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Dana Casey Verhoeven
Clemson University, dverhoe@g.clemson.edu

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AN EXAMINATION OF TRUST, DISTRUST, AND SHARED LEADERSHIP IN
DISTRIBUTED TEAMS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Applied Psychology

by
Dana Casey Verhoeven
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Dr. Marissa Shuffler-Porter, Committee Chair
Dr. Fred Switzer
Dr. C. Shawn Burke

ABSTRACT

As workforce globalization continues to rise, it becomes crucial to understand the impacts that team distribution may have on various team components. The present study aimed to address this question by identifying how partially distributed teams develop team trust, distrust, and shared leadership in comparison to face-to-face teams. Specifically, this lab based study examines team distribution as a contextual input variable. Consistent with the hypothesized model, results indicate that collocated teams have higher levels of trust, while distributed teams have higher levels of distrust. Further, teams that are collocated and have higher levels of trust tend to outperform their distributed counterparts. Surprisingly, there appeared to be no indirect effect between team trust or distrust and performance through shared leadership due to a lack of variability in shared leadership across the teams. Overall, this study highlights the importance of trust within collocated and distributed teams and assists in clarifying the construct confusion that presently exists between trust and distrust. Implications for theoretical development, practical application, and areas for future research are discussed.

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Introduction and Purpose

As workforce globalization continues to rise, it becomes crucial to understand the impacts team distribution can have on teams. Distributed teams face numerous challenges that are inherit to being dispersed, such as communication lags and issues regarding trust and distrust. In the recent years, trust in both public and private institutions has been declining and it has been reported that only 51% of employees have trust and confidence in their senior management (Hardin, 2004). Understanding the role of trust and distrust within various environments is important in order to promote healthy and productive work environments. Teams that do not trust one another may have higher cycle times, increased costs, and impact product quality (Bandow, 2001). These deficiencies could identify the starting point to serious accidents (Wilson, Salas, Priest, & Andrews, 2007). Further, understanding how the separate constructs of trust and distrust play a role in the relationship between distribution and shared leadership is important for organizations to be aware of in order to maintain a productive work environment. Although previous studies have examined the role of trust within distributed teams, many fail to conceptualize trust and distrust as separate entities. This construct confusion sets the stage for the present paper.

While Schrooman, Mayer, and Davis (2007) argue that trust and distrust do not exist simultaneously, but are opposite ends of a continuum, Lewiki and colleagues (1998) propose a model in which both trust and distrust can exist simultaneously. Within the Schrooman et al. (2007) framework, trust is outlined as domain specific, meaning while

you may trust an individual's competence you may distrust their intent. However, they argue that these varying domains do not delineate trust and distrust as separate constructs (Schrooman et al., 2007). Although a theoretical framework in which both trust and distrust exist as separate constructs exists (Lewiki, McAllister, & Biew, 1998), there has yet to be any empirical evidence that supports that concept of distrust being conceptually distinct from trust (Schrooman, Mayer, & Davis, 2007). This study aims to fill this gap by not only examining trust and distrust within the same study, but also through the exploration of whether or not these relationships can exist simultaneously within the same domain and how trust and distrust interact as separate constructs.

By conceptualizing trust and distrust as separate constructs I explore the potential benefits, consequences and outcomes of both of these factors have in regards to shared leadership and performance. In addition, there has been little research that explores the link between trust and collaboration of team members (Peters & Manz, 2007). To address this gap, social network analysis was employed to capture shared leadership amongst team members. In addition, the moderating effect of motivation to lead on the relationship between distrust and shared leadership was explored. The three distinct forms of motivation to lead, including affective-identity motivation to lead, noncalculative motivation to lead, and social-normative motivation to lead, have yet to be linked to shared leadership through the lens of leadership processes as proposed by Morgeson and colleagues (2010; see Figure 1). It is important to understand how the varying concepts of motivation to lead are related not just to the broad category of shared leadership but to the specific processes involved in leadership and shared leadership.

Theoretical Framework

Teams are "a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission" (Salas, Dickinson, Converse, & Tannenbaum, 1992; p. 4). Teams are a special type of group and are organized for a specific purpose, have performance goals, are interdependent, and have an applied function. When defining teams, reoccurring themes amongst definitions include the consideration of the team's "interdependence of action, shared responsibility and common, meaningful goals" (Cannon-Bowes & Bowers, 2010; p. 599). Further, teams have members who see themselves as part of a group, are recognized by others as part of the group, and exhibit adaptive strategies that enable them to respond situations that may arise (Cannon-Bowes & Bowers, 2010).

While teams are the organizational group formed to complete interdependent goals, teamwork involves the social processes of the team. Teamwork explains how teams complete work through methods that develop social interaction patterns, coordination strategies, communication, cooperation, leadership, and the relationships among members that are crucial to the success of the team (Cannon-Bowes & Bowers, 2010). Further, teamwork involves activities that are necessary to ensure effective functioning of the team (Cannon-Bowes & Bowers, 2010). On the other hand, taskwork is the work associated with the performance of the task and explains what teams are doing (e.g., writing, reading, flying, playing a sport). Both teamwork and taskwork (along with other inputs, processes/emergent states, and outputs) contribute to overall team effectiveness. Specifically, "teamwork knowledge, skills, and abilities operate, not

in isolation, but dynamically, simultaneously, and recursively as they unfold over time to emerge as team performance" (Salas et al. 2007).

Team effectiveness has been conceptualized in a variety of ways across the team literature. Hackman (1987) explains that team effectiveness is assessed by three components. First, team effectiveness is measured by the view of the customer/stakeholder of the team outcome in terms of whether or not the output of the team meets their standards for quality and quantity. The second aspect of team effectiveness is whether the needs of the group members are satisfied with their participation in the group (Salas et al. 2007). Finally, team effectiveness involves whether or not working within the team has helped to maintain or strengthen the group's ability to work together again in the future. Another perspective by Cohen (1994) defined team effectiveness in terms of three large categories including "(1) team performance, (2) team members' attitudes about quality of work life, and (3) withdrawal behaviors" (Salas et al. 2007). Pulling from these theoretical foundations, various models of team effective have been explored in order to examine the factors that make effective teams. Two of the more prominent team effectiveness models are the input process output model and the input mediator output input model.

The input process output (I-P-O) model of team effectiveness explains that inputs are a combination of team factors, resources, and organizational/environmental variables (Hackman, 1987). Further, process refers to the behaviors team members engages in to complete tasks, and outputs are the resulting team performance, satisfaction and turnover (Cannon-Bowers & Bowers, 2010). While this model has further advanced team

research, it has been criticized by Ilgen and colleagues (2005) for three reasons: "(a) many of the mediational processes cited by researchers as responsible for transforming inputs into outputs are not processes but emergent cognitive or affective states, for example, collective efficacy, cohesion, and situation awareness (see Marks, Mathieu, & Zaccaro, 2001), (b) I–P–O models are limited because they imply a single cycle, linear path from inputs through outcomes, and (c) recent work indicates that there are interactions between and among inputs, processes, and emergent states, suggesting that a main-effect progression from one to the next may not hold" (Cannon-Bowers & Bowers, 2010). Therefore, the input mediator output input (IMOI) model was proposed, which includes both processes and emergent states as the mediating mechanism between inputs and outputs. The IMOI model also includes a cyclical feedback loop which also aims to address some of the temporal aspects of team effectiveness (e.g., teams perform overtime and previous outputs will turn into future inputs).

Within the IMOI model, mediating mechanisms explore both team processes (behaviors) and emergent states. Emergent states examine the cognitive, motivational, and affective states of teams. Affective states involve how a team feels (i.e., moods and emotions) within a team, such as trust/distrust. However, trust and distrust are not merely opposite ends of a continuum; they can both coexist simultaneous amongst team members. When trust is high within teams it can lower the relationship between task conflict and relationship conflict (De Dreu & Weingart, 2003). Cognitive states include the mental cognition of the team, while motivational state assist teams in their goal achievement by enhancing the team's desire and enthusiasm for completing work.

This study aims to create a comprehensive model that considers the inputs, processes/emergent states, and outcomes within a team. Specifically, this study considers the context of the team in terms of its distribution as a team input, the emergence of trust and distrust as a mediator influencing shared leadership behaviors within a team, and team effectiveness as an output in terms of the team's performance.

CHAPTER TWO

DISTRIBUTED TEAMS

With a globalized workforce, organizations are increasingly using distributed teams to complete interdependent tasks. This has created a world in which teams are continually being challenged to span geographical bounds to collaborate and complete work. Specifically, teams are increasingly distributed across time and space (Bell & Kozlowski, 2002). Teams are no longer limited to the same time zone or geographical location, but can operate globally. These distributed teams face new challenges and opportunities that are unknown to members of collocated teams.

Earlier conceptualizations of virtual teams highlight the importance of team dispersion within their definitions (Bell & Kozlowski, 2002; Cohen & Gibson, 2003; Driskell et al. 2003), assuming that collocated team members are unlikely to interact through virtual modalities (Kirkman & Mathieu, 2005). More recent theoretical developments have dropped this component, noting that team virtuality is comprised of three tenants: (a) the extent of team members' reliance on virtual tools, (b) the informational value these tools provide, and (c) the synchronicity (e.g., interactions occurring in real time vs. time lagged commination) of interactions (Kirkman & Mathieu, 2005). This definition highlights that collocated teams may still choose to interact via virtual tools and have high levels of team virtuality. Although understanding how virtual tools in face-to-face teams may facilitate and hinder team processes is important, this study is primarily interested in distributed virtual teams due to the current globalization of the workforce. The present study will consider the impacts of distributed

teams on various team inputs, mediators and outputs in comparison to face-to-face teams. For the purpose of this study, a distributed team is an interdependent work group in which not all team members interact face-to-face. Specifically, a distributed team is composed of members that interact over time and space using some type of technology-mediated communication (Townsend et al. 1998; Fiore et al., 2003).

