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Team personality composition, emergent leadership and shared leadership in virtual teams: A theoretical framework☆

Julia E. Hoch^{a,*}, James H. Dulebohn^b^a Nazarian College of Business, California State University, 18111 Nordhoff Street Juniper Hall, Northridge, CA 91330, United States^b School of Human Resources and Labor Relations, Michigan State University, 368 Farm Lane, East Lansing, MI 48824, United States

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ABSTRACT

Limited theory and research has been devoted to the role of team personality composition, as well as emergent and shared leadership, in virtual teams. In an effort to provide a theoretical basis for the role of team personality composition, as well as emergent and shared leadership, in virtual teams, we propose a virtual team framework that portrays the team personality composition as predictors of emergent and shared leadership. These in turn are expected to impact virtual team performance. We further posit that the relationships between team personality composition and virtual team performance are indirect, through emergent leadership and shared leadership. Finally, we present team virtuality as a moderator between team composition and team processes. Suggestions for future research and implications for the management of virtual teams are presented.

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The use of virtual teams has continued to grow as organizations widely adopt virtual team structures to perform work. Virtual teams work across geographic distance and different time zones to accomplish joint goals; virtual teams are often comprised of members from different cultural and national backgrounds (Cramton & Hinds, 2005; Gibson & Gibbs, 2006; Hinds, Liu, & Lyon, 2011; Hoch & Kozlowski, 2014). A 2012 survey of 379 HR professionals by SHRM found that 46% of the participants reported their organizations use virtual teams (SHRM, 2012). Similarly, a 2014 survey of 3000 managers from more than 100 countries indicated that 40% of their organizations' employees spend at least half their time working on virtual teams and 77% of these teams are multi-cultural (RW³ CultureWizard, 2014). While virtual teams provide a number of advantages to organizations, there are a number of inherent challenges resulting from team virtuality. For example, in the 2014 RW³ survey, the following percentage of respondents indicated that the lack of co-located interaction of virtual teams created significant challenges affecting trust (64% of respondents), decision-making (55%), managing conflict (54%), and expressing opinions (53%).

One important factor to mitigate these challenges and augment team performance is team leadership. While virtual teams typically have a vertical leader, due to geographical dispersion, the emergence of team members as leaders (willing to take on leadership roles) and the sharing of leadership among members have been discussed as augmentations, in light of living with management challenges, in leading virtual teams (Carte, Chidambaram, & Becker, 2006). The emergence of team members as informal leaders inside the team and the facilitation of shared leadership are expected to facilitate team functioning and team effectiveness in virtual teams (Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015; Hoch & Kozlowski, 2014; Liu, Hu, Li, Wang, & Lin, 2014; Martins, Gilson, & Maynard, 2004; Shuffler, Wiese, Salas, & Burke, 2010; Zhou, Vredenburg, & Rogoff, 2015). Primary

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* Corresponding author.

E-mail addresses: julia.hoch@csun.edu (J.E. Hoch), dulebohn@msu.edu (J.H. Dulebohn).

factors we posit to be antecedents to these leadership processes, and virtual team effectiveness, are the team composition in terms of team member personality.

When it comes to team member personality composition, the most prominent personality trait classification is the Big Five typology. The Big Five framework describes the five central personality dimensions of extraversion, agreeableness, conscientiousness, openness to experience and emotional stability. Field research on co-located teams, has demonstrated the positive impact personality facets can have on team functioning and performance (Bell, 2007; Mount & Barrick, 1995; Mount, Barrick, & Stewart, 1998). With regard to the development of team processes, studies on co-located teams have documented that team member agreeableness, conscientiousness, and emotional stability, represent predominant and consistent predictors of team processes and team effectiveness (Barrick, Stewart, Neubert, & Mount, 1998; Bell, 2007; Mount & Barrick, 1995; Peeters, Van Tuijl, Ruttes, & Reymen, 2006). In addition, the personality variable extraversion has been associated with leadership, leader emergence and shared or collective team leadership (e.g., Barry & Stewart, 1997; Hoch, 2013; Ilies, Germardt, & Le, 2004; Judge, Bono, Ilies, & Gerhardt, 2002).

While research on team composition has highlighted the role of team personality composition as an antecedent of effective team processes in co-located teams, emergent leadership research has highlighted the central role of individual team members' personality as an antecedent of the emergence of (sole) individuals as team leaders, in these settings (e.g., Balthazard, Waldman, & Warren, 2009; Barry & Stewart, 1997; Kickul & Neuman, 2000; Taggar, Hackett, & Saha, 2006). Surprisingly, the role of personality as a team composition variable, has received limited attention in research on virtual teams. In light of research findings on the importance of personality composition in co-located teams, we expect that both individual team member personality as well as team personality composition, representing the aggregation of team members' personality, will be similarly important as predictors of leadership in virtual teams.

To conceptualize the association of team member personality and team personality composition in virtual teams, we present a virtual team model based on the input-process-output (IPO, e.g., McGrath, 1991; Ilgen, Hollenbeck, Johnson, & Jundt, 2005), or input-mediator-output (–input) IMO(I) (Marks, Mathieu, & Zaccaro, 2001)¹ approach of team performance, adopted from Hoch and Dulebohn's (2013) framework. Fig. 1 presents the paper's input-process-output model. The model depicts the team personality composition in terms of the Big Five as input factors that, as antecedents, facilitate the development of emergent leadership and shared leadership, which in turn mediate the team personality composition and virtual team performance relationships. Virtuality moderates the pathway between input variables and emergent states and processes.

The organization of the paper is as follows. First, we describe emergent leadership and shared leadership, which represent the focal mediators in our IPO model, and the association between these virtual team leadership behaviors and virtual team performance. Second, we summarize the literature on the role of both individual team member personality as well as team personality composition, in terms of the Big Five dimensions, as antecedents of emergent and shared leadership, as well as team performance. Following, we outline the role of emergent and shared leadership as mediators between team personality composition and virtual team performance. Finally, we highlight the role of team virtuality as a moderating variable, influencing the input and process pathways.

1. Theoretical background

1.1. Emergent Leadership

Emergent leaders are individuals who exert significant influence over other members of the group, even though they may not be vested with formal authority (Schneider & Goktepe, 1983). Different from shared leadership, defined at the team level and as a group construct, emergent leadership is defined on the individual level. Emergent leadership describes an individual leadership phenomenon whereby an individual arises as team leader informally, without being assigned formal leadership responsibility. Emergent leadership is further described: "as both an individual's completion of leader-like work duties and occupying positions of leadership or authority either within or outside of the work domain" (Cogliser, Garnder, Gavin, & Broberg, 2012, p. 753).

Emergent leadership has been examined in various different contexts, including traditional organization settings (e.g., Judge & Piccolo, 2004), self-managing teams (e.g., Manz & Sims, 1987; Walton, 1977), and small group settings (e.g., Kickul & Neuman, 2000; Neubert & Taggar, 2004; Neubert, 1999). Due to the complexity of their team tasks, virtual teams are often self-managing teams. Self-managing work teams are defined as teams that monitor and manage their own performance, make decisions related to their work, and take collective responsibility for meeting their own goals (Hollander & Offermann, 1990; Kozlowski, Gully, Salas, & Cannon-Bowers, 1996). While implementing self-managing teams is often productive for organizations (for example, to lower costs or improved decision-making quality, Lawler, 1998; Morgeson, DeRue, & Karam, 2010), the most common reason for their failure is due to the failure of leadership (Beyerlein, Johnson, & Beyerlein, 1996; Cohen, Chang, & Ledford, 1997). Related, researchers have consistently found that effective leadership is pivotal to teams' success (Kirkman & Rosen, 1999; Wageman, 2001).

¹ Marks et al. (2001) have distinguished behavioral processes and those process-oriented states that emerge over time and are accessed via team member perceptions. For purposes of this paper we focus on "emergent states" but refer to them as team processes consistent with the extant literature.

