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Group Composition Characteristics as Predictors of Shared Leadership: An Exploration of Competing Models of Shared Leadership Emergence

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GROUP COMPOSITION CHARACTERISTICS AS PREDICTORS OF SHARED LEADERSHIP: AN EXPLORATION OF COMPETING MODELS OF SHARED LEADERSHIP EMERGENCE

by

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ABSTRACT

The study of leadership in organizations has received much research attention over the past several decades. However, most of this research has examined hierarchical structures of leadership wherein one individual leads, or is perceived to lead, several other individuals. With a growing number of organizations structuring employees within teams or work groups, researchers have begun studying the ways in which leadership operates in groups. One alternative to the traditional hierarchical structure is for leadership to be distributed or shared in groups such that multiple group members contribute to the overall leadership function of the group. As a result, researchers have begun examining the construct of shared leadership, which is defined as the extent to which multiple group members share in the leadership function of the group. Because shared leadership is a relatively new concept in the research literature, our knowledge of the antecedents of shared leadership is limited. The primary aim of the present research was to explore group composition as a potential antecedent of shared leadership in teams. Group composition was examined in terms of the agreeableness, extraversion, collectivistic work orientation, and trait competitiveness within the group. Mean, minimum/maximum, and variance models of group composition were employed in the present research. A sample of 385 participants comprised a total of 97 groups of three to six individuals to complete a leaderless group discussion exercise and completed measures of shared leadership after completing the group exercise. Results from a series of hierarchical linear regression analyses found no significant relationships between any of predictors and shared leadership using either a social network analysis or a referent-shift approach. Given the short amount of time

group members worked on the group task, a clear implication of these findings is that shared leadership requires adequate time to manifest in groups.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Organizational researchers and practitioners have been interested in leadership for decades since it has been linked to important work-related outcomes such as motivation (Chaudhry & Javed, 2012; Isaac, Zerbe, & Pitt, 2001), organizational climate and culture (Bass & Avolio, 1994; Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005; Zohar, 2002), and job-related performance (McColl-Kennedy & Anderson, 2002; Yammarino, Spangler, & Bass, 1993). As a result, researchers have proposed multiple theories of leadership to delineate the attributes of effective and ineffective leaders as well as the orientations and behaviors that influence leadership style and effectiveness. From this line of research, scholars have conducted several meta-analyses of the determinants, moderators, and outcomes of leadership from different theoretical perspectives (e.g., Bono & Judge, 2004; Conger & Kanungo, 1987; DeGroot, Kiker, & Cross, 2000; Dumdum, Lowe, & Avolio, 2013; Judge & Piccolo, 2004; Judge, Piccolo, & Ilies, 2004; Martin, Guillaume, Thomas, Lee, & Epitropaki, 2016). Although these traditional theories of leadership are informative of how leadership functions in organizations, changes in the broader work context in recent years have impacted how researchers and practitioners ought to address the concept of organizational leadership.

Particularly, there has been an increase of employees working in teams or work groups in many of today's organizations (McGrath, Arrow, & Berdahl, 2000; Salas, Rosen, Burke, & Goodwin, 200p; Sundstrom, McIntyre, Halfhill, & Richards, 2000). Prior research has suggested that group performance is predicted by a distinct set of variables from what predicts individual performance (Bell, 2007; Bird, 1977; Salas, Cooke, & Rosen, 2008). Additionally, team-based organizational structures are much flatter such that there is less perceived power distance

between different levels within an organization (Halevy, Chou, & Galinsky, 2011; McEvily, Soda, & Tortoriello, 2014). Whereas traditional theories of leadership (e.g., charismatic, transformational, authentic, etc.) have been used to explain a wide array of individual-level outcomes, they were not necessarily conceptualized to explain how leadership functions in newer organizational structures that involve increased group work, less formality, and decreased intra-organizational power distance.

Shared leadership is a newer theory of leadership that is specifically designed to explain how leadership functions within work groups. Whereas traditional leadership theories stemming from the extant literature on leadership emergence explain how a small proportion of people in organizations are perceived as formal or informal leaders of a larger group of people, shared leadership is described as the extent to which the overall leadership function in work groups is shared amongst several members of the work group (Day, Gronn, & Salas, 2004; Perry, Pearce, & Sims Jr, 1999). Although shared leadership is a relatively new construct, there is a growing body of literature explaining some of the determinants as well as many of the outcomes of shared leadership (D'Innocenzo, Mathieu, & Kukenberger, 2016; Nicolaides et al., 2014). As will be discussed later in more detail, there is much more literature on the outcomes versus the antecedents of shared leadership. Therefore, a main goal of the current research was to contribute to the literature on the potential antecedents of shared leadership.

One approach to understanding when shared leadership is most likely to emerge is to focus on the composition of the group (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017). To date, only one published study has addressed group composition as a determinant of shared leadership. In that study (Small & Rentsch, 2010), group averages of collectivistic work orientation and intragroup trust were found to be significant predictors of shared leadership. This

thesis expands on the research by Small and Rentsch (2011) by examining group composition with additional variables as well as using a broader set of approaches for operationalizing group composition beyond the group mean.

The primary aim of the present research was to explore whether group composition predicts shared leadership in teams. Specifically, this study sought to extend the current literature by addressing agreeableness, extraversion, collectivistic work orientation, and trait competitiveness within the group as predictors of shared leadership. Although researchers have used group averages (mean models) to represent group composition for a given variable of interest (Barrick, Stewart, Neubert, & Mount, 1998; Halfhill, Sundstrom, Lahner, Calderone, & Nielsen, 2005), it has been suggested that variability within groups (variance models) or individuals scoring the highest or lowest (compilation models) can provide incremental validity over mean models (Barrick et al., 1998; Halfhill et al., 2005; Moreland, Levine, & Wingert, 2013). Following this line of research, the present research adds to the shared leadership literature by examining both variance and compilation models of group composition alongside traditional mean models to determine which variables lead to greater shared leadership in workgroups. In the following sections, I discuss the construct of shared leadership in much greater detail, explain the three broad models of group composition models, and discuss each of the study propositions.

OVERVIEW OF SHARED LEADERSHIP

Definition and Measurement of Shared Leadership

Carson, Tesluk, and Marrone (2007) defined shared leadership as "an emergent team property that results from the distribution of leadership influence across multiple team members" (p. 1218). There are multiple approaches to measuring shared leadership in teams. One approach is the referent-shift method, which involves asking each group member to rate the extent to which they perceive leadership to be shared within their work group (D'Innocenzo et al., 2016). Typically, the individual ratings are averaged together, and, if there is adequate within-group agreement, the aggregated scores are used as an indicator of overall shared leadership (D'Innocenzo et al., 2016).

The more common approach to measuring shared leadership is through social network analysis (e.g., Carson et al., 2007; D'Innocenzo et al., 2016; Mehra, Smith, Dixon, & Robertson, 2006; Small & Rentsch, 2010; Wang, Waldman, & Zhang, 2014). Here, rather than having people rate the extent to which shared leadership exists, each group member is instructed to indicate the extent to which they perceive each of their fellow group members to be a leader in the group. Figuratively, there is a unidirectional arrow from the rater to everyone perceived as a leader by the rater, and no connections between the rater and group members that are not perceived as a leader by the rater. Unidirectional arrows become bidirectional arrows when two group members perceive each other to be leaders within the work group. In any group, there is a maximum number of possible connections, or 'ties,' between group members. When the number of ties is at the maximum, all members are perceived as leaders by each of their fellow group members and these networks are considered to be dense (Contractor, DeChurch, Carson, Carter, & Keegan, 2012; Mehra et al., 2006). On the contrary, networks are less dense when a relatively

small number of ties exist in proportion to the maximum number of ties. Additionally, networks with high centrality occur when a substantial proportion of the maximum number of ties are unidirectional arrows pointing to one or relatively few group members (Freeman, Roeder, & Mulholland, 1979; Mehra et al., 2006). In such cases, while many ties may be present within the social network, there is little support for shared leadership (Small & Rentsch, 2010). Specifically, rather than many members sharing the overall leadership function of the group, only a relative few are perceived as group leaders. Because the social network approach allows researchers to quantitatively determine the extent to which shared leadership exists down to the level of component ties between two group members, researchers have advocated for the use of the social network method when studying shared leadership (Carson et al., 2007; Contractor et al., 2012; D'Innocenzo et al., 2016; Mehra et al., 2006; Wang et al., 2014).

Outcomes of Shared Leadership

Much of the current research literature on shared leadership has examined its outcomes, with many researchers finding stable, positive relationships between shared leadership and team performance and effectiveness outcomes (e.g., Carson et al., 2007; Hoch, 2014; Hoch & Kozlowski, 2014; Perry et al., 1999; Serban & Roberts, 2016; Ullah & Park, 2013). In addition to team performance, previous research has also found evidence suggesting that shared leadership positively relates to trust and affective commitment (Hoch & Kozlowski, 2014; Pearce & Conger, 2002), cohesion (Mathieu, Kukenberger, D'Innocenzo, & Reilly, 2015; Pearce & Conger, 2002), knowledge sharing (Hoch, 2014), team and task satisfaction (Serban & Roberts, 2016), and team creativity (Wu & Cormican, 2016). There are, however, exceptions to these findings. For example, researchers have found that, over time, shared leadership predicts team

cohesion but not team performance (Mathieu et al., 2015), and others have concluded that shared leadership predicts team performance for knowledge teams rather than for manufacturing teams (Fausing, Jeppesen, Jønsson, Lewandowski, & Bligh, 2013). Nonetheless, there is an extensive body of research relating shared leadership to numerous desirable work outcomes.

Determinants of Shared Leadership

In contrast to the literature on the outcomes of shared leadership, there is far less research exploring the potential determinants of shared leadership. Exceptions include the work by Fausing and colleagues (i.e., Fausing et al., 2013; Fausing, Jønsson, Lewandowski, & Bligh, 2015), who found that factors such as team autonomy, empowering external leadership, and task interdependence serve as potential antecedents of shared leadership. Furthermore, work by Serban and Roberts (2016) found evidence suggesting that creative task types, task cohesion, and internal team environments can promote the emergence of shared leadership in work groups.

Despite this progress, one potential antecedent to shared leadership that has received very limited attention, despite calls by multiple researchers (e.g., Carson et al., 2007; Small & Rentsch, 2010), is group composition. Based on the extensive leadership emergence literature that has found that various individual difference characteristics such as masculinity, dominance, intelligence, extraversion, and conscientiousness significantly predict whether individuals are perceived as leaders (Kirkpatrick & Locke, 1996; LePine, Hollenbeck, Ilgen, & Hedlund, 1997; Lord, de Vader, & Alliger, 1986; Zaccaro, Foti, & Kenny, 1991), it is reasonable to expect that the relative composition of traits within work groups should predict the extent to which leadership is shared among multiple group members. In line with this rationale, Small and Rentsch (2011) conducted longitudinal research on group composition and shared leadership,

finding partial support for average collectivistic work orientation and full support for average intragroup trust as predictors of shared leadership. Currently, this is the only published research on the role of group composition in predicting shared leadership.

One shortcoming of the Small and Rentsch (2011) study is that it only addressed the groups' composition for one individual difference variable, collectivistic work orientation, as intragroup trust is more of a relationship or group process variable. Thus, this study expands on that research by considering several additional group member characteristics. In addition, Small and Rentsch (2011) only focused on mean levels of collectivistic work orientation and trust. As mentioned earlier, there are models of group composition (i.e., variance and compilation models) that may, in some cases, provide incremental predictive validity over mean models. Before addressing how such models may be applied to specific variables for predicting shared leadership, I will explain several approaches to modeling group composition and outline some of the research using each method.

MULTI-LEVEL THEORY OF EMERGENT PHENOMENA

In this thesis, I use the multi-level theory of emergent phenomena (Kozlowski & Klein, 2000) to ground each hypothesis of the study. Kozlowski and Klein (2000) explained how higher-order phenomena can emerge through the interaction of individual-level "elemental content" such as affect, cognition, behavior, and other characteristics. Furthermore, the authors stated that "elemental content is the raw material of emergence" (p.55). Under this definition, group composition is considered an emergent phenomenon not only because it originates from the attributes of component members of the group, but also because it requires the interaction each group member's individual attributes to emerge as a higher-order construct. Kozlowski and Klein (2000) outlined a typology of emergence that describes the multiple ways in which emergent phenomena may emerge. Overall, the typology of theoretical emergent processes exists on a continuum ranging from isomorphic (composition) models to discontinuous (compilation) models. Although the Kozlowski and Klein (2000) typology describes six broad methods of emergent processes, I will discuss three of the methods in greater detail as past research suggests that they are most relevant to the present research.

Convergent Isomorphic Models

Convergent models are some of the most common methods of modeling emergent phenomena. In such models, elemental content is constrained by contextual factors and interactional processes such that there is low variability of elemental content and the phenomenon converges around a common value usually represented by either a mean or a sum (Kozlowski & Klein, 2000). Underlying these models are two key assumptions. First, when using isomorphic models, researchers assume the contextual and interactional factors create low

variability of elemental content between multiple individuals. Due to the presumed low variability, researchers assign a value (i.e., mean or sum) to represent the emergent phenomenon. Second, by assigning one combined value to represent the elemental content of all component individuals, researchers assume there to be a linear relationship between the elemental content and the emergent phenomenon. Kozlowski and Klein (2000) described convergent models as the most isomorphic method of modeling emergent phenomena because such models assume a simple linear relationship between the underlying elemental content and the higher-order emergent phenomenon.

