TEAM COMPOSITION AND VIRTUALITY: A META-ANALYSIS

A Dissertation

by

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ABSTRACT

Team composition is an important consideration when forming work teams as it is known to affect team outcomes through team mediators. However, because current recommendations regarding team composition are based primarily on face-to-face teams, they may not be as applicable to virtual teams, a team-type that is becoming increasingly more prevalent. Virtual teams are those whose members are distributed across locations and, consequently, rely primarily on technology to communicate with one another. This virtuality could moderate the effect of team composition on team outcomes because higher levels of virtuality pose challenges that are not apparent at lower levels of virtuality. Thus, compositions that work well for less virtual teams might not be as effective for teams that are more virtual. Therefore, the objective of this meta-analysis was to examine how team virtuality moderates the relationships between deep- and surface-level compositional characteristics and team outcomes. The relationship between deep- and surface-level composition and team mediators at different levels of team virtuality was also examined because team composition can affect team outcomes through team mediators. The results indicated that the effects of team composition in highly virtual teams and teams that are low in virtuality did not differ from one another; instead, differences arose when teams were moderately virtual. This could be because moderately virtual teams use communication methods that are rich enough for team member characteristics to be discerned, and communicating electronically initially could prevent surface-level attributes from causing categorization. Second-order sampling error, however, could also be influencing the findings. These results suggest that recommendations regarding team composition are generally applicable across teams

of differing levels of virtuality, although moderately virtual teams may require special consideration.

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1. INTRODUCTION

How individuals do work has changed. For instance, according to Lawler, Mohrman, and Ledford (1995), one change that has been seen is the shift away from organizing jobs around individual jobs to structuring work around teams. Teams, as defined by Guzzo and Dickson (1996) and Kozlowski and Bell (2012), are groups that work interdependently to complete tasks and are embedded in a social context. To be a team, Guzzo and Dickson (1996) state that not only must the group consider themselves a social entity, but others outside the group must consider the group a social entity as well. As such, team members must interact with one another and set boundaries so it is clear who is in the team and who is not (Kozlowski & Bell, 2012).

Teams are used in organizations because they benefit both the organization and employees. For example, Cohen and Bailey (1997) note in their review that self-managing work teams help organizations reduce costs because the team members take on responsibilities that had previously been assigned to supervisors or managers. In addition, these teams are associated with better performance and attitudinal outcomes (Cohen & Bailey, 1997). Project teams, which are teams composed of individuals from different backgrounds who work together on a project and then disband once the project is complete, also benefit organizations because these teams can work on multiple activities at the same time, thus reducing the time it takes to complete a task and allowing the organizations to be more competitive (Cohen & Bailey, 1997). As a result, the use of teams in organizations is unlikely to dissipate.

The nature of the teams being used, however, is changing. Increasingly, the teams utilized in organizations are becoming more virtual; that is, the members of the team are geographically dispersed and need to rely on communication technology to communicate with

one another (Schiller & Mandiviwalla, 2007). A survey by the Society of Human Resource Management (2012) found that 46% of organizations use virtual teams, and this number is likely to be larger now. For example, the number of transnational organizations has grown (United Nations Conference on Trade and Development, 2004, 2010). According to Hinds, Liu, and Lyon (2011), these organizations often require that employees collaborate and coordinate with others located at different sites around the world. Thus, they have to rely on communication technology to do their jobs. Therefore, as the number of transnational companies increases, the use of virtual teams is likely to increase as well.

As the use of teams continues to grow in organizations, it is important to understand what makes for a good team member to better select individuals for team positions. While several studies (e.g., Barrick, Stewart, Neubert, & Mount, 1998; Barry & Stewart, 1997; Baugh & Graen, 1997; Bell, 2007; Somech & Drach-Zahayy, 2013) have examined how team composition affects traditional, colocated teams that mainly communicate face-to-face, these effects could be different in virtual teams. Hence, the objective of this study was to examine how virtuality moderates the effects of team composition on team outcomes and mediators.

Predicting Team Outcomes

Traditionally, the understanding of how different factors affect teams has been guided by the input-process-output model (IPO; McGrath, 1964). In this model, inputs are factors that affect how team members interact with one another and the conditions under which they do so. McGrath (1984) describes four categories of inputs: properties of team members, properties of the group, properties of the task/situation, and properties of the environment. Properties of team members includes characteristics that the team members bring to the group, such as abilities or attitudes. These are thought to influence properties of the group, which refers to how the group is

structured (McGrath, 1964). This encompasses not only how task activities and responsibilities are distributed but also the position of power each role in the team has, what communication channels the team utilizes, and the pattern of interpersonal relationships within the team. Properties of the task, such as the type of task the group is doing, and properties of the environment, which refer to the condition that the team is working in, can also influence properties of the group.

Team inputs are thought to influence teams through their effect on team processes, which are the activities and interactions in which the team members engage (McGrath, 1964). The interaction process as described by McGrath (1964) has three components: communication, the flow of influence, and the flow of affect. Communication refers to how the team gathers resources and does the task, while the flow of influence refers to how the team directs its activities. The flow of affect refers to how team members punish and reward one another and how the team members maintain cohesion. According to McGrath (1984), these components interact with one another to not only influence performance on the current task, but also future group properties.

Since the conception of the IPO framework, others (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005) have criticized it as being too simplistic and unable to model teams as adaptive systems. Consequently, several modifications to this model have been proposed. For instance, Cohen and Bailey (1997) incorporated the multilevel nature of different types of inputs into the model by adding a direct effect of environmental factors on organizational, team, and individual level inputs. They also separated what they called group psychosocial traits such as norms and shared mental models from team processes. This would later be formalized by Marks, Mathieu, and Zaccaro (2001). According to Marks et al., many of the constructs included under processes

in the original IPO framework are not really processes at all. They state that in order for a construct to be a process, it must describe how the team directs or monitors the way they interact with tasks, tools, machines, or systems to complete their assigned tasks. Constructs such as psychological safety and cohesion do not fit this definition. Instead, Marks et al. argue that these are emergent states, or constructs that describe team properties that vary and depend on team inputs.

Ilgen et al. (2005) concur with Marks et al. (2001). Instead of excluding emergent states from the model, however, they recommend using the term mediator rather than process to include a broader range of variables that can affect team outcomes. Furthermore, they argue that the original IPO model does not account for temporal dynamics. Although the impact of time was implied in the original IPO model, it was not explicitly included in the model. This is important because performance does not happen at a single point in time; teams perform a variety of tasks that begin and end at different points in time. Thus, it is more accurate to say that teams have performance episodes which are composed of a clear goal and actions taken towards goal attainment (Marks et al., 2001). Different performance episodes can be connected to one another (Mark et al., 2001). The completion of one task, for instance, may be a prerequisite for beginning another task. Because of this, the outcomes of one episode can affect the inputs and mediators of another episode. To reflect these changes, Ilgen et al. (2005) propose the input-mediator-output-input (IMOI) model.

Team Composition

In both the IPO model and later revisions (e.g., the IMOI model), team composition is regarded as an input. Team composition refers to characteristics of the members of the team (Kozlowski & Bell, 2012). It is thought to be important because it not only affects what a team

can do, but how much effort the team puts toward completing its tasks (Bell, 2007). According to Moreland and Levine (1992), research on team composition can be categorized along three dimensions. One dimension is the type of characteristics being examined. Many different team member characteristics, such as personality (e.g., Prewett, Brown, Goswami, & Christiansen, 2016), demographics (e.g., Lemoine, Aggarwal, & Seed, 2016), and values (e.g., Hu & Judge, 2017) have been examined. However, how the characteristics are measured is also important. While oftentimes characteristics are aggregated to the team level, Moreland and Levine (1992) note that the variance of the characteristics can also be examined, as well as different configurations. The third dimension regards how team composition is conceptualized. According to Moreland and Levine, team composition has been studied as a consequence of team processes (e.g., Wilk & Makarius, 2015), as a cause of team outcomes (e.g., Bell, 2007), and as a moderator (e.g., Hu & Judge, 2017).

Mathieu, Tannenbaum, Donsbach, and Alliger (2014), however, conceptualized research on team composition in a different way. According to them, research on team composition can be described as either being individual- or team-based and with an individual or team focus. Individual-based research differs from team-based research in that it is interested in the characteristics and outcomes of individual team members. The level of analysis in this research is at the individual level. On the other hand, team-based research is focused on how individual differences can affect the team. Thus, the level of analysis would be at the team level. For example, individual-based research would examine cooperative learning, where individuals are trained in teams but the goal is to improve individual performance. Team-based research would examine team training, where team performance is the outcome of interest.

While the base (i.e., individual or team) refers to the level of analysis of interest, the focus of team research refers to whether the characteristics examined are important because of a person's position in the team or whether the characteristics are relevant to the entire team. According to Mathieu et al. (2014), individual-focused research examines characteristics that are important because of a team member's position in the team. For example, a study that is individual-focused could examine how the team member lowest on some personality trait affects team performance. Conversely, team-focused research examines characteristics that are not position dependent. Research examining how the mean level of some characteristic affects team outcomes, for instance, is team-focused because the effect of that characteristic on the team is not thought to be caused by one team member.

In addition, team composition research can be characterized by whether it examines surface-level composition or deep-level composition. Surface-level composition refers to the characteristics of team members that are readily apparent, such as age, race, and sex (Bell, 2007; Harrison, Price, & Bell, 1998). Research on surface-level composition tends to focus on the spread of characteristics within a team, as described by Moreland and Levine (1992) and Mathieu et al. (2014). This is important because workforces are becoming increasingly diverse (e.g., Bureau of Labor Statistics, 2017, 2018). Data from the Bureau of Labor Statistics (2015, 2017, 2018), for example, shows that the American workforce is becoming more racially and ethnically diverse and that a larger number of workers are foreign born. Consequently, it is likely that employees will have to interact and get along with others who differ from themselves in various ways.

Harrison and Klein (2007) describe three different types of diversity in team composition: separation, variety, and disparity. Separation refers to the spread of team member characteristics

on a continuum. At low levels, all team members are at the same point on the continuum. For example, all team members could be the same age. At moderate levels, the spread of team members on the continuum for the characteristic varies such that no two individuals are at the same point on the continuum. According to Harrison and Klein, high levels of separation diversity involve polarization on the spread of a characteristic within a team. Thus, team members would be split between opposite ends of the continuum. When it comes to the spread of gender in a team, for instance, maximum separation would occur when half of the team members identify as highly feminine while the other half are highly masculine.

On the other hand, variety refers to differences in categorical attributes (Harrison & Klein, 2007). According to Harrison and Klein (2007), variety differs from separation in that it assumes that there are qualitative differences in categorical attributes whereas separation refers to quantitative differences on some characteristic. Minimum variety diversity in team composition occurs when all team members belong to the same category. A team where all the team members are male, for instance, would have minimal variety composition in terms of sex. Moderate variety diversity involves at least one team member differing from the others on some categorical attribute. A four-member team with two individuals with a background in psychology and two individuals with a background in marketing would be described as manifesting moderate variety diversity. Maximum diversity would then occur when each team member belongs to a different categorical group, such as when each individual on a team belongs to a different department within the organization.

The third type of diversity in team composition, disparity, refers to differences in a valued resource (Harrison & Klein, 2007). Like separation diversity, this is measured on a continuous scale, albeit an ordinal one. According to Harrison and Klein (2007), minimum

disparity diversity occurs when all team members are at the same level. There would be minimum disparity in regard to pay in a team if all team members received the same salary. Moderate disparity would occur when there are some differences in the valued resource, but no one person has a disproportionately large share of the resource. When one team member has a much larger share of the resource than other members of the team, maximum disparity occurs. This would be the case when one team member has a much higher income than other members of the team.

Much of the literature on diversity in teams has reported mixed results, leading to a variety of different theories being utilized to explain these effects. Similarity-attraction theory (Byrne, 1971) and the social identity/self-categorization theories (Tajfel, 1981; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) are often used to explain why diversity can be detrimental in teams. According to similarity attraction theory, people are more positive about those who hold similar beliefs and attitudes as themselves. For instance, Byrne (1961) found that individuals who received information indicating that a fictional other shared the same views as themselves liked that individual more than individuals who received information indicating that the fictional other held dissimilar views. According to Townsend and Scott (2001), this would be applicable to demographic factors as well because these factors serve as proxies for life experiences that would likely lead to differences in attitudes. Consequently, this theory would predict that both demographic and non-demographic differences among team members would be associated with less liking for one another, thus affecting behavior towards one another. In congruence with this, both Harrison et al. (1998) and Price, Harrison, Gavin, and Florey (2002) found that higher demographic dissimilarity was associated with lower team social integration.

Much like similarity attraction theory, the social identity/self-categorization theories posit that individuals like those who are similar to themselves more than those who are different from themselves. According to self-categorization theory, individuals define at least part of their self-concept based on the social groups to which they claim membership (Turner et al., 1987). These memberships, according to social identity theory, are meaningful to the individual, and, because individuals want a positive self-concept, cause people to behave in ways that maintain a positive distinction between their group and other groups (Tajfel & Turner, 1979). Thus, this approach would also predict that diversity in teams would be detrimental because it causes team members to treat those not in their perceived in-group differently. Chatman and Flynn (2001) found, for example, that greater diversity within a team was associated with less cooperative norms within the team. The more alike team members were to one another, the more they cooperated with each other.