Bell and Kozlowski (2002) propose that distributed teams face new challenges in terms of their leadership functions. Within distributed teams it becomes more difficult for hierarchical leaders to execute performance management functions due to possible delays in communication. Further, these delays create challenges in terms of monitoring and managing team performance in real time, which may result in more reactive than proactive leadership functions (Bell & Kozlowski, 2002). These shortcomings of relying solely on hierarchical leadership highlight the need for shared leadership amongst team members within distributed teams. Sharing leadership amongst team members within distributed teams would allow for more real time monitoring, communication, and feedback because all team members would be involved in team events, while formalized leaders may receive delayed information that is decoupled from events (Bell & Kozlowski, 2002).

CHAPTER THREE

TRUST AND DISTRUST

The importance of trust has been cited across multiple disciplines including

communication research, management by objective, and performance (Mayer, Davis, &

Schoorman, 1995). Early research done on trust and distrust conceptualized these terms

as opposite ends of a continuum (Govier, 1994; Barber 1983). However, more recent

developments on these theories have reframed trust and distrust as two separate, but

related, constructs (Lewicki et al., 1998). Lewicki and colleagues (1998) explain that trust

and distrust are not merely opposites because it is possible for individuals to both trust

and distrust another based on their experiences and interactions with that person given the

dynamic nature of interpersonal relationships.

Researchers agree that trust is a psychological state that involves an expectancy

or attitude about others and is a complex, multidimensional psychological state with

affective and motivational components. Robinson (1996) defined trust as a person's

"expectations, assumptions, or beliefs about the likelihood that another's future actions

will be beneficial, favorable, or at least not detrimental to one's interests" (p. 576). Some

view trust as a rational choice that has both theoretical and empirical implications.

Specifically, the decision to trust another individual involves making a rational decision

weighing the advantages and disadvantages involved, as in other forms of risky choices

(Kramer, 1999). This conceptualization of trust is common in organizations because

these behaviors are observable. However, conceptualizing trust this way has been

criticized for over emphasizing the importance of cognitive thought while disregarding

the impact of the situation. Environmental factors such as roles and social influences must be considered when evaluating trust (Dirks, 2010). Therefore, trust will be defined as "confident positive expectations regarding another's conduct" (Lewicki, McAllister, & Blies, 1998; p. 439). In this definition, "another's conduct" refers to ones words, actions and decisions. Therefore, this definition encompasses both the behavioral and cognitive aspects of trust.

Previous studies have conceptualized distrust as simply the opposite of trust. However, both trust and distrust can be felt regarding the same individual due to the numerous facets that compose our relationships (Lewicki, McAllister, & Blies, 1998; p. 439). Relationships are made up of the numerous interactions one has with another in varying contexts, intentions, and outcomes. Each of these experiences creates different situations that may facilitate trust or distrust toward another simultaneously. This can be easily seen when considering ones competence versus their intentions. For example, if I am working on a project with Sarah and she always completes her assigned tasks accurately, I may develop confidence (i.e., trust) in her competence to finish assigned work. However, if while working with Sarah I over hear her say that she only works hard so that she can show our boss how much better of an employee she is in comparison to me, I may develop feelings of distrust in her intentions. Therefore, I have high trust that she is able to complete her work and high distrust in her motives behind working hard. This is just one example of a multifaceted relationship we have with individuals that may facilitate trust and distrust toward another. Distrust is defined as "confident negative expectations regarding another's conduct" (Lewicki, McAllister, & Blies, 1998).

However, this definition is not simply the opposite of trust. Distrust is characterized by fear, skepticism, cynicism, wariness/watchfulness and vigilance toward another. These suspicious tendencies can be triggered when your expectations have been violated (Kramer, 1999). In contrast, trust is characterized by hope, faith, confidence, passivity, and hesitance (Lewicki, McAllister, & Blies, 1998). Although trust and distrust are separate entities, there are numerous ways in which these constructs may interact.

Lewicki and colleagues (1998) have established four relationships between trust and distrust, including: low trust/low distrust, high trust/low distrust, low trust/high distrust, and high trust/high distrust. Low trust/low distrust is characterized by relationships that have had few dimensions or interactions and is seen when individuals have no reason to be neither confident nor wary of another. High trust/low distrust is depicted in relationships with high interdependence where both parties are striving for similar objectives. In this relationship, the actor is confident in the other person's positive actions and has little suspicion of them. In low trust/high distrust relationships, one has no confidence and high suspicion of another, making it difficult to maintain interdependent relationships. This relationship is classified by numerous negative interactions that reinforce distrust and parties may assume that the other has harmful motives. Finally, high trust/high distrust relationships involve situations in which one may be highly confident of another's positive actions or intentions in some contexts and very wary and suspicious of their actions in others. This may be seen in relationships that are highly interdependent, but both parties have separate objectives in addition to their shared objectives. These relationships would have numerous positive experiences that

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confirm ones confidence in the other but also numerous negative experiences, creating a segmented and bounded relationship.

Considering the context of the team is important for understanding how trust and distrust will manifests within a team. For example, within the military the role of trust is vital in swift starting action teams (STAT) in which members of a group are quickly assembled for a specific task (McKinney, Barker, Davis, & Smith, 2005). STATs have three defining characteristics: (1) they are composed of well-trained strangers, (2) they must immediately begin performing, and (3) they have a high level of risk (McKinney et al., 2005). Within these units, individuals develop swift trust based off of the surface level characteristics of the team members and one's own pre-existing trust attitudes toward those characteristics (Wildman et al., 2012). Previous studies have found that collocated teams tend to have higher levels of trust than distributed teams (Powell, Galvin, & Piccoli, 2006). A similar relationship is examined here, in which collocated team members are expected to establish swift trust. That is, team members that are fully collocated and interact face-to-face are expected to trust their team members more than distributed teams due to the potential for members to share information immediately and the richness of their communication modality (Bell & Kozlowski, 2002). Further, these face-to-face teams tend to have more opportunities to interact with their team members on a personal level in order to reduce team conflicts and, in turn, increase trust (Bierly, Stark, & Kessler, 2009).

Hypothesis 1: Trust within a team will be higher when teams are collocated as compared to distributed teams.

Distributed teams are faced with numerous challenges, such as communication delays and technology frustration that collocated teams do not experience. These complexities create added stress when working within a virtual environment. Additionally, distance tends to impede trusting relationship (Carmel, 1999). In turn, distribution can lead to increased suspicion and an excess of monitoring behaviors within a team (Moe & Smite, 2008). These distrusting tendencies appear more apparent within disturbed teams. Considering these, it is likely that distrust will be higher in teams that are distributed.

Hypothesis 2: Distrust within the team will be higher when teams are distributed as compared to collocated teams.

CHAPTER FOUR

SHARED LEADERSHIP

Theoretical Review

Leadership is not merely a top down approach, but can be shared among multiple individuals within a team or organization (Mehra, Smith, Dixon, & Robertson, 2006; Day, Gronn, & Salas, 2004). Shared, or distributed, leadership is an emergent team property that results from the distribution of leadership amongst multiple team members (Carson, Tesluk, & Marrone, 2007; Wang, Waldman, & Zhang, 2014). Although similar in nature, collective leadership focuses on the expertise of varying team members within a network to distribute leadership in regards to the present situation or problem (Friedrich, et al., 2009). In contrast, shared leadership is driven by the relationships within a team and occurs throughout the group (Bennet, et al., 2003). Specifically, shared leadership measures the distribution of leadership amongst team members (Carson, et. al., 2007). The notion of shared leadership posits that teams who share leadership will have enhanced group participation, information sharing, mental models and in turn, performance. Consistent with his proposition, meta analytic results reveal that shared leadership predicts team performance above and beyond vertical leadership (Wang, Waldman, & Zhang, 2014).

This study examines shared leadership emergence by taking a social network approach to evaluate the extent to which members of a team partake in various leadership processes proposed by Morgeson, DeRue, and Karam (2010). The social network perspective focuses on relationships and the structure, or patterns, of these relationships

between individuals (i.e., actors; Wasserman & Faust, 1994). The emphasis on the

relational links among units or individuals is fundamental to network theories and key in

identifying and predicting leadership within a team. Social network analysis is unique in

that it views actors and their actions as interdependent and identifies the ties between

actors that create channels for resources to transfer (Wesserman & Faust, 1994).

Additionally, network models define the context that actors are situated in and emphasize

the lasting nature of relational patterns amongst actors (Wesserman & Faust, 1994).

Shared leadership can be conceptualized in numerous ways within a team and is often

conceptualized at a higher level by asking team members whether or not they share

leadership within their team. Moving forward, we invoke the same idea but apply it to

prominent framework of functional leadership behaviors as outlined by Morgeson,

DeRue, & Karam (2010; Carter et al., 2015). Specifically, this approach allows team

members to assess the level of shared leadership their team members posses by reporting

the occurrence of numerous leadership behaviors as is seen in Carter et al. (2015).

   Shared leadership processes may occur during both the action and transition

phases of the team. During the action phases, teams are actively completing tasks that

contribute toward goal completion, while transition phases are less focused on task work

and more geared toward the planning and preliminary stages involved in preparing for

task work (Morgeson, DeRue, & Karam, 2010). Although typically distinct, it is possible

for teams to rapidly switch between both the action and transition phase depending on the

nature of the task (Marks, Mathieu, & Zaccaro, 2001). In teams that do not allot for

transition phases or are continually in action, the action and transition phases may be

considered simultaneously. As commonly seen in work teams, participants will primarily operate in times of action and their periods of transition will be very rapid. Therefore, shared leadership is composed of all leadership behaviors being exhibited by the team during both the transition and action phases. That is, teams engage in both transition and action processes throughout the duration of the task. Therefore, these phases and their respective processes will be considered together in order to measure shared leadership emergence.