Regarding group composition, Halfhill et al. (2005) stated that "the most common method is to calculate the mean score for the group and works under the assumption that the amount of the characteristic possessed by each individual increases the collective pool of that characteristic" (p.86). Prior research using convergent models (group averages) has found that group-level extraversion is related to group performance and that group-level conscientiousness did not relate to group performance (Barry & Stewart, 1997). Another study using group averages for emotional intelligence found that group-level emotional intelligence did not correlate with group performance (Day & Carroll, 2004). Recently, and perhaps most relevant to the current research, Zhou, Zhang, and Shen (2017) found that average team conscientiousness and openness to experience moderated the relationship between shared leadership and entrepreneurial team performance. Hence, mean models have been commonly used to measure group composition.

Minimum/Maximum Discontinuous Models

Different from convergent isomorphic models, minimum/maximum models suggest that unit members do not converge around a single value in terms of their individual contributions of elemental content. Regarding minimum/maximum models, Kozlowski and Klein (2000) stated that "the standing of one individual on the phenomenon in question determines the standing of the collective" (p. 71). As a result, rather than the group average being most important, the group member with either the lowest or the highest value for a given variable sets the value of the collective for that attribute. Kozlowski and Klein described how, in some cases, the minimum value may be the best indicator of the collective attribute, and in other cases the maximum value may be a better indicator. Researchers must rely on theory to determine whether to use a minimum or a maximum method of modeling emergent phenomena. Although this approach may appear less intuitive, there is a theoretical reason for why using discontinuous models may provide a more realistic conceptualization of group composition as an emergent phenomenon than what is provided through isomorphic models. As mentioned earlier, isomorphic models assume that contextual factors and interactional processes constrain the emergence of elemental content into higher-order phenomena such that individuals in groups converge around a single value that best represents the collective standing for specific forms of elemental content. As a result, isomorphic models assume a linear relationship exists between individual-level elemental content and higher-order emergent phenomena. On the contrary, discontinuous models do not assume that there is low variability of elemental content due to contextual constraints. Specifically, minimum/maximum models suggest that one group member (i.e., the lowest-scoring or the highest scoring) best represents the group's standing on different forms of elemental content. Thus, instead of assuming a linear relationship between elemental content and

emergent phenomena, minimum/maximum models reflect a non-linear, discontinuous relationship between elemental content and emergent phenomena.

There are many examples of prior research that has used the minimum/maximum approach to modeling emergent phenomena in the workplace. For instance, longitudinal research found that minimum values for agreeableness, helping beliefs, and other-oriented values directly predicted the emergence of team helping norms (Raver, Ehrhart, & Chadwick, 2012). In her meta-analysis of group composition variables as predictors of team performance, Bell (2007) found support that team minimum and maximum general mental ability predicted team performance in lab settings, whereas team minimum of agreeableness strongly predicted team performance in field settings. More recent research has found that team maximum neuroticism negatively relates to group performance on some tasks (Kramer, Bhave, & Johnson, 2014). Hence, minimum/maximum models have been used to model group composition in cases wherein it may be less appropriate to use traditional mean models.

Variance Discontinuous Models

Lastly, similar to minimum/maximum models, variance models are discontinuous models of emergent phenomena such that they do not assume a linear relationship exists between elemental content and emergent phenomena. Specifically, Kozlowski and Klein (2000) described variance models as distinct from other forms of emergence in that they do not focus on singular values (e.g., mean, minimum, or maximum) to represent the collective standing for a given trait. Rather, this approach uses the within-group variability in elemental content to explain emergent phenomena. Whereas isomorphic models of emergence should be used in instances where there is little variability in elemental content, variance models can and should be used when there is

high intragroup variability in elemental content. In fact, when using the variance method to model emergent phenomena, the variance or standard deviation is the indicator of variability most commonly used to reflect the emergent phenomenon (Kozlowski & Klein, 2000).

Kozlowski and Klein (2000) described how emergent phenomena can be modeled by either high or low within-group variability. For example, they mentioned how previous researchers (e.g., Jackson, 1975; Jackson, May, & Whitney, 1995; Koene, Boone, & Soeters, 1997; Tsui, Egan, & O'Reilly III, 1992; Wiersema & Bantel, 1992) have used the variance approach to model emergent phenomena such as demographic diversity, norm crystallization, and culture strength in collectives. More recent empirical research has also used similar models of variability to examine emergent phenomena in work settings. Prewett, Walvoord, Stilson, Rossi, and Brannick (2009), for example, found that variability in agreeableness, extraversion, conscientiousness, and emotional stability related to team performance, but only in tasks with frequent communication and work exchanges. Additionally, prior research by Kramer et al. (2014) found that variability in extraversion was positively related to group performance for additive tasks (group members share skills with all other group members) rather than conjunctive tasks (group members work independently toward a common goal).

Summary

Whereas the majority of studies using the theory of emergent phenomena (Kozlowski & Klein, 2000) have examined group performance as the emergent phenomenon of interest, the present research addressed the ways in which group composition (elemental content) can bring about shared leadership (emergent phenomenon) in work groups. Specifically, I used these three models of emergence to explain how individual difference characteristics of team members emerge to predict shared leadership amongst the members of the team. Since the majority of researchers have used Steiner's task types (Steiner, 1972) to determine the most appropriate method of modeling emergent phenomena (e.g., Bell, 2007; Day, Arthur, et al., 2004; Halfhill et al., 2005), I will very briefly describe the four task types under Steiner's typology and explain its relevance in the current research.

STEINER'S TYPOLOGY OF TASKS

Steiner (1972) described how the extent to which group member contributions on team tasks can be shared or divided in several ways. As a result, the ways in which individual-level contributions of team members emerge into emergent phenomena can vary as a function of the task type (Day, Arthur, et al., 2004; Halfhill et al., 2005; Kozlowski & Klein, 2000; Kramer et al., 2014). Steiner (1972) proposed that there are four types of unitary team tasks: disjunctive, conjunctive, additive, and discretionary.

Steiner (1972) defined disjunctive task types as tasks in which "the group can accept only one of the available individual contributions as its own" (p. 17). Such team tasks are mutually exclusive such that, regardless of all other individual contributions, that of one member (typically the stronger or more successful member) is chosen to represent the entire group. Researchers typically use group maximum scores to represent emergent phenomena in teams with disjunctive tasks (Bell, 2007; Day, Arthur, et al., 2004; Kramer et al., 2014; Prewett et al., 2009). On the contrary, conjunctive tasks are those in which the group is no stronger than its weakest member. Steiner used the example of a mountain climbing team to describe how the weakest member on such a task would hinder group performance just enough to overshadow the performance of the remaining members of the mountain climbing team. It is typical to use minimum models to examine emergent phenomena in teams with conjunctive tasks (Bell, 2007; Halfhill et al., 2005; Kramer et al., 2014). Additive task types are those in which the relative contributions of each group member are combined to reflect the group's standing. As Steiner (1972) explained, additive task types require contribution from each group member rather than relying on the contributions of either the strongest (disjunctive tasks) or the weakest member

(conjunctive tasks) to represent the collective standing. It is common to use either the mean or sum of individual group members when modeling emergent phenomena in groups with additive tasks (Barry & Stewart, 1997; Bell, 2007; Halfhill et al., 2005; Small & Rentsch, 2010; Steiner, 1972; Zhou et al., 2017). However, prior research suggests that variance models can predict emergent phenomena in groups with additive tasks (Kramer et al., 2014). Lastly, discretionary tasks are those team tasks in which limited contextual constraints allow members of the group to determine how to combine their individual contributions. In such tasks, members can choose to combine their individual contributions in a disjunctive, conjunctive, or additive manner. Thus, such tasks are considered 'discretionary' as the context grants the work group the latitude to determine how to combine the individual contributions of each group member.

As will be discussed in more detail in the methods section, the current research used a leaderless group discussion (LGD) exercise as the context to observe the emergence of shared leadership in groups. Although the groups were assigned a specific task to complete together, it was up to each group to decide how to best work together to complete the task. On the one hand, some groups could choose to hear ideas from each group member, decide which were the best, and use that idea as the group product (disjunctive task). On the other hand, some groups could choose to work together by having each group member voice their opinions throughout the entire process such that one solution would be created from the individual contributions of each group member (additive task). Even still, some groups could use components of various task types when completing the LGD exercise. Since discretionary task types inherently do not follow a single model of emergence, the present research explored the three approaches previously described as potential routes to the emergence of shared leadership.

GROUP COMPOSITION AND SHARED LEADERSHIP EMERGENCE HYPOTHESES

As mentioned earlier, the primary aim of the current research is to examine the role of group composition characteristics as potential predictors of shared leadership. The characteristics of group composition examined were agreeableness, extraversion, collectivistic work orientation, and trait competitiveness. Specifically, these variables of group composition were chosen based on existing evidence of their impact on various aspects of team functioning. In the following sections, I define each variable being studied and discuss some of the previous research considering each variable in relation to team functioning and how that it relevant for shared leadership. Furthermore, using theory from Steiner (1972) and Kozlowski and Klein (2000), I will present competing models of shared leadership emergence (i.e., mean, minimum/maximum, and variance) to be empirically tested for each of the variables presented.

Agreeableness

Agreeableness is an interpersonally-related personality factor from the Big-Five personality taxonomy whereby agreeable individuals exhibit high levels of interpersonal trust, consideration, and sympathy, and those with low levels of agreeableness are more antagonistic and distrusting of others. Since agreeableness is an indicator of how individuals typically interact with others, it is a highly relevant characteristic of group composition to consider when studying group dynamics and team functioning such as the emergence of shared leadership. Although no study has yet to examine the role of collective agreeableness as a predictor of shared leadership, team agreeableness has been examined in several ways as a predictor of various positive work group outcomes.

Using a mean (convergent) model of team agreeableness, Barrick et al. (1998) sought to explore the role of team agreeableness as a predictor of team viability (team capability to effectively cooperate). However, in a sample comprised of manufacturing team workers, they did not find support for the notion that team agreeableness significantly related to team viability. Contrary to this finding, subsequent empirical studies examining team agreeableness as a predictor of team processes and outcomes has shown that team agreeableness positively relates to several important team processes and outcomes. For example, Neuman, Wagner, and Christiansen (1999) found that team personality elevation (mean) model of team agreeableness was shown to effectively predict overall team performance. More recently, Kong, Konczak, and Bottom (2015) found evidence suggesting that average levels of team agreeableness fully moderated the relationship between team satisfaction and team performance such that when team agreeableness was high, team member satisfaction was not significantly related to team performance. Furthermore, there is evidence suggesting that average team agreeableness moderates the relationship between variability in team agreeableness and constructive controversy (free discussion of diverse ideas), such that the relationship is stronger with higher average levels of team agreeableness (Wang, Chen, Tjosvold, & Shi, 2010). In all, mean models of team agreeableness have been shown to predict the emergence of desirable team functioning.

Although no study has yet to examine whether average team agreeableness relates to shared leadership, there is reason to believe such a relationship may exist. In order for shared leadership to emerge, there must be relatively low intragroup conflict and team members must be mindful of each other's feelings and concerns such that strong group cohesion is maintained. In fact, prior research has found that group cohesion is positively related to shared leadership (Mathieu et al., 2015; Serban & Roberts, 2016). Dijkstra, van Dierendonck, Evers, and De Dreu

(2005), in their article on conflict and well-being at work, suggested that individuals with high agreeableness are less likely to attribute hostile attributions to the actions of others and actively pursue harmonious relations with others. Additionally, since highly agreeable individuals are typically not very argumentative or confrontational, it is likely that groups comprised of such individuals will experience less group conflict and more group cohesion than those comprised of members low in agreeableness. Therefore, agreeableness is likely to relate to shared leadership in that higher average levels of agreeableness will negatively relate to intragroup conflict and positively relate group cohesion and that this will promote the emergence of shared leadership.

Hypothesis 1a: Mean team levels of agreeableness are positively related to shared leadership.

In addition to mean models, some researchers have used minimum discontinuous models to study the role of team agreeableness on team functioning outcomes. Barrick et al. (1998), for example, used a minimum model of team agreeableness alongside of a mean model to determine whether the least agreeable member of a team significantly affected overall team viability. However, the results of their study failed to support the hypothesis that a positive relationship existed between the least agreeable team member and team viability. Nonetheless, other studies have supported the idea that minimum team agreeableness significantly relates to distinct aspects of group functioning. For example, following the notion that agreeableness leads to increased group cohesion (Greene, 1989), Van Vianen and De Dreu (2001) discovered that lowest group members' scores on agreeableness positively related to both task cohesion and task performance. A study by Neuman and Wright (1999), which included 79 four-person human resource work groups, found that the agreeableness score for the least agreeable work group member positively related to team-level performance, conflict resolution, and open communication. Meta-analytic

evidence suggests that the least agreeable team member can significantly disrupt team performance (Bell, 2007). Moreover, in their examination of the predictors of team helping behavior and team helping norms, Raver et al. (2012) discovered that minimum team agreeableness significantly related to both average team helping behavior and team helping norms. Thus, there is substantial empirical evidence supporting the notion that a minimum model of team agreeableness is an appropriate method of examining the emergence of various desirable emergent phenomena in work groups.