Although most research on surface-level diversity in teams suggests that it is detrimental to team functioning, there are some (e.g., Bantel & Jackson, 1989; McLeod, Lobel, & Cox, 1996) who believe that diversity can be beneficial to a team. In this perspective, diversity in team composition is beneficial because it allows for a greater range of task-relevant knowledge, skills, abilities, and other characteristics within the team (McLeod et al., 1996). In diverse groups, compared to homogenous groups, there are more viewpoints as to how to solve a problem or complete a task because the individuals do not share the same background and thus do not have the same beliefs. As a result, the solutions developed by diverse teams are more creative than the solutions of nondiverse teams, as Polzer, Milton, and Swarm (2002) found. In their study, they found that demographic diversity (i.e., age, sex, race, citizenship) was associated with more creative performance when interpersonal congruence among team members was high, ostensibly

because the team members felt more comfortable applying their differences in experiences and perspectives to the task.

Research on deep-level composition has also examined how diversity can affect teams. Deep-level composition pertains to characteristics that might not be readily apparent, such as personality, beliefs, and attitudes (Harrison et al., 1998). These characteristics differ from surface-level characteristics in that they cannot be easily discerned. Instead, they require interaction to be ascertained. Fewer studies have examined the impact that diversity in deep-level composition rather than surface-level composition can have on a team (Jackson, Joshi, & Erhardt, 2003). The research that has been conducted to date suggests that the effect of diversity in deep-level composition on teams depends on the characteristic being studied. For instance, Mohammed and Angell (2003) found that while variation on some personality traits (i.e., agreeableness, emotional stability, and extraversion) predicted performance on a team presentation, variation on other traits (i.e., conscientiousness and openness to experience) did not. As a result, Mathieu, Maynard, Rapp, and Gilson (2008) concluded in their review of team diversity research that many of the findings regarding deep-level diversity were mixed.

Van Knippenberg, De Dreu, and Homan (2004) reconcile these mixed findings and various approaches to diversity in their categorization-elaboration model. According to this model, whether diversity is beneficial or detrimental to teams depends on whether it leads to the elaboration of information or not. When it does, diversity benefits the team by introducing a wider variety of perspectives that lead to innovation. When processes like social categorization occur, the elaboration of information is prevented and diversity hurts the team. This is likely to happen when categorization is easy and when the categories are obvious and thought to reflect meaningful differences. Stereotyping can transpire under these conditions, affecting how

individuals act towards others. Thus, diversity has the potential to positively or negatively impact teams depending on other team factors that can affect the elaboration of information.

Deep-level composition, however, is also frequently measured in terms of the mean, maximum, or minimum level of the characteristic within the team. Which measure is chosen depends on the assumptions being made. Most commonly, deep-level composition is measured as the average level of characteristics within the team (Barrick et al., 1998; Moreland & Levine, 1992). According to Barrick et al. (1998), this operationalization assumes that more of a trait is better or worse and the distribution of that trait across individuals is unimportant. Even if one individual was much higher or lower than the other team members on some characteristic, this operationalization assumes that the differences would not affect team outcomes because the variability across team members is compensatory. Less commonly, the impact of deep-level composition can also be measured by looking at the highest or lowest score on the characteristic of interest. This is normally done when the tasks completed by the team are conjunctive, where the lowest scoring individual has an inordinate impact on task performance, or disjunctive, where the highest scoring individual has the strongest impact on task performance (Steiner, 1966, 1972).

Team Virtuality

Regardless of the type of team composition of interest, other team factors might moderate the effect that team composition has on the team. One such factor is the virtuality of the team. Team virtuality can be difficult to define. According to Foster, Abbey, Callow, Zu, and Wilbon (2015), there are at least 29 definitions of virtuality, most of which are multidimensional. For instance, Gibson and Gibbs (2006) defined virtuality as geographic dispersion, electronic dependence, dynamic structure, and national diversity. On the other hand, Kirkman and Mathieu

(2005) defined virtuality as the extent of reliance on communication technology, the amount of information provided by the technology, and the synchronicity of the interaction. Dixon and Panteli (2010) propose yet another definition where virtuality is defined by the presence of communication discontinuity. In spite of the variety of definitions, there is some consensus on two facets: geographic dispersion and reliance on communication technology (Foster et al., 2015; Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015). Teams are considered more virtual as both increase because they affect the practicality and need for face-to-face meetings.

Yet as Kirkman and Mathieu (2005) note, geographic dispersion and reliance on communication technology alone may not give an accurate representation of how virtual a team is because it does not take into account differences in the type of communication technology used. According to media richness theory (Daft & Lengel, 1986), communication technologies differ in the amount of information they relay. This is important because communication depends not only on what is said but also on nonverbal cues like expressions and body language that add meaning to what is said (Daft, Lengel, & Trevino, 1987). The richness of a medium also depends on whether it allows the message sender to easily personalize the message being sent, use natural language, and give immediate feedback to the message receiver (Daft et al., 1987). The latter is especially important for communication as it allows individuals to check that they correctly understood what was said. Of all forms of communication, Daft and Lengel (1986) note that face-to-face communication is the richest because it not only allows individuals to personalize their message and express themselves using natural language, it also allows for immediate feedback and multiple social cues, such as tone and expressions.

However, the various technologies that people use to communicate with one another vary in their degree of media richness. Email, for example, would be considered low in media

richness because it does not allow an individual to receive nonverbal cues and is not synchronous, although it does allow for personalization and natural language use. As Okdie, Guadagno, Bernieri, Geers, and Mclarney-Vesotski (2011) found, this could lead to individuals who communicate via email to like each other less and be less accurate in their perceptions of the others with whom they communicate because they have less information about the person with whom they are interacting. Video conferencing, on the other hand, would be relatively richer because it allows for nonverbal cues and is relatively synchronous. Thus, it emulates face-to-face communication better than email does, and it would not be associated with the same problems that emerge with less rich communication media. Because of this, teams that rely mainly on richer technologies like video conferencing are thought to be less virtual than teams that rely on less rich communication media. Media richness, then, is an important dimension of virtuality along with team member dispersion and reliance on communication technology.

Most of the research on team composition has been conducted using teams that are colocated and meet face-to-face. Yet, the effects of team composition on team outcomes might not be the same for teams that are more virtual. Virtual teams face challenges that are not as present in colocated, face-to-face teams. For instance, Wilson, Straus, and McEvily (2006) and Peñarroja, Orengo, Zornoza, and Hernández (2013) found that trust is lower in teams that used communication technology low in media richness than in teams that communicated face-to-face. While trust can be established in virtual teams, it normally takes longer to do so and is built through reliability in completing tasks rather than through social bonds (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002; Wilson et al., 2006). The competencies required for virtual teams are also different than the competencies required for colocated teamwork. As Schulze, Schultze, West, and Krumm (2017) found, perceptions of face-to-face communication skill sets

were less predictive of computer-mediated communication outcomes compared to perceptions of computer-mediated communication skill sets. Thus, in reference to team composition, a plausible implication is that compositional factors that are thought to be beneficial in colocated teams could be detrimental in virtual teams, and compositional factors thought to be detrimental to colocated teams could be beneficial in virtual teams.

Surface-level Composition

Although the categorization-elaboration model predicts that diversity can be beneficial or detrimental to teams, most research on surface-level composition in traditional, colocated teams suggests that diversity is detrimental to team functioning (e.g., Chatman & Flynn, 2001; Harrison et al., 1998, Price et al., 2002). However, this might not be the case in teams that are more virtual. In teams that are more virtual, the impact of surface-level composition would likely be less noticeable than in face-to-face teams because in order for processes like categorization to occur, the relevant identities must first be made salient (Tajfel & Turner, 1979). This would be more difficult in highly virtual teams because the increased distance between team members would make them less able to meet face-to-face, and the comparatively less rich communication technology relied on by virtual teams would give fewer or less consistent indications of demographic differences. Teams that are highly virtual, then, would be have fewer problems with the effect of intergroups biases on information elaboration. Consequently, it is predicted that:

> **Hypothesis 1:** Virtuality will moderate the relationships between surface-level composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative (i.e., weaker negative relationships) as virtuality increases.

However, the impact that virtuality has on the relationship between surface-level composition and outcomes might depend on the demographic characteristic that is of interest. For example, racial differences in virtual teams would likely be less impactful than in colocated teams because race should be less salient. In face-to-face teams, racial diversity is negatively associated with team mediators and outcomes. For instance, Kirkman, Tesluk, and Rosen (2004) found that racial heterogeneity was negatively associated with team empowerment and team effectiveness. Furthermore, Bell, Villado, Lukasik, Belau, and Briggs (2011) found that racial diversity was negatively associated with team performance, and Joshi and Roh (2009) reported similar findings in majority-White settings. In each case, the negative impact of racial diversity is thought to occur because racial differences are salient in these groups. Thus, individuals categorize themselves and others into in-groups and out-groups based on these differences, which can lead to the favoring of in-group members.

Nonetheless, these differences should be muted when interacting via computer mediated communication. Members of highly virtual teams are not as constantly presented with racial information like members of colocated, face-to-face teams are. While this information can be transmitted through video conferencing, this tool is infrequently used in virtual teams (e.g., Agrifoglio & Metallo, 2010; Madlock, 2013). Thus, team members have to rely on accents to discern race. But because individuals might not speak with a racial or ethnic accent, this means that virtual team members should be less aware of racial differences among team members. Accordingly, Giambatista and Bhappu (2010) found in two studies that the effects of racial diversity in virtual teams that communicated via synchronous text communication differed from that in colocated teams. While racial diversity was negatively associated with creativity in both colocated teams that had worked together for three months and newly formed colocated teams, it

was positively associated with creativity in virtual teams that had been together for three months. Notably, racial diversity did not affect the creativity of newly formed virtual teams. These results suggest that racial diversity is less likely to lead to stereotyping or the breakdown of information elaboration in teams that are more virtual. Therefore, it is predicted that:

> **Hypothesis 2:** Virtuality will moderate the relationships between racial diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative as virtuality increases.

Research on sex composition in teams is similar to research on racial composition; differences in sex are thought to instigate social categorization processes that are detrimental to teams. According to the categorization elaboration model, this categorization affects how team members interact with one another and, consequently, affects team outcomes because it inhibits information elaboration. In line with this, Cady and Valentine (1999) found that greater sex diversity was associated with decreased consideration and performance. Bell et al. (2011) also found that diversity in sex composition was negatively associated with team performance, and Joshi and Roh (2009) reported similar findings in male-dominated settings. Altogether, research on more traditional teams suggests that sex diversity negatively impacts teams.

In highly virtual environments, diversity in sex composition could also be problematic. Research suggests that sex is discernable in virtual contexts. Sussman and Tyson (2000) examined archived electronic communications and found that men and women differed in how they communicated. While men wrote longer posts, women posted more frequently. Consequently, individuals are able to determine with some accuracy whether the writer of a post is a man or woman (Savicki, Kelley, & Oesterreich, 1999). However, even when the sex of other individuals is known, sex should still be less salient in virtual environments than face-to-face

environments; thus, sex diversity should be less detrimental in virtual teams. For instance, Bhappu, Griffith, and Northcraft (1997) found that although both men and women paid more attention to and were more influenced by male team members, this effect disappeared when participants communicated via electronic media. This is further supported by del Carmen, Triana, Kirkman, and Wagstaff (2012), who found that women felt more included in groups when the group initially communicated via technology. Based on this, it is predicted that:

> **Hypothesis 3:** Virtuality will moderate the relationships between sex diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative as virtuality increases.

Much of the research in traditional, less virtual teams concerning age examines how diversity in age affects teams. The results of this research are mixed, with some finding it has an effect while others conclude it does not. For instance, Bell et al. (2011) report that age diversity did not affect team performance, whereas Joshi and Roh (2009) found that it did negatively impact team performance. Yet in teams that are more virtual, both mean age and age diversity could be important. Age is infrequently studied in virtual teams, but as Gilson et al. (2015) note, it could impact how accepting the team members are of communication technology, which could affect how applicable the findings from older studies are to younger generations. Helsper and Eynon (2010), for example, found that younger individuals were more comfortable using technology than older individuals, possibly because they have grown up with most of the communication technologies in use today. Gorman, Nelson, and Glassman (2004) also note in their review of the age and technology literature that research shows younger workers tend to have more skills that facilitate working in virtual environments. Thus, a higher mean team member age could indicate that the team members will be more discomfited by having to

communicate virtually and will encounter more difficulties doing so. Age diversity, then, should also be more detrimental in virtual teams because having to rely on communication technology could make differences in age more salient. Therefore, it is predicted that:

Hypothesis 4: Virtuality will moderate the relationships between mean age composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative (i.e., stronger negative relationships) as virtuality increases.

Hypothesis 5: Virtuality will moderate the relationships between age diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative as virtuality increases.