The proposed leadership processes that typically occur within the transition phase are: *defining the mission, establishing expectation and goals, structure and planning, sense making,* and *providing feedback* (Morgeson, DeRue, & Karam, 2010). While the action phase of leadership includes: *monitoring the team, challenging the team, solving problems, providing resources,* and *supporting social climate* (Morgeson, DeRue, & Karam, 2009). *Defining the team mission* involves coming up with performance expectations and communicating those expectations to the team. The function of establishing *expectations and goals* involves performance-oriented behaviors that aim to facilitate group actions toward achieving the team's task. Once the team has set its goals, they must establish a structure and plan for accomplishing those goals. The process of creating a *structure and plan* involves determining how to achieve tasks, who will be responsible for different aspects of the team task, and establishing a timeline for completing the work. During the duration of a team's lifespan, events that disrupt the team's function will occur. *Sense making* is crucial during these times to ensure all members of the team understand the current conditions of the task and their individual

performance expectations. *Feedback* allows team members to assess their past successes and failures while continually adapting their behaviors to enable future accomplishments. It is also important for members to monitor the team by continually analyzing performance and processes as members engage in assigned tasks to achieve the team's goals. Further, *challenging the team* aims to unearth the best way to accomplish the team's task through the challenging of the team's methods, assumptions and processes.

Team members may also help *solve problems* of the team by assessing problems, developing solutions, and implementing solutions. By *providing resources* such as informational, financial, material, and personnel resources for the team, leaders take action to ensure their team can complete tasks. In order to *support social climate*, leaders execute behaviors that aim to foster team cohesion and support the socio-emotional health of the team. In teams that share leadership, all members of the team should exhibit the aforementioned leadership processes. Specifically, shared leadership will be prominent in those teams that have all members engage in these behaviors fairly equally. In contrast, individuals within the team may emerge as a leader of the team when multiple team members do not engage in these leadership processes. Leader emergence is defined "as both an individual's completion of leader-like work duties and occupying positions of leadership or authority either within or outside of the work domain" (Reichard et al., 2011, p. 472). In addition, leader emergence is often looked at as others' perceptions an individual's abilities (Cogliser et al. 2012). If the target individual is perceived to be 'leader-like,' then others will be more likely to elect or appoint the target individual into leadership positions (i.e., leader emergence, Reichard et al. 2011; p. 472).

These behaviors will describe the leadership behaviors team members' exhibit in order to assess shared leadership. Overall, shared leadership posits that teams who share leadership will have enhanced group participation, information sharing, mental models and in turn, performance. Notably, this line of research has warranted three meta analyses within the past two years (Wang, Waldman, & Zhang, 2014; Nicolaides et al., 2014; D'Innocenzo, Mathieu, & Kakenberger, 2014)

A meta-analysis by Wang, Waldman, and Zhang (2014) found that shared leadership predicts team performance when controlling for vertical leadership (Wang et al., 2014). Specifically, Wang and colleagues (2014) assessed the differences between shared traditional forms of leadership, shared new-genre leadership, and cumulative, overall shared leadership. Traditional forms of leadership including initiating structure and consideration, task-oriented and participative leadership and transactional forms of leadership, were less related to team effectiveness ($p=.18$). Shared new-genre leadership including transformational leadership, charismatic leadership, and inspirational leadership, had a stronger relationship than traditional forms of leadership. However, new-genre leadership ($p=.34$) and cumulative shared leadership ($p=.35$) had a similar relationship with team performance. The aforementioned effects are stronger when team members are faced with complex tasks. Further, shared leadership had stronger relationships with both behavioral processes and emergent team states when compared with team performance.

Another meta-analysis assessed the proximal, distal and moderating relationship of shared leadership within teams (Nicolaides et al., 2014). This study also found that

shared leadership explains unique variance in team performance above and beyond that of vertical leadership. This relationship was moderated by task interdependence, team tenure, and how performance was measured. Specifically, the relationship between shared leadership and performance was strengthened when tasks were more interdependent, while team tenure decreased the strength of this relationship. In addition, subjective measurements of team performance yielded a significantly higher variability than objective indices. In addition to these moderators, the relationship between shared leadership and team performance was partially mediated by team confidence. Consistent with these meta-analyses, performance is expected to be enhanced by shared leadership.

> Hypothesis 3: Teams that share leadership will perform better than teams that do not share leadership.

Finally, a third meta-analysis assessed the varying forms of shared leadership and performance (D'Innocenzo et al., 2014). Results indicate that network conceptualizations are a better predictor of performance than aggregations. Further, network density and (de)centralization were both predictors of performance. In regards to the methods in which these studies took place, there were lower effects in the lab/classroom than studies done in the fields. In contrast to the Wang et al. (2014) meta-analysis, these effects were lower when tasks were more complex. In line with these findings, shared leadership is measured using team density scores within this study. Density refers to an individual's ties in comparison to all possible ties, or the percent of ties an individual has (Wasserman & Faust, 1994). In this study, "ties" refers to the number of leadership processes exhibited, with higher density scores expected in teams that share leadership.

Trust, Distrust, and Shared Leadership

Trust has been highlighted as a key antecedent to the success or failure of virtual teams (Grabowski & Roberts, 1999; Kanawattanachai & Yoo, 2002, Martin et al., 2004; Moe & Smite, 2008). Trust within a team is particularly important when team tasks require interdependence between members in order to accomplish goals (Mach et al., 2010). When team members trust one another they will be more likely to share workloads and complete tasks interdependently because they are confident in their team (Bandow, 2001). The sharing of workloads and interdependent tasks occurs when individuals partake in multiple shared leadership processes (e.g., multiple team members will be preforming the team task). These processes have been shown to increase team performance and satisfaction within the team (Carson et al., 2007). Due to the positive relationships inherent in teams higher in trust, and consistent with the proposition Bligh, Pearce, and Kohles (2007), outlined, shared leadership is anticipated to be higher when team trust is higher.

> Hypothesis 4: Teams high in trust will be more likely to share leadership
> and have higher performance than teams with low trust.

However, when team distrust is high, team members will grow suspicious of one another and be more likely to view their teammates with cynicism. This distrust will obstruct information sharing and the thwart the positive role that shared leadership plays in task interdependence. As team suspicion rises, members will be less likely to share leadership roles and participate in information sharing. Therefore, it is anticipated that teams high in distrust will have lower levels shared leadership and, in turn, performance.

Hypotheses 5: Teams high in distrust will be less likely to share leadership

and have poorer performance than teams with low distrust.

In addition to these hypotheses, there are several exploratory components of the

distrust and trust interaction that must be assessed. As Schoorman and colleagues (2007)

noted, few studies have measured both trust and distrust within the same study. In fact,

the authors note that researchers intending to study distrust have simply reverse scored a

measure established to assess trust (e.g. McAllister, Pang, Tan, & Ruan, 2006;

Schrooman, Mayer, & Davis, 2007). These authors further retort that due to the lack of

empirical evidence there is little reason to conceptualize trust and distrust as two separate

constructs. This assumption would eliminate the "high trust, high distrust" and "low trust,

low distrust" categorization that Lewicki et al. (1998) proposed. Lewiki and colleagues

(1998) postulate that it is possible to trust and distrust someone due to the multifaceted

relationships we form, but Schrooman and colleagues (2007) challenged, that although

this may be the case, they can still be opposite ends of a continuum, although the referent

may change. For example, you can trust someone's competence but distrust their level of

intent; Schromman et al. (2007) explain that because these two constructs are separate,

there is no way to tell if trust and distrust are truly separate constructs or opposite ends of

the continuum. However, by assessing both trust and distrust in terms of one's intent and

competence, the proposed study can close this gap.

Research Question 1: Do high levels of trust and distrust exist within the

same domain (e.g., high trust and high distrust in competence)?

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This study also aims clarify this construct confusion by examining what the interaction between trust and distrust would look like within both collocated and distributed teams, as these conditions will likely foster both trust and distrust within a team. Within the present study, high levels of trust are proposed to facilitate shared leadership while high levels of distrust are proposed to inhibit shared leadership. However, the interaction of these two constructs could potentially increase, decrease, or maintain the level of shared leadership within a team.

Research Question 2: How do high levels trust and high distrust interact within collocated and distributed teams to impact shared leadership?

CHAPTER FIVE

MOTIVATION TO LEAD

Previous hypotheses detail the importance of trust in sharing leadership, such that it is predicted that teams high in trust will be more likely to share leadership and teams high in distrust, will be less likely to share leadership. However, there are also moderators that may nullify the negative relationship between distrust and shared leadership. From a selection standpoint, it is important to consider how individual characteristics such as one's motivation to lead (MTL) will impact shared leadership. Individual MTL, or ones intrinsic drive to lead, should also be considered when assessing these constructs due to the potential impact it would have on leader emergence and, in turn, shared leadership. MTL is a constant personality trait meaning that it remains consistent over time. However, leadership experiences and training may lead one's MTL to change/develop over time (Chan & Drasgow, 2001).

Chan and Drasgow (2001) examined three components of MTL including affective-identity MTL, noncalculative MTL, and social-normative MTL. Affective-identity MTL represents those who like to lead others for the sake of leading. The social-normative MTL category represents people that lead because they feel they have a duty or responsibility to lead. Noncalculative MTL involves a person leading because they are not calculative about the responsibilities required of them and would be less likely to avoid the role of a leader (Chan& Drasgow, 2001). That is, they see neither the costs nor benefits of leading, making their decision to lead noncalculative.

In the affective-identity MTL, individuals choose to take on leadership because they enjoy leading (Chan& Drasgow, 2001). These individuals are more likely to seek out leadership positions because they want to lead (Kark & Van Dijk, 2007). When teams are comprised of individuals with high levels of affective-identity MTL, it is reasonable to conclude that these individuals will try to take on leadership roles particularly in times when distrust and is high, creating shared leadership within the team. Therefore, it is predicted that when teams have high levels of affective-identity MTL they will be likely to share leadership, despite the hypothesized negative relationship between distrust and shared leadership.