It is likely that the least agreeable team member can influence the emergence of shared leadership in teams. As mentioned earlier, those with low agreeableness may lack the skills needed to deescalate group conflicts when they arrive and may even contribute to conflict within the group. For example, in a group with mostly agreeable members, one highly disagreeable member can create a negative team environment by lacking the consideration, politeness, and interpersonal discernment necessary to maintain positive and constructive team functioning. Buttressing this view, Dijkstra et al. (2005) suggested that those low in agreeableness are more likely to misattribute the actions of others, and that such individuals can exacerbate small group conflicts. The increase in group conflict will likely decrease group cohesion, therefore diminishing the potential for shared leadership to emerge. Hence, I expect that teams in which the least agreeable team members' agreeableness scores are high will result in more shared leadership relative to teams in which the least agreeable members' agreeableness scores are low.

Hypothesis 1b: Minimum team levels of agreeableness are positively related to shared leadership.

Although much research has used convergent and minimum models to explore the role of team agreeableness on emergent phenomena in work groups, far less research has used a

variance approach to model team agreeableness. Nevertheless, research by Barrick et al. (1998) and Bell (2007) suggested that variability in team agreeableness positively relates to team conflict. In many cases, team conflict is negatively related to team performance (De Dreu & Weingart, 2003). However, others have noted that some amount of task conflict (disagreement concerning how to approach team duties) can result in better team outcomes (De Dreu, 2006; DeChurch & Marks, 2001; Jehn, 1995; Jehn & Mannix, 2001). Building on this line of research, Wang et al. (2010) sought to understand ways in which team conflict might be beneficial to overall effective team functioning. These researchers found that agreeableness diversity (i.e., variability in team agreeableness) significantly and positively related to constructive controversy, which they define as "the open-minded discussion of diverse views" (p. 139). More importantly, Wang et al. (2010) found constructive controversy to positively predict team effectiveness. Taken together, these findings indicate that variability in team agreeableness may result in more conflict, but that this conflict may ultimately result in greater team effectiveness. While shared leadership is a team process is facilitated by cohesive team environments (i.e., little team conflict) and often predicts improved team effectiveness, it is unclear whether variability in team agreeableness will positively or negatively predict shared leadership. As a result, the present study sought to answer the following research question:

Research Question 1: How does variability in team agreeableness relate to shared leadership?

Extraversion

Extraversion is an interpersonally-related Big-Five personality trait whereby individuals high in extraversion are sociable, active, and tend to experience positive emotions such as

happiness and pleasure (Costa & McCrae, 1992). Implicit leadership theory argues that individuals have schemas for people in leadership positions (Lord, Foti, & De Vader, 1984), and prior meta-analytic evidence suggests that people tend to perceive extraverts as leaders more than introverts (Lord et al., 1986). Another meta-analysis found that extraversion positively relates to leader emergence in LGDs (Ensari, Riggio, Christian, & Carslaw, 2011).

The highly referenced meta-analysis of personality and performance by Barrick and Mount (1991) concluded that extraversion positively predicts job performance for jobs requiring much interpersonal interaction better than for job requiring little interpersonal interaction. Supporting this notion at the group level, Barrick et al. (1998) found that average team levels of extraversion positively related to the team's ability to effectively cooperate (i.e., team viability). Examining the role of personality on group interaction style and group contextual performance, Balthazard, Potter, and Warren (2004) studied average team extraversion in relation to constructive interaction style, which they described as being "characterized by a balanced concern for personal group outcomes, cooperation, creativity, free exchange of information, and respect for others' perspectives" (p. 42). Contrary to the findings of Barrick et al. (1998), Balthazard et al. (2004) did not find a significant relationship between average team extraversion and group contextual performance, and found that average levels of team extraversion negatively predicted constructive interaction style. However, supporting the results of Barrick et al. (1998), a study by Van Vianen and De Dreu (2001) found that average team extraversion was positively related to social cohesion in groups. Moreover, meta-analytic evidence suggests that average team extraversion positively predicts team performance (Bell, 2007).

With shared leadership being an emergent group phenomenon that requires coordinated group interaction and communication, it is expected that extraversion as a group composition

variable should relate to the emergence of shared leadership. Specifically, groups with higher average levels of extraversion will likely verbally distribute ideas amongst group members to a greater to degree than groups with lower average levels of extraversion. Furthermore, this sharing of ideas is likely to foster greater task cohesion amongst group members and possibly even greater social cohesion as people are often more attracted to others with which they feel comfortable talking. Supporting these claims, previous studies using mean models have found that team extraversion positively relates to respect, cooperation, and social cohesion (Balthazard et al., 2004), all of which likely influence the free flow of information within groups. Since both knowledge sharing and group cohesion are important correlates of shared leadership (Mathieu et al., 2015; Pearce & Conger, 2002; Serban & Roberts, 2016), I expect average team extraversion to positively relate to shared leadership.

Hypothesis 2a: Mean team levels of extraversion are positively related to shared leadership.

Far less research has used a minimum/maximum approach to modeling team extraversion in groups. The single exception identified in this literature review using a minimum/maximum approach to modeling team extraversion found that the least extraverted (minimum) group member's extraversion score positively predicted group social cohesion (Van Vianen & De Dreu, 2001) in both student and field samples. Interestingly, in the same study, the researchers found that the most extraverted (maximum) group member's extraversion score positively predicted group social cohesion in the student sample but not in the field study. Despite the paucity of research using a minimum/maximum approach when exploring team extraversion, the existing evidence suggests that a minimum model exhibits more consistent results relative to a maximum model.

Building on these findings, it is expected that the least extraverted team member will likely influence the emergence of shared leadership in work groups. Individuals low in extraversion, being less likely to engage in social interaction, will be more likely to withhold information that could be valuable to the team. In addition, the least extraverted team member may create an internal group environment that makes it uncomfortable for more extraverted team members to speak freely with other members of the group. An internal environment such as the one just described will likely reduce the overall cohesiveness of the group since open communication is a necessary correlate of social cohesion. As both knowledge sharing and group cohesion are vital for the emergence of shared leadership to take place, the least extraverted team member will likely play an important role in the emergence of shared leadership. Specifically, the higher the extraversion score for the least extraverted team member, the more shared leadership is expected to emerge for the group.

Hypothesis 2b: Minimum team levels of extraversion are positively related to shared leadership.

Lastly, several studies have used a variance approach to modeling team extraversion in relation to various emergent phenomena in workgroups. Although Neuman et al. (1999) found that variability of extraversion in teams positively related to team performance, they also discovered that variability of extraversion in teams did not significantly relate to team viability. Other researchers have found that variability in team extraversion does not relate to, and may even disrupt, effective group functioning. For example, Van Vianen and De Dreu (2001) did not find evidence suggesting that variance in extraversion related to social cohesion or task cohesion. Furthermore, Balthazard et al. (2004) found that variation in extraversion was negatively related to both contextual performance and constructive interaction style, and was positively related to a

passive/defensive style, which they described as being focused on maintaining group harmony at the expense of knowledge sharing, open communication and questioning, and impartiality.

Based on existing research, it appears that variability in team extraversion should disrupt shared leadership in groups. Namely, Balthazard et al. (2004) found that variability in team extraversion negatively related to open communication and knowledge sharing. Whereas groups comprised of highly extraverted individuals would likely engage in open communication which results in the free flow of information between group members, teams with a mixture of extraverted and introverted members may speak out less so as not to create conflicts with one another. More importantly, high variability in extraversion indicates low within-group agreement regarding the optimal amount of communication within the group. Accordingly, for groups with high variability in extraversion, a portion of the group members will prefer less verbal communication between group members, whereas others will prefer more verbal communication. This disagreement is likely to result in greater task and relationship conflict, decreased social cohesion, and ineffective knowledge sharing amongst members of the group. In turn, these negative team processes will hinder the emergence of shared leadership.

Hypothesis 2c: Group variability in extraversion will be negatively related to shared leadership.

Collectivistic Work Orientation

Collectivistic work orientation is an individual difference construct described as an individual's preference for working in groups rather than by oneself (Eby & Dobbins, 1997). Various researchers (e.g., Hofstede, 1980, 1984; Triandis, 1995) have argued that although collectivistic orientation as an individual-level characteristic stems from higher-level (e.g., organizational, societal) cultural orientations, substantial within-group variation of collectivistic orientation exists within collectives such that collectivistic orientation may not be the same for every individual within a given collective. Almost all research considering the collectivistic work orientation in organizations has explored how it relates to unit-level functioning and outcomes. As shared leadership is an emergent phenomenon within the context of work groups, it is expected that collectivistic work orientation will be related to the emergence of shared leadership.

Supporting this notion, the one study examining group composition as a predictor of shared leadership (Small & Rentsch, 2010) found that mean team collectivistic work orientation significantly predicted shared leadership at time 1, but not at time 2. As with the majority of studies examining team collectivistic work orientation, Small and Rentsch (2010) operationalized team collectivistic work orientation as the average orientation of all of the members of the team. Other studies using a similar operationalization (mean model) of team collectivistic work orientation have also found that higher team collectivistic work orientation positively relates to desirable team outcomes. For example, Eby and Dobbins (1997) found that team cooperation mediated the relationship between team collectivistic composition and team performance, such that higher average team collective composition led to higher team cooperation and that, in turn, positively related to team performance. found that average team

collectivistic work orientation positively related to team empowerment and indirectly related to knowledge sharing by way of increased team empowerment and development competition. Furthermore, meta-analytic evidence by Bell (2007) suggested that there is a moderate to large correlation between average team collectivistic work orientation and team performance in field settings.

As shared leadership is stronger in groups where there is better coordination of tasks, communication, and cohesion, it is likely that having groups comprised of members who prefer working with others (i.e., high collectivistic work orientation) would result in more shared leadership relative to groups comprised of members who prefer working alone (i.e., low collectivistic work orientation). Buttressing this view, as mentioned earlier, empirical evidence suggests that higher average team collectivistic work orientations result in greater group cooperation and knowledge sharing, both of which are related to shared leadership. Additionally, Small and Rentsch (2010) found some support for a positive relationship between team collectivistic work orientation and shared leadership. Therefore, I expect that average team collectivistic orientation will positively relate to shared leadership.

Hypothesis 3a: Mean team levels of collectivistic work orientation are positively related to shared leadership.

No research was identified that took a minimum/maximum approach when studying team collectivistic work orientation in terms of group composition. Eby and Dobbins (1997), however, conducted a mean-split of collectivistic orientation, such that group members were categorized as either “high collectivistic orientation” or “not high collectivistic orientation,” and team collectivistic work orientation was determined by calculating the average collectivistic work orientation of the group members with high collectivistic orientation. The results of their analysis

indicated that groups comprised of members with high collectivistic work orientation exhibit greater team cooperation relative to those with members having low collectivistic work orientation. Nonetheless, this approach does not reflect a true maximum model insofar as multiple group members' collectivistic orientation scores were used to compute the overall team collectivistic work orientation score. However, there is evidence that people with individualistic orientations (those on the end of the continuum opposite of those with collectivistic orientations) are less likely to exhibit cooperative behavior relative to those with collectivistic orientations (Kozlowski & Bell, 2003; Wagner, 1995). There is also empirical evidence suggesting that those with more individualistic orientations are less likely to engage in knowledge sharing behavior relative to those with more collectivistic orientations (Muller, Spiliopoulou, & Lenz, 2005).

In summary, there is evidence suggesting that the team member with the lowest collectivistic work orientation can disrupt group processes that are vital to the emergence of shared leadership. Specifically, those with low collectivistic work orientations, having a low preference for working in groups, are less likely to cooperate well with others when placed in a group. A possible explanation for this may be that when working in a group, those with low collectivistic work orientation are motivated to maximize their own independence within the group by limiting knowledge sharing and open communication with others, as well as working to complete group objectives by themselves. As a result, group members that score low on collectivistic work orientation can disrupt team processes that are critical for the emergences of shared leadership (i.e., knowledge sharing, open communication, team cohesion). Thus, it is expected that the group member that scores the lowest on this personality trait can affect shared leadership for the entire group, such that the lower the collectivistic work orientation score for the team member with the lowest score for this trait, the less likely shared leadership is expected

to emerge. Accordingly, the higher the collectivistic work orientation score for the team member with the lowest score for this trait, the more likely shared leadership is expected to emerge.

Hypothesis 3b: Minimum team levels of collectivistic work orientation are positively related to shared leadership.

The only study that I identified considering variability in team collectivistic work orientation is by Dierdorff, Bell, and Belohlav (2011). In this study, the authors were interested in determining the relationship between team collectivistic work orientation, amongst other variables, in relation to team-member exchange (TMX). Like the related leader-member exchange (LMX) construct, Seers (1989) described TMX as group members' perceptions of the quality of social exchanges in their team or work group. In their primary analyses, Dierdorff et al. (2011) measured team collectivistic work orientation as the average collectivistic orientation among the group members. However, they also controlled for variability in collectivistic orientation among team members and discovered that it did not significantly relate to TMX.