Deep-level Composition

The effects of deep-level composition on team mediators and outcomes might also depend on the virtuality of the team. Personality and cultural diversity are both frequently studied deep-level characteristics. Cultural diversity refers to differences in the cultural backgrounds of team members and is generally measured through differences in nationality, language, or cultural values (Staples & Zhao, 2006). Personality is generally described in terms of the Five Factor Model (FFM; Tupes & Christal, 1961/1992). This model specifies five basic personality traits: extraversion, conscientiousness, emotional stability (or neuroticism), openness to experience, and agreeableness. Extraversion refers to a person's sociability and energy levels (McCrae & John, 1992). Someone who is highly extraverted, for instance, would be outgoing and energetic. Conscientiousness refers to an individual's dependability (McCrae & John, 1992). Individuals high in conscientiousness are diligent and get their work done on time. Emotional stability, which is also known as neuroticism, refers to a person's tendency to feel distressed (McCrae & John, 1992). An individual low in emotional stability (i.e., high in neuroticism), for

instance, would be easily agitated and would frequently experience negative affect. Openness to experience is how willing someone is to learn and experience things they have not encountered before, and agreeableness refers to how a person interacts with others (McCrae & John, 1992; Tupes & Christal, 1961/1992). Someone who is high in openness to experience would be willing to try new things, while someone who is high in agreeableness would be described as warm and friendly.

Reviews on the effects of personality composition and cultural diversity in colocated teams show that both can impact team mediators and outcomes (e.g., Bell, 2007; Bowers, Pharmer, & Salas, 2000; Horwitz & Horwitz, 2007; Stahl, Maznevski, Voigt, & Jonsen, 2010). However, these effects could be stronger in more virtual teams because less information about others is available. According to Walther (1996), communication technology being less rich than face-to-face communication can be beneficial because it allows individuals to focus on their conversational partner without being as influenced by the surface-level attributes of the partner. Thus, characteristics like personality can play a stronger role in how people react to one another. Hancock and Dunham (2001), for example, found that participants who used communication technology to communicate with a partner formed less detailed impressions about their partner than participants who communicated face-to-face, but their impressions about their partner were stronger. Although computer mediated communication affected how much information was relayed, it also led to participants placing more faith in the information that had been relayed. As a result, it is predicted that:

Hypothesis 6: Virtuality will moderate the positive relationships between deep-level composition and (a) mediators, (b) performance, and (c) affective outcomes such that the

relationships will be more positive (i.e., stronger positive relationships) as virtuality increases.

At the trait level, however, the strengthening effect of virtuality might not be apparent because traits differ in how apparent they are in virtual environments. As a result, these traits should have less of an impact in virtual teams because they are not as expressed in virtual environments. This would be especially likely for traits that influence social interaction. For example, in colocated teams, higher levels of extraversion are thought to be beneficial because individuals who are more extraverted are more social. Thus, they more frequently engage in behaviors that improve interpersonal relations between team members. Barrick et al. (1998), for instance, found that higher mean levels of extraversion within a team were associated with higher cohesion, flexibility, and communication, and lower conflict. As a result, higher levels of extraversion within a team are also associated with better outcomes for the team, as both Kichuk and Wiesner (1997) and Barry and Stewart (1997) found. Kichuk and Wiesner (1997) report that the successful design teams in their study were composed of individuals higher in extraversion, and Barry and Stewart (1997) found that higher levels of extraversion were associated with task focus and team performance. Barry and Stewart (1997) caution, however, that extraversion is only helpful to a point. The relationships they observed were curvilinear, suggesting that higher levels of extraversion can become problematic because it causes the team to focus too much on socializing and not enough on the task at hand. It should be noted, though, that this curvilinear relationship has been disputed by others (e.g., Walmsley, Sackett, & Nichols, 2018).

However, extraversion should have less of an effect in virtual teams. Although higher levels of team extraversion are helpful in colocated teams because it increases participation, participation levels in more virtual environments tend to be higher than in less virtual

environments. Yoo and Alavi (2001), for example, found that participation was higher when participants used audio conferencing rather than video conferencing. This suggests that the difference between introverts and extraverts on participation becomes smaller when they utilize less rich media to communicate. Studies by Maldonado, Mora, Garcia, and Edipo (2001) and Yellen, Winniford, and Sanford (1995) support this. Both studies found that the number of contributions from group members were equal when using text communication; extraversion did not have an effect. Consequently, extraversion should have less of an impact on team mediators and outcomes. Therefore, it is predicted that:

> **Hypothesis 7:** Virtuality will moderate the relationships between mean extraversion composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive (i.e., weaker, positive relationships) as virtuality increases.

Emotional stability, too, should be less apparent in virtual teams. Like extraversion, higher levels of emotional stability are thought to be beneficial in teams because it improves relationships between team members. According to Driskell, Goodwin, Salas, and O'Shea (2006), higher levels of emotional stability should contribute to better interpersonal relationships. They posit that not only would individuals low in emotional stability blame others when mistakes are made, but their high levels of negative affect make them unpleasant to work with as well. In such situations, team members would be unlikely to work well with one another. In support of this, both Barrick et al. (1998) and van Vianen and De Dreu (2001) found that higher levels of emotional stability were associated with higher social cohesion, and Barrick et al. (1998) also found that it was associated with higher flexibility, communication, and workload sharing and lower conflict. As a result, higher levels of emotional stability within a team should

also affect team outcomes such as performance (Bell, 2007; Mount, Barrick, & Stewart, 1998) and viability (Barrick et al., 1998).

Emotional stability, however, should be less evident in teams that are more virtual. According to Rice and Markey (2009), individuals low in emotional stability experience less anxiety when communicating virtually compared to communicating face-to-face. As a result, individuals low in emotional stability should prefer to communicate virtually, as Hertel, Schroer, Batinic, and Naumann (2008) found. Both mediators and team outcomes, then, should be unaffected by the mean level of emotional stability in a team that is highly virtual. Team members low in emotional stability should feel less anxious in these teams, thus they should not engage in actions that are detrimental to mediators or team outcomes. This is supported by Blumer and Döring (2012), who found that individuals rated themselves as more emotionally stable online than offline. Therefore, it is predicted that:

> **Hypothesis 8:** Virtuality will moderate the relationships between mean emotional stability composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive as virtuality increases.

The effect of mean team member agreeableness in more virtual teams should be similar to that of extraversion and emotional stability. According to Driskell et al. (2006), agreeableness is an important predictor in colocated teams. Agreeable team members are trusting and willing to work with others in their team. Thus, teams were the members are on average high in agreeableness should be more likely to form positive emergent states such as cohesion. This also means that team performance should be higher. Prewett, Walvoord, Stilson, Rossi, and Brannick (2009) found that higher levels of agreeableness were positively related to team mediators, as did Barrick et al. (1998) who found that higher levels of agreeableness were associated with less

conflict and more cohesion, flexibility, and workload sharing. Furthermore, Barrick et al. (1998), Bell (2007), and Prewett et al. (2009) all report that agreeableness is related to performance, albeit with correlations that are somewhat weaker than they are for team mediators. In their totality, these findings suggest that for colocated teams, the mean level of team member agreeableness is of import.

The average level of team agreeableness, however, should not have as much of an impact in teams that are more virtual. When teams rely on communication technology that is less rich such as email, important aspects of communication such as body language are lost. According to Bradley, Baur, Banford, and Postlethwaite (2013), these aspects are important in communicating agreeableness. Findings by Hancock and Dunham (2001) support this. In their study, they found that participants were less able to rate the agreeableness of their communication partner when they communicated via technology. As a result of the loss of this component of communication, the benefits of higher levels of team agreeableness should also diminish. Bradley et al. (2013) found that higher average levels of agreeableness were not beneficial for communication or performance in teams that communicated more virtually, and Furumo, de Pillis, and Green (2008) found that agreeableness was not associated with trust in teams that used computer mediated communication. As a result, it is predicted that:

> **Hypothesis 9:** Virtuality will moderate the relationships between mean agreeableness composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive as virtuality increases.

Because extraversion, emotional stability, and agreeableness have less of an impact on how people interact in virtual environments and would thus be less evident as team virtuality increases, highly virtual teams should benefit more from traits that are easier to detect, such as

conscientiousness and openness to experience. Higher team member conscientiousness is thought to be beneficial to traditional teams because highly conscientious individuals are diligent in their work. When all team members are high in conscientiousness, they can coordinate their efforts to complete their tasks more efficiently. In support of this, Bell (2007), Barrick et al. (1998), and Peeters, Van Tuill, Rutte, and Reymen (2006) all found that higher levels of conscientiousness within a team were positively associated with team performance. This greater task focus, however, does not benefit team mediators, as Barrick et al. (1998) found. Their results showed that mean conscientiousness was unrelated to social cohesion, flexibility, or communication. At least in colocated teams, mean team member conscientiousness does not seem to affect interpersonal relations.

In virtual teams, higher levels of team conscientiousness should be even more important than in less virtual teams because teams experience less social control from other members and have to be self-disciplined in order to work effectively (Krumm, Kanthak, Hartmann, & Hertel, 2016). As Chidambaram and Tung (2005) found, social loafing becomes more of a problem in distributed work because individuals cannot see other team members. Higher levels of team conscientiousness should counteract this, thus improving performance. Supporting this, Krumm et al. (2016) found that qualities such as taking initiative and working autonomously were more important in virtual environments than colocated ones. However, the higher levels of task focus associated with higher conscientiousness could be detrimental to team mediators as it could occur at the cost of building interpersonal relationships, which becomes more difficult as virtuality increases. Furumo et al. (2008), for instance, found that higher conscientiousness was associated with decreased trust in virtual teams but not in teams that met face-to-face. Hence, it is predicted that:

Hypothesis 10: Virtuality will moderate the relationships between mean conscientiousness composition and (a) mediators and (b) affective outcomes such that the relationships will be more negative as virtuality increases.

Hypothesis 11: Virtuality will moderate the relationships between mean conscientiousness composition and performance such that the relationships will be more positive as virtuality increases.

Openness to experience should also be important in highly virtual teams. In colocated teams, openness to experience does not generally predict team performance. Both Peeters et al. (2006) and van Vianen and De Dreu (2001), for example, report that openness to experience is not associated with performance. Bell (2007) suggests that this could be because openness to experience is more related to performance in teams with low structure as those situations require adaptability, but she was unable to find support for this, possibly due to a small number of studies that have examined openness to experience in low structure contexts. However, LePine (2003) did find that teams higher in openness to experience were better able to coordinate actions after an unexpected change, and consequently their performance was better than teams lower in openness to experience. There is also some research (e.g., Bradley, Klotx, Postlethwaite, & Brown, 2013) that suggests that higher levels of openness to experience within a team can moderate the effects of conflict on team performance. In general, research on the importance of openness to experience in colocated teams is mixed.

In more virtual teams, however, openness to experience should influence team outcomes and mediators. According to Webster and Staples (2006), openness to experience would be important to virtual teams because individuals high in openness to experience would be better able to adapt to being in a virtual team. For instance, research shows that openness to experience

is positively related to interest in being in a virtual team (Luse, McElroy, Townsend, & Demarie, 2013). Openness to experience is also positively associated with intent to use communication technology (Devaraj, Easley, &Crant, 2008) and negatively associated with technology communication anxiety (Jacques, Garger, Brown, & Deale, 2009). This greater interest in using communication technology could mean that team members communicate more with one another and thus develop more positive emergent states (e.g., cohesion; Macdonnell, O'Neill, Kline, & Hambley, 2009). Team outcomes should also be positively affected, as Colquitt, Hollenbeck, Ilgen, LePine, and Sheppard (2002) found. In their study, they found that computer mediated communication was associated with better decision making, but only for groups that were high on openness to experience. Given this, it is predicted that:

> **Hypothesis 12:** Virtuality will moderate the relationships between mean openness to experience composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more positive as virtuality increases.

The effect of cultural diversity on teams could also depend on how virtual the team is. Cultural diversity has both surface- and deep-level components. Because the surface-level components of cultural diversity are more apparent in less virtual teams, it can be detrimental because of the categorization processes it causes. For example, Stahl et al. (2010) found in their meta-analysis that cultural diversity was detrimental in colocated teams because it was associated with less social integration and more conflict. This could help explain why Watson, Kumar, and Michaelson (1993) found that culturally homogenous teams outperformed culturally diverse teams. Because individuals like those who are similar to them more than they like those who are different from them, they give preferential treatment to the similar others. This preference impairs the team's ability to work together, thus damaging performance. Hence, it would seem

that at least in the early stages of team development, cultural diversity causes problems that hinder nonvirtual teams.

Cultural diversity could also be detrimental in virtual teams because there are cultural differences in communication. For instance, Holtbrügge, Weldon, and Rogers (2013) found that individuals from different cultures differed in their beliefs of how direct, precise, formal, and task-related emails should be, and there were also differences in beliefs in how to quickly respond to emails. When individuals from different cultures interact, these differences in communication norms can then cause team members to form negative opinions of one another. In their study, Vignovic and Thompson (2010) found that individuals thought negatively about others who sent an email to them that contained technical writing violations (e.g., spelling errors) and etiquette violations. Although learning that the email sender was from a different culture mitigated the effect of technical writing violations on perceived conscientiousness and intelligence, it did not mitigate the effect of etiquette violations on the outcomes of interest (i.e., agreeableness, extraversion, cognitive trustworthiness, and affective trustworthiness). The negative perceptions of the email sender remained. Consequently, this perspective would predict that:

> **Hypothesis 13:** Virtuality will moderate the relationships between cultural diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative as virtuality increases.