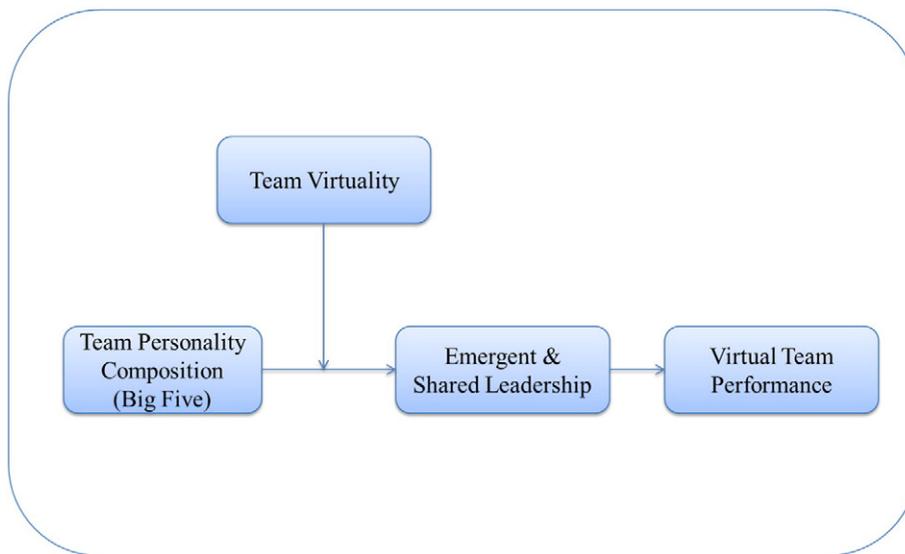


Fig. 1. Conceptual model: team personality composition, emergent and shared leadership, team virtuality and virtual team performance.

1.1.1. The impact of emergent leadership in co-located teams

Emergent leadership has been found to be associated with co-located team and organizational effectiveness (Judge & Piccolo, 2004; Taggar et al., 1999, 2006). For example, Taggar et al. (1999, 2006) found emergent leadership to be a positive predictor of team performance in a sample of 94 initially leaderless undergraduate teams. Participants worked on teams of 5 or 6 members, over the course of 13 weeks. Taggar et al. (1999, 2006) found that teams performed highest when both the emergent team leader (i.e., the team member with the highest leadership score) and the other team members (referred to as staff) were high on emergent leadership. Furthermore, they found that an effective leader could not ameliorate the negative effects of other team members being low in leadership. Instead, teams were highest performing when the emerging team leader and the other team members all engaged in the team leadership.

Neubert and Taggar (2004) studied emergent leadership in 237 team members in 18 teams engaged in the production and assembly of small appliances or in support of such tasks in a Midwestern manufacturing organization. They examined the relationship of individual differences and team member network centrality to informal leadership emergence. Neubert and Taggar (2004) found positive effects for emergent leadership on team outcomes, and they found that the proportion of female leaders, i.e., females being (co-) involved in the leadership tasks, had positive effects on the team outcomes.

Results of a study by Neubert (1999) also documented that emergent leadership among the team members had a positive effect on the team performance among 21 manufacturing teams. Neubert's results indicated that informal leadership dispersion (the number of perceived informal leaders divided by team size) is positively related to team cohesion. In addition, they found that when females composed a larger portion of the informal leadership core, supervisors' ratings of team performance were higher.

Kickul and Neuman (2000) investigated the role of individual differences in emergent leadership behaviors and their influence on team performance in a sample of 67 teams, comprising 320 undergraduate psychology students. They found emergent leadership to be related to team performance. Precisely, the team members rated each other on emergent leadership behaviors as well as personality and cognitive ability and the results documented that extraversion, openness to experience and cognitive ability were predictive of emergent leadership behaviors, and conscientiousness and cognitive ability were associated with team performance.

Foti and Hauenstein (2007) examined the influence of individual differences on both leadership emergence and leader effectiveness in a group of 81 male freshman members of the Corps of Cadets for a period of 9 months. They found that individual differences of intelligence, dominance, general self-efficacy, and self-monitoring were positively associated with both leadership emergence and leader effectiveness. Persons scoring high on this set of individual differences were more likely emerged as leaders, were promoted to leadership positions, and rated by their superiors as effective leaders.

With regard to traditional organizational settings, Judge and Piccolo (2004) conducted a meta-analysis relating transformational leadership emergence in traditional organizational settings to organizational outcomes (e.g., organization performance, individual performance). Judge and Piccolo's (2004) results (based on 626 correlations from 87 sources, including those focused on co-located teams) revealed an overall validity of $r = 0.44$ for transformational leadership emergence, and this validity generalized over longitudinal and multisource designs. Related, meta-analytic research by Wang, Oh, Courtright, and Colbert (2011) on 113 primary studies further showed that emergent transformational leadership was positively related to individual-level follower performance across criterion types, with a stronger relationship for contextual performance than for task performance across most study settings. In addition, emergent transformational leadership was positively related to performance at the team and organization levels. However, both of these studies examined the effects of the emergence of formally assigned leadership, as opposed to informally emerging leadership in such as student groups or virtual teams.

1.1.2. The impact of emergent leadership in virtual teams

In addition to traditional co-located teams, a smaller amount of empirical research has addressed the role of emergent leadership in virtual teams (e.g., Carte et al., 2006; Sarker, Grewal, & Sarker, 2002). While not all of these studies examined the relationship between emergent leadership and team performance (e.g., Charlier, Stewart, Greco, & Reeves, 2016), support has been found for the notion that emergent leadership and virtual team performance are positively related. In the following we will summarize some of these studies.

First, Kayworth and Leidner (2001) reported that in their sample of 13 globally distributed teams, effective team leaders demonstrated the capability to deal with paradox and contradicting situations by performing multiple leadership roles, such as mentoring, asserting authority and providing regular, detailed, and prompt communication simultaneously, with their peers and in articulating responsibilities among the virtual team members. Next, Sarker et al. (2002) examined the emergence of leaders in cross-cultural virtual teams. They found that factors such as performance, cultural ability, trust, ability, communication ability, and co-location with client explained the emergence of leaders in the initial stages of a project, while performance, culture, and ability explained the emergence of a leader in later stages. Interestingly, in both initial and later stages, technical ability of an individual was found to have a negative effect on leader emergence.

Tyran, Tyran, and Shepherd (2003) researched 13 virtual teams to understand the role of leadership in virtual teams, paying particular attention to how and why leaders emerge. They concluded that high performing teams had a strong leader and low performing teams had no emergent leader. Carte et al. (2006) completed a study focused on leadership behaviors in self-managed virtual teams, specifically researching whether and if so, how emergent leadership impacts team performance. After reviewing and separating high performing from low performing teams, the conclusion was high performing self-managed teams were successful using emergent, concentrated, and shared leadership styles. They concluded that the emergence of all leadership behaviors, regardless of the type of behavior, exhibited early in the team's life, resulted in a more productive and successful team.

Balthazard et al. (2009) examined the role of emergent leadership in virtual teams in a sample of MBA students and found that team member personality was a predictor of emergent leadership, which turned out to be a predictor of team performance. Specifically, they found positive effects for team member extraversion, conscientiousness, agreeableness and emotional stability in predicting individual leadership emergence, which, in turn, predicted team performance. Ocker, Huang, Benbunan-Fich, and Hiltz (2011), using three dimensions of virtual distance (geographic, cultural and temporal), investigated how the configuration of virtual teams interacts with leadership dynamics including emergent leadership. Their results demonstrated that leader emergence positively impacted team performance. Finally, Coglisier et al. (2012) investigated virtual teams using a sample of 243 undergraduate business students assigned to 71 virtual teams. They found that aggregated task-oriented emergent leadership behaviors predicted virtual team performance. Together the research summarized above has provided evidence for the positive effects of emergent leadership in virtual teams. Therefore we posit:

Proposition 1. Emergent leadership is positively related to virtual team performance.