Although there is inadequate justification for a hypothesis involving the relationship between variability in team collectivistic work orientation and shared leadership, it is still worthwhile to examine whether such a relationship exists. For example, it may seem reasonable to assume that groups with high variance in collectivistic work orientation would exhibit less shared leadership than groups with less variability. Specifically, since collectivistic work orientation captures an individual's preference for group work, it is likely that groups wherein all members have relatively high collectivistic work orientations will work better together than groups wherein some members are high while others are low in collectivistic work orientation. In latter case, it may be difficult to coordinate the responsibilities of all group members when some would prefer to work alone rather than with others. As a result, those with high collectivistic

work orientation may clash with members who prefer to work alone over how group tasks ought to be completed. This would most likely result in less shared leadership. However, variability may not have a large effect in groups with low average collectivistic work orientations. Since these groups are comprised of members who mostly prefer to work alone, they are already more likely to disagree on group responsibilities and how to handle potential group conflicts and would likely exhibit little shared leadership. Thus, I sought to answer the following research question in the present research:

> **Research Question 2:** How does variability in team collectivistic work orientation relate to shared leadership?

Trait Competitiveness

As stated by Spence and Helmreich (1983), trait competitiveness is "the enjoyment of interpersonal competition and the desire to win and be better than others" (p. 41). Typically, trait competitiveness is studied in relation to individual-level outcomes such as performance (Fletcher, Major, & Davis, 2008) and motivation (Brown, Cron, & Slocum Jr, 1998). Thus, trait competitiveness can function in ways that are beneficial to organizations. However, research has shown that too much competition can be detrimental to employees and organizations insofar as highly competitive individuals may be more likely to experience stress (Fletcher et al., 2008) and may even engage in unethical behavior for the sake of winning (Mudrack, Bloodgood, & Turnley, 2012). Although effects of trait competitiveness in organizations has received quite a bit of attention, trait competitiveness in relation to group processes has received far less research attention relative to personality and cultural traits. Nonetheless, there is evidence suggesting that both intragroup competition and trait competitiveness can influence emergent team outcomes.

Rather than examining competition as a characteristic of group composition, researchers have studied the role of intragroup competition to determine the effects of competition on group processes. For example, prior research by Boos, Franiel, and Belz (2015) found that groups with greater intra-group competition exhibited weaker group cohesion relative to groups with less intra-group competition. One study exploring trait competitiveness as a characteristic of group composition found that average trait competitiveness was negatively related to team empowerment, team flexibility, and intra-group knowledge sharing (He et al., 2014).

Despite the prior empirical evidence suggesting that trait competitiveness positively relates to some individual-level work outcomes, research also suggests that greater trait competitiveness can disrupt group processes that are vital to the emergence of shared leadership (e.g., group cohesion and knowledge sharing). This suggests that competitive individuals are less likely to transparently share task-relevant information with their group members relative to those who are less competitive. Furthermore, competitive individuals are less likely to freely communicate and cooperate well with others, which likely hinders effective group cohesion. Together, knowledge sharing (Hoch, 2014) and cohesion (Hoch & Kozlowski, 2014; Mathieu et al., 2015; Pearce & Conger, 2002; Serban & Roberts, 2016) are two important correlates of shared leadership. Additionally, highly competitive individuals are more likely to put their interests above the interests of the collective. As a result, such individuals may try to take charge in group settings rather that work collaboratively with others so that they are perceived as more knowledgeable and in control. When groups have several members vying to be perceived as the team leader, shared leadership will likely not exist since group members are more interested in competing with others rather than working together to achieve common goals. Hence, I present the following hypothesis:

Hypothesis 4a: Mean team levels of trait competitiveness are negatively related to shared leadership.

To date, no research has used either a minimum/maximum or variance approach to modeling team competitiveness as a characteristic of group composition. However, it is quite possible that the most competitive group member influences shared leadership emergence as much, if not more than the rest of the group. For example, in a group with relatively non-competitive members, one member who is extremely competitive may undermine the group's efforts to freely share task-relevant information, quickly resolve group conflicts, and distribute group responsibilities evenly amongst all group members. In such a case, despite the group's best efforts, little shared leadership will exist because the highly competitive individual will put his or her own agenda ahead of the group's goals. Hence, I hypothesize the following:

Hypothesis 4b: Maximum team levels of trait competitiveness are negatively related to shared leadership.

Similarly, there was little support in the literature to justify a hypothesis concerning variability in team competitiveness. Since less variability suggests greater intragroup agreement, groups with members who are mostly competitive or mostly collaborative may work together better than groups comprised of a mixture of competitive and collaborative members. Therefore, it is quite possible that teams with less variability will exhibit more shared leadership than groups with greater variability in team competitiveness. To explore these possible outcomes, I sought to answer the following research question in the present study:

Research Question 4: How does variability in team trait competitiveness relate to shared leadership?

METHOD

Sample

A total of 385 undergraduate psychology students from a large university in the southeastern United States participated in this study. Participants worked in groups ranging in size from 3 to 6 members with an average group size of 4.13 members (SD = .83). Participants had an average age of 19.29 years (SD = 2.68). A total of 243 participants (63.1%) identified themselves as female, 140 participants (36.4%) identified as male, and 2 participants (.5%) chose not to report their gender. Regarding ethnicity, 40.8% were White, 23.6% were Hispanic, 15.1% were Black or African American, 10.7% were Asian, 7.0% had multiple ethnicities, and the remaining 2.3% indicated they were of another ethnicity or chose not to report their ethnicity. Although the majority of participants (64.7%) indicated that they were not currently employed, a total of 135 participants (35.3%) indicated that they were employed at the time they completed the study.

Procedure

Upon entering the lab, participants were assigned a participant identification number (PIN) that was used to match their data on the two surveys. After consenting to participate in the study, participants first completed an online survey including measures of personality, collectivistic work orientation, trait competitiveness, and demographic variables. Immediately following completion of the first survey, participants completed an LGD exercise with two to five other team members. In the LGD exercise, groups were told that the chair of the psychology department at their university is interested in hearing from students about what makes an effective instructor. Each group was provided an initial list of 17 attributes of effective classroom

teaching, and were instructed to remove five items, generate three additional items, and rank the remaining 15 items from most to least important. This task was previously used by Campbell, Simpson, Stewart, and Manning (2003) and was slightly adapted to meet the needs of the current research. All group interactions during the LGD were recorded for further data analysis. The materials provided to participants for the completion of the LGD exercise are provided in Appendix A. After finishing the LGD exercise, participants completed a second online survey including measures of shared leadership. The complete measures included in both the first and second surveys are shown in Appendix B.

Survey 1 Measures

Personality

Agreeableness and extraversion were assessed using Goldberg's (1999) 10-item measures for both constructs. A sample item of the agreeableness scale read: "Sympathize with others' feelings. " A sample item of the extraversion scale read: "Don't mind being the center of attention." For both scales, participants were asked to indicate how accurately each statement describes themselves by using a Likert scale ranging from 1 (Very inaccurately) to 5 (Very accurately). Coefficient alphas were .87 for agreeableness and .91 for extraversion.

Collectivistic Work Orientation

Jackson, Colquitt, Wesson, and Zapata-Phelan's (2006) 15-item measure of psychological collectivism was used to measure collectivistic work orientation. Participants were instructed to think about the work groups that they currently belong and/or have belonged to in the past and indicate the extent to which they agree with several statements using a Likert scale

ranging from 1 (Strongly disagree) – 5 (Strongly agree). A sample item read: “I wanted to work with those groups as opposed to working alone.” The coefficient alpha for this measure was .82.

Trait Competitiveness

Trait competitiveness was measured using the four-item measure by Helmreich and Spence (1978). Respondents indicated the extent to which they agreed with various statements by using a Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). A sample item read: “It is important to me to perform better than others.” The coefficient alpha for this scale in the current study was .79.

Survey 2 Measures

Shared Leadership

Shared leadership was measured two separate ways. First, I used the social network analysis approach to measure shared leadership in this study. Specifically, I used the 1-item measure of shared leadership created by Carson et al. (2007). The item read: “Use the scale to indicate the extent to which your team relied on *Team Member X* for leadership.” The endpoints for the scale ranged from 1 (To a very small extent) to 5 (To a very great extent). Participants answered the same question for each of their team members in the place of *Team Member X*. As is commonly used when taking a social network approach to shared leadership (e.g., Carson et al., 2007; D’Innocenzo et al., 2016; Serban & Roberts, 2016), I determined the network density by summing all individual perceptions of team members’ leadership and dividing by the total number of possible network ties for each group. I used a specialized calculation approach to appropriately measure the valued ties present in the data. Since participants rated each of their

fellow group members leadership contribution on a scale ranging from 1 to 5, each tie has a maximum value of 5 and a minimum value of 1. Furthermore, the calculation for the total number of possible ties varies as a function of group size (n) and is presented in the following expression: ($n \times (n - 1) \times 5$). Thus, a group of three has a total of 30 possible ties (or 6 ties each having a maximum strength of 5), and a group of six has a total of 150 ties (or 30 ties each having a maximum strength of 5).

Second, participants completed the 25-item measure of shared leadership by Hiller, Day, and Vance (2006). This scale asks respondents to indicate how frequently their team members shared in various aspects of leadership. A sample item read: "Organizing tasks so that work flows more smoothly." The scale ranges from 1 (Never) to 7 (Very frequently). Hiller et al. (2006) found that the 25 items divide into four factors (i.e., planning and organizing, problem solving, support and consideration, and development and mentoring). A review of the 25 items in the scale revealed that not all items in the scale were relevant for the present research. A team of four research assistants with extensive knowledge of the study independently rated each item on its relevance to the study. After rating the items, I facilitated a discussion to reach consensus between each of the four raters. This process led me to remove six items that were irrelevant to the task used in the present study. For example, one of the removed items read: "Helping out when a team member is learning a new skill," and another item read: "Allocating resources according to team's priorities." The full 25-item scale is listed in Appendix B with the dropped items noted with an "X." The coefficient alpha of the remaining 18 items was .90.

Control Variables

To better understand how the hypothesized variables related to shared leadership, I controlled for both the gender and racial makeup of the group as both variables have been empirical shown to significantly relate to leadership perceptions. Although meta-analytic evidence has found that that men and women are equally effective as leaders, additional meta-analytic results suggest that men are perceived as leaders more than women (Eagly & Karau, 1991; Eagly, Karau, & Makhijani, 1995). Furthermore, recent empirical research suggests that Caucasian Americans are perceived as leaders more than racial minorities within the United States (i.e., Asian Americans; Sy et al., 2010). For group gender diversity, I calculated the proportion of males in each group as males were the minority in the current research. Similarly, for ethnic diversity, I dichotomized ethnicity by assigning White/Caucasian participants a value of 1 and non-White/non-Caucasian participants a value of 2 and calculated the proportion of non-Whites in each group. Although Whites/Caucasians constituted less than half of the sample, Whites/Caucasians were the single largest ethnic group represented in the current research. I also included group size as a control variable. In addition to group size and gender and racial makeup of the group, I also controlled for the mean levels of each predictor variable when testing the minimum/maximum and variance models for the same variable. This was done to determine whether there is incremental validity in using a minimum/maximum or variance model above and beyond a mean model when testing the various predictors of shared leadership.

Task Interest

One possible concern with the current study is whether participants showed enough interest in the task to put forth the necessary effort to complete the task. After completing the

task, participants self-reported task interest using an adapted version of the four-item measure of task interest from Van Yperen (2003). A sample item from the measure reads: “Did you take interest in doing the group task?” Respondents answered each question by using a five-point Likert scale ranging from 1 (Not at all) to 5 (Very much). The coefficient alpha for this measure in the current study was .90. The average total task interest across all 384 participants in the present study was 4.07 (SD = .90), which indicates that most participants were at least moderately interested in the group task used in this study. This provides some level of confidence that participants generally exerted the necessary effort to complete the task-at-hand.

RESULTS

Analyses

The independent variables for the analyses were group composition of agreeableness, extraversion, collectivistic work orientation, and trait competitiveness. Each of these variables were aggregated to the group-level using several composition models: mean, minimum, maximum, and/or variance. Group averages were calculated by adding together the individual group members' scores and dividing by the group size. Minimum and maximum group scores were calculated by identifying the lowest (minimum) and highest (maximum) scoring individual group member for a given personality construct of interest and assigning that value to the group. Lastly, group variability was calculated using the standard deviation among individual group members for a given personality construct of interest. Since we make no assumptions that members of a group will be similar in their levels of each of the four personality variables of interest, it is inappropriate to provide evidence of within-group agreement concerning group composition (Klein & Kozlowski, 2000).

The primary dependent variable for the analyses was shared leadership. Shared leadership was measured two ways. First, it was measured using a one-item measure of network density of shared leadership. Network density was calculated through the social network analysis approach using the UCINET statistical software. Second, participants completed an 18-item measure of shared leadership that was aggregated to reflect the extent to which shared leadership was perceived by the entire group. A one-way analysis of variance (ANOVA) with group as the independent factor and the 18-item referent-shift measure of shared leadership as the dependent variable yielded a significant ($p < .01$) result. The ICC(1) value was .12 and the ICC(2) value was .35. Lastly, the average within-group agreement ($r_{WG(j)}$) was .91 and the median value was

.96, both of which were above the commonly used .70 threshold (Klein & Kozlowski, 2000). Taken together, these statistics provide justification for the aggregation of individual reports using the 18-item measure of shared leadership to the group-level. The correlation between the network density and referent-shift consensus operationalizations of shared leadership was .30, indicating that these two approaches capture different aspects of the shared leadership construct.