However, it is also possible that cultural diversity in more virtual teams would be less detrimental than in less virtual or colocated teams. Because of the fewer social cues available in more virtual teams, culture should be less salient. Thus, group membership has less of an effect on who is listened to within the team. Because minority group members are more willing to

stand by their beliefs, this would increase discussion about what the team should do and possibly lead to better solutions. Some have found evidence to support this. Staples and Zhao (2006), for example, found that culturally diverse teams that used computer mediated communication had better performance on a desert survival task than culturally diverse teams that met face-to-face. Furthermore, Li, Rau, and Salvendy (2014) found that culturally diverse virtual teams made better decisions than homogenous virtual teams. And in their meta-analysis on the cultural diversity literature, Stahl et al. (2010) found that the relationships between cultural diversity, conflict, and social integration were not seen in teams that were more virtual. Thus, this perspective would predict that:

> **Hypothesis 14:** Virtuality will moderate the relationships between cultural diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more positive as virtuality increases.

In summary, this study contributes to the virtual team literature by providing a quantitative summary of the effects of team composition in virtual teams and exploring how different forms of diversity affect teams. Although there are qualitative reviews of virtual teams that examine team composition (e.g., Schulze & Krumm, 2017; Webster & Staples, 2006), these reviews do not allow the comparison of the effects that surface- and deep-level composition have on teams with different levels of virtuality. Much of the research on team composition has been conducted on traditional teams that mainly communicate face-to-face, yet this research might not be particularly generalizable to virtual teams. As Schulze and Krumm (2017) note, virtual teams face different challenges than traditional, colocated teams do. Not only do they face greater coordination issues because the members of the team might not be working concurrently, but relationships among team members are harder to build because they are working in environments

where fewer social cues are available. Consequently, the objective of the present study was to quantitatively examine how virtuality moderates the relationship between team composition and team mediators, performance, and affective outcomes. This was accomplished by using a meta-analysis to aggregate results of primary studies. Doing so reduces the impact of sampling error by giving more weight to studies with larger samples, which allows for more accurate estimates of these relationships. The use of meta-analysis can also reveal gaps in the literature that call for or warrant additional research.

2. METHOD

Literature Search

The literature search process and associated outcomes are depicted in Appendix A. To locate studies for inclusion in this meta-analysis, PsycINFO, Google Scholar, and Web of Science were searched for articles. The search terms used were *virtual team*, *virtual group*, and *distributed team* in combination with the terms *extraversion*, *conscientiousness*, *emotional stability*, *neuroticism*, *openness to experience*, *gender diversity*, *gender composition*, *racial diversity*, *ethnic diversity*, *cultural diversity*, *race composition*, *sex composition*, and *age composition*. Unpublished studies were identified for inclusion by searching ProQuest Dissertations and Theses and relevant conference proceedings (i.e., Society for Industrial and Organizational Psychology, Academy of Management, Hawaii International Conference on System Sciences) using the same search terms. In addition, the reference lists from identified articles (e.g., MacDonnell et al., 2009) were examined for relevant articles. This process resulted in a total of 10,408 hits. Based on their abstracts, 79 sources were considered for inclusion in the meta-analysis.

Inclusion Criteria

To be included in this meta-analysis, the primary studies had to have reported (1) the distance between team members, (2) the extent to which team members relied on face-to-face communication and technology mediated communication (e.g., mostly or partly), and (3) what type of technology the teams used to communicate (e.g., Skype or chat). Studies that did not report all three were excluded. In addition, the study had to have examined the effects of team composition on team mediators, performance, or affective outcomes (see Table 1). Thus, studies

examining how team composition affected individual outcomes were excluded from the analyses. Furthermore, studies had to have reported sufficient information to conduct the meta-analysis (e.g., correlation coefficients, sample sizes). If studies examined virtuality dichotomously (e.g., teams that communicated face-to-face and teams that used computer-mediated communication) and provided correlations, then correlations for both groups had to be provided. Studies that collapsed the correlations were not be included. If correlations were not provided, either *d*, or enough information to calculate *d* had to be provided for the study to be included. This was then converted to a correlation before the analyses. An attempt was made to contact authors when studies had missing information. In total, 23 sources were retained for the analyses (see Appendix B). The coding sheet that was used to code each data point is presented in Appendix C.

Table 1
Examples of Outcomes in Each Category.

Categories	Examples
Performance	Target identification, report quality, assignment grade, solution quality, perceived performance
Affective Outcomes	Commitment, satisfaction
Mediators	Communication, cohesion, trust, identification, engagement

Coding Process

The author and one other coder coded all sources. First, the coder was trained on how to use the coding scheme. One source was coded independently by the author and the coder, then a meeting was held to discuss issues encountered while coding and make adjustments to the coding scheme. The author and the coder then independently coded five sources before meeting once

again to assess interrater agreement. Interrater agreement was adequate at 86.27%, subsequently the remaining sources were coded by both the author and the coder. All discrepancies were discussed and resolved via consensus.

Description of Variables

Composition. The type of composition examined in each source (e.g., sex diversity, mean team conscientiousness) was coded. Because diversity information was taken from the correlation tables of the sources, different indices were likely used to calculate diversity. Predictors regarding race, sex, and age were classified as surface-level predictors, while predictors regarding extraversion, emotional stability, agreeableness, conscientiousness, openness to experience, and culture were classified as deep-level predictors. Information on the specific type of surface- or deep-level composition was also coded and included in a separate dataset for ease of analysis.

Team outcomes. Outcomes were collapsed into three categories (i.e., mediators, performance, and affective outcomes). Examples of the outcomes in each category are presented in Table 1. Several data points came from the same sample; thus, not all data points were independent of one another. Whenever the data points examine outcomes that fell into different categories (e.g., performance and affective outcomes), they were retained as separate data points. Data points whose outcomes fell into the same category (e.g., measures of cohesion and trust or two measures of cohesion) were combined into a single data point via linear composite. Simple averages were calculated when not enough information was provided to compute a linear composite.

Virtuality. A checklist was used to classify the teams in each study into different levels of virtuality. The checklist was comprised of three dimensions: team member distribution,

reliance on communication technology, and the information richness of the technology used. Each sample was assigned a score (i.e., 1, 2, or 3) on each dimension, where higher points indicated a higher level of virtuality. Based on prior research (e.g., O'Leary & Mortensen, 2010; Polzer, Crisp, Jarvenpaa, & Kim, 2006), teams that are colocated received a one on the distribution dimension, while teams where the team members are split among a few (e.g., two or three) locations received a two. Teams where nearly every team member (e.g., more than 80%) was at a different location received a three on this dimension. For reliance on communication media, teams that communicated entirely face-to-face received a one, while teams that used a combination of face-to-face and computer-mediated communication received a two. Teams that did not communicate face-to-face received a three. If a team relied on face-to-face communication or richer forms of computer-mediated communication such as video conferencing, the team scored a one on information richness dimension. Teams using mixtures of face-to-face communication and electronic communication such as email scored a two, as did teams that used media such as telephones. Teams that relied entirely on text-based forms of communication like email or instant messaging scored a three.

The points on each dimension were then averaged to develop a virtuality score for each sample. The distribution of virtuality scores was then examined to place samples into low, moderate, and high virtuality groups[1]. Samples scoring below the 25th percentile were placed in the low virtuality group, samples between the 25th and 75th percentiles were placed in the moderate virtuality group, and samples above the 75th percentile were placed in the high

[1] Groupings could also have been decided by dividing the potential range of the virtuality scores by three to develop cut-scores. Using this method led to virtuality codes that correlated highly with the sample-based codes (r = .86), but led to a less even distribution of teams in each group. Thus, the decision was made to use the sample-based virtuality codes for the analyses.

virtuality group. Using this method led to a total of 8 low virtuality teams 10 moderate virtuality teams, and 15 high virtuality teams.

Meta-analysis of Correlations

A bare-bones meta-analysis was conducted using Schmidt and Hunter's (2014) meta-analytic approach. These analyses were conducted using the SAS PROC MEANS syntax of Arthur, Bennet, and Huffcut (2001). Sample-weighted correlations and standard deviations were calculated for each data point. In addition, 95% confidence intervals were computed to calculate the accuracy of the sample-weighted correlations (Whitener, 1990).

Other meta-analytic estimates, such as the percentage of variance accounted for by sampling error, were also calculated to check for the presence of moderators. Schmidt and Hunter's (2014) subgroup analysis procedure was used to test virtuality as a moderator of the relationships between team composition and mediators, performance, and affective outcomes. To do so, the team virtuality moderator was split into three categories (i.e., low, moderate, high) and a meta-analysis was conducted at each level of the moderator. These moderator analyses were also done using SAS PROC MEANS (Arthur et al., 2001).

Outliers. Effect sizes were examined prior to the analyses for the presence of outliers using Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviancy statistic (SAMD). This was computed separately for team mediators, performance, and affective outcomes using the SAS syntax developed by Arthur et al. (2001). The resulting scree plots identified 17 data points from 13 studies (i.e., Brahm & Kunz, 2012; Eubanks, Palanski, Olabisi, Joinson, & Dove, 2016; Herschel, Cooper, Smith, & Arrington, 1994; Hobman, Bordia, Irmer, & Chang, 2002; Huber, Eggenhofer, Ramer, Schafter, & Titz, 2007; Krebs, Hobman, & Bordia, 2006; MacDonnell et al., 2009; Magnusson, Schuster, & Taras, 2014; Robert & You, 2017; Staples &

Zhao, 2006; Vasilatos, 2010; Warren, 2003; Zhang & Turel, 2012) as potential outliers. Further review found that these data points were not due to transcription or computational errors, and examination of the studies did not reveal any characteristic that could cause these unusual effect sizes. In light of this, all data points were retained for analysis.

Publication bias. Proquest Dissertations and Theses and several conference proceedings were searched in an effort to mitigate the potential for publication bias. In addition, empirical procedures were used afterwards to help identify publication bias in the dataset. Specifically, the metafor package for R (Viechtbauer, 2010) was used to run Begg rank correlation (Begg & Mazumdar, 1994), Egger regression (Egger, Davey Smith, Schneider, & Minder, 1997), trim-and-fill (Duval & Tweedie, 2000a, 2000b), and fail-safe N (Rosenthal, 1979) analyses for team mediators, performance, and affective outcomes. The results generally suggested that publication bias was not apparent in either dataset. For the overall surface/deep composition dataset, the Begg rank correlation (τ = -.02, p = .88), the Egger regression ($t(27)$ = -0.04, p = .97), fail-safe N analyses (N = 0), and trim-and-fill method (k_0 = 0, Δr = .00) did not indicate publication bias. Analyses for performance and affective outcomes, however, were mixed. For performance outcomes, the Begg rank correlation (τ = .00, p = 1.00), Egger regression ($t(29)$ = 0.80, p = .43), and trim-and-fill analyses (k_0 = 0, Δr = .00) did not indicate publication bias, but the fail-safe N analysis (N = 1) did. Similar results were obtained for affective outcomes, where the Begg rank correlation (τ = -.16, p = .54), Egger regression ($t(9)$ = -0.39, p = .71), and trim-and-fill analyses (k_0 = 0, Δr = .00) once again did not indicate publication bias. The fail-safe N analysis (N = 7), however, did. Because the findings generally did not indicate publication bias, no adjustments were made to the true effect estimates.

For the specific surface/deep composition dataset, the analyses also showed mixed evidence of publication bias. The results of the Begg rank correlation (τ = -.12, p = .23), Egger regression ($t(50)$ = -0.28, p = .78), and trim-and-fill method (k_0 = 0, $\Delta\rho$ = .00) for mediators found no evidence for publication bias, although the fail-safe N analysis (N = 43) indicated a potential for publication bias. The fail-safe N analysis for performance outcomes (N = 18) also indicated the potential for publication bias, although the Begg rank correlation (τ = -.09, p = .32), Egger regression ($t(58)$ = -0.02, p = .98), and trim-and-fill method (k_0 = 1, $\Delta\rho$ = .00) did not. With regard to affective outcomes, the trim-and-fill analysis (k_0 = 4, $\Delta\rho$ = .03) indicated potential publication bias. However, the Begg rank correlation (τ = .17, p = .27), Egger regression ($t(21)$ = 0.91, p = .37), and fail-safe N analysis (N = 0) results did not. Consequently, no adjustments for publication bias were made in this dataset due to the mixed evidence of publication bias.

3. RESULTS

The relationships between surface- and deep-level composition and team mediators, performance, and affective outcomes are presented in Tables 2 and 3. Forest plots for these effects are presented in Figures 1 through 3. These tables reveal small *k*s for several analyses, showing that composition in teams of various levels of virtuality is an understudied area. Nevertheless, tests of the hypotheses were conducted to examine what the literature would currently suggest about the effects of composition in teams of various levels of virtuality. Based on this small sample, as Table 2 shows, overall surface-level composition was not related to team mediators, performance, or affective outcomes, nor were most of the specific types of composition. The only exception was age diversity, which was positively associated with team performance. In addition, the high percentage of variance accounted for in each analysis indicated that there were generally no moderators of these relationships.

The results for deep-level composition differed slightly from those for surface-level composition. As Table 3 shows, deep-level composition was negatively related to affective outcomes, as was cultural diversity. Mean emotional stability composition was positively related to team mediators and performance outcomes, as was mean conscientiousness composition. Mean agreeableness composition was positively related to team mediators, while cultural diversity was positively associated with team performance. Mean openness to experience composition was positively associated with team mediators and affective outcomes. Like the results for surface-level composition, few of the analyses indicated the presence of moderators. However, because conceptual arguments suggest that virtuality should moderate these relationships, virtuality was examined as a moderator of each relationship.