1.2. Shared leadership

Shared leadership is defined as a collective leadership process, whereby multiple team members step up to take the lead or to participate in team leadership functions. Shared leadership has been described as a mutual influence process carried about by members of a team where they lead each other toward the achievement of goals (Day, Gronn, & Salas, 2004; Hoch, 2016; Pearce & Conger, 2003). It describes a group process or “a property of the group as a whole” and “a set of functions which must be carried out by the group” (Gibb, 1954, p. 884) and is generally characterized by the spreading of leadership to multiple or all team members, rather than only a few. Ensley, Hmieleski and Pearce (2006, p. 220) noted this in describing shared leadership as a “team process where leadership is carried out by the team as a whole, rather than solely by a single designated individual.”

Shared leadership represents a team-level concept that is generally viewed as advantageous for teams composed of members who are competent in self-management and self-leadership skills (Bell & Kozlowski, 2002). As typically highly skilled professionals, virtual team members often are expected to possess both of these abilities/skills that contribute to the ability to engage in the process of shared leadership (Hoch & Dulebohn, 2013). Further, prerequisites to shared leadership include the ability to: participate in collaborative decision-making, influence and to support other team members, foster motivation, and take responsibility for outcomes (Carson, Tesluk, & Marrone, 2007; Hoch & Dulebohn, 2013; Pearce & Conger, 2003).

1.2.1. The impact of shared leadership in co-located teams

Recently, research literature on the relationship between shared leadership and team performance resulted in three separate meta-analyses (D'Innocenzo, Mathieu, & Kukenberger, 2014; Van Nicolaidis et al., 2014; Wang, Waldman, & Zhang, 2014). It has been demonstrated that shared leadership enhances team and organizational outcomes in a variety of organizational settings. All three meta-analyses found support for the notion that shared leadership explains unique variance in team performance, over and above that of vertical leadership (Van Nicolaidis et al., 2014; Wang et al., 2014).

Wang et al. (2014) include 42 independent samples of shared leadership and examined shared leadership's relationship to team effectiveness. Their findings reveal an overall positive relationship between shared leadership and outcomes. The average relationship between shared leadership and team effectiveness was $r = 0.29$, the corrected correlation was $\rho = 0.34$. Effect sizes ranged from ($\rho = 0.18$) for shared traditional forms (e.g., initiating structure and consideration) to ($\rho = 0.34$) for shared new-genre leadership

forms (e.g., charismatic and transformational leadership; $\rho = 0.34$). Van Nicolaides et al. (2014) reviewed 467 studies and examined $N = 54$ independent effect sizes (a total sample size of 3882 teams), documenting further support for the positive relationship between shared leadership and team performance ($\rho = 0.35$). Lastly, D'Innocenzo et al. (2014) using 50 effect sizes from both published and unpublished studies (43 studies, 3198 teams), also found support for a significant relationship between shared leadership and team performance (r -observed, average: $r = 0.21$, range 0.15 to 0.32, r -weighted, average: $r = .21$, range 0.14 to 0.21).

In addition, the three meta-analyses examined a variety of moderators of the shared leadership and team performance relationship, some which may likely be correlates of team virtuality. Van Nicolaides et al. (2014) found that the relationship between shared leadership and team performance was moderated by task interdependence, team tenure, and whether performance was objectively versus subjectively measured. Wang et al. (2014) found complexity to moderate the effects of shared leadership. D'Innocenzo et al. (2014) analysis revealed lower average effect sizes for classroom/lab studies as compared to field studies. With respect to these moderating variables, it is likely that real world virtual team tasks are typically involved in more interdependent and complex projects, compared to lab studies of student teams that typically work on tasks of a different nature.

1.2.2. *The impact of shared leadership in virtual teams*

Shared leadership is advocated as beneficial for virtual teams because it is linked with collaborative decision-making (Pearce & Conger, 2003), collaborative behavior that increases trust and knowledge sharing among team members (Hill, 2005), and positive team and organizational outcomes including higher team performance (Hoch & Dulebohn, 2013). More recently, some research attention has been directed toward examining the role of shared leadership in virtual teams (e.g., Carter, Seely, Dagosta, DeChurch, & Zaccaro, 2015; Eisenberg, Gibbs, & Erhardt, 2016; Hoch & Kozlowski, 2014; Hoegl & Muethel, 2016; Paunova, 2014; Robert, 2013). We will briefly discuss a couple of these studies' results in the following.

With respect to examples of empirical research, Hoegl and Muethel (2016) studied 96 globally dispersed software development teams and they found that team leaders tend to underestimate the team members' capacity to lead themselves. As a result, formal team leaders may monopolize decision-making authority and provided insufficient levels of autonomy for team members to tackle their tasks or engage in shared leadership. In a similar sample, based on data from 96 dispersed teams, Muethel, Gehrlein, and Hoegl (2012) documented that shared leadership behavior fostered team performance.

Another example is Hoch and Kozlowski (2014) who examined a sample of 101 virtual teams and found shared leadership predicted team performance and was a more stable leadership form than traditional forms of hierarchical leadership. In fact, they found that while structural supports were more strongly related to virtual team performance in more than in less virtual teams, traditional hierarchical leadership was less. The relationship between shared leadership and team performance was not affected by team virtuality. Thus, shared leadership emerged as a stable predictor of team performance in virtual teams. In their study, Hoch and Kozlowski (2014) operationalized shared leadership in terms of cognitive, affective and behavioral/motivational components.

Yoo and Alavi (2004) also examined the role of shared leadership in a sample of non-profit virtual teams and found the relationship between shared leadership and performance to be significant and strongly positive. Similarly, Carte et al. (2006) examined the association between shared leadership and team performance and found that high performing self-managed teams were successful using emergent, concentrated, and emergent shared leadership styles. Based on this, we posit:

Proposition 2. Shared leadership is positively related to virtual team performance.

1.3. *Team personality composition and virtual team leadership*

A review of the literature indicates that limited research attention has been given to the role of team personality composition in virtual teams (Carte et al., 2006; Gilson et al., 2015; Martins et al., 2004; Serban et al., 2015). However, several meta-analyses on co-located teams have documented the positive impact that team personality composition has on team functioning and performance (e.g., Barrick & Mount, 1991; Bell, 2007; Halfhill, Sundstrom, Lahner, Calderone, & Nielsen, 2005; Peeters et al., 2006). As displayed in Fig. 1, we include personality dimensions as input factors, representing the team personality composition.

Team personality composition refers to the configuration and aggregation of personality traits in teams that influence team processes and outcomes (Halfhill et al., 2005). Team personality is a deep-level composition variable, referring to the underlying psychological characteristics of team members, that is believed to influence team processes and outcomes (Bell, 2007). It is distinguished from other deep level composition variables, such as attitudes and values, in that the focus is on enduring team member personality characteristics that influence how effectively individual members work together and complete goal-relevant tasks (Bell, 2007). In order to assess team personality composition, researchers convert team members' scores into a measure representing team personality composition (Chan, 1998; Peeters et al., 2006; Prewett, Walvoord, Stilson, Rossi, & Brannick, 2009; Stewart, 2003; Zaccaro, 2007; Zaccaro, Rittman, & Marks, 2001).

Furthermore, a primary focus of research dealing with the etiology of emergent leaders in groups and organizations has been on the role of personality. Barry and Stewart (1997) noted that personality might be particularly important to emergent leadership because of how leadership roles evolve through interpersonal interactions. With regard to personality and leadership emergence, Judge et al.'s (2002) meta-analysis of 73 samples found that the correlations of "Neuroticism, Extraversion, Openness to Experience, and Conscientiousness with leadership generalized in that more than 90% of the individual correlations were positive and greater than 0" ($p = .765$). In total, research has shown that the different personality traits differ with regard to the strength of their relationship with team leadership, team performance and other outcomes.