Multiple regression analyses were used to test each of the hypotheses. Mean-centered predictor and control variables were included in the regression analyses in accordance with analytical standards (Cohen, Cohen, West, & Aiken, 2003). The two operationalizations of shared leadership were regressed onto each of the predictor variables in separate regression analyses. Multiple regression analyses were conducted using IBM SPSS 25.

Descriptive statistics (i.e., means and standard deviations) and intercorrelations of the study variables are displayed in Table 1. Concerning the control variables, group gender composition (% of females in the group) significantly correlated with average group agreeableness (r = .29) and minimum group agreeableness (r = .25). Additionally, a significant, negative correlation (r = -.23) was found between ethnic minority proportion and average group extraversion. I also found significant, negative correlations between group size and both minimum group agreeableness (r = -.25) and minimum group collectivistic work orientation (r = -.24), and a positive correlation between group size and variability in group collectivistic work orientation (r = .28). Accordingly, I controlled for the effect of group gender composition, group ethnic minority proportion, and group size when testing hypotheses involving variables that were found to significantly correlate with these control variables.

Table 1: Summary of Means, Standard Deviations, and Intercorrelations for Study Variables

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Mean Agree	4.13 (.29)	--																
2. Min Agree	3.50 (.49)	.75	--															
3. SD Agree	.53 (.25)	-.28	-.79	--														
4. Mean Extrav	3.16 (.40)	.35	.24	-.00	--													
5. Min Extrav	2.33 (.54)	.30	.28	-.07	.73	--												
6. SD Extrav	.76 (.30)	.05	-.04	.10	.01	-.57	--											
7. Mean CWO	3.46 (.23)	.09	-.07	.16	.17	.17	-.11	--										
8. Min CWO	2.98 (.41)	.07	.06	.04	.13	.19	-.15	.69	--									
9. SD CWO	.43 (.22)	-.02	-.13	.14	-.02	-.15	.18	-.11	-.73	--								
10. Mean TC	5.12 (.58)	-.02	-.04	.06	.09	-.03	.13	.04	-.11	.08	--							
11. Max TC	6.14 (.58)	-.07	-.12	.04	.05	-.12	.11	-.02	-.21	.21	.67	--						
12. SD TC	.99 (.42)	-.04	-.03	-.00	.03	-.09	.08	-.09	-.15	.21	-.40	.29	--					
13. SL-Den	.65 (.07)	.20	.02	.16	.12	.11	-.02	.09	.01	.06	.02	.00	.02	--				
14. SL-RS	5.12 (.23)	.12	.05	.04	.12	.09	.04	.08	-.04	.12	.02	.06	.07	.30	--			
15. % Female	.63 (.23)	.29	.25	-.09	.13	.10	.15	-.18	-.07	.00	-.12	-.10	-.00	.08	.22	--		
16. % EM	.59 (.21)	.022	.03	-.08	-.23	-.12	-.04	-.02	-.02	-.04	.01	.05	.05	.02	-.11	.02	--	
17. Group Size	3.95 (.83)	-.09	-.25	.13	-.14	-.18	-.05	.04	-.24	.28	.00	.16	.08	-.10	.09	.06	.01	--

Note. N = 97 groups. Agree = Agreeableness; Extrav = Extraversion; CWO = Collectivistic Work Orientation; Max = Maximum; Min = Minimum; SD = Standard Deviation; SL-Den = Shared Leadership using network density approach; SL-RS = Shared leadership using 18-item referent-shift consensus measure; TC = Trait Competitiveness; % EM = Proportion of Ethnic Minorities; % Female = Proportion of Females. All variables presented were measured at the group-level. Asterisks (*) were omitted to conserve space; all $rs \geq |.20|$ are significant at the .05 level; all $rs \geq |.28|$ are significant at the .01 level.

Network Density Measure of Shared Leadership

In the following sections, I present the results for each hypothesis and research question. Due to numerous researchers highlighting the superiority of the social network approach to shared leadership over other operationalizations (D'Innocenzo et al., 2016; Mehra et al., 2006; Wang et al., 2014), I first outline the results of each hypothesis and research question by regressing shared leadership using a network density approach onto each of the predictor variables. Afterward, I highlight noticeable differences in results from using a referent-shift operationalization of shared leadership.

Group Agreeableness

For Hypothesis 1a, I expected average group agreeableness to positively predict shared leadership. After controlling for the effect of group gender composition, results from a hierarchical regression analysis found a non-significant relationship between average group agreeableness and shared leadership (B=.05, SE=.03, ΔR^2=.04, p=.07). Thus, Hypothesis 1a was not supported. Concerning Hypothesis 1b whereby I expected minimum group agreeableness to predict shared leadership, results from a hierarchical regression found, after controlling for the effects of group size, group gender composition, and average group agreeableness, a significant, negative relationship between minimum group agreeableness and shared leadership (B=-.05 , SE=.02, ΔR^2=.04, p<.05). Thus, Hypothesis 1b was not supported as the relationship was expected to be in the opposite direction of what was hypothesized. In Research Question 1, I sought to understand the extent to which group variability in agreeableness predicts shared leadership. After controlling for the effect of average group agreeableness and group gender composition, results from a hierarchical regression analysis found a non-significant relationship

between group variability in agreeableness and shared leadership (B=.05, SE=.03, ΔR^2=.03, p=.10). Lastly, as an exploratory analysis, the relationship between maximum group agreeableness and shared leadership (Exploratory 1) was also tested. After controlling for the effect of average group agreeableness and group gender composition, results from a hierarchical regression analysis found non-significant relationship between maximum group agreeableness on shared leadership (B=.02, SE=.03, ΔR^2=.01, p=.45). The full regression results for analyses involving group agreeableness as a predictor of shared leadership using the network density approach are provided in Table 2.

Table 2: Shared Leadership (Network Density) Regressed on Group Agreeableness

	Hypothesis 1a DV = Shared Leadership		**Hypothesis 1b DV = Shared Leadership**		**Research Question 1 DV = Shared Leadership**		**Exploratory 1 DV = Shared Leadership**	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	.66 (01)***	(64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
Group Size			.00 (.01)	(-.02, .02)				
% Female	.03 (.03)	(-.04, .09)	.01 (.03)	(-.06, .07)	.01 (.03)	(-.06, .07)	.01 (.03)	(-.06, .07)
Mean Agree			.05 (.03)	(-.00, .10)	.05 (.03)*	(-.00, .10)	.05 (.03)*	(-.00, .10)
R^2	.01		.04		.04		.04	
F	.63		1.35		2.04		2.04	
Step 2								
Constant	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)	(.64, .67)	.66 (.01)***	(.64, .67)
Group Size			-.01 (.01)	(-.02, .01)				
% Female	.01 (.03)	(-.06, .07)	.01 (.03)	(-.05, .08)	.01 (.03)	(-.06, .07)	.01 (.03)	(-.06, .07)
Mean Agree	.05 (.03)	(-.00, .10)	.10 (.04)**	(.03, .19)	.06 (.03)*	(.01, .12)	.04 (.03)	(-.03, .10)
Min Agree			-.05 (.02)*	(-.10, -.00)				
SD Agree					.05 (.03)	(-.01, .11)		
Max Agree							.02 (.03)	(-.04, .08)
ΔR^2	.04		.04		.03		.01	
ΔF	3.44		4.44*		2.83		.57	

Note. N = 97 groups. Agree = Agreeableness; DV = Dependent Variable; Max = Maximum; Min = Minimum; SD = Standard Deviation; % Female = Proportion of Females. All variables presented were measured at the group-level.
*p<.05; ** p<.01; ***p<.001

Group Extraversion

For Hypothesis 2a, I expected average group extraversion to positively predict shared leadership. After controlling for the effect of group proportion of ethnic minorities, I found a non-significant relationship between average group extraversion and shared leadership (B=.02, SE=.04, ΔR^2=.00, p=.21). Thus, Hypothesis 2a was not supported. For Hypothesis 2b, I hypothesized that minimum group extraversion would positively predict shared leadership. After controlling for the effect of average group extraversion and group proportion of ethnic minorities, results from a hierarchical regression analysis found a non-significant relationship between minimum group extraversion and shared leadership (B=.00, SE=.02, ΔR^2=.00, p=.84). Hence, Hypothesis 2b was not supported. In Hypothesis 2c, I postulated a positive relationship between group variability in extraversion in shared leadership. After controlling for the effect of average group extraversion and group proportion of ethnic minorities, a hierarchical regression analysis found a non-significant relationship between group variability in extraversion and shared leadership (B=-.00, SE=.03, ΔR^2=.00, p=.93). Thus, Hypothesis 2c was not supported. Lastly, as an exploratory analysis, the relationship between maximum group extraversion and shared leadership (Exploratory 2) was also tested. After controlling for the effect of average group extraversion and group proportion of ethnic minorities, results from a hierarchical regression analysis found non-significant relationship between maximum group extraversion on shared leadership (B=-.00, SE=.02, ΔR^2=.00, p=.96). The full regression results for the analyses involving group extraversion as a predictor of shared leadership using the network density approach are provided in Table 3.

Table 3: Shared Leadership (Network Density) Regressed on Group Extraversion

	Hypothesis 2a DV = Shared Leadership		**Hypothesis 2b DV = Shared Leadership**		**Hypothesis 2c DV = Shared Leadership**		**Exploratory 2 DV = Shared Leadership**	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
% EM	.01 (.04)	(-.06, .07)	.02 (.04)	(-.06, .09)	.02 (.04)	(-.06, .09)	.02 (.04)	(-.06, .09)
Mean Extrav			.02 (.02)	(-.01, .06)	.02 (.02)	(-.01, .06)	.02 (.02)	(-.01, .06)
R^2	.00		.02		.02		.02	
F	.02		.80		.80		.80	
Step 2								
Constant	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
% EM	.02 (.04)	(-.06, .09)	.02 (.04)	(-.06, .09)	.02 (.04)	(-.06, .09)	.02 (.04)	(-.06, .09)
Mean Extrav	.02 (.02)	(-.01, .06)	.02 (.03)	(-.04, .08)	.02 (.02)	(-.01, .06)	.02 (.03)	(-.03, .07)
Min Extrav			.00 (.02)	(-.04, .04)				
SD Extrav					-.00 (.03)	(-.05, .05)		
Max Extrav							-.00 (.02)	(-.04, .04)
ΔR^2	.00		.00		.00		.00	
ΔF	1.58		.04		.01		.00	

Note. N = 97 groups. % EM = Proportion of Ethnic Minorities; DV = Dependent Variable; Extrav = Extraversion; Max = Maximum; Min = Minimum; SD = Standard Deviation. All variables presented were measured at the group-level.
***p<.001

Group Collectivistic Work Orientation

For Hypothesis 3a, I expected average group collectivistic work orientation to positively predict shared leadership. Results from a linear regression analysis found a non-significant relationship between average group collectivistic work orientation and shared leadership (B=.03, SE=.03, ΔR^2=.01, p=.36). Thus, Hypothesis 3a was not supported. Furthermore, after controlling for the effect of group size and average group collectivistic work orientation, results from a hierarchical regression found a non-significant relationship between minimum group collectivistic work orientation and shared leadership (B=-.02, SE=.03, ΔR^2=.01, p=.41). Hence, Hypothesis 3b was not supported. The purpose of Research Question 2 was to understand the predictive role of group variability in collectivistic work orientation on shared leadership. After controlling for the effect of average group collectivistic work orientation, results from a hierarchical regression found a non-significant relationship between group variability in collectivistic work orientation and shared leadership (B=.04, SE=.04, ΔR^2=.02, p=.24). Lastly, as an exploratory analysis, the relationship between maximum group collectivistic work orientation and shared leadership (Exploratory 3) was also tested. After controlling for the effect of average group collectivistic work orientation, results from a hierarchical regression analysis found non-significant relationship between maximum group collectivistic work orientation on shared leadership (B=.03, SE=.03, ΔR^2=.01, p=.26). The full regression results for the analyses involving group collectivistic work orientation as a predictor of shared leadership using the network density approach are provided in Table 4.

