses are numbered according to my proposal, rather than the numbering system I used in the main paper. Hypotheses with the letter "B" indicates that they are found only in Appendix B, not the main paper.

In addition to measuring shared leadership using the Hiller et al. (2006) psychometric measure, I also included a measure of shared leadership density. Shared

leadership density was unrelated to any of my study variables so I focused on shared leadership as measured using the psychometric approach. The issue with my density measurement may have been caused by sample size. Density can be an unreliable measurement with a teams as small as the ones in this study (Contractor, Wasserman, & Faust, 2006).

Compositional hypotheses with mean levels of individual difference variables (conscientiousness not included in main paper, agreeableness and psychological collectivism included in the main paper):

HB4: Teams with a high mean level of conscientiousness will experience higher levels of shared leadership at the project midpoint and endpoint.

H6: Teams with a high mean level of agreeableness will experience higher levels of shared leadership at the project midpoint and endpoint.

H8: Teams with a high mean level of psychological collectivism will experience higher levels of shared leadership at the project midpoint and endpoint.

I regressed shared leadership at each time point onto team mean levels of conscientiousness, agreeableness, and psychological collectivism using SEM in AMOS. Results are described in table 2 in the main paper. For the main paper I removed H4 and focused on the variables that predict group belongingness (i.e. agreeableness and psychological collectivism). Conscientiousness has been found to predict task performance on teams (e.g. Bell., 2007) but does not assess an individual's propensity to identify with their in-groups as psychological collectivism does, or their desire to get along with others as agreeableness does. For this reason, conscientiousness does not fit the conceptual frame of the paper and therefore my conscientiousness analyses were not included in the main paper, even though conscientiousness is a marginal predictor of shared leadership at time 2 in the table below. For the main paper, H6 and H8 became H4 and H5. Results of H6 and H8 are described in Table B1 below.

Table 10. Results of SEM Analysis for Compositional Variables and Shared Leadership at Time 2 and 3

Variable	Shared Leadership Time 2 (b)	Shared Leadership Time 3 (b)
Team Size	.08	.06
Gender Diversity	-.25	-.50†
Racial Diversity	.27	.22
Conscientiousness	.27†	.14
Agreeableness	-.09	-.04
Psychological Collectivism	.13	.21†
R^2	.07	.09

*Note. * = p < .05; † = p <.10,* two tailed *N = 225 teams*

Compositional hypotheses with standard deviation levels of individual difference variables (not included in main paper)

HB5: Teams with low variance in conscientiousness will experience higher levels of shared leadership at the project midpoint and endpoint.

HB7: Teams with low variance in agreeableness will experience higher levels of shared leadership at the project midpoint and endpoint.

HB9: Teams with low variance in psychological collectivism will experience higher levels of shared leadership at the project midpoint and endpoint.

H5, H7, and H9 were all non-significant and are not included in the main paper. Variance has not typically been found to be a strong predictor of team level outcomes (Bell, 2007), however it has never been tested in shared leadership research. To test these hypotheses I regressed shared leadership at each time point onto team standard deviation levels of conscientiousness, agreeableness, and psychological collectivism using SEM in AMOS. Results are described in table B2

Table 11. Results of SEM Analysis for Standard Deviation of Compositional Variables and Shared Leadership at Time 2 and 3

Variable	Shared Leadership Time 2 (b)	Shared Leadership Time 3 (b)
Team Size	.17†	.13
Gender Diversity	-.24	-.48
Racial Diversity	.40	.48
Standard Deviation of Conscientiousness	-.35	-.04
Standard Deviation of Agreeableness	.03	-.42
Standard Deviation of Psychological Collectivism	-.18	-.02
R^2	.04	.04

Note. * = $p < .05$; † = $p < .10$, two tailed $N = 225$ teams

Research Questions

RQB1: Will teams with high mean levels of extraversion and agreeableness experience higher levels of shared leadership at the project midpoint and endpoint than teams with lower levels of both attributes?

RQB2: Will teams with high mean levels of motivation to lead and agreeableness experience higher levels of shared leadership at the project midpoint and endpoint than teams with lower levels of both attributes?

RQB3: Will teams with high mean levels of extraversion and psychological collectivism experience higher levels of shared leadership at the project midpoint and endpoint than teams with lower levels of both attributes?

RQB4: Will teams with high mean levels of motivation to lead and psychological collectivism experience higher levels of shared leadership at the project midpoint and endpoint than teams with lower levels of both attributes?

In my dissertation proposal, interactions between compositional variables were phrased as research questions due to a lack of conceptual and empirical work on interactions between compositional variables as shared leadership predictors. Between proposing and defending my dissertation, I wrote a chapter (Chen & Zaccaro, 2013) that created the conceptual basis to develop these research questions as hypotheses. Accordingly, in the main paper, the research questions are re-phrased to be hypotheses and are written as interaction hypotheses to correspond to the most appropriate test of this configural or pattern approach. Agreeableness did not interact with either extraversion or motivation to lead at any of the three time points in my study. Research Questions 1 and 2 are not included in the main paper but are described in tables B3 and B4, respectively.