A premise of the typology is that the five factors are consistent in individuals and remain stable over time and each factor predisposes an individual to certain behaviors (Costa & McCrae, 1992a, 1992b; Peeters et al., 2006). Within a team the levels of the personality dimensions (e.g., agreeableness) held by the team members coalesce to form a team personality composition for each dimension. The following sections describe the relationship between the team personality compositions with emergent and shared leadership, and team performance.

1.4. Extraversion, emergent and shared leadership

As presented in Fig. 1, extraversion represents a dimension of team personality and input in the IPO. Extraversion is associated with being sociable, assertive, and talkative. Extraverts are normally energetic, optimistic, and upbeat (Costa & McCrae, 1992a, 1992b). Extraverts are described as assertive, active, talkative, upbeat, energetic, and optimistic (Costa & McCrae, 1992a, 1992b). They seek excitement and social attention (Ashton, Lee, & Paunonen, 1999). In contrast, low extraversion is characterized by being reserved. Watson and Clark (1997) suggested that positive emotionality is at the core of extraversion—extraverts experience and express positive emotions. Because they are positive, ambitious, and influential, they are likely to generate confidence and enthusiasm among their team members. Consequently, extraverts also may also be more likely take on team leadership roles.

Scholars have pointed out that extraversion is strongly linked to team processes and that it facilitates smooth functioning of the social mechanisms within a team (Peeters et al., 2006). Researchers have shown extraversion to be related to a variety of phenomena related to interpersonal interactions and establishing close relationships. It has been posited to be especially beneficial when work situations require interpersonal interaction, teamwork, high performance expectations (Barrick & Mount, 1991; Barrick et al., 1998; Barry & Stewart, 1997; Halfhill et al., 2005), as well as team processes such as seeking help from other team members (Porter, 2003). In addition, extraverted individuals are prone to be attracted to team work and working in groups (Kristof-Brown, Barrick, & Stevens, 2005) and to stimulate discussion within the team (Taggar, 2002).

Few studies have been conducted examining the role of the Big Five in virtual teams. A study by Jung, Lee, and Karsten (2012) provided evidence that individual differences in the personality dimension of extraversion/introversion can play a significant role in-group idea generation. They conducted two controlled experiments using a web-based group simulator to empirically test the impact of these factors on group idea generation. In the first experiment, extraverts outperformed introverts in computer-mediated groups and in the second experiment, extraverts generated more unique and diverse ideas than did introverts in moderate-stimuli and high-stimuli conditions only. Introverts did not outperform extraverts in any condition.

Extraverts are seen as confident and forceful due to their emotional expressiveness as well as their positive verbal and non-verbal behaviors. Consequentially, extraverted individuals will likely command attributions of respect and confidence among team members, and thus more likely to emerge, and be viewed as, leaders (Gardner & Avolio, 1998). Emergent leaders, as individuals, have been identified as “initiating more ideas, expressing more opinions, and asking more questions” (Carte et al., 2006, p. 326). Additionally, Simoff and Sudweeks (2005) described emergent leaders as arising based on the needs of the group by exhibiting attributes such as early and frequent participation, communicating often with quality messages, and building confidence among team members regarding their skills and expertise. These actions are consistent with extraversion tendencies. Taken together it is likely that more extravert team members will emerge as leaders in teams, including virtual teams.

Empirical research has supported the relationship between extraversion and individual leadership emergence. For example, Judge and Bono (2000) analyzed data on 14 samples of leaders from over 200 organizations that demonstrated that extraversion and agreeableness positively predicted transformational leadership. Bono and Judge (2004) also documented that extraversion ($\rho = 0.24$) was linked to transformational leadership emergence. For example, Hogan, Curphy, and Hogan (1994) found a relationship between emergent leadership and extraversion, with extraverts more likely to emerge as team or organizational leaders (c.f., Judge & Bono, 2000; Barrick & Mount, 1991). Similarly, studies using undergraduate student samples by both, Taggar et al. (1999, 2006) and Kickul and Neuman (2000) found that extraversion was related to leadership emergence. Thus, we posit:

Proposition 3a. Extraversion will be positively related to individual leadership emergence in virtual teams.

As related to shared leadership, extraverts tend to be more socially capable by possessing better social and interaction skills. In addition, extraverts are described as high energy and engaging in outward directed behavior and contributing to group discussions (Littlepage, Schmidt, Whisler, & Frost, 1995). Thus, we expect that virtual teams that are characterized by higher levels of team composition extraversion will also be associated with higher levels of the engagement by the team in shared leadership behaviors. This is in contrast to teams characterized by lower levels of extraversion and higher levels of introversion because introverts (and teams characterized by introversion) prefer to focus on their own internal world and tend to not focus on leading other team members. As portrayed in Fig. 1, we propose the following:

Proposition 3b. Team extraversion composition will be positively related to shared leadership in virtual teams.

With regard to extraversion as a team composition characteristic, co-located research has shown that beyond the “team average” other aspects, such as heterogeneity (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007) can also have an impact on the development of team processes and team performance. Beyond that, there could be curvilinear relationships between team level extraversion and team performance (Peeters et al., 2006). Specifically, in spite of the positive benefits of having extraverted individuals in a team, the inclusion of too many high extraverts in a team could be harmful since extraverts tend to interact merely for the social interaction it provides them and too many extraverts (or high levels of team extraversion) may lead to decreases in team performance as a result

of lowered ability by the team to remain focused on task completion (Barry & Stewart, 1997; Neuman, Wagner, & Christiansen, 1999; Peeters et al., 2006). Further, because of their tendency to be talkative and assertive, extraverts tend to be dominant and too many dominant individuals in a team may lead to conflict over team issues such as emergent leadership (Barry & Stewart, 1997).

Research supporting curvilinear associations include Barry and Stewart (1997) who documented, using a sample of 61 student teams engaged in creative problem solving tasks, at the individual level that extroverts were perceived as having greater effects on group outcomes than introverts. Their analyses suggest that this effect was through both socio-emotional and task-related inputs. In contrast, at the group level, the portion of relatively extraverted team members had curvilinear associations with task focus and group performance. Consequently, it is likely to assume that too many members who are high extraverts (and thus a high level of team composition extraversion) may hinder the enactment of shared leadership that is based on cooperation in sharing the lead. Therefore, we propose:

Proposition 3c. There will be a curvilinear relationship between team composition extraversion and shared leadership whereby moderate levels of team extraversion will be positively associated with shared leadership while high levels of team composition extraversion will be negatively associated with shared leadership.

1.5. Conscientiousness, emergent and shared leadership and virtual team performance

Conscientiousness is associated with being careful, responsible, and organized. Conscientiousness has been one of the most commonly studied personality traits in work psychology (e.g., Schmidt & Hunter, 1998). Conscientious individuals are described as having strong sense of direction and as working hard to achieve goals (Costa & McCrae, 1992a, 1992b). They are also cautious, deliberate, self-disciplined, and tend to be neat and well organized (Costa & McCrae, 1992a, 1992b). Further, they are expected to develop more reliable and trustworthy working relationships with others (e.g., Barrick & Mount, 2000). Meta-analytical research has documented that conscientiousness is positively related to job performance criteria across different occupational groups (e.g. Judge & Piccolo, 2004).

Barrick and Mount (2000) maintained that conscientiousness is related to workplace motivation or willingness to perform, which are associated with leadership emergence. Specifically, team members who are more organized and dutiful are more likely to take steps to actively contribute to, and seek out, leadership opportunities. Research has documented that leaders of high performing virtual teams are able to gain the confidence of team members by being reliable, consistent, and showing initiative; thus, high performing teams often have emergent leaders who are highly trusted by team members and have the necessary experience to back up their ideas and claims (Tyran et al., 2003).