Table 4: Shared Leadership (Network Density) Regressed on Group Collectivistic Work Orientation

	Hypothesis 3a DV = Shared Leadership		**Hypothesis 3b** DV = Shared Leadership		**Research Question 2** DV = Shared Leadership		**Exploratory 3** DV = Shared Leadership	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
Group Size			-.00 (.01)	(-.02, .02)	-.00 (.01)	(-.02, .02)		
Mean CWO	.03 (.03)	(-.04, .09)	.03 (.03)	(-.04, .10)	.03 (.03)	(-.04, .10)	.03 (.03)	(-.04, .09)
R^2	.01		.01		.01		.01	
F	.84		.43		.43		.84	
Step 2								
Constant			.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
Group Size			-.00 (.01)	(-.02, .02)	-.00 (.01)	(-.02, .01)		
Mean CWO			.06 (.05)	(-.04, .15)	.04 (.03)	(-.03, .10)	-.00 (.04)	(-.09, .08)
Min CWO			-.02 (.03)	(-.07, .03)				
SD CWO					.04 (.04)	(-.03, .11)		
Max CWO							.03 (.03)	(-.02, .08)
ΔR^2			.01		.02		.01	
ΔF			.68		1.42		1.27	

Note. N = 97 groups. CWO = Collectivistic Work Orientation; DV = Dependent Variable; SD = Standard Deviation. All variables presented were measured at the group-level.
***p<.001

Group Trait Competitiveness

For Hypothesis 4a, I hypothesized a positive relationship between average group trait competitiveness and shared leadership. Results from a linear regression found a non-significant relationship between average group trait competitiveness and shared leadership (B=.00, SE=.01, ΔR^2=.00, p=.85). Thus, Hypothesis 4a was not supported. Hypothesis 4b articulated the expectation of a negative relationship between maximum group trait competitiveness and shared leadership. After controlling for the effective of average group trait competitiveness, results from a hierarchical linear regression analysis found a non-significant relationship between maximum group trait competitiveness and shared leadership (B=-.00, SE=.02, ΔR^2=.00, p=.88). Therefore, Hypothesis 4b was not supported. The purpose of Research Question 4 was to examine the predictive role of group variability of trait competitiveness on shared leadership. After controlling for the effect of average group trait competitiveness, results from a hierarchical regression analysis found non-significant relationship between group variability of trait competitiveness on shared leadership (B=-.00, SE=.02, ΔR^2=.00, p=.97). As an exploratory analysis, the relationship between minimum group trait competitiveness and shared leadership (Exploratory 4) was also tested. After controlling for the effect of average group trait competitiveness, results from a hierarchical regression analysis found non-significant relationship between minimum group trait competitiveness on shared leadership (B=-.00, SE=.01, ΔR^2=.00, p=.85). The full regression results for the analyses involving group trait competitiveness as a predictor of shared leadership using the network density approach are provided in Table 5.

Table 5: Shared Leadership (Network Density) Regressed on Group Trait Competitiveness

	Hypothesis 4a DV = Shared Leadership		**Hypothesis 4b DV = Shared Leadership**		**Research Question 3 DV = Shared Leadership**		**Exploratory 4 DV = Shared Leadership**	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
Mean TC	.00 (.01)	(-.02, .03)	.00 (.01)	(-.02, .03)	.00 (.01)	(-.02, .03)	.00 (.01)	(-.02, .03)
R^2	.00		.00		.00		.00	
F	.04		.04		.04		.04	
Step 2								
Constant			.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)	.66 (.01)***	(.64, .67)
Mean TC			.00 (.02)	(-.04, .05)	.00 (.01)	(-.03, .04)	.00 (.01)	(-.03, .03)
Min TC							-.00 (.01)	(-.03, .02)
Max TC			-.00 (.02)	(-.04, .03)				
SD TC					-.00 (.02)	(-.04, .04)		
ΔR^2			.00		.00		.00	
ΔF			.02		.00		.04	

Note. N = 97 groups. DV = Dependent Variable; Max = Maximum; Min = Minimum; SD = Standard Deviation; TC = Trait Competitiveness. All variables presented were measured at the group-level.
***p<.001

In all, these regression analyses did not find support for any of hypotheses or significant relationships described in any of the research questions. I did, however, find a significant, negative relationship between minimum group agreeableness and shared leadership which was opposite of what was expected in Hypothesis 1b.

Referent-Shift Consensus Measure of Shared Leadership

In addition to examining the predictors of shared leadership as measured by the density of the leadership network, I also analyzed the data using the referent-shift operationalization of shared leadership. Rather than outlining each finding, I highlight findings that were different from those found using the network density approach. Overall, the findings were largely consistent using the referent-shift consensus measure of shared leadership compared to the findings using the network density approach to shared leadership. Specifically, all relationships tested with the referent-shift measure of shared leadership were found to be non-significant. This means that the significant, negative relationship between minimum group agreeableness and shared leadership found using the network density approach was not found using the referent-shift measure (B=-.09, SE=.17, ΔR^2=.00, p=.61). The full regression results for all hypotheses and research questions using the referent-shift consensus measure of shared leadership are provided in Tables 6 through

Table 6: Shared Leadership (Referent-Shift) Regressed on Group Agreeableness

	Hypothesis 1a DV = Shared Leadership		**Hypothesis 1b** DV = Shared Leadership		**Research Question 1** DV = Shared Leadership		**Exploratory 1** DV = Shared Leadership	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Group Size			.05 (.07)	(-.08, .18)				
% Female	.52 (.23)*	(.06, .98)	.46 (.25)	(-.03, .95)	.48 (.25)	(-.01, .96)	.48 (.25)	(-.01, .96)
Mean Agree.			.12 (.19)	(-.26, .51)	.11 (.19)	(-.28, .49)	.11 (.19)	(-.28, .49)
R^2	.05		.06		.05		.05	
F	4.95*		1.94		2.61		2.61	
Step 2								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Group Size			.04 (.07)	(-.09, .18)				
% Female	.48 (.25)	(-.01, .96)	.47 (.25)	(-.02, .96)	.48 (.25)	(-.01, .10)	.46 (.25)	(-.03, .95)
Mean Agree.	.11 (.19)	(-.28, .49)	.23 (.29)	(-.34, .80)	.15 (.20)	(-.25, .55)	-.03 (.24)	(-.50, .44)
Min Agree.			-.09 (.17)	(-.43, .25)				
SD Agree.					.17 (.23)	(-.29, .62)		
Max Agree.							.21 (.21)	(-.21, .63)
ΔR^2	.05		.00		.01		.01	
ΔF	.31		.27		.55		.97	

Note. N = 97 groups. Agree = Agreeableness; DV = Dependent Variable; Max = Maximum; Min = Minimum; SD = Standard Deviation; % Female = Proportion of Females. All variables presented were measured at the group-level.
*p<.05; ** p<.01; ***p<.001

Table 7: Shared Leadership (Referent-Shift) Regressed on Group Extraversion

	Hypothesis 2a DV = Shared Leadership		**Hypothesis 2b DV = Shared Leadership**		**Hypothesis 2c DV = Shared Leadership**		**Exploratory 2 DV = Shared Leadership**	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
% EM	-.28 (.25)	(-.78, .22)	-.22 (.26)	(-.74, .29)	-.22 (.26)	(-.74, .29)	-.22 (.26)	(-.74, .29)
Mean Extrav.			.14 (.14)	(-.14, .41)	.14 (.14)	(-.14, .41)	.14 (.14)	(-.14, .41)
R^2	.01		.02		.02		.02	
F	1.23		1.11		1.11		1.11	
Step 2								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
% EM	-.22 (.26)	(-.74, .29)	-.22 (.26)	(-.74, .30)	-.22 (.26)	(-.74, .30)	-.22 (.26)	(-.74, .30)
Mean Extrav.	.14 (.14)	(-.14, .41)	.13 (.20)	(-.27, .53)	.14 (.14)	(-.14, .41)	-.01 (.18)	(-.37, .35)
Min Extrav.			-.01 (.15)	(-.28, .30)				
SD Extrav.					.05 (.18)	(-.31, .41)		
Max Extrav.							.17 (.13)	(-.10, .44)
ΔR^2	.01		.00		.00		.02	
ΔF	.99		.00		.08		1.62	

Note. N = 97 groups. % EM = Proportion of Ethnic Minorities; DV = Dependent Variable; Extrav = Extraversion; Max = Maximum; Min = Minimum; SD = Standard Deviation. All variables presented were measured at the group-level.
***p<.001

Table 8: Shared Leadership (Referent-Shift) Regressed on Group Collectivistic Work Orientation

	Hypothesis 3a DV = Shared Leadership		**Hypothesis 3b** DV = Shared Leadership		**Research Question 2** DV = Shared Leadership		**Exploratory 3** DV = Shared Leadership	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Group Size			.05 (.07)	(-.08, .18)	.05 (.07)	(-.08, .18)		
Mean CWO	.19 (.24)	(-.28, .66)	.19 (.24)	(-.29, .66)	.19 (.24)	(-.29, .66)	.19 (.24)	(-.28, .66)
R^2	.01		.01		.01		.01	
F	.66		.66		.66		.66	
Step 2								
Constant			5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Group Size			.03 (.07)	(-.12, .16)	.03 (.07)	(-.10, .17)		
Mean CWO			.46 (.33)	(-.15, 1.15)	.22 (.23)	(-.26, .70)	-.01 (.31)	(-.63, .61)
Min CWO			-.49 (.34)	(-.22, 1.14)				
SD CWO					.29 (.26)	(-.23, .80)		
Max CWO							.20 (.20)	(-.19, .59)
ΔR^2			.01		.01			
ΔF			1.28		1.24			

Note. N = 97 groups. CWO = Collectivistic Work Orientation; DV = Dependent Variable; Max = Maximum; Min = Minimum; SD = Standard Deviation. All variables presented were measured at the group-level.
***p<.001

Table 9: Shared Leadership (Referent-Shift) Regressed on Group Trait Competitiveness

	Hypothesis 4a DV = Shared Leadership		**Hypothesis 4b DV = Shared Leadership**		**Research Question 3 DV = Shared Leadership**		**Exploratory 4 DV = Shared Leadership**	
	B (SE)	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**	**B (SE)**	**CI**
Step 1								
Constant	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Mean TC	.02 (.10)	(-.17, .20)	.02 (.10)	(-.17, .20)	.02 (.10)	(-.17, .20)	.02 (.10)	(-.17, .20)
R^2	.00		.00		.00		.00	
F	.03		.03		.03		.03	
Step 2								
Constant			5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)	5.12 (.05)***	(5.02, 5.23)
Mean TC			-.04 (.13)	(-.29, .22)	.05 (.10)	(-.15, .26)	.23 (.16)	(-.08, .54)
Max TC			.08 (.13)	(-.18, .33)				
SD TC					.12 (.14)	(-.16, .41)		
Min TC							-.16 (.10)	(-.35, .03)
ΔR^2			.00		.01			
ΔF			.36		.72			

Note. N = 97 groups. DV = Dependent Variable; Max = Maximum; Min = Minimum; SD = Standard Deviation; TC = Trait Competitiveness. All variables presented were measured at the group-level.
***p<.001

Additional Analyses

To delve deeper into the primary results of this study, I ran identical linear regression analyses for separate clusters of groups based on the strategy groups used to solve the problem, the amount of time groups spent talking about non-task-relevant content, and the amount of time groups needed to complete the task. In addition to the results of these additional analyses, a brief description of the method used to code each of these variables are provided in the respective sections below. Most of the results are given in a summative format to conserve space and limit redundancy. Detailed results are provided only for those analyses that yielded significant results.

Group Task Strategy

According to Steiner (1972), discretionary tasks such as the one used in the present study allow groups to create their own strategies to approach the task at hand. To determine whether the type of strategy used had an impact on the level of shared leadership reported, I reviewed the video recordings of each group and noted each group's method of completing the task. Due to clerical errors, video recordings for two group were missing. Therefore, a total of 95 groups were coded for group task strategy and included in these additional analyses. Across these 95 groups, I observed three different, and almost equally common task strategies. The first strategy involved group members first completing the task alone and then discussing as a group to determine the final solution for the group. The second strategy involved group members first reading through the task separately and then completing the actual task together as a group. The third strategy used involved groups reading and working through the task entirely as a group. Accordingly, it appears that all groups approached the task using slight variations of an additive task type according to Steiner's (1972) typology of tasks.

To determine whether these slight variations in task strategy impacted shared leadership, I ran the same analyses as were described in the preceding sections after sorting the groups by task strategy. Concerning the social network analysis approach using network density, the results of these analysis found that each of the predictor variables did not significantly relate to shared leadership regardless of the task strategy used by the group. The results of these same analyses using the referent-shift consensus measure of shared leadership were largely similar. The only exceptions were found for minimum group extraversion and variability in group extraversion. For groups in which members first familiarized themselves with the task materials alone and then completed the rest of the task together, there was a significant, positive relationship between minimum group extraversion and shared leadership using the referent-shift consensus measure (B=.66, SE=.24, ΔR^2=.18, p<.05). There was a non-significant relationship between minimum group extraversion and shared leadership for groups who used either of the other two task strategies. Similarly, for groups in which members first familiarized themselves with the task materials alone and then completed the rest of the task together, there was a significant, negative relationship between group variability in extraversion and shared leadership using the referent-shift consensus measure (B=-.70, SE=.33, ΔR^2=.12, p<.05). There was a non-significant relationship between group variability in extraversion and shared leadership for groups who used either of the other two task strategies. These results indicate that the strategy groups used to complete the task related to the extent to which multiple models of group extraversion predicted shared leadership in this study, but only when shared leadership was measured using a referent-shift consensus approach.

Off-task Talking

In addition to group task strategy, I also considered whether the amount of time groups spent talking about content that was irrelevant to the task impacted shared leadership. Due to limited time and resources, data for off-task talking was coded for only 46 out of 97 groups. Despite being slightly less than half of the total sample of groups, 46 groups should provide enough power to determine whether there are trends in the data that warrant follow-up analyses using the full sample. A group of 12 research assistants were trained to code off-task talking. Three research assistants were assigned to code each group. To reduce bias, all twelve research assistants were blind to each other's coding responses. The average intraclass correlation coefficient across the three raters for each group was .94 which is evidence of strong interrater reliability. Accordingly, the average across all three raters for each group was used to reflect group off-task talking. A review of the frequency of group off-task talking reflected that a total of 28 groups (60.9%) did not engage in off-task talking. The remaining groups engaged in an average of 18.33 seconds (SD = 44.09).