Table 12. Non-significant Results of SEM Analysis of Shared Leadership at Time 2 and 3 on Interaction of Agreeableness and Extraversion

Variable	Shared Leadership Time 2 (b)	Shared Leadership Time 3 (b)
Team Size	.09	.10
Gender Diversity	-.00	.00
Racial Diversity	.00	.00
Agreeableness	.05	.13*
Extraversion	-.04	-.14*
Agreeableness x extraversion	.02	.04
R^2	.01	.04

Note. * = $p < .05$, † = $p < .10$, *N = 225 teams*

Table 13. Non-significant Results of SEM Analysis of Shared Leadership at Time 2 and 3 on Interaction of Agreeableness and Motivation to Lead

Variable	Shared Leadership Time 2 (b)	Shared Leadership Time 3 (b)
Team Size	.08	.08
Gender Diversity	.00	-.00
Racial Diversity	.00	.00
Agreeableness	.00	.07
Motivation to lead	.06	-.01
Agreeableness x motivation to lead	.03	.05
R^2	.01	.02

Note. * = $p < .05$, † = $p < .10$, *N = 225 teams*

Research questions 3 and 4 were tested at both time 2 and 3 but were only significant at time 3. The non-significant interaction of psychological collectivism and extraversion at time 2 is described in table B5 below. The non-significant interaction of psychological collectivism and motivation to lead at time 2 is described in table B6 below.

Table 14. Non-significant Results of SEM Analysis of Shared Leadership at Time 2 on Interaction of Psychological Collectivism and Extraversion

Variable	Shared Leadership Time 2 (b)
Team Size	.08
Gender Diversity	-.00
Racial Diversity	.00
Psychological Collectivism	.15*
Extraversion	-.02
Psychological Collectivism x extraversion	.06
R^2	.05

*Note. * = p < .05, † = p <.10, N = 225 teams*

Table 15. Non-significant Results of SEM Analysis of Shared Leadership at Time 2 on Interaction of Psychological Collectivism and Motivation to Lead

Variable	Shared Leadership Time 2 (b)
Team Size	.08
Gender Diversity	.00
Racial Diversity	.00
Psychological Collectivism	.14*
Motivation to lead	.05
Psychological Collectivism x mot. to lead	.07
R^2	.05

*Note. * = p < .05, † = p <.10, N = 225 teams*

Shared Leadership and Performance

HB10: Early shared leadership emergence will predict higher levels of performance at the project midpoint and endpoint.

The relationship between shared leadership and performance was not significant at time two or three. Results from my SEM analysis at time 2 and 3 are described in Table B7

Table 16. Results of SEM Analysis for Shared Leadership Predicting Performance at Time 2 and 3

Variable	Performance Time 2 (b)	Performance Time 3 (b)
Team Size	.05	.15
Gender Diversity	-.06	.07
Racial Diversity	.09	.04
Shared Leadership Time 1	-.07	.03
R^2	.04	.03

Note. * = $p < .05$; † = $p < .10$, two tailed $N = 225$ *teams*

Mediation

HB11: The relationship between team composition and shared leadership emergence is partially mediated by the emergent states of cohesion and trust.

HB12: The relationship between shared leadership and performance is partially mediated by the emergent state of collective efficacy.

No significant relationships were found for mediation for H11 or H12. For H11 I tested whether the relationship between psychological collectivism and shared leadership was partially mediated by cohesion or trust. Results with cohesion as a mediator were non-significant at either time 2 or time 3 and are presented in table B8. Results with trust as a mediator were non-significant at either time 2 or time 3 and are presented in table B9. For H12, I tested whether the relationship between shared leadership and performance was mediated by collective efficacy. Results were non-significant at either time 2 or time 3 and are presented in table B10.

Table 17. Indirect Effects of Psychological Collectivism on Shared Leadership Through Cohesion at Time 2 and 3

Parameter Label	Shared Leadership Time 2	Shared Leadership Time 3
	Indirect effect	Indirect effect
Bootstrap estimate (*a* x *b* path)	.15	.11
SE	.04	.04
95% CI Lower	.14	.34
95% CI Upper	3.67	4.89
	Direct effects	Direct effects
IV on mediator (*a* path)	.29*	.28*
Mediator on DV (*b* path)	.53*	.47*
IV on DV (*c*' path)	.12	.22†
Mediation	*ns*	*ns*

*Note. * = p < .05; † = p <.10, N = 225 teams*

Table 18. Indirect Effects of Psychological Collectivism on Shared Leadership Through Trust at Time 2 and 3

Parameter Label	Shared Leadership Time 2	Shared Leadership Time 3
	Indirect effect	Indirect effect
Bootstrap estimate (*a* x *b* path)	.13	.11
SE	.04	.04
95% CI Lower	.26	.34
95% CI Upper	4.35	4.89
	Direct effects	Direct effects
IV on mediator (*a* path)	.29*	.29*
Mediator on DV (*b* path)	.45*	.39*
IV on DV (*c*' path)	.14	.24
Mediation	*ns*	*ns*

*Note. * = p < .05; † = p <.10, N = 225 teams*

Table 19. Indirect Effects of Shared Leadership on Performance Through Collective Efficacy at Time 2 and 3

Parameter Label	Performance Time 2	Performance Time 3
	Indirect effect	Indirect effect
Bootstrap estimate (*a* x *b* path)	-.14	.01
SE	.05	.05
95% CI Lower	.37	.59
95% CI Upper	5.24	5.29
	Direct effects	Direct effects
IV on mediator (*a* path)	.66*	.26*
Mediator on DV (*b* path)	-.22	.04
IV on DV (*c*' path)	.10	.28
Mediation	*ns*	*ns*

*Note. * = p < .05; † = p <.10 N = 225 teams*

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