CONSTRUAL LEVEL THEORY AND VIRTUAL TEAMS: THE EFFECT OF VIRTUALITY ON PSYCHOLOGICAL DISTANCE, CONSTRUAL LEVEL, AND CAUSAL ATTRIBUTIONS

A Thesis

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PAULA LEAL COSTA

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Chair of Committee,	Charles D. Samuelson
Committee Members,	Heather C. Lench
	Jane Sell
Head of Department,	Heather C. Lench

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ABSTRACT

Many different theories have been used to predict the effects different facets of virtuality can have on teams. Construal Level Theory (CLT) is more parsimonious in that it provides one mechanism for various facets. This study tested hypotheses based on CLT to examine how being part of a virtual or collocated team affected psychological distance, construal level, and causal attributions. Two-hundred eighty-seven participants read vignettes that places them in either a virtual or collocated team. Inclusion of situational information that could account for a problem that occurred in each vignette was also manipulated. Results showed that there was a significant effect of team type on psychological distance, but not on construal level or causal attributions. The presence of situational information did not affect the types of causal attributions made. The implications of these results are discussed.

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Contributors

This work was supervised by a thesis committee consisting of Professor Charles D. Samuelson [advisor] and Professor Heather C. Lench of the Department of Psychology and Professor Jane Sell of the Department of Sociology.

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1. INTRODUCTION

The amount of research on the use of communication technology within teams has grown in recent years. This trend is unsurprising given the increasing usage of distributed teams whose members have to rely upon technology to collaborate with one another. Also known as virtual teams, these teams are groups whose members are generally geographically dispersed from one another. They all have a common reliance on electronic communication technology (Kirkman, Gibson, & Kim, 2012; Schiller & Mandviwalla, 2007).

A recent survey by the Society for Human Resource Management (2012) found that 46% of organizations used virtual teams. The United Nations Conference on Trade and Development (2004, 2010) reported that the usage of transnational corporations increased by 56% between 1993 and 2003 and by 35% between 2006 and 2008. These organizations often require workers in different locations to communicate frequently and work closely with employees at different sites (Hinds, Liu, & Lyon, 2011). Increasing outsourcing can also increase dependence on virtual teams (Farrell, Laboissière, & Rosenfeld, 2006). As this research shows, the usage of virtual teams in organizations will likely increase in the future. Employees will be expected to not only work with collocated others, but also with team members in distant locations. Consequently, it is important to study virtuality to understand its effects on individuals and their cognitive processes.

Virtuality

Virtuality is a construct that has proven difficult to define. According to Foster, Abbey, Callow, Zu, and Wilbon (2015), there are at least 29 approaches to defining virtuality. Griffith et al. (2003), for instance, defined virtuality in terms of (1) the physical distance between members, (2) how much technological support the team has, and (3) how much work the team does while its members are dispersed across time and space. In contrast, Kirkman and Mathieu (2005) believe that the three factors that constitute virtuality are (1) how much the team relies on virtual tools, (2) the amount of information provided by those tools, and (3) the synchronicity of the virtual interactions between team members. They argue that these factors are important because they can be used to describe all teams, unlike other common facets such as geographic dispersion. Yet Gibson and Gibbs's (2006) definition aligns more with Griffith et al.'s (2003): They contend that geographic dispersion, electronic dependence, dynamic structural arrangements, and national diversity should be included in the conceptual definition of virtuality. All four facets contribute independently to the effects virtuality has on teams, although the effect of dynamic structure is not as consistent (Gibson & Gibbs, 2006).