To determine whether the amount of group off-task talking moderated relationships between the predictors and shared leadership, I ran the same analyses as were described in the preceding sections with the inclusion of the moderator variable (group off-task talking) and interaction term in each of the full regression models. Results of these analyses indicated that the amount of group off-task talking did not significantly moderate relationships between any of the predictor variables or shared leadership using either the social network approach or the referent-shift consensus approach.

Total Task Time

Further analyses were conducted to determine whether there were significant differences in the extent to which the various predictor variables related to shared leadership as a function of the amount of time groups took to complete the task. Each group had up to 30 minutes to complete the task. Total task time was calculated by watching each group video, identifying the starting time (once the research assistants left participants to complete task) and ending time (once the participants completed the task or the research assistants re-entered the room), and calculating the difference between the two time points. This is the same time window that research assistants used when coding group off-task talking. The average total task time was 22.86 minutes (SD = 6.47).

To determine whether the total amount of time each group needed to complete the task moderated relationships between the predictors and shared leadership, I ran the same analyses as were described in the preceding section with the inclusion of the moderator variable (total task time) and interaction term in each of the full regression models. Results of these analyses indicated that the total task time did not significantly moderate relationships between any of the predictor variables or shared leadership using either the social network approach or the referent-shift consensus approach.

Curvilinear Effects

Lastly, I ran additional analyses to determine whether there were curvilinear relationships between mean levels of each of the group composition variables and either the social network density approach or the referent-shift consensus measure of shared leadership. Curvilinear relationships were tested by calculating squared terms for each of the mean-centered variables

for average group agreeableness, extraversion, collectivistic work orientation, and trait competitiveness. Afterward, these newly created quadratic terms were included as an additional step of the same hierarchical regression analyses used to test the mean models for each of the group composition variables. Results did not support curvilinear relationships between any of the mean levels of the four group composition variables and shared leadership using either the social network or referent-shift consensus approach.

DISCUSSION

The main purpose of this study was to better understand the determinant conditions of shared leadership in work groups by testing multiple models of group personality composition as predictors of shared leadership. The four personality traits examined in the current research were agreeableness, extraversion, collectivistic work orientation, and trait competitiveness. Four composition models (i.e., mean, minimum, maximum, and variance) were tested for agreeableness, extraversion, collectivistic work orientation, and trait competitiveness across nine hypotheses, three research questions, and four exploratory analyses. Among the nine hypotheses, the results yielded one statistically significant relationship between minimum group levels of agreeableness and shared leadership. However, this relationship was found to be negative rather than the expected positive direction. The results did not yield any significant results concerning any of the three research questions. No significant relationships were found for hypotheses or research questions involving extraversion, collectivistic work orientation, or trait competitiveness. Next, I will further discuss the one significant finding, highlight methodological strengths and limitations, and provide several practical implications of the present research.

Contrary to expectations, the findings indicated that groups wherein the least agreeable member was *not* very agreeable predicted greater shared leadership than groups wherein the least agreeable member was fairly agreeable. One plausible explanation for this surprising finding may be found by considering the role of conflict on team outcomes. As mentioned earlier, prior research has distinguished between relationship conflict and task conflict (De Dreu, 2006; De Dreu & Weingart, 2003; DeChurch & Marks, 2001; Jehn, 1995; Jehn & Mannix, 2001). Whereas relationship conflict (i.e., the degree of disagreement amongst group members concerning

personal, non-task-related characteristics) almost always results in poorer team outcomes, moderate levels of task conflict (i.e., the degree of disagreement amongst group member concerning matters related to the task-at-hand) can result enhanced group outcomes such as increase team performance (Jehn, 1994, 1995; Jehn & Mannix, 2001). Since individuals low in agreeableness are more likely to voice their thoughts, opinions, and ideas with others even when they are not shared by others, it is possible that this will result in higher task conflict which ultimately can result in more positive team outcomes such as shared leadership. One reason for this might be that the presence of one group member who voices a differing view would encourage others to speak up with their own thoughts and opinions as well. Supporting this notion, existing research suggests that having a group member who voices alternative opinions and solutions can counteract the negative effects of groupthink (MacDougall & Baum, 1997; Nemeth, Brown, & Rogers, 2001). Team conflict (e.g., task and relationship conflict) was not measured in the current research. Hence, this is topic that future research in this area can address.

Prior research (e.g., D'Innocenzo et al., 2016; Mehra et al., 2006; Wang et al., 2014) advocates for the utilization of social network analysis when studying shared leadership. Accordingly, the present research operationalized shared leadership using a network density approach through social network analysis as well as a referent-shift consensus approach. Although there was a small to moderate correlation (r = .30) between the two operationalizations of shared leadership, the results of the regression analyses were largely consistent between the two operationalizations. The only notable difference was the non-significant relationship between minimum group agreeableness and shared leadership using the referent-shift measure compared to the significant, negative relationship found using the network density approach.

Although the general consensus in the extant literature supports the use of social network analysis rather than a referent shift consensus approach, there are pros and cons to both approaches that are worth noting. A major benefit of social network analysis is the ability for researchers to examine network relationships at the dyadic-level, which eliminates the need to assume similar relationships between all members within a given network. Another benefit of social network analysis is the ability to examine network density (as was used in the present research) or network centrality which provides an index of the degree to which one or relatively few members (nodes) of a network are the most influential members of the group. However, a major limitation of social network analysis comes from the fact that in larger groups, it quickly becomes impractical to have survey respondents answer multiple questions for each member in the network. As a result, researchers often limit the amount of questions in social network measures to just one or very few. This limits the amount of information researchers can get when using social network analysis. With referent-shift consensus measures, researchers are able to use longer measures that may include multiple factors, which provide more diversified information. However, these measures introduce error in the form of cognitive biases that occur when survey respondents have to aggregate information from interactions with multiple group members to make global evaluations at the group-level. Hence, the type of information gleaned from these two approaches may be slightly different. Specifically, the referent-shift approach captures respondents' global evaluations of a group-level construct (i.e., shared leadership) whereas the social network approach is capturing respondents' perceptions of dyadic relationships which are then combined mathematically to represent a group-level construct. This likely explains the small to moderate correlation found between the two operationalizations of shared leadership in the current research.

Although some of the relationships involving group agreeableness were statistically significant, I did not find significant relationships for any of the other personality traits. Rather than explaining these findings individually, I will discuss some broad limitations of the current research that likely explain why many of the hypothesized relationships were unsupported by the data. The main limitation of this study was the brief time period that groups participated in the task. There is consensus in extant shared leadership literature (e.g., Carson et al., 2007; Contractor et al., 2012; D'Innocenzo et al., 2016; Mathieu et al., 2015; Nicolaides et al., 2014; Small & Rentsch, 2010; Wang et al., 2014) that shared leadership is a group phenomenon that emerges over time. In perhaps the most highly cited article on shared leadership, Carson et al. (2007) state that "shared leadership is an emergent phenomenon, and longitudinal designs are needed to understand how shared leadership develops over time by looking at changes in a leadership network over stages of team development" (p. 1229).

Regarding the additional analyses, I found a significant positive relationship between minimum group extraversion and shared leadership and a significant negative relationship between group variability in extraversion and shared leadership using the referent-shift consensus measure, but only for groups in which members first familiarized themselves with the task materials alone and then completed the rest of the task together. It is likely that the same explanation applies to both of these findings. That is, group members are more likely to act in accordance with their personality traits when first given the opportunity to familiarize themselves with the task. Once given the opportunity to familiarize themselves with the task, extraverted group members will be more comfortable speaking up during group discussion, while less extraverted group members will likely remain relatively quiet. In such situations, groups wherein the least extraverted member's score on extraversion is low will exhibit less shared leadership

relative to groups wherein the least extraverted member's score on extraversion is high since more extraverted group members are likely to engage in the interpersonal communication necessary for shared leadership to emerge. Similarly, there would be greater variability in the amount of talking between group members high in extraversion and those low in extraversion for groups that allowed members to familiarize themselves with the task prior to working through the task as a group. This increase in variability between highly extraverted group members and those low in extraversion will lend the ability to detect significant effects that would not be detectable when there is little to no variability between the actions of group members high in extraversion and those low in extraversion.

There was at least one major justification for using a group task with such a limited amount of time for the current research. The existing literature on group development (e.g., Bonebright, 2010; Cassidy, 2007; Tuckman, 1965; Tuckman & Jensen, 1977, 2010) suggests that the "forming" stage is the beginning of group development and incorporates processes that allow members of the group to orient themselves with one another. Accordingly, I assumed that group personality composition is important even in the very beginning stages of group functioning. However, the thirty-minute maximum that groups were allowed to work together to complete the task was likely not enough time for shared leadership to emerge in majority of groups for this study. This is represented by the low variance (SD = .07) in shared leadership observed in the present research. In fact, a prior meta-analysis of group performance outcomes of shared leadership using a network density approach through social network analysis across 50 effect sizes (D'Innocenzo et al. (2016) reported a standard deviation of .40 for shared leadership. This provides additional support for the notion that design of the current research limited variability in shared leadership such that true effects, if any, would be unlikely to be detected. If using a

research design similar to the one used in the current research, future researchers may consider collecting data from existing groups consisting of members that have experience working with their fellow group members.

Although the research design was the greatest limitation of the present research, there are other limitations worth noting. First, the task used in the study required interdependence insofar as group members had to come to an agreement concerning the final ranking of items on the ranking sheet that would be submitted at the end of the group task. After reviewing several of the video recordings, I noticed that many groups decided to complete the task by having each group member work individually and then quickly discuss and create the final rank based on the general consensus in the group. Although this strategy worked for many groups, for the purposes of studying shared leadership in laboratory settings, future researchers may consider using group tasks whereby individual group members are provided with unique information that must be combined with that of the remaining group members to successfully complete the tasks. These tasks require higher levels of group interaction that can lead to greater variability in shared leadership.

Second, this study consisted of a young population of undergraduate college students, most of whom were not employed at the time they completed the study. Although many colleges and universities are increasing the use of group work to facilitate course instruction, a trend that is also apparent in many workplaces around the globe, the types of group projects for coursework is largely different from group projects in the workplace. As a result, the sample for the current study likely lacked the experience of working in groups. Hence, utilizing participants with more work experience may have resulted in increased variability in shared leadership, as an older

sample with more experience working in groups at work may have used their past experiences to inform how they interacted with their group members for the study.

Third, there was no measure of group performance used in the present research although prior research has established the positive association between shared leadership and team performance (Carson et al., 2007; Hoch, 2014; Hoch & Kozlowski, 2014; Perry et al., 1999; Serban & Roberts, 2016; Ullah & Park, 2013). With no index of group performance in the present research, I am left to make the assumption that groups that reported greater shared leadership also performed the group task better than groups that reported less shared leadership. Future researchers in this area who use similar methodology can avoid making this assumption and bolster the practical implications of their research by directly measuring team performance and other team effectiveness outcomes.

Despite these limitations, there are several strengths of the current research worth mentioning. First, a network density approach through social network analysis was used to measure shared leadership. The extant shared leadership literature suggests that a social network approach is often the most appropriate way to measure shared leadership as it allows researchers to observe trends based on relationships at the network level rather than relying entirely on aggregated reports based on global judgments of shared leadership (Carson et al., 2007; D'Innocenzo et al., 2016; Mathieu et al., 2015; Mehra et al., 2006; Nicolaides et al., 2014; Wang et al., 2014). Second, the predictors (i.e., personality traits) were collected prior to participants' completion of the group task, which reduced the potential for common-method bias. Although there are different sources of common-method bias, Podsakoff, MacKenzie, Lee, and Podsakoff (2003) mention that the measurement of predictor and criterion variables in the same medium can inflate covariance such that reported relationships do accurately reflect the relationships

being reported. By measuring shared leadership through a later survey than the one used to collect participants' responses for the predictor variables, the likelihood of reporting inflated relationships was reduced. Third, the sizeable sample of 385 participants allowed me to collect data from a total of 97 groups ranging in size from three to six members per group. An a priori power analysis using the G*Power software program indicated that a sample size of 65 groups would afford the power necessary to detect significant effects. Apart from the low variability in shared leadership, the current research was supported by a sample size that reduced the likelihood of committing type-II errors.

Despite several limitations of the current research, I was still able to find significant effect of variability in group agreeableness on shared leadership. As mentioned earlier, agreeableness is a personality trait that enables individuals to engage in positive interactions with others. Therefore, it is not surprising that group agreeableness was found to predict shared leadership in the present research. However, given that this study used a lab-based experimental design with randomly assigned group members, it is interesting that variability in group agreeableness was found to predict shared leadership in these short-lived groups. Thus, a key practical implication of the current research is that organizational leaders should consider the agreeableness of potential group members prior to creating work groups as agreeableness plays an important role in the very beginning stages of group development. Another underlying implication is that having a mix of group members in terms of agreeableness may actually result in enhanced group functioning as this variability can promote constructive group conversations concerning within-group disagreement. However, due to the statistically non-significant finding, readers should use their best judgment when making decisions based on this finding.