Conscientiousness is associated with achievement motivation and competence (Costa & McCrae, 1992a, 1992b). Taggar et al. (1999, 2006) suggested that conscientious individuals emerge as leaders primarily because of their knowledge of and focus on the team's task. Consequently, these individuals use their influence to create task-focused roles and strategies to assist team performance. In their study of 94 undergraduate student teams, Taggar et al. (1999, 2006) found that conscientiousness was more strongly related to leadership emergence than extraversion or emotional stability. Since conscientious individuals are dependable and unlikely to shirk their work responsibilities, they would be expected to be more likely to emerge as leaders as well as be willing to engage in shared leadership.

In addition, because conscientious individuals are viewed as goal and detail oriented (Barrick & Mount, 2000), and usually motivated to get the job done, they may be more likely to emerge as leaders in teams and be successful in that role. Conscientious team members may be more likely to engage in task related virtual team leadership behaviors, which involve setting and monitoring goals, providing feedback to team members, and keeping updated on the status quo (Bass, 1998). Thus they may be more likely to lead their fellow team members to successful team performance in virtual teams.

In line with that, a recent study by Cogliser et al. (2012) explored the relationship between the Big Five personality factors, shared leadership emergence, and virtual team performance. They found that conscientiousness was positively related to leader emergence, and aggregated task-oriented emergent leadership behaviors predicted virtual team performance. Beyond task-oriented leadership, conscientiousness was found to be related to virtual team performance. Balthazard et al. (2009) also studied the role of conscientiousness as predictor of emergent leadership. Using a student sample of virtual teams, they documented a positive relationship between virtual team conscientiousness and emergent leadership.

In sum, prior research leads to the conclusion that individual members of teams and groups that are more conscientious will be more likely to take on task leadership roles. In addition, high levels of team conscientious will lead to cooperation and willingness by the team members to engage in share leadership roles. Further high levels of team conscientiousness will contribute to virtual team performance. Consequently, we posit:

Proposition 4a. Individual team member conscientiousness is positively related to emergent leadership;

Proposition 4b. Team conscientious composition is positively associated with shared leadership and c) team performance in virtual teams.

1.6. Agreeableness, emergent and shared leadership

Agreeableness is a personality dimension that relates to how individuals interact with others. Agreeableness represents the tendency to be cooperative, trusting, gentle, and kind (Graziano & Eisenberg, 1997). Individuals high in agreeableness value

affiliation and avoid conflict and are good-natured, cooperative, and tolerant, and tend to be more trusting and more trustworthy than individuals who are less agreeable (Costa & McCrae, 1992a, 1992b).

Research on co-located teams on team member personality has found that among all the Big Five variables team agreeableness has the strongest ties, with team performance and effectiveness (e.g., Barrick & Mount, 1991; Bell, 2007; Peeters et al., 2006). Specifically, the association between agreeableness and performance has been found in numerous studies to be particularly strong for performance in jobs that involve teamwork and interaction among employees (e.g., Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Barrick et al., 1998; Bell, 2007; Kong, Konczak, & Bottom, 2015; Mount et al., 1998; Peeters et al., 2006). Further, this has been supported in several meta-analyses on co-located teams (Barrick & Mount, 1991; Barrick et al., 2001; Bell, 2007; Peeters et al., 2006). Since, agreeableness tends to be the strongest predictor of team effectiveness, among all of the Big Five variables and this relationship has been fairly strong and reliable, we posit that it will also extend, or generalize to virtual teams.

In addition, agreeable individuals maintain positive relationships with others such they are likely to positively influence team processes. The good-natured, cooperativeness, and tolerance exhibited by agreeable individuals toward others are ingredients to well-functioning team processes. Nonetheless, they may be seen as weak and indecisive, because of their trustworthiness and consideration for others. Finally, agreeable team members are likely to be available when needed, leading to improved perceptions of team cohesion.

Research support for agreeableness as a predictor of leadership emergence has received mixed support. For example, some reviews have found agreeableness to be positively related to emergence of transformational leadership (e.g., Judge & Bono, 2000), while others did not confirm such a relationship (Bono & Judge, 2004). Similarly, Taggar et al. (1999, 2006) found support for a positive relationship, whereas Kickul and Neuman (2000) did not find agreeableness to be related to leadership emergence in their small group settings. So far, to our knowledge there has been no research in traditional work settings that has examined the role of team agreeableness as a predictor of shared leadership. However, a few studies have investigated the role of agreeableness in relation to emergent leadership as predictor of emergent leadership in virtual teams.

Cogliser et al. (2012) explored the relationship between the Big Five personality factors, leader emergence, and virtual team performance. Their study was conducted using a sample of 243 undergraduate business students assigned to 71 virtual teams. As predicted, team member agreeableness was positively related to leader emergence as aggregated task-oriented emergent leadership behaviors and to virtual team performance. Cogliser et al. (2012) assessed team virtuality in terms of electronic communication media usage among team members (student teams) and all teams were working on a course-related team project across distance, with no co-located communication permitted.

Related, Balthazard et al. (2009) examined the role of emergent leadership in virtual teams in a sample of MBA students and found that team member personality was a predictor of team member emergent leadership, which predicted team performance. Precisely, they found positive effects for the role of team member agreeableness in predicting emergent leadership, which, in turn, predicted team performance. Further, Bradley, Baur, Banford, and Postlethwaite (2013) demonstrated that agreeableness affects virtual team performance through the team processes of communication and cohesion.

Similar to traditional co-located teams, members in virtual teams must have the ability to develop relational links, establish trust, and share knowledge between the team members. However, due to the altered context of a virtual environment, virtual team members must also build and maintain a social climate necessary for team unity and cohesiveness (Kayworth & Leidner, 2001; Kong et al., 2015). These characteristics are related to the conditions under which shared leadership can occur. Specifically, team members need to be willing to lead others and be led by their team members. Team agreeableness composition will facilitate both of these. Therefore, we expect that teams that are comprised of more agreeable team members, and therefore have higher levels of agreeableness composition, will be more apt to engage in both emergent leadership as well as in shared leadership behaviors, which in turn will lead to higher team performance. As displayed in the model in Fig. 1, we posit:

Proposition 5 a, b, and c. a) Individual team agreeableness is positively related emergent leadership.

Team agreeableness composition is positively related to b) shared leadership and c) performance in virtual teams.

1.7. Openness to experience, emergent and shared leadership and virtual team performance

Openness to experience describes the extent to which an individual is original, aesthetic, curious, imaginative, open-minded, daring, tolerant of ambiguity, differences and uncertainty, independent thinking, and willing to experiment (McCrae & Costa, 1987). Individuals who are high in openness to experience are naturally curious and interested in learning, they strive to extend their knowledge, and they aim to generate new insights. While openness to experience has been consistently reported as the weakest predictor of job performance among the Big Five (Barrick & Mount, 1991; Barrick et al., 2001; Driskell, 2006; Griffin & Hesketh, 2004), meta-analytic results have consistently documented openness as the strongest predictor of training performance (e.g. Barrick et al., 2001; Salgado, 1997) and creativity (Schilpzand, Herold, & Shalley, 2010).

Individuals who are open to new experiences are more responsive to environmental challenges. Therefore, they would be expected to be more willing to participate in globally distributed forms of work, such as virtual teams. Those that are high in openness do better when task environments change (LePine, 2003). In contrast, individuals who are less open tend to be overly conservative, traditional, and set in their ways (Costa & McCrae, 1992a, 1992b). They have more difficulties adjusting to novel conditions, which are often involved in participating on virtual teams (Ilgen et al., 2005).

Openness to experience is associated with performance to the extent that teams with high levels of this trait should be more adaptable and responsive to the changes characterizing a dynamic team environment (LePine, Colquitt, & Erez, 2000). Further, openness has been described as a better predictor of performance when situations are novel or complex (Griffin & Hesketh, 2004). Teams that are high in openness are likely to perform at higher levels than teams with lower levels of openness in contexts such as virtual teams that are dynamic and complex. Consequently, teams with higher levels of openness to experience will be more, and teams with lower levels of openness to experience will be less, adaptable to changing situations that often characterize virtual teams.