This suggests that as varied as these definitions may seem, there has been some movement toward coalescence. Foster et al. (2015) mention that organizational differences and cultural distances are commonly included in definitions of virtuality. Many definitions of virtual teams acknowledge that team members may not all work for the same firm and there may also be a lot of variation in their cultural backgrounds. Gilson, Maynard, Young, Vartiainen, & Hakonen (2015) indicate that technology usage

is also consistently incorporated. A reliance on communication technology is generally considered an important aspect of virtual teams. In addition, many definitions include dimensions of geographic dispersion or distance as a component of virtuality (Foster et al., 2015; Gibson & Gibbs, 2006; Gilson et al., 2015). In their review of the literature, Foster et al. (2015) found it included in 19 out of 27 studies. Distance is frequently included in definitions of virtuality because it becomes more difficult to get group members together to meet face-to-face as it increases. Team members have to rely more on technology to communicate and work with one another. This is especially true for spatial distance, although temporal distance (i.e., time zones or differing work hours) is also often considered (Foster et al., 2015; O'Leary & Cummings, 2007). Consequently, virtuality in this paper is defined by distance between team members and reliance on communication technology.

Although there is growing consensus on the facets of virtuality, there has been less theoretical work that explains the effects of virtuality on cognitive processes. Kirkman et al. (2012) note that previous qualitative reviews of the virtual teams literature did not devote much space to theory (e.g., Martins, Gilson, & Maynard, 2004). This may be related to the fact that much research on virtuality and virtual teams is atheoretical (Schiller & Mandviwalla, 2007). Only 53% of the studies reviewed by Schiller and Mandviwalla (2007) used theory as a foundation for their research. Many studies rely more on the results of prior empirical work rather than theory to predict the effects of virtuality. As for theory-based papers, many different theories (e.g., media richness theory, swift trust theory) have been used to predict the effects of different

dimensions of virtuality. This is a problem when a similar psychological mechanism may operate for similar facets such as the different types of distance. Spatial and temporal distance are conceptually related, but they are often hypothesized to work through different mechanisms. For instance, Hinds and Bailey (2003) proposed that spatial distance will cause conflict within virtual teams because it disrupts processes like the formation of mutual understanding, but that temporal distance will have no effect beyond what can be attributed to spatial distance. Yet Montoya-Weiss, Massey, and Song (2001) suggest that temporal distance may cause conflict because of information overload due to increased reliance on asynchronous communication. Thus, although spatial and temporal dispersion are both types of distance, their effects on conflict are believed to work through different mechanisms.

According to Wilson, Crisp, and Mortensen (2013), this separate consideration of mechanisms for related distance constructs is problematic. They argue that this trend contributes to the fragmentation of theory and research already seen in the virtual teams literature. Hence, scientific progress is impeded. Wilson et al. (2013) proposed that Construal Level Theory (CLT; Trope & Liberman, 2010) may provide a solution to this fragmentation problem. CLT contends that different forms of distance share a similar underlying psychological mechanism: psychological distance. Thus, it provides a potential explanation for the effects of both spatial and temporal distance on cognitive processes. Wilson et al. (2013) developed a set of theoretical propositions by applying CLT to virtual teams. However, to our knowledge, no one has formally tested their

hypotheses. Therefore, the purpose of the proposed study is to test several hypotheses derived from Wilson et al.'s (2013) theoretical framework.

Construal Level Theory

According to Trope and Liberman (2010), "the basic premise of CLT is that distance is linked to level of mental construal, such that more distant objects will be construed at a higher level, and high-level construal will bring to mind more distant objects" (p. 444). The way a person thinks about an object depends on how near or far the object is from them. Construals are mental representations of objects, actions, and events that can capture features at different levels. What level a feature belongs to depends on how central they are to the object, action, or event and whether they are subordinate to other features. Lower level construals are more concrete representations in that they include more details that are often goal irrelevant, contextualized, and include features that would not be considered vital (Trope, Liberman, & Wakslak, 2007). Conversely, higher level construals are more abstract and only include central features of the object (Trope & Liberman, 2010). Changing a higher level feature would have more impact on how something is represented because it changes its meaning.