Individuals with noncalculative MTL choose to take on leadership roles because they believe the costs associated with leading are trivial. Although distrust may increase the costs within a team, individuals with noncalculative MTL lead because they are noncalculative about the costs associated with taking on a leadership role. This form of leadership is the most passive form of MTL. These individuals do not care about the inherit benefits of leading such as recognition or rewards, but possess a selfless form of motivation. Within teams that are high in distrust this motivational component will delineate the negative relationship between distrust and shared leadership by facilitating leader emergence, and ultimately, shared leadership.

Finally, social-normative MTL represents those who feel they have an obligation to lead due to the circumstances or social pressures of the group. These individuals are more likely to feel like they need to lead due to the other group members' thoughts and actions. Teams high in distrust may motivate these individuals to serve as a leader,

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sparking their need to step up based on the level of suspicion (e.g., distrust) within the team. That is, these individuals may feel social pressure to lead the team when distrust is high in order to help facilitate team performance. When teams have high levels of social-normative MTL numerous team members would be motivated to take on leadership roles due to the social pressures of the group.

> Hypothesis 6: The relationship between distrust and shared leadership depends on affective-identity MTL, noncalcualtive MTL and social-normative MTL such that the higher the team's MTL the more likely the team is to share leadership.

When comparing these different motivational components, it is worth noting the differences each style may have within a team. Although each form of MTL is predicted to change the direction of the negative relationship between distrust and shared leadership into a positive relationship when MTL is high, the different MTL styles are not expected to impact shared leadership the same way. As previously mentioned, affective identity motivation to lead within a team is a more active form of motivation in which team members will seek out leadership responsibilities (Kark & Van Dijk, 2007). Team members with affective-identity MTL are more likely to emerge as leaders in leaderless teams (Hong, Catano, & Liao, 2011); therefore teams composed of members with affective identity MTL will likely have higher levels of shared leadership than teams without these members. On the other hand, teams with noncalculative MTL will likely not impact the negative relationship between distrust and shared leadership in the magnitude of that teams with affective-identify MTL will. Due to its passive nature, it is

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predicted that individuals who have a noncalculative MTL will be less likely to emerge as a leader than both the affective-identity MTL and social-normative MTL. The social-normative form of leadership however, is more passive than affective-identity MTL, but less passive than noncalculative MTL. Individuals with social-normative MTL will be more likely to take on leadership roles than those with noncalculative MTL due to social pressures, but less likely to take on leadership roles than those with affective identity MTL. Overall, distrust within a team may cause team members to step up into leadership roles that they previously were not motivated to take on due to their suspicions of other team members and individual motivations. However, it is unknown whether or not individuals with different types of MTL will be more or less likely to emerge as a leader when distrust is present in the team.

> Hypothesis 7: In the moderation between motivation to lead and shared leadership, affective-identify MTL will have the strongest effect size, followed by social-normative MTL and noncalculative MTL, respectively.

CHAPTER SIX

METHODS

Participants and Procedure

In order to test the aforementioned hypotheses, a laboratory research study of undergraduate student teams was conducted. Each of the teams were comprised of four participants recruited from undergraduate classes at two large southeastern universities in the United States using the SONA system at each institution.

The experiment utilized a video game platform called Artemis (see Figure 2). This is a spaceship bridge simulator where team members work together to accomplish interdependent tasks. Participants were randomly assigned to one of four roles and the roles were randomly assigned to each of the four computers. Each participant was given unique information relevant to their role on the team that aided in completing the missions. Therefore, each player had to communicate specific, unique information to one another for the team to successfully and efficiently complete the missions.

Upon arrival, participants were assigned their role within the team and are then asked to take a seat at a computer to complete a survey detailing individual difference variables such as motivation to lead. Following the initial survey, participants received training for their specific role on Artemis. After the training each team is given an introductory practice mission that allows the team to practice their roles and familiarize themselves with the game. In this practice mission they are tasked with collecting an anomaly, eliminating one enemy, and docking at a base station. This allows them to

accomplish all tasks that will be required of them in the game prior to beginning the actual missions in order to limit the effects of novice players.

There are two conditions in which this experiment operated: collocated and partially distributed. In the collocated condition, all four participants could see one another. In the partially distributed condition there was a barrier between the participants such that two participants sit on either side of the barrier. Participants completed three missions in each session and were provided specific instructions explaining the order in which to complete tasks for both the first and final missions. However, in the second mission participants were allowed to complete their task in any order and are only instructed to collect as many anomalies and neutralize as many enemies as possible. Surveys were completed after each round to obtain measures of shared leadership and performance. Across both conditions, participants were provided headsets to facilitate verbal communication and utilize Mumble, an audio recording program, to speak with one another. After analyzing the z scores for each aggregated scale, five total outliers were identified and removed from our data. Therefore, a total of 151 teams (total N= 604) were included in the following analyses. Power analyses revealed that the current study needed a minimum of 115 teams; therefore this study should have sufficient power to detect the hypothesized relationships.

Measures

Performance Research assistants were trained to code the video capture of each session to assess team performance. Performance will be indexed by the order in which the team completes their objectives and by how successfully they executed each

objective. Specifically, participants were told to complete their mission in the order in which the objectives are outlined and their team cheat sheets. Participants were also told that "if you deviate from the assigned order your team will be penalized." Therefore, both the order in which the team completes the objectives and how accurately they complete each objective contributed to their overall performance. Two research assistants coded all videos to ensure inter rater agreement. Any discrepancies in coding were resolved by a meeting in which all discrepancies were discussed and resolved leading to a uniform decision.

Motivation to lead was measured prior to the team task. A measure developed by Chan and Drasgow (2001) was used that assesses three factors: affective-identity MTL, noncalcualtive MTL, and social-normative MTL. An example item of affective-identity MTL is "Most of the time, I prefer being a leader rather than a follower when working a group. An example item of noncalcualtive MTL is "I am only interested to lead a group if there are clear advantages for me." An example item of social-normative MTL is "I feel that I have a duty to lead others if I am asked." Within our study, factor analysis revealed two items, one item from the social identity MTL scale and one item from the noncalculative MTL scale to be dropped. Therefore, this measure had an overall Cronbach's alpha of .902, affective-identity MTL had a Cronbach's alpha of .758, noncalculative MTL Cronbach's alpha of .84, and affective-identity MTL had a Cronbach's alpha of .898.

Trust and Distrust were measured after each of the missions. Wildman and colleagues (2009) unpublished measure was used to assess participants trust and distrust

in their team members' intent and competence. An example item of trust is "Assured that your other team members will make intelligent decisions? An example of distrust is "Afraid that the other team members will purposefully do something that isn't helpful" (see appendix 1). In this study, Cronbach's alpha for trust was .939 while distrust had a Cronbach's alpha of .864.

Shared Leadership was assessed between each mission using the leadership process framework presented by Morgeson, Rue, & Karam (2009). Each participant rated the other three participants on the degree to which the team relied on each of these players after each mission. An example item is "To what degree does your team rely on this individual when defining the team's mission (e.g., specifying clear direction, emphasizing collectiveness, ensuring and understanding of purpose)?" These ratings were then used to create a team density score. Density is the most common index used within shared leadership network measurement (D'Innocenzo et al. 2014).

Meta analytic results indicate that network conceptualizations are a better predictor of performance than aggregations (D'Innocenzo et al. 2014). Further, network density and (de)centralization were both predictors of performance. In regards to the methods in which these studies took place, there were lower effects in the lab/classroom than studies done in the fields. In contrast to the Wang et al. (2014) meta-analysis, these effects were lower when tasks were more complex. In line with these findings, shared leadership is measured using team density scores within this study. Density refers to an individual's ties in comparison to all possible ties, or the percent of ties an individual has (Wasserman & Faust, 1994). In this study, "ties" refers to the number of leadership

processes exhibited, with higher density scores expected in teams that share leadership.

However, this study extends this assessment by using valued ratings of shared leadership density by determining not only the presence of a tie, but also the strength of that tie. In this study, density is the proportion of the strength of the ties within a team in comparison to the highest possible strength of that network (e.g., the sum of a participants score across all shared leadership question divided by 55, which is the highest possible score participants could receive). Therefore, the density of this network increases as more team members provide leadership (Carson et al., 2007; D'Innocenzo et al., 2014). It is also worth noting that density is essentially a richer form of aggregated assessment because, although the team's density is the average density of the team members (e.g., an aggregated assessment), it is richer than typical aggregated approaches because it assesses each individual team member's contribution (D'Innocenzo et al. 2014).

Control Variables Finally, this study examined both collocated and distributed teams while controlling for a number of factors when conducting analyses. The control variables include distribution (i.e., collocated vs distributed), team member familiarity, videogame efficacy, technology familiarity, and gender. Both gender and distribution were conditional variables. Team member familiarity was assessed by calculating a density score for each team member using the question "On average over the past six months, how often have you interacted with the person in the Helm role?" Technology familiarity assessed how frequently participants use a variety of technological mediums to communicate with others (e.g., texting). Finally, videogame self-efficacy assessed

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team members perceived videogame abilities. An example questions is "I can always manage to solve difficult problems within a videogame if I try hard enough."