Further, McCrae (1996) reported that compared with the other four Big Five factors, openness had a strong influence on interpersonal and social interaction as individuals who are curious and open-minded must have an interest in identifying and networking with people inside and outside of their social network (Griffin & Hesketh, 2004). Individual team members who are more open to reaching out and learning about their fellow team members will likely develop higher quality work relationships in these settings and be more likely to emerge as leaders. In addition, high openness in virtual team composition will provide a condition that facilitates team shared leadership engagement, as a core indicator of high quality team work relationships. Thus, we expect individual openness will be associated with leadership emergence and team openness composition will be associated with shared leadership in virtual teams as well as with virtual team performance due to the propensity of openness to adapt to change.

In spite of this, a team that is high in openness to experience also might experience greater sense of distraction, focusing on what is interesting curious and new, and they do not have as much focus to concentrate on and persist on tasks (Schilpzand et al., 2010). Consequently, virtual teams that have higher levels of team openness could experience higher challenges to perform effectively, due to their potential to be easily distracted. Schilpzand et al. (2010) found that teams that are diverse in openness (i.e., teams with members who were both high and low) were the most effective in terms of creativity. Thus, we expect that moderate levels of openness in team composition will be associated with higher levels of shared leadership and performance than high or low levels. Thus, we posit:

Proposition 6 a, b, and c. a) Individual team member openness to experience is positively related to emergent leadership.

Virtual teams that have moderate levels of team openness to experience composition have higher levels of b) shared leadership and c) performance than virtual teams with low or high levels of team openness to experience composition.

1.8. Emotional stability, emergent and shared leadership and virtual team performance

The fifth personality factor of the Big Five is emotional stability. Individuals who are emotionally stable have a tendency to be secure, calm, self-confident, and to possess high self-efficacy and high self-esteem (Costa & McCrae, 1992a, 1992b). Further, they are resilient and are more capable of making more accurate decisions under stress, more confident in handling difficult situations, problems and challenges. Emotionally stable people are better able to develop positive relationships with others, because they are unlikely to reject others and because they experience more positive affect and less negative affect (Sangster & Ellison, 1978). They tend to see others in more favorable ways, and they are generally perceived to be more resilient. Thus, we expect individual emotional stability to be associated with leadership emergence in virtual teams.

Proposition 7a. Individual team member emotional stability is positively related to emergent leadership.

Emotional stability team composition has been associated with a number of phenomena related to interpersonal interaction. It is expected to contribute positively to a positive teamwork climate, such as by creating a relaxed team atmosphere (Barrick et al., 1998), stability, coordination and cooperation (Neuman et al., 1999). Further it is associated with task cohesion (Van Vianen & De Dreu, 2001), and reduced levels of conflict and disruptive behavior (Barrick et al., 2001; Driskell, Hogan, & Salas, 1987; Hough, 1992; Mount et al., 1998).

Emotional stability also is associated with higher levels of both leadership performance expectations and levels of leadership performance (Judge & Bono, 2000; Judge et al., 2002) as well as with team performance (Barrick et al., 1998; Thoms, Moore, & Scott, 1996). While the majority of this research has been conducted on co-located teams, we expect that the positive effects of emotional stability will generalize to virtual teams and virtual teams will benefit from having high levels of team composition emotional stability.

It is likely that the interpersonal facilitation, problem solving competencies, positive attitude, and high stress-resistance associated with team composition emotional stability will contribute to shared leadership. This is in contrast to lower levels of team emotional stability, which is associated with team members being anxious, frustrated, and shy. This expectation is particularly relevant in light of the often more challenging circumstances of virtual teams. Specifically, challenges associated with virtual teams could be viewed as stressors, and teams with high emotional stability composition as being more capable of handling stressors than teams with low emotional stability. Emotional stability is thus likely to contribute to overcoming challenges resulting from conditions such as the lack of co-located interaction inherent in virtual teams. Therefore, we posit the following:

Proposition 7b and 7c. b) Team-level emotional stability is positively associated with shared leadership, and c) team performance in virtual teams.

1.9. Mediating processes: emergent and shared leadership

Researchers have frequently argued that personality and leadership research alike would benefit from investigating more mediating variables (e.g., Hogan et al., 1994; Witt, Burke, Barrick, & Mount, 2002). In our model in Fig. 1, we respond to this need by

positing individual leader emergence and shared leadership as two mediating mechanisms of the relationship between individual and team personality composition with team performance in virtual teams. In the following, we will outline this proposition separately for emergent leadership and shared leadership.

First, emergent leadership has been posited as a mediator of the relationship between leader personality and performance (Hogan et al., 1994). Leader personality is widely believed to predict the engagement in, or emergence of, leadership behaviors, which in turn are expected to influence team performance (Ilies et al., 2004; Judge et al., 2002). This association has been supported for individual, team and organization performance in wider organizational settings (Ilies et al., 2004; Judge et al., 2002). It has also been supported in small group research for emergent leadership (e.g., Balthazard et al., 2009; Barry & Stewart, 1997; Taggar et al., 1999, 2006). While research has primarily been conducted on traditional co-located teams (e.g., Kickul & Neuman, 2000; Taggar et al., 1999, 2006) initial evidence suggests that these relationships also hold for the context of virtual teams (Balthazard et al., 2009). For example, Cogliser et al. (2012) posited that the relationship between team personality composition and team outcomes is mediated and explained through emergent leadership. They found support for an indirect relationship in their sample of virtual teams. Therefore, in our model presented in Fig. 1, we also position emergent leadership as a mediating variable explaining the relationship between team personality composition and team performance in virtual teams. As portrayed in our model, we expect that the effects of team personality composition on team performance will be through emergent leadership. Therefore, we propose:

Proposition 8a. Emergent leadership will mediate the relationship between team member personality and virtual team performance.

Second, with regard to shared leadership, team personality composition has repeatedly been positioned as an antecedent of shared leadership in teams. For example, in their theoretical review, Hoch and Dulebohn (2013) proposed that the relationship between team member personality composition and team performance is mediated by shared leadership. This relationship was also put forward by Pearce and Sims' (2002). A small number of empirical studies have addressed the mediated relationship between team personality composition, shared leadership and team performance in co-located teams. For example, Hoch (2013) examined the role of shared leadership as a mediator between team personality composition and team outcomes in co-located teams, and found support for an indirect relationship. Likewise, other studies have examined the role of team composition (not in terms of personality, but in terms of diversity; e.g., DeMeester, Lopez, Moore, Cook, & Chin, 2016; Zhou et al., 2015) and found support of the role of shared leadership as a mediating process. Therefore, in Fig. 1 we position shared leadership as a mediating variable explaining the relationship between team personality composition and team performance in virtual teams.

Proposition 8b. Shared leadership will mediate the relationships between team member personality composition and virtual team performance.

1.10. Moderating Role of Team Virtuality

Virtual teams have been described as teams that work together across distance to accomplish common goals (Bell & Kozlowski, 2002). Beyond these basic shared attributes, the literature contains a variety of different conceptualizations and empirical forms of measurement of team virtuality (Gilson et al., 2015; Kirkman & Mathieu, 2005; Martins et al., 2004; O'Leary & Cummings, 2007; O'Leary & Mortensen, 2010). The role of team virtuality has been discussed in various ways, and team virtuality has been posited to affect the development of team processes and team outcomes in different ways.

We consider team virtuality as a moderating variable that influences the strength and direction of the relationships between team personality composition and team processes. This is consistent with other research that has positioned virtuality as a moderating variable that influences the input and process pathway and the process and outcome pathway. For example, Bradley et al. (2013) posited that team virtuality moderated the relationship between team personality composition and the team process of communication as well as between personality composition and performance. Kirkman, Rosen, and Tesluk (2004) investigated the interaction between team virtuality and team composition with team outcomes. They explored team empowerment as a moderating variable and compensating mechanism towards the negative effects of team virtuality on team outcomes. Similarly, a study by Hoch and Kozlowski (2014) further supported the role of team virtuality as a moderator of the relationship between antecedents and outcomes in virtual teams.