Table 2

Meta-Analytic Summary of Surface-level Composition and Team Mediators, Performance, and Affective Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Surface-level Composition							
Mediators	911	17	.05	0.23	34.77	-.06	.16
Performance	739	11	.00	0.14	74.33	-.09	.08
Affective Outcomes	127	3	-.08	0.13	100.00	-.23	.06
Racial Diversity							
Mediators	171	5	-.03	0.15	100.00	-.16	.11
Affective Outcomes	66	2	-.07	0.09	100.00	-.20	.05
Sex Diversity							
Mediators	552	11	.05	0.24	36.27	-.08	.19
Performance	380	5	.03	0.14	67.02	-.09	.16
Affective Outcomes	127	3	-.12	0.17	86.07	-.31	.07
Mean Age							
Mediators	326	6	-.01	0.14	94.58	-.12	.10
Performance	304	5	-.10	0.12	100.00	-.20	.01
Age Diversity							
Mediators	290	4	.14	0.20	38.57	-.06	.34
Performance	195	2	.08	0.03	100.00	.04	.12

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Table 3
Meta-Analytic Summary of Deep-level Composition and Team Mediators, Performance, and Affective Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Deep-level Composition							
Mediators	818	12	-.01	0.17	48.65	-.11	.09
Performance	1113	20	.06	0.16	71.81	-.01	.13
Affective Outcomes	364	8	-.10	0.14	100.00	-.20	-.001
Mean Extraversion							
Mediators	594	9	-.03	0.15	72.39	-.13	.06
Performance	639	12	-.04	0.13	100.00	-.11	.03
Affective Outcomes	285	6	-.02	0.10	100.00	-.10	.06
Mean Emotional Stability							
Mediators	162	3	.10	0.08	100.00	.01	.20
Performance	162	3	.12	0.04	100.00	.07	.16
Mean Agreeableness							
Mediators	162	3	.19	0.03	100.00	.16	.22
Performance	334	9	.05	0.17	93.06	-.06	.16
Affective Outcomes	45	3	-.02	0.18	100.00	-.23	.18
Mean Conscientiousness							
Mediators	162	3	.13	0.08	100.00	.03	.22
Performance	457	11	.14	0.14	100.00	.05	.22
Affective Outcomes	45	3	.02	0.25	100.00	-.26	.31
Mean Openness							
Mediators	224	5	.16	0.14	100.00	.04	.29
Performance	269	8	.05	0.16	100.00	-.06	.15
Affective Outcomes	45	3	.10	0.07	100.00	.02	.17
Cultural Diversity							
Mediators	224	3	-.07	0.09	100.00	-.16	.03
Performance	224	3	.10	0.05	100.00	.03	.16
Affective Outcomes	79	2	-.34	0.05	100.00	-.41	-.27

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

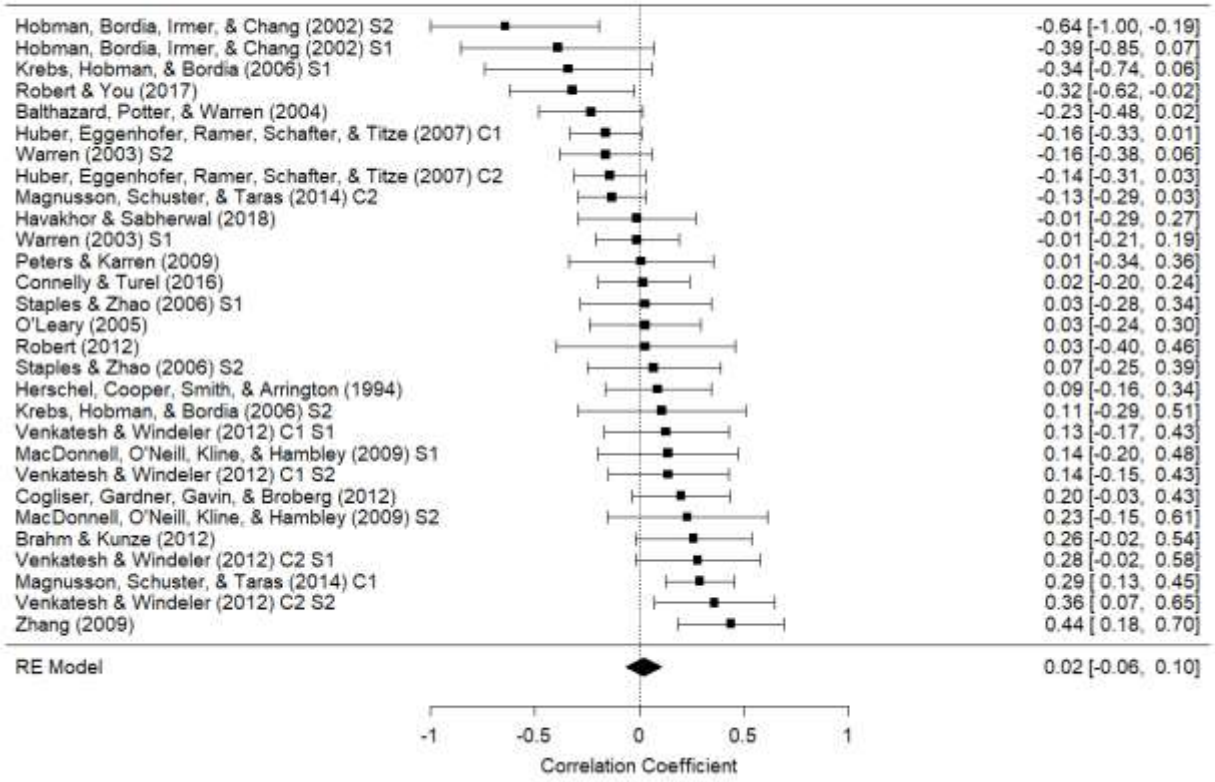

Figure 1. Correlations between overall surface- and deep-level composition (C1 and C2 respectively) and team mediators. The squares represent the correlations whereas the 95% confidence intervals are represented by the error bars. Multiple samples are indicated with an S.

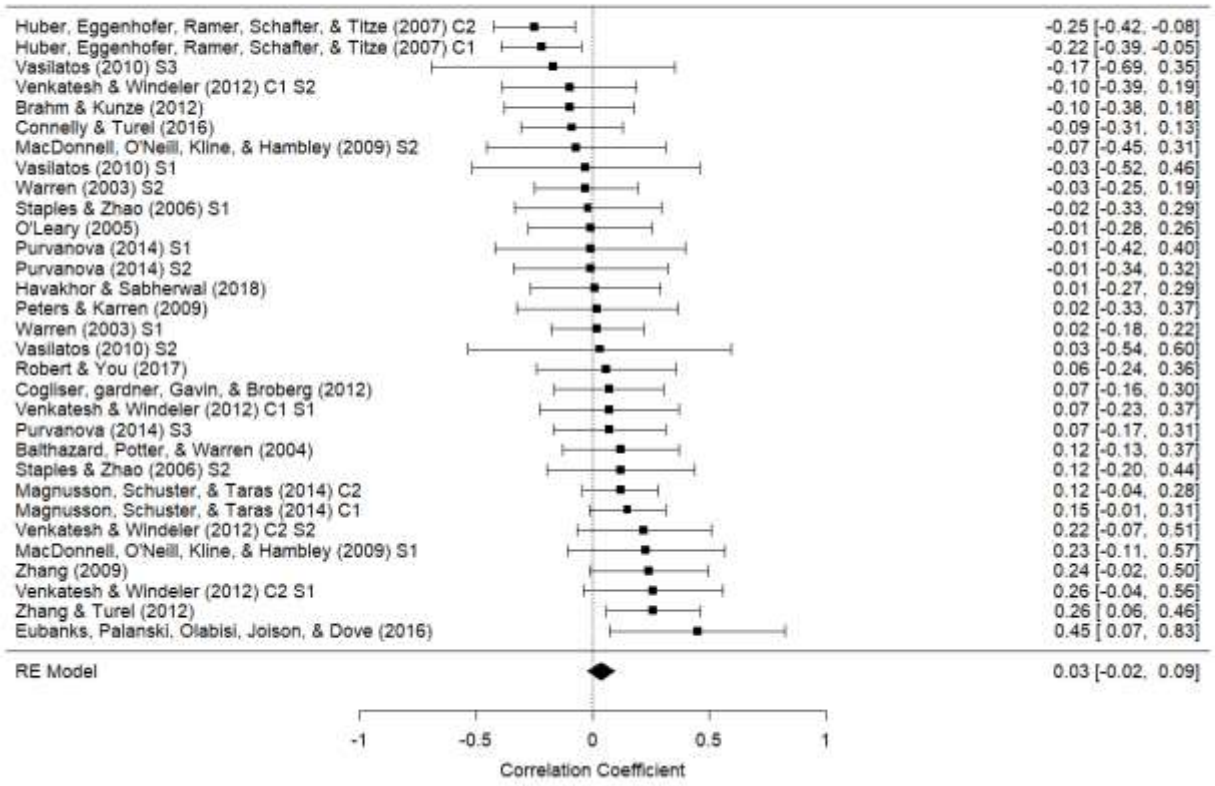

Figure 2. Correlations between overall surface- and deep-level composition (C1 and C2 respectively) and team performance. The squares represent the correlations whereas the 95% confidence intervals are represented by the error bars. Multiple samples are indicated with an S.

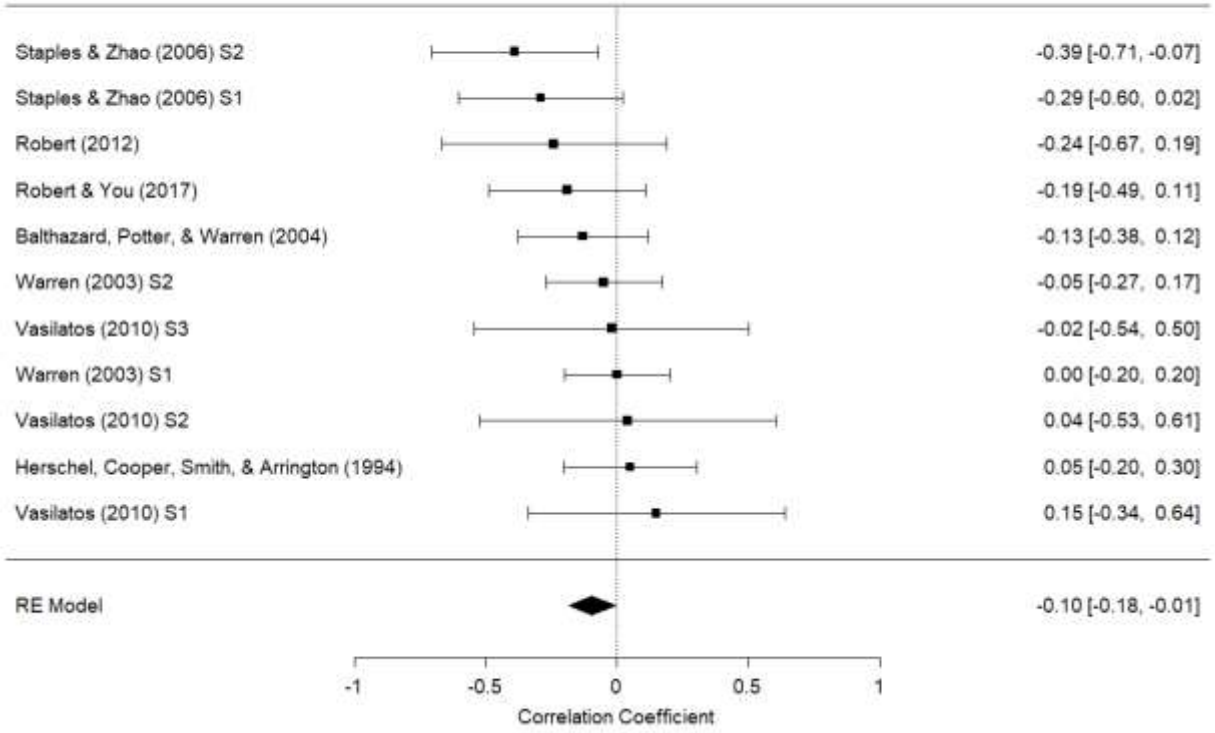

Figure 3. Correlations between overall surface- and deep-level composition (C1 and C2 respectively) and team affective outcomes. The squares represent the correlations whereas the 95% confidence intervals are represented by the error bars. Multiple samples are indicated with an S.

Moderation of Surface-level Composition

Hypothesis 1 predicted that virtuality would moderate the relationship between team mediators, performance and affective outcomes and surface-level composition such that the relationship would be less negative as virtuality increases. As Table 4 shows, this hypothesis was not supported. For the relationship between surface-level composition and team mediators, there was a large overlap in confidence intervals for teams low, moderate, and high in virtuality for mediators, suggesting no moderation. And although virtuality moderated the relationship between surface-level composition and team performance, the relationships were not in the expected direction. Table 4 shows that surface-level composition was positively associated with performance for moderately virtual teams, but was unrelated to performance in highly virtual teams. The relationship between surface-level composition and affective outcomes could not be examined due to the small number of effect sizes (*k*).