Given the strengths and limitations of the present research, there are several noteworthy directions for future research in this area. First, as mentioned earlier, the task used for this research required little interdependence amongst group members. However, when studying shared leadership, it is critical for researchers to select a task that facilitates adequate interdependence between group members. In addition to using tasks that provide group members with unique information that must be combined to reach an appropriate solution, future research may be equipped to better understand conditions under which shared leadership emerges by varying the amount of time group members have to complete the task as well as varying the type of incentives offered to group members. Regarding incentives, one condition might have collective reward structures that reward entire groups for good performance while another condition might implement individual reward structures that encourage individual group members rather than entire teams to put forth their maximum effort. It is quite possible that shared leadership would emerge to a much greater degree in groups with collective reward structures.

Second, researchers might consider re-testing these hypotheses and research questions using intact work groups. Compared to the groups studied in the present research, members of intact teams have more time working with one another, which should lead to greater variability in shared leadership to adequately test each hypothesis and research question. Third, longitudinal research designs that capture the emergence of shared leadership and group performance and effectiveness outcomes over time can better explain the role of shared leadership at different stages of group development (Tuckman, 1965; Tuckman & Jensen, 1977, 2010).

Fourth, I found a significant negative relationship between minimum group agreeableness and shared leadership which suggests that having a group member who voices alternative

viewpoints can promote the emergence of shared leadership in work groups. However, the presence of a disagreeable team member or a "devil's advocate" may result in greater harm to overall team effectiveness over longer periods of time. Namely, Hackman (1987) proposed that team effectiveness is comprised of task performance, group member preference for being in the group, and team viability. It is the last component, team viability, that may be impacted by the presence of disagreeable group members. Bell and Marentette (2011) define team viability as "a team's capacity for the sustainability and growth required for success in future performance episodes" (p. 275). Although having a disagreeable team member may initially result in group members voicing dissenting opinions and ideas, it is also possible that a disagreeable team member will harm the internal team environment by creating greater relationship conflict, decreasing group cohesion, and thus reducing overall team viability. Hence, future research using longitudinal designs could explore the relative stability of the negative relationship between minimum group agreeableness and shared leadership that was found in the present research.

Fifth, future research might consider additional characteristics of group composition that may facilitate the emergence of shared leadership in work groups. While this study focused primarily on personality characteristics, other variables of interest include goal orientation (Dweck, 1986; Grant & Dweck, 2003) and cultural value orientations (Schwartz, 1994, 2006; Schwartz & Boehnke, 2004; Schwartz et al., 2012).

Overall, this current study contributed to the existing body of research on shared leadership in work groups by examining the extent to which group composition serves as a predictor of shared leadership. Rather than relying solely on the use of average group levels for various personality traits, the current research explored the extent to which various composition

models provide incremental variance over that which is explained by mean models. Even though very few significant relationships were found, results indicated that group agreeableness may play a critical role as a predictor of shared leadership during the beginning stages of group development and functioning. Future research can contribute to the extant literature on the predictors of shared leadership by employing longitudinal research designs that allow ample time for shared leadership to emerge.

APPENDIX A: LGD MATERIALS

University of Central Florida

MEMORANDUM
DATE: September 5, 2016
FROM: Dr. Janis P. Stout – Dean of Faculties
LOCATION: Administration Building
SUBJECT: Group Discussion Results – PHASE 1
TO: Group Discussion Participants – PHASE 2

Recently universities have been accused of placing too much emphasis on research and too little on teaching. As Richard Hedd, the Dean of Liberal Arts at Stanford University said, "research grants and scientific publications are important, but students and their benefactors pay the bills. In the future, those universities who focus on *science and research* at the expense of *teaching* will be nothing more than renowned institutions with empty classrooms. The best universities in the new millennium will be those who find the best balance between the two."

The problem then becomes how does a university improve the quality of teaching. The easy answer is to hire better teachers, but this is more of a platitude than an answer. According to Dr. Noam Chomsky, professor of psychology at MIT, "The primary reason for poor teaching is professors are not rewarded for good teaching. They are rewarded (e.g., tenure) for acquiring grants and publishing papers resulting in a lack of focus on teaching." When viewed in this light, improving teaching effectiveness becomes a more manageable problem. Simply reward professors for good teaching and teaching should improve. With this in mind, I met with each tenured professor in the Psychology Department to ask them how UCF could "reward" professors for effective teaching. After receiving many quality suggestions, I realized that to reward good teachers one must first *identify* such people. At this point, I solicited the help of the Chair of the Psychology Department at UCF who is expert on measuring job performance. He made two suggestions:

1. Identify the abilities and/or behaviors required for effective teaching
2. Ask students to identify these abilities since they are the best judges of teaching effectiveness.

During the Fall-2017 academic semester, the Psychology Department at UCF initiated a project, headed by the Chair of the Psychology Department, for UCF students to assist in the development of a new teaching evaluation instrument. We are using student groups to conduct "brain storming" sessions whereby they identify the abilities/behaviors of effective teachers. This input will then be used to construct a new teaching evaluation system which will be pilot tested on UCF Psychology professors.

The project consists of two phases. In Phase 1, approximately 2000 students (500 groups) were asked to identify the abilities/behaviors that make an effective teacher. After collecting and analyzing the students' input, we found 17 independent "teaching performance dimensions" (see Table A1).

The goal of Phase 2 is for new student groups to use the information from Phase 1 to provide the final student input for the new teaching evaluation system. To accomplish this, we ask that you use the identified dimensions in Table A1 to do the following:

1. After group discussion, eliminate the 5 teaching performance dimensions that are least important to teaching effectiveness. The important question to ask yourselves, as a group is, "which 12 dimensions do you think teachers should be evaluated on?" Simply cross through the 5 dimensions you are eliminating on Table A2.

2. Identify 3 new teaching performance dimensions that you decide as a group are critical to teaching effectiveness, which are not listed in Table A1. Write these 3 new dimensions in the space provided in Table A2.

3. Assign a rank to each of the 15 dimensions from most important (1) to least important (15). Thus, you must rank the 12 dimensions that you identify as critical from Table A1 as well as the 3 new dimensions which you identified as a group. The important question to ask yourselves, as a group is, "if a teacher could be outstanding on only 1 of the 15 dimensions, which would be most crucial to effective teaching?" After deciding on the #1 teaching performance dimension decide which dimension of the remaining 14 is the most important to effective teaching. Repeat this process until you have ranked each teaching performance dimension. None of the dimensions can be treated as equally important. We need you to rank them from 1 to 15. Simply record the rank in the Rank column on Table A2.

TABLE A1: Teaching Performance Dimensions

1. The instructor was well organized.
2. The amount of material presented or assigned by the instructor was appropriate.
3. The instructor appeared to have a thorough knowledge of the subject.
4. Information and references provided by this instructor were relevant.
5. The instructor spoke clearly and was easily understood.
6. The instructor emphasized the major points.
7. Concepts were presented in a manner that aided my understanding.
8. The instructor's examination questions required me to do more than recall factual information.
9. The instructor helped me integrate facts, develop conclusions, and arrive at solutions.
10. The instructor raised challenging questions or problems for consideration.
11. The instructor created and maintained an atmosphere that facilitated learning.
12. The instructor stimulated my interest in the subject.
13. The instructor was courteous and easy to approach.
14. The instructor was willing to help students outside of class.
15. The instructor's examination questions covered the important concepts presented in the course.
16. The examination questions from this instructor were reasonable in difficulty.
17. The examination questions from this instructor were graded fairly.

Table A2: Teaching Performance Dimensions

	Rank
Dimension # 1	
Dimension # 2	
Dimension # 3	
Dimension # 4	
Dimension # 5	
Dimension # 6	
Dimension # 7	
Dimension # 8	
Dimension # 9	
Dimension # 10	
Dimension # 11	
Dimension # 12	
Dimension # 13	
Dimension # 14	
Dimension # 15	
Dimension # 16	
Dimension # 17	
New Teaching Performance Dimensions	
New Dimension #1	
New Dimension #2	
New Dimension #3	

APPENDIX B: COMPLETE MEASURES

Agreeableness

Instructions: You will be presented with 10 phrases describing people's behaviors. For each behavior, indicate how accurately the statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly, in relation to other people you know of the same sex as you are, and roughly your same age. Your responses will be completely confidential.

Anchors:

1	2	3	4	5
Very Inaccurate	Inaccurate	Neither Accurate nor Inaccurate	Accurate	Very Accurate

1. Am interested in people.
2. Sympathize with others' feelings.
3. Have a soft heart.
4. Take time out for others.
5. Feel others' emotions.
6. Make people feel at ease.
7. Am not really interested in others. (R)
8. Insult people. (R)
9. Am not interested in other people's problems. (R)
10. Feel little concern for others. (R)

Extraversion

Instructions: You will be presented with 10 phrases describing people's behaviors. For each behavior, indicate how accurately the statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly, in relation to other people you know of the same sex as you are, and roughly your same age. Your responses will be completely confidential.

Anchors:

1	2	3	4	5
Very Inaccurate	Inaccurate	Neither Accurate nor Inaccurate	Accurate	Very Accurate

1. Am the life of the party.
2. Feel comfortable around people.
3. Start conversations
4. Talk to a lot of different people at parties.
5. Don't mind being the center of attention.
6. Don't talk a lot. (R)
7. Keep in the background. (R)
8. Have little to say. (R)
9. Don't like to draw attention to myself. (R)
10. Am quiet around strangers. (R)

Psychological Collectivism

Instructions: Think about the work groups to which you currently belong and have belonged to in the past. The items below ask about your relationship with, and thoughts about, *those particular groups*. Respond to the following questions, as honestly as possible, using the response scale provided.

Anchors:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

1. I preferred to work in those groups rather than working alone.
2. Working in those groups was better than working alone.
3. I wanted to work with those groups as opposed to working alone.
4. I felt comfortable counting on group members to do their part.
5. I was not bothered by the need to rely on group members.
6. I felt comfortable trusting group members to handle their tasks.
7. The health of those groups was important to me.
8. I cared about the well-being of those groups.
9. I was concerned about the needs of those groups.
10. I followed the norms of those groups.
11. I followed the procedures used by those groups.
12. I accepted the rules of those groups.
13. I cared more about the goals of those groups than my own goals.
14. I emphasized the goals of those groups more than my individual goals.
15. Group goals were more important to me than my personal goals.

Trait Competitiveness

Instructions: Please read each statement carefully and choose the one answer that best describes your agreement or disagreement using the scale below. There are no right or wrong answers. Please answer honestly and frankly. Indicate your answer on the answer sheet provided.

Anchors:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree

1. I enjoy working in situations involving competition with others.
2. It is important to me to perform better than others.
3. I feel that winning is important in both work and games.
4. I try harder when I am in competition with other people.

Shared Leadership (for Social Network Analysis)
Instructions: Think back to the group exercise that you just completed in the lab. Use the scale to indicate the extent to which **your team** relied on each member for leadership.

Anchors:

1	2	3	4	5
To a Very Small Extent	To a Small Extent	To a Moderate Extent	To a Great Extent	To a Very Great Extent

- *Respondents will answer the same question for each of their team members.*

Shared Leadership

<u>Instructions:</u> The following statements refer to perceptions about the group that you worked with to complete the group discussion task in the laboratory. The following statements refer to various factors that contributed to your group's completion of the group discussion task. Use the scale to indicate **<u>how frequently your team members shared in</u>**:

1 Never	2 Almost Never	3 Rarely	4 Sometimes	5 Several Times	6 Frequently	7 Very Frequently

Planning and Organizing

1. ...planning how the work gets done.
2. ...allocating resources according to team's priorities. (X)
3. ...setting our team's goals.
4. ...organizing tasks so that work flows more smoothly.
5. ...deciding how to go about our team's work.
6. ...providing helpful input about team's work plans.

Problem Solving

7. ...deciding on best course of action when problems arise.
8. ...diagnosing problems quickly.
9. ...using our team's combined expertise to solve problems.
10. ...finding solutions to problems affecting team performance.
11. ...identifying problems before they arise.
12. ...developing solutions to problems.
13. ...solving problems as they arise.

Support and Consideration

14. ...providing support to team members who need help.
15. ...showing patience toward other team members.
16. ...encouraging other team members when they're upset.
17. ...listening to complaints and problems of team members.
18. ...fostering a cohesive team atmosphere.
19. ...treating each other with courtesy.

Developing and Mentoring

20. ...exchanging career-related advice among our team. (X)
21. ...helping to develop each other's skills. (X)
22. ...learning skills from all other team members. (X)
23. ...being positive role models to new members of the team. (X)
24. ...instructing poor performers on how to improve. (X)
25. ...helping out when a team member is learning a new skill. (X)

APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Determination of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Richard A. Currie**

Date: **February 07, 2018**

Dear Researcher:

On 02/07/2018, the IRB reviewed the following activity as modifications to human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	Added task interest measure to survey 2. Revised Protocol and new measure uploaded in iRIS.
Project Title:	Group Composition and Group Processes
Investigator:	Richard A. Currie
IRB Number:	SBE-18-13721
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.
In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.
This letter is signed by:

Kamille Chap

Signature applied by Kamille Chaparro on 02/07/2018 12:20:10 PM EST

Designated Reviewer

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