The reason that higher level construals do not contain incidental information is that this type of information is more likely to change. As Trope and Liberman (2010) note, the goal of contacting a friend (high level construal) is less likely to change than the goal of sending a friend an email (low level construal) because many situational factors, such as lacking an Internet connection, could make the latter goal unobtainable.

This is why people think about things more abstractly as distance increases. Thus, distance (e.g., geographic dispersion) is an important factor to construal level.

Distance can be measured as either objective or psychological distance. Objective distance is distance that "can be observed or calculated by others" (Wilson et al., 2008). For example, spatial distance can be measured in miles and temporal distance can be measured by time zones. For many years, much of the research on distance has focused on objective distance (e.g., O'Leary & Cummings, 2007). This research suggests that increasing objective distance is detrimental to teams. Cramton and Webber (2005), for example, found that distance was associated with less effective work processes and poor perceptions of performance. O'Leary and Cummings (2007) also describe several negative effects, such as decreased chances for spontaneous communication, that can occur as a result of increasing distance. Kiesler and Cummings's (2002) review of the literature suggests that this lack of spontaneous communication can diminish social ties and hinder coordination.

Objective distance, however, is not the only kind of distance to affect construal level. Psychological distance, the "subjective experience that something is close or far away from the self, here, and now" (Trope & Liberman, 2010, p. 440), may also play an important role. Subjectivity is key to psychological distance. Whereas objective distance can be measured by a third party, psychological distance is concerned with the subjective perception of distance and can differ between two people thinking about the same object. Recent research on psychological distance and related constructs such as proximity shows that it is important to team processes. For example, Siebdrat, Hoegl,

and Ernst (2014) found that subjective distance predicted team collaboration. O'Leary, Wilson, and Metiu (2014) found that perceptions of proximity predicted relationship quality within teams. People who perceived their colleagues as being close to them were more satisfied with their relationships than those who felt more distance between them (O'Leary et al., 2014).

Because geographic distance is seen as an important component of virtual teams (e.g., Foster et al., 2015; Gibson et al., 2015; O'Leary & Cummings, 2007), Wilson et al. (2013) posit that these teams should be associated with more psychological distance than collocated teams. A lack of spontaneous communication that affects familiarity and friendship may be associated with increased conflict in teams (Hinds & Bailey, 2003; Hinds & Mortensen, 2005) and may also cause team members to feel more distant from one another (Wilson et al., 2008, O'Leary et al., 2014). Therefore, following Wilson et al., the first hypothesis to be tested in the present study is:

> **Hypothesis 1:** Individuals in virtual teams will report greater psychological distance than individuals in collocated teams.

Psychological distance affects how a person construes an object, action, or event. Many studies have found that psychological distance affects construal level (e.g., Henderson, 2009; Thomas & Tsai, 2012). For instance, Fujita, Henderson, Eng, Trope, and Liberman (2006) found that when people were led to believe that an event took place in a location far away from them, they preferred more abstract identifications of events and used more abstract language to describe actions than if the event took place nearby. Henderson, Fujita, Trope, and Liberman (2006) also found that judgments of

events differed depending on whether participants were told the events took place nearby or far away. For virtual teams, this means that objective distance may cause problems because it may affect construal levels through psychological distance. Virtual team members may feel more distant from one another and may perceive distant team members in more abstract terms. Because virtual teams should be higher in psychological distance than collocated teams (Hypothesis 1), the second hypothesis suggested by Wilson et al. (2013) is:

> **Hypothesis 2:** Individuals in virtual teams will use more abstract levels of construal than individuals in collocated teams to describe their team members' behavior.