Aggregation

This study used trust, distrust, shared leadership and performance data collected after the third mission to allow for these dynamic relationships, such as trust and distrust, to develop. To track the longitudinal development of trust and distrust, data from missions one and two were collected and used as controls of the study. In order to assess these constructs at the team level, observations of individuals within a team must be more similar to each other than to observations from different teams. This assumption can be assessed by examining the intra-class correlation coefficient, ICC1 (e.g., the group variance divided by all the variance at the individual and team level). Variables with an ICC1 above .02 should be aggregated to assess team level effects (Bliese, 2000). In order to aggregate these variables to the team level, empirical support for both the reliability (ICC2) and agreement (r_{WG}) of these constructs at a team level must also be determined. Within this assessment higher levels of ICC2 indicate that the means formed at the team level are more reliable. Although no specific cutoff for the ICC2 exists, an ICC2 of .7 or above supports that the variables should be aggregated to the team level, as in other reliability assessments such as Cronbach's alpha (Bliese, 2000). Within-group agreement, or the r_{WG}, delineates the degree to which ratings from individuals within a team are interchangeable for a single variable and is calculated by comparing the observed group to a random distribution for each team. A value of .7 or above is also acceptable for the r_{WG} in order to support the aggregation. Further, higher levels of the

r_{WG} indicate that the observed scores are closer to the group mean (Klein & Kozlowski, 2000). All ICC1s, ICC2s, and r_{WG} can be found in Table 1. All variables indicated appropriate levels of ICC1 to support aggregation, accept overall motivation to lead and technology familiarity. When looking at the ICC2s, only one measure, team member familiarity, appears to have enough between group variance to aggregate to level two. Finally, that r_{WG} of all measures are well over .7, indicating that team members' responses are interchangeable within the team and that it is appropriate to aggregate these measures to level two. Although the ICC2 highlights those groups aggregation may not be a reliable assessment. The r_{WG}'s were appropriate and these measures were all aggregated to level two in order to run the predicted analyses.

Analyses

To analyze the proposed model, this study implemented Hayes Process bootstrapping method for mediated-moderation. Bootstrapping is a method for analyzing data that runs a random sample of your data a large number of times (e.g., 5000 times) in order to find the slope of the relationship between variables, or a coefficient between two variables. This repeated sampling creates a normal distribution curve, in which 95% of the repeatedly sampled data will be located in the middle of the curve. In order to reject the null hypotheses, this confidence interval should not include zero. Process Models 4 and 7 will be used to test the aforementioned hypothesis with distribution, team member familiarity, videogame efficacy, technology familiarity, gender, missions one and two trust, and missions one and two distrust were entered as a control variable within the model (see Table 2). Table 3 has descriptive statistics and correlations of these variables.

CHAPTER SEVEN

RESULTS

To analyze research question 1 a paired samples t-test was conducted in which trust and distrust within the same domain (e.g., trust and distrust in intent or trust and distrust in competence) created the tested pairs (see Table 4). Results indicate that team members are not high in both trust in intent and distrust in intent or trust in competence and distrust in competence in mission one (t=46.44, $p<.01$; t=24.68, $p<.01$), two (t=45.55, $p<.01$; t=34.18, $p<.01$), or three (t=47.05, $p<.01$, t=38.69, $p<.01$). This test had six total pairs. Each mission had two pairs: one pair was the level of trust in competence and distrust in competence and the second pair was the amount of trust in intent and distrust in intent. In order to establish that both trust in intent and distrust in intent can be present, the results of this test should be nonsignificant (e.g., participants would be rating both trust and distrust high), but each of mean differences were significant across missions.

To analyze Research Question 2 an interaction term between trust and distrust was created for mission three. Then a linear regression with trust, distrust, and the trust*distrust interaction was entered in the model as an independent variables and shared leadership was entered as the dependent variable. The results indicate no significant interaction between trust and distrust (B=.004, p=.84).

The effects of distribution described in hypotheses 1 and 2 were analyzed using a one-way ANOVA across missions one, two, and three (see Table 5). The results provide partial support for both hypotheses 1 and 2. Missions one, two, and three, indicating that collocated teams have more trust than distributed teams (F=3.21, p=.075, F=3.83, p=.052,

F=2.62, p=.108 respectively). However, the difference between collocated team trust and distributed team trust was only marginally significant across missions one and two, and not significant for mission 3. When looking at distrust, distributed teams have higher levels of team distrust than collocated teams in s one, two, and three (F=3.18, p=.076, F=7.94, p=.005, F=2.62, p=.108 respectively). These results were highly significant in mission two, marginally significant in mission one, and nonsignificant in mission three.

To analyze Hypothesis 3 and 4, Hayes Process model four was implemented in which trust was the independent variable, shared leadership was the moderator, and performance was the dependent variable. Within in this test, the following variables were controlled for: mission two trust, mission two distrust, mission three distrust, distribution, team member familiarity, videogame self-efficacy, technology familiarity, gender, and motivation to lead.

Results do not provide support for Hypothesis 3 or 4 (see Figure 3). Both the relationship between shared leadership and performance was nonsignificant (95% CI: -29.81, 41.98) and the indirect relationship of trust and performance through shared leadership was not significant (95% CI: -.665, 1.62). Specifically, the indirect effect of trust to performance through shared leadership only explained .45% of the relationship between trust and performance. In contrast, the direct effect of trust on performance was highly significant (95% CI: 5.10, 25.50).

To analyze Hypothesis 5, Hayes Process model four was implemented in which distrust was the independent variable, shared leadership was the moderator, and performance was the dependent variable (see Figure 4). The controls run in the

aforementioned model were maintained for this analysis. Results do not provide support for Hypothesis 5. The indirect relationship of distrust and performance through shared leadership was not significant (95% CI: -.40, 1.60). Specifically, the indirect effect of distrust to performance through shared leadership explained 14.08% of the relationship between distrust and performance. Further, the direct effect of distrust on performance was also not significant (95% CI: -6.88, 25.50).

Hypotheses 6 and 7 tested the moderating effects of MTL on the relationship between distrust and shared leadership using Hayes Process model seven (see Figures 5, 6, & 7). All moderating effects of MTL were not significant, providing no support for Hypothesis 6. When testing for the moderation of affective-identity MTL on the relationship between distrust and shared leadership, there was no significant direct effect between distrust and performance (95% CI: -6.87, 8.26). There was also no significant indirect effect between distrust and performance through shared leadership. However, the indirect effect did account for 61.9% of the relationship between distrust and performance. Finally, there was no significant interaction between distrust and affective-identity MTL (95% CI: -.010, .03). The final tenant of motivation to lead, non-calculative MTL, was also tested as a moderator between distrust and shared leadership in hypothesis 7. Results reveal no significant direct effects between distrust and performance (95% CI: -6.15, 8.74) and there was no significant indirect effect through shared leadership. Overall, the indirect effect accounted for 44.8% of the relationship between distrust and performance. The interaction between non-calculative MTL and distrust was also not significantly related to shared leadership of the team (95% CI: -.01,

.14). With social normative MTL entered in the model as a moderator between distrust and shared leadership, there was no significant direct effect between distrust and performance (95% CI: -.29, .21). Further, the indirect relationship between distrust and performance through shared leadership was non-significant; this indirect relationship accounted for 17.7% of the total relationship between distrust and performance. When looking at the interaction of social MTL and team distrust, there was no significant effect on shared leadership (95% CI: -.10, .08). Therefore Hypothesis 6 was not supported.

Finally, Hypothesis 7 outlined that in the interactions of MTL and distrust, affective-identity MTL would have the strongest effect size and that noncalculative MTL would have the smallest effect size. However, it appears that noncalculative MTL has the largest effect size (B= 06, SE=.04, *n.s.*), followed by affective-identity MTL (B= -.04, SE=.03, *n.s.*), and social-normative (B= -.01, SE=.03, *n.s.*) respectively. However, as mentioned previously, none of these relationships significantly impacted the relationship between distrust and SL.

CHAPTER EIGHT

DISCUSSION

This study is unique in that it examines not just leader emergence, but the level of shared leadership within the team using a network measure, creating a more holistic approach to measuring team leadership. This study aims to identify potential precursors to shared leadership, including the roles of distribution, trust and distrust within a team. As business globalization continues to rise, it is crucial to understand the role distribution plays within these teams in order to reduce potential performance detriments. These constructs have the potential to improve not only performance, but also improve the amount shared leadership and the inherit benefits associated with the sharing of leadership amongst team members. Both academic and applied personnel alike would benefit from distinguishing the need to further both leadership training literature and leadership development initiatives in practice by recognizing and including distrust and shared leadership within their future models and programs.

Summary of Findings

This study posed two research questions to help further the conceptualization of trust and distrust within teams. First, this study sought to understand whether or not trust and distrust could be present simultaneously within the same construct (e.g., competence and intent). However, the results indicate a significant difference between the mean of trust and distrust across all missions and domains. This suggests that when trust in intent is high, distrust in intent is low, supporting that trust and distrust are at opposite ends of a continuum. In contrast, the significant, positive relationship between trust and

performance was not modeled in the distrust and performance relationship. That is, distrust was not significantly related to performance, suggesting that trust and distrust operate as separate constructs.

The results of Hypothesis 1 and 2 indicate that teams working in a face-to-face environment tend to have higher levels of trust than their distributed counterparts. Further, distributed teams have reportedly more distrust than collocated teams. These results indicate that teams spanning geographical bounds tend to be more suspicious of their teammates intentions and abilities than teams working face-to-face. Although not predicted within this study, these results seem to be particularly true for teams that are given higher levels of autonomy. That is, when distributed teams have more control over their work and less directions from their supervisors, they seem to have much higher levels of team distrust than collocated teams under the same high autonomy conditions. Overall, trust seems to grow over time in both the collocated and distributed teams, while distrust dissipates over time in both conditions. However, the rates at which trust grows and distrust fades appear to occur faster in collocated and slower in distributed teams.

In Hypothesis 4, there appears to be no significant indirect effect between trust and performance through shared leadership, but there is a significant direct effect between trust and shared leadership. This supports that trust is an important team component within these distributed and collocated teams. Although there appears to be no meditation present between trust and performance when considering shared leadership; this result is potentially due to the lacking variance in shared leadership.