As noted, virtuality is comprised of multiple dimensions such as a lack of face-to-face contact, geographic distance among members, time zone differences, isolation of team members, cultural diversity (for review see, e.g., Hoch & Kozlowski, 2014). When compared to co-located teams, virtual teams face a number of challenges due to virtuality; and input factors in virtual teams may be more or less important in the development of team emergent states and processes depending on level of virtuality. We expect that team virtuality will moderate the strength of the relationships between team personality composition and emergent leadership as well as team personality composition and shared leadership. In the following we describe expected interactions for each of the Big Five variables.

1.10.1. Extraversion and virtuality

Extraversion is associated with engaging in socially competent activities, higher levels of energy, and outward directed behavior (Barrick & Mount, 1991; Barrick et al., 2001). As outlined earlier, we expect there to be a positive linear and curvilinear

relationship between team extraversion and emergent leadership and extraversion and shared leadership in virtual teams. This is due to extravert team members' propensity to be action-oriented and out-going in terms of reaching out to their teammates. We expect the relationships between the personality dimension of extraversion and emergent and shared leadership processes to be strengthened as the level of virtuality increases because of the relevance of extraversion, in facilitating leader emergence and shared leadership.

Extraverts are characterized as assertive, talkative, and energetic. Higher levels of virtuality leading to challenges, such as increased isolation and geographic dispersion among virtual team members should increase the need for extraversion, because of the extra effort (due to challenges due to virtuality) needed by members to overcome these obstacles and engage in the leadership processes. Further, we expect that team virtuality will moderate the relationship between moderate levels of extraversion with emergent leadership and shared leadership, such that the relationships are stronger in more virtual teams than less virtual teams. At high levels of virtuality high team composition extraversion is to be negatively related to leader emergence and shared leadership, due to the reasons described above with respect to the curvilinear relationship. High levels of team extraversion suggest too many dominant team members leading to conflict over team issues and potentially too many emergent leaders as well as lower cooperation that is vital to shared leadership. Thus, we expect the associations of moderate team extraversion and emergent and shared leadership will be strengthened in teams at higher levels of virtuality. Thus, we posit:

Proposition 9a and b. Virtuality will moderate the relationships between moderate levels of team extraversion with a) emergent leadership and b) shared leadership, such that the relationships will be stronger in teams with higher levels of virtuality than in teams with lower levels of virtuality.

1.10.2. Conscientiousness and virtuality

Individuals who are conscientious have been described as purposeful, achievement oriented, organized, self-disciplined, and competent (Humphrey et al., 2007). In addition, conscientiousness has been consistently found to be associated with performance motivation (Judge & Piccolo, 2004). Members of teams characterized as high in conscientious will be more likely to put forth more effort in emerging as leaders and in participating in shared leadership than teams low in conscientiousness. Due to the challenges of virtuality, the importance of conscientious as a team composition variable should increase with higher levels of virtuality.

Traditional, hierarchical leadership may be able to exercise influence on co-located teams, for example in motivating team members to take on leadership roles or to participate in shared leadership. In contrast, since hierarchical leadership influence is typically less effective and more difficult to perform under conditions of high virtuality (Hoch & Kozlowski, 2014), the role of conscientiousness in relation to team processes such as emergent and shared leadership should increase. Thus, we expect that team virtuality will moderate the relationship between team conscientiousness composition with emergent and shared leadership such that the relationship will increase in more virtual teams than in less virtual teams. Therefore we posit the following:

Proposition 10 a and b. Virtuality will moderate the relationships between team conscientiousness with a) emergent leadership and b) shared leadership, such that the relationships will be stronger in teams with higher levels of virtuality than in teams with lower levels of virtuality.

1.10.3. Agreeableness and virtuality

Research has shown that agreeableness is positively related to team processes and performance in co-located teams (Barrick & Mount, 1991; Barrick et al., 2001; Kong et al., 2015; Peeters et al., 2006). However, the majority of these studies have examined agreeableness in co-located teams and there is little research on team agreeableness in virtual teams. Further, the few virtual team studies did not all examine a moderated relationship between team personality composition and team virtuality. For example, Cogliser et al. (2012) examined the role of agreeableness as an antecedent of emergent leadership in virtual teams, but did not examine or hypothesize a moderated relationship.

In contrast, Bradley et al. (2013) examined team virtuality as a moderating variable. They found that the lack of co-located meetings moderated the relationship such that co-located teams benefitted from agreeableness more than teams whose members did not meet. However, their sample was comprised of student teams and meta-analyses have demonstrated a weaker relationship between team personality, such as agreeableness, and core team outcomes in student teams than in real organizational teams (Bell, 2007). Furthermore, their operationalization of team virtuality only included frequency of co-located meetings, which is different from our more complex and multidimensional concept of virtuality, thus potentially leading to different results.

It is our expectation that agreeableness will play an even stronger role in team functioning in virtual than co-located teams. A primary reason is related to the communication challenges in virtual teams. Media richness theory (e.g., Daft & Lengel, 1984, 1986) classifies communication media in terms of their information carrying properties. A medium is rich to the extent it provides immediate feedback, multiple cues through body language, voice modulation, and uses natural language. In general, richer mediums are more personal as they include nonverbal and verbal cues, body language, inflection, and gestures that signal a person's reaction to a message. The richer the medium, the better it facilitates collaboration and enhances attendant clarity and understanding among team members. Media richness theory classifies co-located interaction as being the highest in terms of media richness (Daft & Lengel, 1984, 1986).

Low media richness in virtual team communication, compared to co-located teams, may lead to misinterpretations when communicating among team members. In teams with high levels of virtuality, high levels of team agreeableness will contribute to

team members overlooking co-member miscommunication resulting from low media richness. As noted by [Costa and McCrae \(1992a, 1992b\)](#), those high in agreeableness tend to be sympathetic, thoughtful, altruistic, and cooperative and thus we expect that such will more willing overlook communication faults. Thus, high levels of virtuality will increase the importance of agreeableness and will strengthen the relationship between agreeableness and shared leadership that is characterized by the need for team members to cooperate and communicate in sharing leadership responsibilities. We posit the following:

Proposition 11. Virtuality will moderate the relationship between team agreeableness and shared leadership, such that the relationship will be stronger in teams with higher levels of virtuality than in teams with lower levels of virtuality.

1.10.4. Openness and virtuality

As stated earlier, we expect that higher levels of team openness are more conducive for individual team leader emergence and for the emergence of shared leadership in virtual teams. This is due to team virtuality comprising cultural and national diversity among team members, since virtual teams are more often globally distributed and therefore comprise members from different national and cultural backgrounds. Related, communication challenges are exacerbated by diverse ethnic, national, cultural and organizational backgrounds of virtual team members ([Kayworth & Leidner, 2001](#)).

In this respect, team openness should facilitate dealing with diversity challenges and contributing to a more inclusive team climate. For example, openness is positively associated with tolerance to diversity and negatively with ethnocentrism, prejudice, and social dominance orientation ([Butler, 2000](#); [Jost, 2006](#); [Sibley & Duckitt, 2000](#)). Openness contributes to inclusiveness and an environment where diverse members are willing to emerge as leaders as well as engage in shared leadership, which requires cooperation. Thus, we expect team virtuality will moderate the relationships between openness team personality composition and emergent leadership and shared leadership, such that the relationships between openness and emergent and shared leadership will be strengthened under conditions of high virtuality. Thus, we posit:

Proposition 12 a and b. Virtuality will moderate the relationships between team openness with a) emergent leadership and b) shared leadership, such that the relationships will be stronger in teams with higher levels of virtuality than in teams with lower levels of virtuality.

1.10.5. Emotional stability and virtuality

Teams that are comprised of members who are more emotionally stable tend to outperform teams who are less emotionally stable (e.g., [Barrick & Mount, 1991](#)). This is due to enhanced capabilities of emotionally stable individuals to more successfully handle stressful and ambiguous work situations, which will more likely arise under conditions of geographic and temporal dispersion. With virtual teams being distributed across the globe, this presents stressors not typically present in co-located teams.