Causal Attributions in Virtual Teams

One area where distance is believed to matter is in causal attributions for others' actions. Attributions in teams are important because they have been associated with problems in group communication and motivation to complete task-work (Bazarova & Hancock, 2012). Over time it can result in conflict among team members (Hinds & Bailey, 2003; Hinds & Mortensen, 2005). One approach to predicting causal attributions in virtual teams is based on the fundamental attribution error and correspondence bias (Cramton, 2002; Cramton, Orvis, & Wilson, 2007; Gilbert & Malone, 1995). According to this perspective, individuals in virtual teams are more likely to make dispositional attributions for their distributed teammates, but not for their collocated teammates because they are more aware of situational constraints for team members who are proximate (Cramton, 2001; Cramton, 2002; Cramton et al., 2007). While past attribution

research demonstrates that individuals are generally more inclined to use dispositional attributions for another's behavior (e.g., Jones & Harris, 1967; Gilbert & Malone, 1995), they may also use situational information if available (Cramton et al., 2007). Physical distance from team members, however, may limit an individual's ability to discern variability in situations. Thus, a virtual team member may erroneously conclude that everyone is facing the same situation (Cramton et al., 2007).

CLT would make similar predictions to the Crampton (2002) theoretical approach, albeit for different reasons. As mentioned earlier, lower level construals contain features that are more likely to change as distance increases. In contrast, higher level construals contain features that are assumed to be relatively stable. Thus, CLT would predict that members of virtual teams (compared to members of collocated teams) are more likely to use dispositional attributions to explain other members' behavior because dispositions are less likely to change (Trope & Liberman, 2010; Wilson et al., 2013). There is some research indicating that situational attributions are associated with lower level construals, while dispositional attributions are associated with higher level construals (Henderson et al., 2006; Rim, Uleman, & Trope, 2009). For example, Henderson et al. (2006) found that knowledge that an author of a paper had been instructed to take a certain viewpoint was not enough to affect attributions about the author's actions. When participants believed that the author lived in a distant location, they were still likely to believe the opinion expressed in the paper aligned with the author's personal belief. Rim et al. (2009) also found that people were more likely to infer traits about spatially distant others compared to others nearby. This finding

supports the assumption that traits reflect higher level construals, rather than lower level construals. Hence, the third set of hypotheses is:

> **Hypothesis 3A**: Individuals in virtual teams will be more likely to use dispositional attributions to explain teammate behavior compared to individuals in collocated teams.
>
> **Hypothesis 3B**: Individuals in virtual teams will be less likely to use situational attributions to explain teammate behavior compared to individuals in collocated teams.

Note here that CLT differs from the traditional attribution bias approach of Crampton (2002). For CLT, it is psychological distance, not "situation invisibility" (Crampton, 2001, 2002) that causes individuals to use dispositional rather than situational attributions to explain teammate behavior (Wilson et al., 2013). Thus, even if situational information was available to virtual team members, it would not be expected to increase the likelihood of situational attributions (Henderson, 2006). Members within virtual teams who use abstract construals should be less likely to make situational attributions because those inferences are more concrete (lower construal level). Based on this theoretical analysis, a fourth hypothesis is:

> **Hypothesis 4A**: Individuals provided with situational information will be as likely to make situational attributions for teammate behavior as individuals without access to situational information.

In contrast, the attributional bias framework of Crampton (2002) would predict that the presence of situational information does matter. If an observer's perception of

the actor's situation does not offer an obvious explanation for his or her behavior, then causal attributions will be more likely to be dispositional. Accurate assessment of situational constraints is problematic in distributed teams because situations facing each member may differ, but observers are unlikely to recognize this variability because the situation is invisible (Cramton, 2001, 2002). For example, Cramton et al. (2007) found that the presence of situational information mitigated the effect of spatial distance (collocated vs. distributed teams) on causal attributions. They report that while distributed team members were more likely than collocated team members to rely on dispositional attributions for their teammate's behavior, this difference disappeared when situational information was provided. Hence, Crampton's (2002) attributional bias perspective would predict an alternative hypothesis to H4A:

> **Hypothesis 4B**: Individuals provided with situational information will be more likely to make situational attributions for teammate behavior compared to individuals without access to situational information.