Hypothesis 5, predicting an indirect effect between distrust and performance through shared leadership, was not significant. That is, there appears to be no mediation present when examining the relationship between distrust and performance. Again, the non-significant finding for the indirect effect may be due to the minimal variance in shared leadership. Although non-significant, there appears to be a positive trend between distrust and shared leadership within these teams. In contrast to hypothesis 4, there also appears to be no significant direct relationship between distrust and performance. This provides an interesting piece of support for the conceptualization of trust and distrust as separate constructs. Specifically, it would be expected that if trust and distrust are opposite ends of a continuum, then distrust should be significantly and negatively related to performance. However, the relationship between distrust and performance is not negative. This highlights the need for more research in the area of trust and distrust.

Hypotheses 6 and 7 were not supported, indicating that MTL is not a moderator of the relationship between distrust and performance. However, these results may also be due to the limited variability in shared leadership. From the moderator analyses, it appears that the interaction between noncalculative MTL and shared leadership yielded the strongest effect size followed by affective-identity MTL and social-normative MTL respectively.

Implications

Practical Implications One notable contribution this paper makes is acknowledging the importance of context within a team. That is, this study highlights that different contexts will cause different behaviors to form within a team. Within this study,

team trust was exhibited in collocated teams while distrust was exhibiting in distributed teams. This is important to consider as the globalization of our workforce continues to expand. Although virtual teams allow companies to span international bounds, the process losses inherit within these teams may present challenges for optimal performance. Therefore, virtual teams must develop trust quickly in order to facilitate teamwork on urgent projects (Jarvenpaa & Leidner, 1999).

This study also identifies individual and team level characteristics that influence performance. The current work provides inconclusive results for selecting individuals that have a high level of MTL. Although members that had higher levels of noncalculative MTL seemed beneficially for distributed teams that are prone to having higher levels of team distrust, theses results were not significant. Overall, teams that have high levels of distrust are more likely to have lower levels of shared leadership and poorer performance. However, by selecting team members that have high levels of noncalculative MTL, companies may be able to counteract the negative effects of distrust. Members with high noncalculative MTL take on leadership responsibilities without considering the benefits or costs inherit to leading. It may be helpful to hire these individuals in virtual, swift action teams that have not yet had the opportunity to develop deeper levels of trust based on the other members' abilities, benevolence, and integrity (Wildman, et al. 2012).

Theoretical Implications

This study provides several theoretical implications for moving the literature on distributed teams, team trust, and shared leadership forward. Primarily, this study aims to

address the current debate on whether or not trust and distrust exist as two separate constructs (Lewiki et al., 1998) or at opposite ends of a continuum (Schrooman et al., 2007). Specifically, in response to Lewiki et al.'s, (1998) claim that trust and distrust are separate constructs, Schrooman and colleagues (2007) wrote a piece detailing that their unidimensional conceptualization of trust and distrust allows for trust and distrust to operate in separate domains (e.g., intent and competence). Further, Schrooman and colleagues (2007) explain that there has yet to be any empirical evidence that supports that concept of distrust being conceptually distinct from trust because trust and distrust had yet to be analyzed within the same study (Schrooman, Mayer, & Davis, 2007). Therefore, this study aimed to address these claims by studying both trust and distrust within the same experimental design. Results indicate that distributed teams have higher levels of distrust, while collocated teams have higher levels of trust. However, as Lewiki and colleagues proposes, these differences do not appear to operate at opposite ends on a continuum. Instead, teams appear to have stronger feelings of trust than they do distrust. If trust and distrust operated at opposite ends of continuum, then distrust would have been significantly negatively related to team performance because team trust is significantly positively related to performance. However, there is no significant relationship between distrust and performance, providing some evidence that trust and distrust may be two separate constructs.

Limitations and Directions for Future Research

This study has a number of possible limitations that should be considered when interpreting the results. First, the majority of the teams within this study have very dense

leadership networks, thus little variability is present in the shared leadership assessment. This brings to question whether or not the interdependent nature of this lab task required all members to step into leadership roles in order to successfully complete the task, eliminating the true variability in shared leadership. Future research should explore other avenues for assessing shared leadership within a team. Although the density method used to assess shared leadership within this study has been previously used (Carson et al., 2007), the highly correlated items that were adapted from Morgeson and colleagues (2010) leadership framework brings to question whether or not this is the best approach.

The study design is another potential limitation in terms of the participants and task at hand. Specifically, the participants in this study were all undergraduate students placed on ad hoc teams to gain extra credit for class. However, these teams had no high level of risk, which is a key motivator in STATs (Wildman et al., 2012). Specifically, because the teams have no direct consequences for succeeding or failing their objectives, the dynamic relationships of trust and distrust may not have fully formed. Future research should aim to better understand how performance based incentives influence trust and distrust within a team.

In addition to the participants used for this study, another potential limitation is the interdependent nature of this task. Although teams need some degree interdependence (Salas et al., 1992) to be classified as a team, too much interdependence within the lab setting potentially diminished the possibility of having variability within the assessment of shared leadership processes. Future studies should aim to create a task in which team

members can work both independently and interdependently within the same task to avoid the emergence of forced leadership processes.

Finally, although this study tried to identify whether trust and distrust operate as separate constructs or at opposite ends of a continuum, much more research needs to be conducted in this area. Currently, the results from this study are inconclusive when it comes to delineating trust and distrust as two separate constructs. Although trust and distrust in competence and intent did not seem to manifest simultaneously within this team study (suggesting that they are at opposite ends of a continuum), trust and distrust did have varying impacts on performance. Therefore evidence exists both supporting and hindering the theory that trust and distrust are two separate, but related, entities. Although the nature of this task did not clarify this debate, this is an area ripe for future research.

Conclusion

Overall, this study aimed to identify how the context of team distribution may influence other team processes such as trust, distrust, and shared leadership. This study reveals that distributed teams have higher levels of distrust than their collocated counterparts, while collocated teams had higher levels of trust. Results indicate that team trust was significantly related to performance while controlling for numerous variables (e.g., gender, team member familiarity, videogame self-efficacy ect.). Surprisingly, there appeared to be no indirect effects between team trust or distrust and performance through shared leadership due to a lack of variability in shared leadership across the teams. When examining distrust, it appears that noncalculative MTL can negate the negative influences that distrust has on shared leadership, leading to higher performance, although this

relationship was not significant. Overall, this study highlights the importance of trust

within collocated and distributed teams and assists in clarifying the construct confusion

that presently exists between trust and distrust

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APPENDICES

Appendix A

Measure of Trust and Distrust

Wildman, J. L., Fiore, S. M., & Salas. E. (2009). Development of trust and distrust measures. *Unpublished Working Draft.* Institute for Simulation and Training, University of Central Florida.

Scale
    1 = Not at all → 6 = Very much so

To what extent do you feel:

1. Assured that your other team members will make intelligent decisions? (TC)
2. Confident that other team members will try to do things that benefit the team? (TI)
3. Afraid that other team members will purposefully do something that isn't helpful? (DI)
4. Faith that the other team members can do the task at hand? (TC)
5. Suspicious about the other team members 's reasons behind certain decisions? (DI)
6. Convinced that you can rely on the other team members to try their hardest? (TI)
7. Confident in the other team members ability to complete a task? (TC)
8. Nervous that the other team members will betray you? (DI)
9. Afraid that the other team members will make a mistake? (DC)
10. Confident that the other team members will do as they say? (TI)
11. Positive that the other team members will try and do what is best for the team? (TI)
12. Compelled to keep tabs on the other team members to be sure things get done? (DC)
13. Certain that the other team members will perform well? (TC)
14. Cautious about the other team members' intentions for the team? (DI)
15. Paranoid that the other team members will fail? (DC)
16. Worried that the other team members will do something wrong? (DC)

*TC: trust in competence, TI: Trust in intent, DC: Distrust in competence, DI: Distrust in intent

Appendix B

Measure of Shared Leadership

Directions: Answer if your role was Engineering, Weapons, or Science.
The following questions will specifically be referring to the individual who is in the Helm role.

	Not At All (1)	Once in a While (2)	Sometimes (3)	Fairly Often (4)	Frequently, if not Always (5)
To what degree does your team rely on this individual for leadership when defining the team's mission (e.g., specifying clear direction, emphasizing collectiveness, ensuring an understanding of purpose)? (1)	❍	❍	❍	❍	❍
To what degree does your team rely on this individual for leadership when establishing expectations and goals (e.g., defining clear performance goals, establishing standard rules and regulations)? (2)	❍	❍	❍	❍	❍
To what degree does your team rely on this individual for leadership when structuring and planning (e.g., identifying what work needs to be done, developing ways to accomplish that work,	❍	❍	❍	❍	❍

clarifying team roles)? (3)					
To what degree does your team rely on this individual for leadership when the team is sensemaking (e.g., interpreting events that occur within the team, facilitating understanding of the team's situation, clarifying ambiguous situations)? (4)	❍	❍	❍	❍	❍
To what degree does your team rely on this individual for leadership regarding feedback (e.g., communicating reviewing team performance, providing positive/corrective feedback)? (5)	❍	❍	❍	❍	❍
To what degree does your team rely on this individual for leadership when monitoring the team (e.g., monitoring team behaviors, noting flaws in procedures/performance, staying informed of the team's current status)? (6)	❍	❍	❍	❍	❍
To what degree does your team rely on this individual for leadership when challenging the team (e.g., promotes new	❍	❍	❍	❍	❍

ways of completing work, generates new ideas to solving problems, challenges status quo)? (7)					
To what degree does your team rely on this individual for leadership when team is performing (e.g., pitches in to help team with work)? (8)	○	○	○	○	○
To what degree does your team rely on this individual for leadership when solving problems (e.g., creates/implements solutions to problems, ensures everyone's perspective is part of the problem solving process)? (9)	○	○	○	○	○
To what degree does your team rely on this individual for obtaining needed resources (e.g., obtains/allocates resources, makes sure resources are available)? (10)	○	○	○	○	○
To what degree does your team rely on this individual for leadership when supporting the team's social climate (e.g., shows respect/concern for fellow team members, puts aside self-interest for the good of the team,	○	○	○	○	○

creates a pleasant environment)? (11)					