Table 4
Meta-Analytic Summary of the Moderating Effect of Virtuality on Surface-level Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Surface-level Composition							
Mediators							
Low Virtuality	106	3	-.15	0.29	32.02	-.48	.18
Moderate Virtuality	156	4	.16	0.27	34.69	-.10	.42
High Virtuality	649	10	.05	0.19	43.80	-.07	.17
Performance							
Moderate Virtuality	137	3	.13	0.10	100.00	.02	.24
High Virtuality	602	8	-.04	0.13	76.30	-.13	.06

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Concerning the specific types of surface-level composition, several analyses could not be conducted, again due to small *k*s. Thus, Hypothesis 2 and Hypothesis 5, which predicted virtuality would moderate the relationship between racial diversity (age diversity) and team mediators, performance, and affective outcomes as virtuality increases, could not be examined. The results for sex diversity showed that Hypothesis 3, which predicted virtuality would moderate the relationship between sex diversity and team mediators, performance, and affective outcomes such that the relationships would be less negative as virtuality increases, was not supported. The relationship between sex diversity and team mediators was not moderated by the virtuality of the team. As Table 5 shows, all confidence intervals for this relationship contained zero and overlapped one another. The relationships between sex diversity and team performance and affective outcomes could not be examined due to small *k*.

Table 5
Meta-Analytic Summary of the Moderating Effect of Virtuality on Sex Diversity and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Sex Diversity							
Mediators							
Low Virtuality	106	3	-.10	0.28	37.56	-.41	.21
Moderate Virtuality	79	2	.26	0.31	23.08	-.17	.70
High Virtuality	367	6	.05	0.16	67.89	-.07	.18

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Moreover, Hypothesis 4A (i.e., virtuality will moderate the relationship between mean age composition on mediators such that the relationship will be more negative as virtuality increases) was not supported, as Table 6 shows. Virtuality did, however, moderate the relationship between mean age and team performance. Although mean age composition was

positively related to performance in moderately virtual teams, it was negatively associated with performance in highly virtual teams. Thus, Hypothesis 4B was supported. The relationship between mean age and affective outcomes (i.e., Hypothesis 4C) could not be examined due to small *k*.

Table 6
Meta-Analytic Summary of the Moderating Effect of Virtuality on Mean Age Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Mean Age							
Mediators							
Moderate Virtuality	77	2	.08	0.06	100.00	-.00	.16
High Virtuality	249	4	-.04	0.15	74.86	-.18	.11
Performance							
Moderate Virtuality	77	2	.05	0.02	100.00	.01	.08
High Virtuality	227	3	-.14	0.09	100.00	-.25	-.04

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Moderation of Deep-level Composition

Hypothesis 6 predicted that virtuality would moderate the relationship between team mediators, performance, and affective outcomes and deep-level composition such that the relationship would be more positive as virtuality increases. This hypothesis was not supported. As Table 7 shows, team virtuality did not moderate the relationship between deep-level composition and team mediators or affective outcomes. However, while deep-level composition was not associated with team performance at low and high levels of virtuality, it was positively associated with team performance at moderate levels of virtuality.

Table 7
Meta-Analytic Summary of the Moderating Effect of Virtuality on Deep-level Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Deep-level Composition							
Mediators							
Low Virtuality [a]	225	5	.05	0.18	72.81	-.10	.21
High Virtuality	593	7	-.03	0.17	41.89	-.16	.09
Performance							
Low Virtuality	222	6	.01	0.1	100.00	-.07	.09
Moderate Virtuality	216	5	.23	0.14	100.00	.11	.35
High Virtuality	675	9	.02	0.15	62.54	-.07	.12
Affective Outcomes							
Low Virtuality	136	3	-.10	0.14	100.00	-.26	.06
High Virtuality	215	4	-.11	0.14	90.60	-.25	.03

Note. [a] Contains study coded as low and moderate virtuality; *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Furthermore, examination of the specific types of deep-level composition showed that none of the hypotheses were supported. For instance, although it was predicted that virtuality would moderate the relationships between mean extraversion composition and team mediators, performance, and affective outcomes such that the relationships will be less positive as virtuality increases (Hypothesis 7), the results indicated that virtuality did not moderate the relationships between mean extraversion and team mediators or affective outcomes. It should be noted, however, that the latter comparison required that teams in the low virtuality and moderate virtuality groups be collapsed into the low virtuality category. Virtuality did moderate the relationship between extraversion and team performance, but not in the expected direction. As seen in Table 8, mean extraversion was not related to team performance at low and high levels of virtuality. It was, however, positively related to team performance at moderate levels of virtuality.

Table 8
Meta-Analytic Summary of the Moderating Effect of Virtuality on Mean Extraversion Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Mean Extraversion							
Mediators							
Low Virtuality	141	3	-.01	0.20	56.49	-.23	.22
High Virtuality	409	5	-.05	0.13	74.91	-.16	.06
Performance							
Low Virtuality	158	4	-.05	0.06	100.00	-.10	.01
Moderate Virtuality	57	2	.11	0.05	100.00	.04	.18
High Virtuality	424	6	-.06	0.14	76.17	-.17	.05
Affective Outcomes							
Low Virtuality [a]	109	3	-.01	0.07	100.00	-.09	.06
High Virtuality	176	3	-.02	0.11	100.00	-.15	.10

Note. [a] Contains study coded as low and moderate virtuality; *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Hypothesis 8, which regarded the moderation effect of virtuality on the relationships between mean emotional stability composition and team mediators, performance, and affective outcomes, could not be examined due to small *k*. Hypotheses 13 and 14 (i.e., the moderation effect of virtuality on the relationships for cultural diversity) could also not be examined for the same reason. Hypothesis 9, however, was not supported. Team virtuality moderated the relationship between mean agreeableness composition and team performance such that this relationship was more negative at low levels of virtuality than high levels of virtuality (see Table 9). The moderation effects of team virtuality could not be examined for team mediators or affective outcomes due to small *k*.

Table 9
Meta-Analytic Summary of the Moderating Effect of Virtuality on Mean Agreeableness Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Mean Agreeableness							
Performance							
Low Virtuality	41	2	-.12	0.03	100.00	-.16	-.07
Moderate Virtuality	93	3	-.01	0.17	100.00	-.20	.18
High Virtuality	200	4	.11	0.16	79.26	-.05	.27

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Moderation analyses for mean conscientiousness and mean openness to experience show that Hypotheses 10 through 12 were also not supported. The results for the outcomes that could be examined are shown in Tables 10 and 11. As the results in these tables show, virtuality did not moderate the relationships between mean openness to experience and team mediators or performance. Although virtuality did moderate the relationship between mean conscientiousness and team performance, the relationship was not in the expected direction. The wide confidence interval for highly virtual teams largely overlaps with that of low virtuality teams, suggesting the relationships do not differ in strength from one another. The confidence interval for moderately virtual teams, however, does not overlap with low or high virtuality teams and suggests there is a weak to moderate positive relationship. Because Hypothesis 11 predicted that this relationship would be more positive as virtuality increases, this hypothesis was not supported.

Table 10
Meta-Analytic Summary of the Moderating Effect of Virtuality on Mean Conscientiousness Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Mean Conscientiousness							
Performance							
Low Virtuality	43	2	.09	0.04	100.00	.03	.15
Moderate Virtuality	216	5	.24	0.10	100.00	.15	.32
High Virtuality	200	4	.04	0.12	100.00	-.08	.16

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Table 11
Meta-Analytic Summary of the Moderating Effect of Virtuality on Mean Openness Composition and Outcomes

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Mean Openness							
Mediators							
Low Virtuality	106	3	.16	.19	77.98	-.06	.37
High Virtuality	118	2	.17	.09	100.00	.05	.29
Performance							
Low Virtuality	79	3	.16	.15	100.00	-.02	.33
Moderate Virtuality	57	2	.10	.07	100.00	.00	.20
High Virtuality	133	3	-.04	.13	100.00	-.19	.10

Note. *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Table 12 summarizes the results of the analyses. While virtuality moderated several relationships, the results were not in the expected direction. The relationships between surface-level composition, deep-level composition, mean extraversion composition, and mean conscientiousness composition and team performance, for instance, were only seen in moderately virtual teams; performance for teams low and high in virtuality was not related to

team composition. Only Hypothesis 4A was supported as the relationship between mean age composition and performance was more negative for highly virtual teams than it was for moderately virtual teams.

Table 12
Summary of Hypotheses and Results

Hypothesis	Results
Hypothesis 1: Virtuality will moderate the relationships between surface-level composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative (i.e., weaker negative relationships) as virtuality increases.	**Not Supported** – There was no moderation of the relationship with mediators, and the relationship with performance was positive for moderately virtual teams Affective outcomes were not examined because of small *k*.
Hypothesis 2: Virtuality will moderate the relationships between racial diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.
Hypothesis 3: Virtuality will moderate the relationships between sex diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less negative as virtuality increases.	**Not Supported** – All confidence intervals for mediators overlapped. Moderation analyses could not be conducted for performance and affective outcomes.
Hypothesis 4: Virtuality will moderate the relationships between mean age composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative (i.e., stronger negative relationships) as virtuality increases.	**Supported** – The relationship with performance was more negative at high levels of virtuality than moderate levels of virtuality. Affective outcomes were not examined due to small *k*.

Table 12 Continued

Hypothesis	Results
Hypothesis 5: Virtuality will moderate the relationships between age diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.
Hypothesis 6: Virtuality will moderate the positive relationships between deep-level composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more positive (i.e., stronger positive relationships) as virtuality increases.	**Not Supported** – All confidence intervals for mediators and affective outcomes overlapped. In addition, composition was only positively associated with performance for moderately virtual teams.
Hypothesis 7: Virtuality will moderate the relationships between mean extraversion composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive (i.e., weaker, positive relationships) as virtuality increases.	**Not Supported** – All confidence intervals for mediators and affective outcomes overlapped. In addition, composition was only positively associated with performance for moderately virtual teams.
Hypothesis 8: Virtuality will moderate the relationships between mean emotional stability composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.
Hypothesis 9: Virtuality will moderate the relationships between mean agreeableness composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be less positive as virtuality increases.	**Not Supported** – The relationship between mean agreeableness composition and performance was more negative for teams low in virtuality than teams high in virtuality. Analyses for mediators and affective outcomes could not be conducted due to small *k*.

Table 12 Continued

Hypothesis	Results
Hypothesis 10: Virtuality will moderate the relationships between mean conscientiousness composition and (a) mediators and (b) affective outcomes such that the relationships will be more negative as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.
Hypothesis 11: Virtuality will moderate the relationships between mean conscientiousness composition and performance such that the relationships will be more positive as virtuality increases.	**Not Supported** - Mean conscientiousness composition and performance were only related in moderately virtual teams.
Hypothesis 12: Virtuality will moderate the relationships between mean openness to experience composition and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more positive as virtuality increases.	**Not Supported** – All confidence intervals for mediators and performance overlapped. No analyses for affective outcomes could be conducted due to small *k*.
Hypothesis 13: Virtuality will moderate the relationships between cultural diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more negative as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.
Hypothesis 14: Virtuality will moderate the relationships between cultural diversity and (a) mediators, (b) performance, and (c) affective outcomes such that the relationships will be more positive as virtuality increases.	**Not Examined** – No moderation analyses could be conducted due to small *k*.

Exploratory Analyses

Processes and emergent states. Team mediators, as described by the IMOI model, include both team processes and emergent states. Therefore, exploratory analyses were conducted to examine whether the pattern of relationships remained the same for both categories of mediators. As Table 13 shows, overall surface-level composition had a weak, positive relationship with team processes, although it was not related to emergent states. The relationship

between deep-level composition and team processes could not be examined due to small *k*, but the results show that it was also unrelated to emergent states. Virtuality did not moderate any of these relationships.

Table 13
Meta-Analytic Summary of Overall Composition and Team Processes and Emergent States

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Surface-level Composition							
Processes	447	6	.16	0.11	100.00	.07	.25
Low Virtuality [a]	121	2	.21	0.07	100.00	.11	.31
High Virtuality	326	4	.14	0.12	84.88	.02	.26
Emergent States	861	16	.03	0.22	39.05	-.08	.14
Low Virtuality	106	3	-.15	0.29	32.94	-.48	.17
Moderate Virtuality	156	4	.13	0.23	46.70	-.10	.35
High Virtuality	599	9	.04	0.18	47.67	-.08	.16
Deep-level Composition							
Emergent States	818	12	.01	0.15	67.80	-.07	.10
Low Virtuality [a]	225	5	.04	0.19	63.37	-.12	.21
High Virtuality	593	7	.00	0.13	73.52	-.09	.10

Note. [a] Contains study coded as low and moderate virtuality; *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Because few studies examined team processes, the exploratory analyses for the specific types of team composition could only examine the relationships between team composition and emergent states. The results, which are presented in Table 14, indicate that no type of composition was related to team emergent states. In addition, virtuality did not moderate any of the relationships.