2. METHOD

Participants

Before data collection began, a power analysis was run to determine the number of participants needed for the study. Based on past research, a moderate effect size (f = .20) was specified and we found that we needed 50 people per condition. Participants were 287 undergraduate students enrolled in an introductory psychology course from a predominantly white Southern university. They were compensated with partial course credit for participating. Sixty percent of the participants were female, and on average the students were 18.6 years old. Most of the students were biomedical sciences majors (n = 47, 16.67%), followed by kinesiology (n = 28, 9.76%), psychology (n = 26, 9.06%), business (n = 26, 7.80%), animal science (n = 16, 5.57%), biology (n = 14, 4.88%), communication (n = 13, 4.53%) and allied health (n = 12, 4.18%). Few individuals (n = 107, 37.94%) were in the other 53 majors represented in the study.

Design

The study used a 2 x 2 (Team Type [virtual, collocated] x Situational Information [present, absent]) between-subjects design. Participants were randomly assigned to one of the four conditions. Psychological distance, construal level, and causal attributions were the primary dependent variables.

Procedure

Before each session, all materials for the study were placed into packets, and each packet was numbered. Manipulation of team type and situational information was

done via vignette. Which vignette version was placed into each packet was determined via block randomization. Each vignette condition was numbered one through four, and then a random number generator was used to determine which vignette should be placed in each packet. All the forms, including the vignettes, were presented in the same order in each packet.

Participants signed up for the study online using the psychology subject pool website. Each session consisted of 3 to 32 individuals. They were told to report to a classroom on campus, where they first received a brief introduction to the study and then obtained a packet. Packets were numerically ordered in stacks, and participants were instructed to take a packet from the top of each stack. After filling out some demographic information, they were then asked to read the vignette and picture themselves in the described scenario. The full texts of the vignettes are presented in Appendix A. In each vignette, participants were asked to imagine themselves as part of a five-person software development team whose project deadline is quickly coming up. In the collocated condition, participants were told that their four other teammates (i.e., Marcus, Kurt, Ye-Rim, and Madison) work at the same location as themselves in Houston. Participants in the virtual condition were told that their teammates are located in different cities around the world (i.e., Montevideo, Berlin, Seoul, and London). To further reinforce the differences in location, participants in the collocated condition were told that they can often see their teammates in the hallway during breaks, whereas those in the distributed condition were told they have to rely on technology to communicate with their teammates. In all conditions, participants were given some information about

the characteristics of their teammates. They were told that "Madison is a fair, albeit stern, team leader. Marcus is quiet, and Ye-Rim is diligent. Kurt is friendly, although he can be disorganized."

A problem arises during one of the meetings in the vignette. One of the team members (i.e., Kurt) did not complete his assigned tasks, and he blames one of the other team members (i.e., Marcus). He claims that Marcus was supposed to email him some necessary information but never did. Marcus says he did send the email, and the two get into a disagreement that has to be handled by the team leader (i.e., Madison). Participants in the situational information condition received information that can account for the lost email. Specifically, they learn that their teammates are facing "technological issues, such as computer glitches and faulty cellphone signals, that led to communication failures between members." Participants in the no situational information condition did not receive this information.

The manipulations of team type and situational information were assessed using three questions. Participants were asked to indicate how much they agreed with these statements on a five-point scale (1 = strongly disagree, 5 = strongly agree). To check the manipulation of team type, participants were asked: "According to what you read, you and your teammates worked in the same physical location." To check the manipulation of situational information, they were asked two questions: (1) "According to what you read, all of your teammates experienced problems with technology," and (2) "According to what you read, technological problems interfered with communication with your teammates."

Participants then completed the psychological distance, construal level, and causal attribution measures. Participants also indicated how familiar they were with the locations mentioned in the study, how familiar they were with software programming, and how realistic they found the vignette because these factors may be potential confounds. Individuals familiar with a location may not feel it is as far away as an individual not familiar with the location (Fujita et al., 2009; Henderson et al., 2006). Previous research also suggests that realism and familiarity can affect responses (Boots, Cochran, & Heide, 2003). Afterwards, the participants were debriefed through an information sheet and dismissed following the completion of all dependent measures. Each session lasted for one hour.