Measure of Motivation to Lead

This is a five point Likert scale ranging from 1 strongly disagree to 5 strongly agree. Please rate the degree to which you agree with the following statements:

Affective-Identity MTL
1. Most of the time I prefer being a leader rather than a follower when working in a group
2. I am the type of person who is not interested in leading others(R)
3. I am definitely not a leader by nature (R)
4. I am the type of person who likes to be in charge of others
5. I believe I can contribute more to a group if I am a follower rather than a leader(R)
6. I usually want to be the leader in the groups that I work in
7. I am the type who would actively support a leader but prefers not to be appointed as leader (R)
8. I have a tendency to take charge in most groups or teams that I worked in
9. I am seldom reluctant to be the leader of a group

Noncalculative MTL
10. I am only interested in leading a group if there are clear advantages for me (R)
11. I will never agree to lead if I cannot see any benefits of accepting that role (R)
12. I would only agree to be a group leader if I know I can benefit from that role (R)
13. I would agree to lead others even if there are no special rewards or benefits with that role
14. I would want to know 'what's in it for me' if I am going to agree to lead a group (R)
15. I never expect to get more privileges if I agree to lead a group
16. If I agree to lead a group, I would never expect any advantages or special benefits
17. I have more of my own problems to worry about than to be concerned about the rest of the group (R)
18. Leading others is really more of a dirty job rather than an honorable one (R)

Social-Normative MTL

19. I feel that I have a duty to lead others if I am asked
20. I agree to lead whenever I am asked or nominated by other members
21. I was taught to believe in the value of leading others ?
22. It is appropriate for people to accept leadership roles or positions when they are asked
23. I have been taught that I should always volunteer to lead others if I can
24. It is not right to decline leadership roles DROPPED FROM DISSERTAION
25. It is an honor and privilege to be asked to lead
26. People should volunteer to lead rather than wait for others to ask or vote for them
27. I would never agree to lead just because others voted for me (R)

Table 1. ICC1, ICC2 and r_{WG} for Aggregating Variables to Level 2.

Predictors	ICC1	ICC2	r_{WG} (agreement)
M2 Trust	0.17	0.3816	0.89
M2 Distrust	0.20	0.3492	0.85
M3 Trust	0.14	0.3082	0.87
M3 Distrust	0.13	0.2281	0.82
Shared Leadership	.28	0.5895	.99
Affective Identity Motivation to Lead	0.04	0.1082	0.9040
Noncalculative Motivation to Lead	0.05	0.1954	0.9402
Social Normative Motivation to Lead	0.01	0.0815	0.9622
Motivation to Lead	0.04	0.1313	0.99
Technology Familiarity	.00	-0.0989	0.90
Team Familiarity	.45	0.8087	0.9873
Videogame Efficacy	0.05	-0.2470	0.93

Table 2. Hypotheses and Analyses Conducted.

Variables included in analysis	Hypothesis	Methodology used to test hypothesis
Trust	Research Question 1: Do high levels of trust and	One-way ANOVA
Distrust	distrust exist within the same domain as separate	DV: Trust and Distrust
	constructs (e.g., high trust and high distrust in competence)?	IV: competence, intent
Trust	Research Question 2: How do high levels trust and	Paired t-test
Distrust	high distrust interact within teams to impact shared	DV: Shared Leadership
Shared Leadership	leadership?	IV: Trust*Distrust interaction
Distribution	Hypothesis 1: Trust within a team will be higher when	One-way ANOVA
Trust	teams are collocated.	DV: Trust
		IV: Distribution
Distribution	Hypothesis 2: Distrust within the team will be	One-way ANOVA
Distrust	higher when teams are distributed.	DV: Distrust
		IV: Distribution
Shared Leadership	Hypothesis 3: Teams that share leadership will	Bootstrapping Method for Mediation
Performance	perform better than teams that do not share leadership.	DV: Performance
		IV: Shared Leadership
Trust	Hypothesis 4: The relationship between trust	Bootstrapping Method for Mediation
Shared Leadership	and performance will be mediated by shared	DV: Performance
Performance	leadership such that teams high in trust will be more likely to share leadership	IV: Trust
	and have higher performance than teams with low trust.	Mediator: Shared Leadership

Distrust Shared Leadership Performance	Hypotheses 5: The relationship between distrust and performance will be mediated by shared leadership such that teams high in distrust will be less likely to share leadership and have poorer performance than teams with low distrust.	Bootstrapping Method for Mediation DV: Performance IV: Distrust Mediator: Shared Leadership
Distrust Affective-identity Motivation to Lead Shared Leadership	Hypothesis 6: The relationship between distrust and shared leadership will be moderated by affective-identity MTL such that the higher the team's affective-identity MTL the more likely the team is to shared leadership.	Bootstrapping Method for Moderation DV: Shared Leadership IV: Distrust Moderator: Affective-Identity MTL
Distrust Noncalculative MTL Shared leadership	Hypothesis 7: The relationship between distrust and shared leadership will be moderated by noncalculative MTL such that the higher the team's noncalculative MTL the more likely the team is to share leadership	Bootstrapping Method for Moderation DV: Shared Leadership IV: Distrust Moderator: Noncalculative MTL
Distrust Social-normative MTL Shared Leadership	Hypothesis 8: The relationship between distrust and shared leadership will be moderated by social-normative MTL such that the higher the teams' social-normative MTL the more likely the team is to share leadership.	Bootstrapping Method for Moderation DV: Shared Leadership IV: Distrust Moderator: Social-normative MTL

Distrust	Hypothesis 9: In the moderation of MTL between distrust and shared leadership, affective-identify MTL will have the strongest effect size, followed by social-normative MTL and noncalculative MTL, respectively.	Bootstrapping Method for Moderation
Social-normative MTL, Affective-identity MTL, & Noncalculative MTL		DV: Shared Leadership IV: Distrust Moderator: Affective Identity MTL, Social-normative MTL, Noncalculative MTL
Shared Leadership		

Table 3. Raw means, standard deviations, and correlations for aggregated variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. M1 Trust	4.99	0.49	-														
2. M1 Distrust	2.11	0.53	-0.65**	-													
3. M2 Trust	5.14	0.48	0.77**	-.53**	-												
4. M2 Distrust	1.94	0.55	-.50**	.71**	-.60**	-											
5. M3 Trust	5.23	0.49	.72**	-.55**	.83**	-.60**	-										
6. M3 Distrust	1.88	0.55	-.44**	.67**	-.51**	.74**	-.59**	-									
7. AI MTL	3.45	0.42	.17*	-.01	.19*	-.02	.16*	-.01	-								
8. NC MTL	3.71	0.35	.27**	-.30**	.27*	-.29**	.24*	-.30**	.3**	-							
9. SN MTL	3.66	0.26	.19*	.01	.21**	-.09	.12	-.04	.55**	.48**	-						
10. Overall MTL	3.61	0.27	.26*	-.13	.28**	-.16*	.23**	-.14	.82**	.74**	.81**	-					
11. Familiarity	0.06	0.11	.04	-.02	.02	.01	.02	-.04	.01	.06	.13	.08	-				
12. Technology Familiarity	4.92	0.39	.07	.00	.05	.07	.06	.06	.119	-.02	.07	.07	.02	-			
13. Videogame Efficacy	3.61	0.42	.068	.02	.04	.00	.12	.04	.13	.02	.03	.09	-.16	.29**	-		
14. Gender	2.08	1.06	.123	-.06	.14	-.116	.08	-.08	.07	.21*	.19-	.19*	.27*	-.16	-.50**	-	
15. Shared Leadership	0.79	0.08	.26**	-.10	.26**	-.02	.20*	-.02	.10	.21*	.21**	.21*	.12	.13	.1	.00	-
16. Performance	31.54	17.03	.035	-.11	.14	-.13	.26*	-.13	-.10	-.11	-.24**	-.18*	-.04	-.09	.09	-.25**	.00

** M1= Mission 1, M2= Mission 2, M3=Mission 3, AI= Affective Identity, MTL= Motivation to Lead, NC= Noncalculative, SN= Social Normative, *=*p*<.05, **=*p*<.01

Table 4. Examining Both Trust and Distrust in Intent and Competence Across Missions.

Pair	SE	t
Mission 1: TI & DI	.07	46.44**
Mission 1: TC & DC	.09	24.68**
Mission 2: TI & DI	.08	45.55**
Mission 2: TC & DC	.08	34.18**
Mission 3: TI & DI	.08	47.05**
Mission 3: TC & DC	.08	38.69**

NOTE: TI= trust intentions, DC= distrust intentions, TC= trust competence, DC= distrust competence, **Significant at .05.

(t=55.22, p<.01; t=28.35, p<.01), two (t=54.9, p<.01; t=40.658, p<.01), or three (t=53.553, p<.01, t=43.49, p<.01).

Table 5. One-way ANOVA Examining the Conditional Effects of Collocated and Distributed Teams on Team Trust and Distrust (H1 and H2).