Also, emotional stability enhances team members' capability resolve conflict, which may more likely arise in virtual teams than in co-located teams, due to the increased need of coordination. The ability to remain calm and solve problems under high levels of stress and conflict increases the importance of emotional stability in facilitating leader emergence as well as team engagement in shared leadership. Thus, we expect that team virtuality will positively moderate the relationship between team emotional stability and emergent leadership and shared leadership. We therefore posit:

Proposition 13 a and b. Virtuality will moderate the relationships between team emotional stability with a) emergent leadership and b) shared leadership, such that the relationships will be stronger in more virtual teams than in less virtual teams.

2. Discussion

The purpose of this article was to address the role of team personality on leader emergence and shared leadership in virtual teams. While attention has been given to emergent and shared leadership as predictors of various team outcomes in co-located teams, less attention has been directed toward their potential effects in virtual teams or to their antecedents. Regarding potential antecedents, limited research has been devoted to investigating personality dimensions, such as the Big Five, as predictors of emergent and shared leadership. To contribute to the literature, we develop and present a model that is aimed at closing all of these gaps.

To contribute to future research, we presented an IPO model that highlights team member personality composition, in terms of Big 5 dimensions, as an input to the processes of emergent and shared leadership in virtual teams. The model also positions emergent and shared leadership as mediators of the team personality composition and virtual team performance relationship. Finally, the model presented includes virtuality as a moderator of the team personality, emergent and shared leadership relationship. Overall, the goal was to develop a framework for a better understanding of the role of personality as an antecedent to virtual team leadership processes and how team virtuality relates to team personality composition and leadership processes.

2.1. Theoretical development and future directions

The model makes multiple theoretical contributions to the literature. First, we extend the literature on team personality composition to the context of virtual teams. While there is ample research on the role of team member personality (composition) in

the context of co-located work, including teams, less research has addressed the role of team personality (composition) in virtual teams. In the present article we summarize and integrate the literature and point towards directions for future research.

The present study's model also presented a clear conceptual distinction between the concepts of emergent leadership and shared leadership, in the context of virtual teams. We describe shared leadership as a collective within-team process, engaged in by multiple team members. Due to its being shared it represents a collective influence process and as such, shared leadership is a team-level phenomenon. In contrast, individual emergent leadership describes a situation where an individual rises above other team members; thus it refers to an individual, rather than a group, process. Even though multiple leaders may arise, emergent leadership does not describe a collective phenomenon. Leadership emergence research has addressed what predicts individual team leader emergence.

Our literature review indicated that overall, more empirical research has been carried out on shared leadership, which is summarized in three recent meta-analyses (D'Innocenzo et al., 2014; Van Nicolaides et al., 2014; Wang et al., 2014) than on the (informal) emergent leadership in teams (e.g., Neubert & Taggar, 2004; Taggar et al., 1999, 2006). At the same time, the average sample size of the meta-analyses on the emergence of (formally assigned) leadership in organizations (Judge & Piccolo, 2004; Wang et al., 2011) with 87 to 113 studies exceeds that of the shared leadership meta-analyses (D'Innocenzo et al., 2014; Van Nicolaides et al., 2014; Wang et al., 2014), which averages to less than 50 samples per meta-analysis.²

In addition to traditional teams, both emergent leadership (e.g., Balthazard et al., 2009; Carte et al., 2006; Sarker et al., 2002) and shared leadership (e.g., Hoch & Kozłowski, 2014; Muethel et al., 2012) have been studied as predictors of team performance in virtual teams. However, overall significantly fewer studies have examined the effects of the two leadership forms in virtual teams than in traditional co-located team settings.

Regarding the role of team personality composition as an antecedent of leadership, a large amount of studies have examined the role of individual leader personality as predictor of (formally assigned) emergent leadership (for recent meta-analyses and reviews, see Bono & Judge, 2004; Judge & Bono, 2000; Judge et al., 2002; Wang et al., 2011). In addition, a relatively large number of individual studies examined the predictors of (informally) emergent leadership in teams (e.g., Foti & Hauenstein, 2007; Kickul & Neuman, 2000; Taggar et al., 1999, 2006) and in virtual teams (e.g. Balthazard et al., 2009; Coglisier et al., 2012). However, only a small number of studies have examined the role of team personality composition, as an antecedent of shared leadership, in co-located teams (e.g., Hoch, 2013).

As another theoretical contribution, we suggested that a composite measure of virtuality is more suitable to capture the multidimensional nature of virtuality. We argue that a multidimensional approach to virtuality better captures the different characteristics that distinguish virtual teams from co-located teams. We define virtuality as comprising the dimensions of geographic dispersion, time zone differences, imbalance of members across sites, isolation of members, electronic communication media usage and different national or cultural backgrounds.

We posited interaction effects by virtuality on the team personality composition and leadership processes relationships. Overall, we expected that the relationships between each personality dimension and the leadership processes would be strengthened, due to their ability to help overcome the additional challenges presented by high levels of virtuality. The exception was extraversion where we initially expected that moderate, rather than high levels of extraversion would be moderated by high levels of virtuality in relationships to shared leadership.

2.2. Practical implications

There are several practical implications for management practice from this discussion. First, the obvious implication is that selection criteria for virtual team members should consider personality dimensions. For example, because of the positive associations expected from agreeableness, conscientiousness, openness, emotion stability, and extraversion, virtual team member selection should include an assessment of these personality dimensions. Further, high levels of team composition extraversion should be avoided with moderate levels of extraversion being more appropriate. Thus, in forming teams, managers can potentially positively influence team personality composition by selecting team members who exhibit dimensions that are positively associated with team leadership processes of emergent and shared leadership.

In addition, based on the expectation that both emergent leadership and shared leadership predict team performance, organizations need to facilitate the development of these processes in virtual teams. Particularly, the development of shared leadership by virtual team members, will not be able to benefit from a number of processes that naturally emerge among co-located team members. Shared leadership functions are facilitated by socially-related information exchange, creating commitment, trust, and cohesion among team members. Much of this is enabled through social interaction among co-located team members including informal conversations, socializing outside of work and through co-located team and individual team member meetings. Informal interaction is less common and feasible in virtual teams; interaction is more frequently characterized as formal and in the context of scheduled team meetings, structured for purposes such as defining and assigning particular task contributions and assessing and reporting on team progress. Thus, organizations need to make efforts to directly encourage and facilitate shared leadership through training. These efforts would be augmented by selecting team members whose personality profiles (e.g., high levels of

² An even larger amount of literature has been produced, and attention has been given to the role of team member personality composition as predictor of organizational outcomes, with sample sizes by far exceeding those on either form of leadership. For example, a recent meta-analysis integrated findings from 15 separate meta-analyses on the role of team personality in teams (Barrick et al., 2001), and additional meta-analyses have been conducted since then (e.g., Halfhill et al., 2005; Peeters et al., 2006).

agreeableness) are positively associated with shared leadership as posited in this paper. Further efforts could be made to encourage team members to emerge as leaders and that could be facilitated in part by creating a climate characterized by vertical leaders who are not overbearing but developmental and who encourage members to take on leadership roles.

3. Conclusion

The present study contributes to the literature by integrating the role of team personality composition, emergent and shared leadership in virtual teams. The challenges in leading and managing virtual teams highlight the importance of theoretical and empirical work to identify factors that facilitate team processes and outcomes. Toward this end, we have discussed the role of team personality composition in facilitating emergent and shared leadership processes as well as in relation to virtual team performance. We also discussed the moderating role of virtuality and its impact on the team composition and leadership relationship. Our goal has been to facilitate empirical research by providing testable propositions. We encourage researchers to continue investigating virtual teams, which are continuing to become one of the predominant work arrangements in organizations.

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