Table 14
Meta-Analytic Summary of Specific Composition Types and Team Processes and Emergent States

Variable	*N*	*k*	*r*	SD_r	% var.	95% CI_L	95% CI_U
Sex Diversity							
Emergent States	612	12	.07	0.22	40.17	-.06	.19
Low Virtuality	106	3	-.11	0.27	38.57	-.41	.20
Moderate Virtuality	139	3	.23	0.21	44.61	-.01	.47
High Virtuality	367	6	.05	0.16	65.83	-.07	.18
Mean Age							
Emergent States	276	5	-.01	0.15	78.8	-.14	.13
Moderate Virtuality	77	2	.08	0.06	100.00	-.00	.16
High Virtuality	199	3	-.04	0.16	56.48	-.23	.14
Mean Extraversion							
Emergent States	594	9	-.01	0.14	82.49	-.10	.08
Low Virtuality	141	3	-.02	0.21	49.46	-.26	.22
Moderate Virtuality	44	1	.04	0.00	—	—	—
High Virtuality	409	5	-.01	0.11	100.00	-.11	.08

Note. [a] Contains study coded as low and moderate virtuality; *N* = total number of teams; *k* = total number of correlations included in each analysis; *r* = sample-weighted mean correlation; SD_r = standard deviation of uncorrected correlations; % var. = the percentage of variance due to sampling error; 95% CI = 95% confidence interval.

Relative weight analyses. The extent to which various types of composition explain variance in team mediators and outcomes was examined using relative weight analysis (Johnson, 2000). In relative weight analysis, the proportion of variance accounted for by a predictor is calculated by first rotating predictors to create new, orthogonal predictors. The criterion is regressed onto the original predictors, and the original predictors are regressed onto the new predictors. The resulting estimates are squared and combined with one another using matrix algebra. Unlike other methods for determining the relative importance of predictors (e.g., betas, regression weights), this method takes predictor intercorrelations into consideration and results in a more unbiased measure of predictor importance. R code developed by Tonidandel and LeBreton (2014) was used to conduct these analyses.

Relative weight analyses could not be conducted for surface-level composition because there were too few correlations, but the relative weight analysis results for personality composition and team mediators and performance are shown in Table 15. Affective outcomes could not be examined because of missing correlational information. The results of this analysis showed that personality composition accounted for nine percent of the variance in team mediators and four percent of the variance in team performance. Of this, agreeableness composition accounted for the most variance in team mediators, followed by openness to experience and conscientiousness. Emotional stability and extraversion composition accounted for little variance in team mediators. Conversely, mean conscientiousness composition accounted for the most variance in team performance, followed by emotional stability, extraversion, agreeableness and openness to experience. Removing studies at low levels of virtuality from these analyses revealed that these results remained the same for teams moderate to high in virtuality.

Table 15
Relative Importance of Personality Composition on Team Mediators and Performance

	Mediators			Performance		
Composition	*r*	RW	RW%	*r*	RW	RW%
Extraversion	-0.03	0.01	7.70	-0.04	0.01	14.46
Agreeableness	0.19	0.03	38.46	0.05	0.00	4.59
Conscientiousness	0.13	0.02	18.08	0.14	0.02	46.45
Emotional Stability	0.10	0.01	9.20	0.12	0.01	31.75
Openness to Experience	0.16	0.02	26.55	0.04	0.00	2.74

Note. RW = raw relative weight estimate; RW% = relative weight as a percentage of total R^2

4. CONCLUSIONS

Virtual teams are becoming more common in organizations, thus it is important to understand if team member characteristics influence the team and, if they do, how they do so in order to improve the utility of these teams. Yet much of the research on team composition has focused on traditional, colocated teams. Because virtual teams face different challenges than these teams do, recommendations for team composition based on colocated teams might not be as applicable to teams that are more virtual. By comparing the effects of team composition at different levels of virtuality, this study allows conclusions to be drawn regarding the appropriateness of applying findings from traditional teams to virtual teams.

Because many of the analyses utilized few effect sizes, the results of this meta-analysis could be due to second-order sampling error. If these results were to be interpreted, however, they would suggest that the relationships between team composition and team mediators, performance, and affective outcomes are similar for teams high and low in virtuality, but are somewhat different for moderately virtual teams. For instance, while it has been suggested that surface-level composition is detrimental to colocated teams because it can incite social categorization and stereotyping processes and that this would be less likely to happen in teams that are more virtual because information about surface-level characteristics is less salient, this was not evident in this study. Instead, surface-level composition was not related to team mediators at any level of team virtuality. And contrary to what was predicted, surface-level composition was not related to team performance at high levels of virtuality, but it was positively associated with team performance at moderate levels of virtuality. The timing of when team members acquired knowledge of surface-level differences could help explain this finding. The

influence a team member has within the team depends on their status relative to the other team members, which is, in part, dependent on their surface-level characteristics. Thus, individuals with more positive stereotypes have more influence within the team (Manago, Sell, & Goar, 2018). When these differences in status are not immediately known, however, this allows individuals with less power to have more influence on the team when norms are being formed and can facilitate social interactions. As a result, when differences are made salient they are more likely to lead to information elaboration rather than social categorization. Because differences might never be salient in highly virtual teams, they do not see this benefit. Moderately virtual teams, however, would if their primary forms of communication were initially electronic.

However, examination of specific types of surface-level composition found that virtuality did not moderate most relationships. The results show that sex diversity was not related to team mediators regardless of team virtuality. This is surprising because research on sex diversity normally suggests that it is detrimental to colocated teams (e.g., Bell et al., 2011; Cady & Valentine, 1999), although this relationship was predicted to be less negative as team virtuality increased. This was not evident in this meta-analysis. Instead, the results suggest that while sex diversity does not necessarily lead to self-categorization and stereotyping processes, it also does not necessarily lead to information elaboration in a team. Future research should examine what other conditions are necessary for either self-categorization or information elaboration processes to occur.

Yet the results for mean age composition suggest that its effects are dependent on how virtual a team is. Regardless of team virtuality, team mean age composition was not related to team mediators. It was, however, positively related to team performance in moderately virtual teams, but negatively related to performance in highly virtual teams. This supports prior research

which suggests that older individuals feel less comfortable working in virtual environments and have more trouble doing so (Gorman et al., 2004; Helsper & Eynon, 2010). As a result, highly virtual teams would not be able to take advantage of the experience normally associated with higher team member age and team performance suffers.

In addition, the results for overall deep-level composition were similar to those for overall surface-level composition. It had been predicted that the relationships between deep-level composition and team mediators, performance, and affective outcomes would be stronger as virtuality increased because team members would have less information about the surface-level attributes of others and would thus rely more on the deep-level attributes they could discern. While deep-level composition was not related to team mediators regardless of team virtuality, it was related to team performance at moderate levels of virtuality. These results suggest that at high levels of virtuality, little, if any, information about deep-level attributes could be discerned. In moderately virtual teams, however, team members could have had an easier time discerning deep-level attributes because of their use of richer forms of communication. Thus, deep-level composition would have more of an effect on moderately virtual teams.

This pattern of results was also evident when examining mean extraversion composition and mean conscientiousness composition. Virtuality did not moderate the relationship between mean extraversion composition and team mediators and affective outcomes, but it did moderate the relationship between mean extraversion composition and team performance and mean conscientiousness composition and team performance. In both cases, team composition was positively associated with performance for moderately virtual teams but not for low or highly virtual teams. The results for teams low in virtuality are surprising because prior research (e.g., Barrick et al., 1998; Kichuk & Wiesner, 1997) has found that both are associated with team

performance in colocated teams. For teams high in virtuality, the null relationship could indicate that these traits were either not displayed or not discernable through the communication media. Moderately virtual teams, because of their use of richer communication media, could have made these characteristics more evident. Thus, they impacted team performance for moderately virtual teams.

The direction of the moderation of virtuality on the relationship between mean agreeableness composition and team performance was also surprising. The results showed that the relationship was more negative for less virtual teams than for highly virtual teams. Ellis et al. (2003) and Giambatista and Bhappu (2010) suggest that agreeableness might not benefit teams as it could lead to groupthink; because highly agreeable individuals are motivated to avoid conflict, they could avoid discussing solutions to problems the team is facing and consequently agree quickly on a suboptimal solution. The findings of this meta-analysis suggest that this is not the case for highly virtual teams, ostensibly because the comparatively poorer forms of communication relied upon by these teams make it more difficult to communicate agreeableness. Thus, even highly agreeable members of highly virtual teams would feel less need to reciprocate agreeable behavior.

However, virtuality did not moderate the relationship between mean openness to experience composition and team mediators and performance. Openness to experience is not known to impact colocated teams, but these findings suggest that it also does not affect the performance of more virtual teams. And while theorizing on virtual teams suggests that higher levels of openness to experience could benefit team mediators in highly virtual teams as it indicates that the team members would be more willing to use technology to communicate and

would feel more comfortable doing so, the results of this study instead suggest that higher mean levels of openness to experience benefit team mediators regardless of team virtuality.

Implications for Science and Practice

Team diversity is generally thought to negatively impact teams, although the literature on surface-level composition in virtual teams suggests that highly virtual teams should be less impacted by it than teams that are less virtual (e.g., Bhappu et al., 1997; Giambatista & Bhappu, 2010). However, the results of this study suggest that surface-level composition generally does not impact teams. When it does, it benefitted moderately virtual teams through improved team mediators. Conversely, overall surface level composition was not associated with team mediators for highly virtual teams. However, highly virtual teams with a higher mean team member age could need more support than less virtual teams with a similar age composition or highly virtual teams with lower mean team member age. More training to familiarize team members with the technology they will be using and teach team members how to communicate effectively through technology could benefit highly virtual teams.

In addition, it is often recommended that personality be taken into account when composing teams (e.g., Bell, 2007; Hollenbeck, DeRue, & Guzzo, 2004). Yet the findings of this meta-analysis suggest some traits are more appropriate for some types of teams than others. For example, the results of this study indicate that higher levels of extraversion and conscientiousness would benefit team performance more at moderate levels of team virtuality than at low or high levels of team virtuality. Conversely, while agreeableness was positively associated with team mediators, its direct impact on team performance was more negative for teams low in virtuality than teams high in virtuality. In addition, the relationship between openness to experience composition and team mediators was not moderated by virtuality,

suggesting it is equally important to all teams. Thus, organizations should consider how teams will primarily communicate when deciding which individuals to place on the team. While personality composition might not have much of an impact in highly virtual teams, it could impact teams that are less virtual.

Limitations and Future Directions

This meta-analysis has its limitations. While one of the strengths of meta-analysis is the larger sample sizes, many of the analyses in this meta-analysis utilized small *k*s of two or three. Thus, the results of these analyses were likely affected by second-order sampling error. Because second-order sampling error is known to affect standard error estimates more than mean estimate (Schmidt & Hunter, 2014), this means that the moderation analysis results might not be stable. Including more studies and reanalyzing these relationships could show that more relationships were moderated by virtuality than this meta-analysis found. More research needs to be conducted on the effects of team composition in teams of various levels of virtuality to estimate more stable estimates of their effects. In addition, because the correlations used in the relative weight analyses were also based on small *k*s, these results could also change with the addition of further studies.

Moreover, these small *k*s also prevented several analyses from being conducted. Moderation analyses for racial diversity, age diversity, mean emotional stability composition, and cultural diversity, for instance, were not conducted because few studies have examined their effects at different levels of team virtuality. Although research on teams suggest that all of these are important and could have a different impact on teams as team virtuality increases, this study was unable to examine this. Additionally, few moderation analyses could be conducted for team affective outcomes because of a small number of effect sizes. Prior research shows that these

affective outcomes are important because they are related to outcomes such as turnover (e.g., Riketta & Van Dick, 2005), which can be costly to organizations. Therefore, more studies examining how composition can affect team affective outcomes are needed.

In addition, future research should examine other moderators of the relationship between team composition and outcomes. The low percentage of the variance accounted for in the sex diversity moderation analyses, for instance, indicate that other moderators of these relationships are present. Joshi and Roh (2009) found that work context can also impact the effect of surface-level composition on teams. While they found that sex diversity, racial diversity, and age diversity were more detrimental to performance in male-dominated, majority-White, and younger settings, this was not evident in more balanced settings. A small number of effect sizes, however, prevented these analyses in this meta-analysis. Thus, further research is necessary to examine, for example, whether work context and virtuality interact to moderate the effect of sex diversity on teams.

Further research examining how communicating through technology initially or communicating face-to-face initially affects moderately virtual teams is also necessary. The results for surface-level composition in this study could be due to moderately virtual teams initially communicating electronically, thus building relationships before surface-level characteristics become highly salient. While little research has examined this (e.g., del Carmen et al., 2012), this research is important because current recommendations for virtual teams include having the teams meet face-to-face initially to facilitate the development of mediators like trust and cooperative norms (Wilson et al., 2006). However, if doing so highlights surface-level differences before interpersonal relationships can be built, then the team could be unable to leverage its diverse viewpoints effectively and its diversity could end up hindering the team.

Conclusion

The popularity of virtual teams continues to increase, yet there is little guidance on how these teams should be composed. Most recommendations for team composition are based on teams who are colocated and communicate primarily face-to-face, but teams that are more virtual face different challenges than these teams do. The results of this meta-analysis suggest that the relationships between deep-level composition and team mediators and outcomes are similar for teams low and high in virtuality, but these relationships tend to be stronger for teams moderate in virtuality. However, the analyses for surface-level composition indicate that mean age composition had a more negative impact in highly virtual teams than in moderately virtual teams. Overall, recommendations based on colocated teams are applicable to more virtual teams.