	Collocated		Distributed			
	Mean	SD	Mean	SD	F	*p*
M1 Trust	5.05	.46	4.91	.52	3.21	.075
M1 Distrust	2.04	.51	2.2	.54	3.18	.076
M2 Trust	5.21	.44	5.05	.52	3.83	.052
M2 Distrust	1.82	.53	2.07	.56	7.94	.005
M3 Trust	5.3	.48	5.16	.49	2.62	.108
M3 Distrust	1.8	.55	1.95	.53	2.22	.138

Figure 1. Hypothesized Model
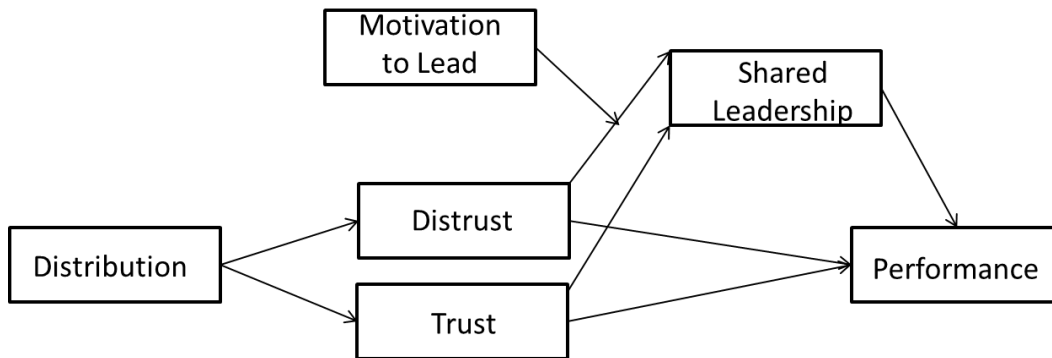
Figure 2. Screenshot of Artemis interface for an observer of the game
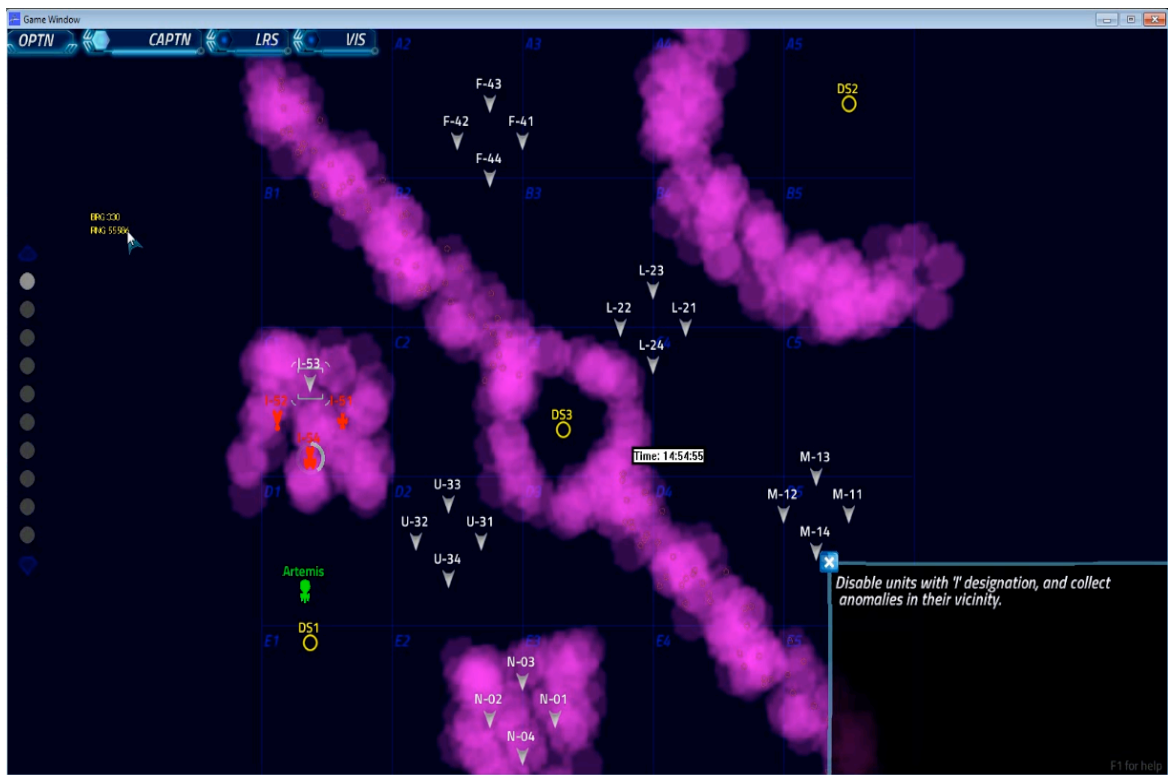
Figure 3. Trust and Shared Leadership.

Mediated model of direct and indirect effects of trust on performance through shared leadership.
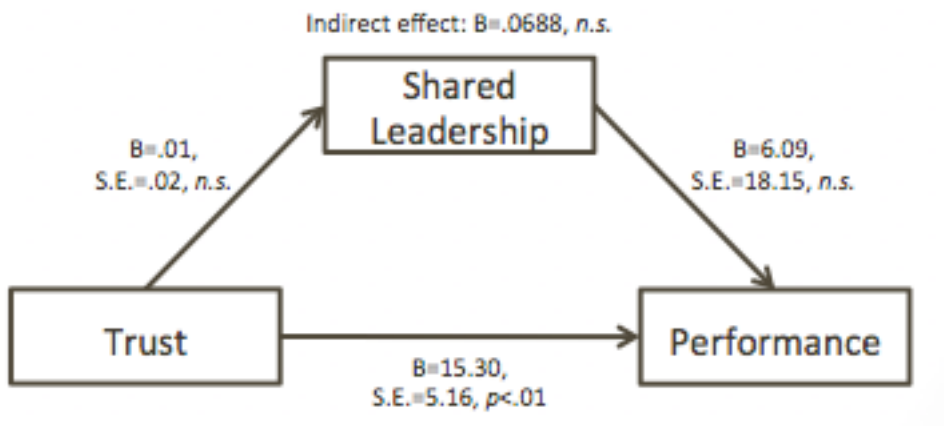
Figure 4. Distrust and Shared Leadership.

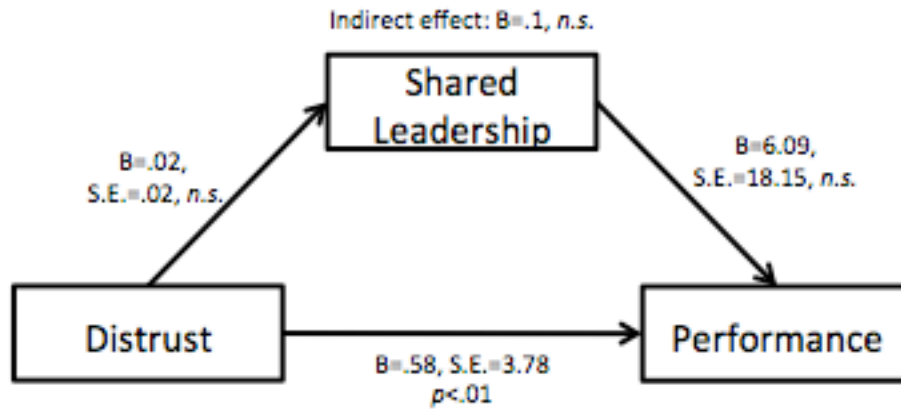Mediated model of direct and indirect effects of distrust on performance through shared leadership.

Figure 5. Affective-identity MTL

Mediated model of direct and indirect effects of distrust on performance through shared leadership, with distrust and shared leadership moderated by affective identity MTL.
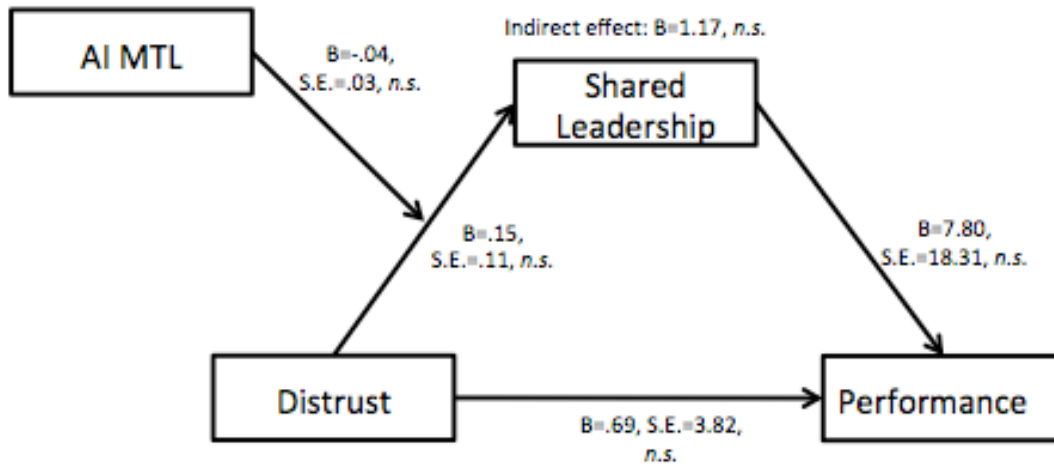
Figure 6. Noncalculative MTL

Mediated model of direct and indirect effects of distrust on performance through shared leadership, with distrust and shared leadership moderated by noncalculative MTL.
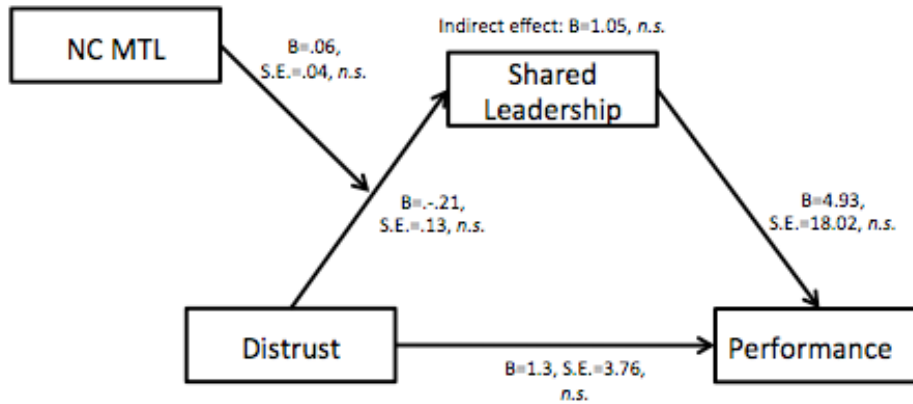
Figure 7. Social-normative MTL

Mediated model of direct and indirect effects of distrust on performance through shared leadership, with distrust and shared leadership moderated by social normative MTL.