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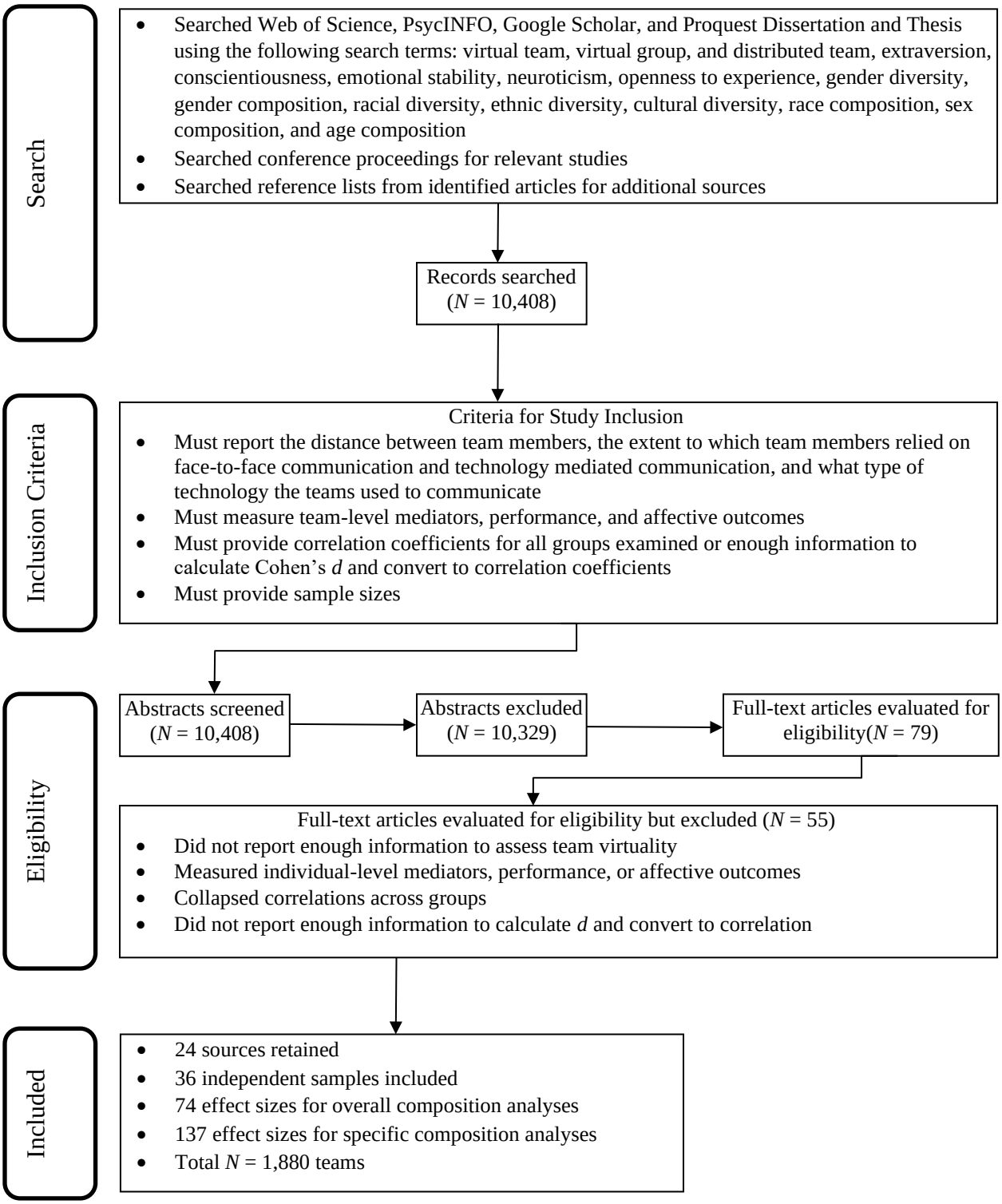
APPENDIX A

FLOW CHART OF THE LITERATURE SEARCH PROCESS AND OUTCOMES



APPENDIX B

Table B-1

Studies Included in the Meta-analysis, Team Virtuality Classifications, and Composition Relationships with Team Mediators, Performance, and Affective Outcomes

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Balthazard, Potter, & Warren (2004)	1	63	3	Extraversion	Affect	-.13	-.13
					Med	-.23	-.23
					Perf	.12	.12
Brahm & Kunze (2012)	1	50	3	Age Diversity	Med	.16	.26
					Perf	.03	-.10
				Sex Diversity	Med	.23	
					Perf	-.18	
Cogliser, Gardner, Gavin, & Broberg (2012)	1	71	3	Agreeableness	Med	.22	.20
					Perf	.29	.07
				Conscientious	Med	.03	
					Perf	-.02	
				Emo. Stability	Med	.20	
					Perf	.16	
				Extraversion	Med	.08	
					Perf	-.06	
				Openness	Med	.10	
					Perf	-.14	
Connelly & Turel (2016)	1	81	3	Sex Diversity	Med	.02	.02
					Perf	-.09	-.09
Eubanks, Palanski, Olabisi, Joison, & Dove (2016)	1	28	1	Conscientious	Perf	.45	.45
Havakhor & Sabherwal (2018)	1	50	3	Mean Age	Med	-.01	-.01
					Perf	.01	.01

Table B-1 Continued

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Herschel, Cooper, Smith, & Arrington (1994)	1	61	1	Sex Diversity	Affect Med	.05 .09	.05 .09
Hobman, Bordia, Irmer, & Chang (2002)	1	20	1	Sex Diversity	Med	-.64	-.64
Hobman, Bordia, Irmer, & Chang (2002)	2	19	2	Sex Diversity	Med	-.29	-.39
Huber, Eggenhofer, Ramer, Schafter, & Titze (2007)	1	130	3	Mean Age	Med Perf	-.16 -.22	-.16 -.22
				Extraversion	Med Perf	-.14 -.25	-.14 -.25
Krebs, Hobman, & Bordia (2006)	1	25	1	Age Diversity	Med	-.40	-.34
				Race Diversity	Med	-.04 -.13	
				Sex Diversity			
Krebs, Hobman, & Bordia (2006)	2	25	3	Age Diversity	Med	-.03	.11
				Race Diversity	Med Med	.27 -.08	
				Sex Diversity			
MacDonnell, O'Neill, Kline, & Hambley (2009)	1	35	1	Extraversion	Med Perf	.31 .01	.14 .23
				Openness	Med Perf	-.11 .32	
MacDonnell, O'Neill, Kline, & Hambley (2009)	2	27	1	Extraversion	Med Perf	.04 -.08	.23 -.07
				Openness	Med Perf	.33 -.03	

Table B-1 Continued

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Magnusson, Schuster, & Taras (2014)	1	145	3	Age Diversity	Med	.26	.29
					Perf	.10	.15
				Sex Diversity	Med	.16	
					Perf	.12	
				Cultural Div.	Med	-.13	-.13
					Perf	.12	.13
O'Leary (2005)	1	55	3	Race Diversity	Med	.03	.03
					Perf	-.01	-.01
Peters & Karren (2009)	1	33	2	Mean Age	Med	.01	.01
					Perf	.02	.02
Purvanova (2014)	1	24	1	Agreeableness	Perf	-.14	-.01
				Conscientious	Perf	.13	
Purvanova (2014)	2	36	2	Agreeableness	Perf	-.14	-.00
				Conscientious	Perf	.13	
Purvanova (2014)	3	67	3	Agreeableness	Perf	-.04	.04
				Conscientious	Perf	.11	
Robert (2012)	1	22	3	Mean Age	Affect	.13	-.24
					Med	.26	.02
				Race Diversity	Affect	-.20	
					Med	-.12	
				Sex Diversity	Affect	-.30	
					Med	-.11	
Robert & You (2017)	1	44	3	Race Diversity	Affect	-.01	-.19
					Med	-.21	-.32
					Perf	.15	.06
				Sex Diversity	Affect	-.27	
					Med	-.27	
					Perf	-.06	
Staples & Zhao (2006)	1	40	1	Cultural Div.	Affect	-.29	-.29
					Med	.03	.03
					Perf	-.02	-.02

Table B-1 Continued

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Staples & Zhao (2006)	2	39	3	Cultural Div.	Affect	-.39	-.39
					Med	.07	.07
					Perf	.12	.12
Vasilatos (2010)	1	17	1	Agreeableness	Affect	.21	.15
					Perf	-.08	-.03
				Conscientious	Affect	.12	
					Perf	.04	
				Extraversion	Affect	.14	
					Perf	-.19	
				Openness	Affect	.13	
					Perf	.12	
Vasilatos (2010)	2	13	2	Agreeableness	Affect	-.14	.04
					Perf	-.25	.03
				Conscientious	Affect	.29	
					Perf	.20	
				Extraversion	Affect	.00	
					Perf	.20	
				Openness	Affect	-.01	
					Perf	-.03	
Vasilatos (2010)	3	15	3	Agreeableness	Affect	-.19	-.02
					Perf	-.17	-.17
				Conscientious	Affect	-.32	
					Perf	-.32	
				Extraversion	Affect	.28	
					Perf	-.07	
				Openness	Affect	.15	
					Perf	-.12	

Table B-1 Continued

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Venkatesh & Windeler (2012)	1	44	2	Mean Age	Med	.13	.13
					Perf	.07	.07
				Agreeableness	Med	.15	
					Perf	.16	
				Conscientious	Med	.20	
					Perf	.15	
				Emo. Stability	Med	.02	
					Perf	.10	
				Extraversion	Med	.04	
					Perf	.08	
				Openness	Med	.26	.28
					Perf	.14	.26
Venkatesh & Windeler (2012)	2	47	3	Mean Age	Med	.14	.36
					Perf	-.10	.22
				Agreeableness	Med	.19	
					Perf	.14	
				Conscientious	Med	.20	
					Perf	.14	
				Emo. Stability	Med	.04	
					Perf	.07	
				Extraversion	Med	.17	
					Perf	.05	
				Openness	Med	.28	.14
					Perf	.13	-.10
Warren (2003)	1	79	1	Extraversion	Affect	-.05	-.05
					Med	-.16	-.16
					Perf	-.03	-.03
Warren (2003)	2	98	3	Extraversion	Affect	.00	.00
					Med	-.01	-.01
					Perf	.02	.02

Table B-1 Continued

Reference	Samples	*N*	Virtuality	Composition	Outcomes	Specific Corr.	Overall Corr.
Zhang (2009)	1	60	2	Sex Diversity	Med	.44	.44
					Perf	.24	.24
Zhang & Turel (2012)	1	95	2	Conscientious	Perf	.26	.26

Note. Virtuality: 1 = low virtuality, 2 = moderate virtuality, 3 = high virtuality. Composition: Emo. Stability = emotional stability, Cultural Div. = cultural diversity. Outcomes: Perf = team performance, Med = team mediators, Affect = team affective outcomes.

APPENDIX C

VIRTUALITY AND TEAM COMPOSITION META-ANALYSIS CODING SHEET

Data Point #: Click or tap here to enter text.

Article Code: Click or tap here to enter text.

General Study Information

Reference:

Click or tap here to enter text.

Publication Year: Click or tap here to enter text.

Publication Type:

☐ 1. Journal ☐ 2. Dissertation ☐ 3. Thesis ☐ 4. Conference

Study Location:

☐ 1. Lab ☐ 2. Field ☐ 3. Other: Click or tap here to enter text.

Participant Occupation:

☐ 1. Student ☐ 2. Organization Employee ☐ 3. Military ☐ 4. Mixed

Team Information:

Number of Teams:Click or tap here to enter text.

Team Size (report average if variable): Click or tap here to enter text.

Team Tenure (in months): Click or tap here to enter text.

Composition [Type of Composition]:

☐ 1. Mean ☐ 2. Diversity

Surface/Deep Composition:

☐ 1. Surface ☐ 2. Deep

Surface Composition:

☐ 1. Race ☐ 2. Sex ☐ 3. Age

Deep Composition:

☐ 1. Extraversion ☐ 2. Emotional Stability ☐ 3. Agreeableness

☐ 4. Conscientiousness ☐ 5. Openness to Experience ☐ 6. Cultural

Team Outcomes [Dependent Variable]:

☐ 1. Mediator (e.g., communication, cohesion, trust, identification, engagement)

☐ 2. Affective (e.g., commitment, satisfaction)

☐ 3. Performance (e.g., assignment grade, solution quality, perceived performance)

Dependent Variable Description: Click or tap here to enter text.

Effect Sizes:

☐ Correlation: Click or tap here to enter text.

☐ Cohen's *d*: Click or tap here to enter text.

☐ Hedges' G: Click or tap here to enter text.

Calculating Effect Sizes:

Group 1 Mean: Click or tap here to enter text. Group 2 Mean: Click or tap here to enter text.

Group 1 SD: Click or tap here to enter text. Group 2 SD: Click or tap here to enter text.

Group 1 N: Click or tap here to enter text. Group 2 N: Click or tap here to enter text.

Virtuality

Team Distribution:

☐ 1. Entirely/Mainly Colocated ☐ 2. Partly Distributed ☐ 3. Entirely/Mainly Distributed

Medium of Communication:

☐ 1. Entirely FTF ☐ 2. CMC/FTF Mixture ☐ 3. Entirely CMC

Communication Media Richness:

☐ 1. High (e.g., FTF, video) ☐ 2. Moderate/Mixed (e.g., phone) ☐ 3. Low (e.g., text)