Measures

Psychological distance measure. Psychological distance was measured using 12 items from scales by Lim, Cha, Park, Lee, and Kim (2012), O'Leary et al. (2014), and Siebdrat et al. (2014). Items from all scales were slightly modified and are presented in Appendix B. Because the items were written for actual members of virtual teams, they specify a certainty (e.g., "I feel close to my team members") that does not exist in hypothetical situations in the vignettes. Items were modified to reflect this uncertainty (e.g., "I would feel close to my team members"). Participants indicated how much they agreed with the items on a five-point scale (1 = strongly disagree, 5 = strongly agree).

The subjective distance scale by Siebdrat et al. (2014) consists of five items (e.g., "I could easily visit most team members with whom I collaborated"), although one item

was dropped because it did not make sense in the vignette context. Participants rated these items on a five-point scale (1 = strongly disagree, 5 = strongly agree).

The perceptions of proximity scale developed by O'Leary et al. (2014) consists of 12 items (e.g., "When I think about a proximate colleague, the distance between us generally feels small"). Participants rated each item using a five-point scale (1 = strongly disagree, 5 = strongly agree). Seven items were selected from this scale because these questions fit the vignette context. The phrase "proximate colleague" was also changed to "team members" to keep the wording consistent with the other scales.

The spatial distance scale by Lim et al. (2012) consists of four items (e.g., "I felt our group was spatially close"). The original scale asked participants to rate these items on a seven-point scale (1 = strongly disagree, 7 = strongly agree), but this was modified to a five-point scale to match the response scaled from Siebdrat et al. (2014) and O'Leary et al. (2014). Two items were chosen from this scale because they made sense in the vignette context. Cronbach's alpha for the entire scale was .88 in this study.

Construal level. Construal level was measured using the procedure described by Fujita et al. (2006) in Study 2. Participants were asked to describe the events that occurred in the meeting and what they would have done if they had been the team leader. These questions are presented in Appendix C. Participants' responses were coded using a coding scheme based on the Linguistic Categorization Model (Semin & Fiedler, 1988). Semin and Fiedler describe four categories of words that vary in their level of abstractness. Descriptive action verbs (e.g. call) are the least abstract, whereas adjectives (e.g., homely) are the most abstract. Interpretive action verbs and state verbs fall in

between. The predicates of each sentence were coded into one of the four categories and given a weighted score based on that category (i.e., 1 = descriptive action verb, 2 = interpretive action verb, 3 = state verb, and 4 = adjective). These values were then summed and divided by the number of predicates coded in the description to create an abstractness index. Index scores could range from 1 to 4. Higher numbers indicate more abstractness.

Two coders (i.e., the author and an undergraduate research assistant) coded each written response. Before being allowed to code the data, the undergraduate was trained in how to use the coding system. She was only given access to the data once she was correctly able to categorize commonly occurring verbs (e.g., reprimand) and determine what the predicates of a sentence were. Because participants did have access to the vignette while they were writing, verbs used in the vignette often appeared in the writing samples as well. These verbs could have been considered highly concrete (i.e., descriptive action verbs) because they were used in the vignette. However, to comply with the coding scheme, these verbs were coded into their appropriate categories. Predicate nominatives (e.g., "This was a problem") were not coded unless they referred to a property of the sentence's subject. Intraclass correlations (ICCs) were computed to measure interrater reliability. ICC (2, K) for this study was .64. Discrepancies were then discussed to reach consensus on a single abstractness index for each participant.

Causal attributions. Causal attributions were measured using the scales developed by Bazarova and Walther (2009). All items are presented in Appendix D. The dispositional attribution subscale had four items (e.g., "Person A's behavior was

determined by his or her disposition."), whereas the situational attribution subscale consisted of eight items (e.g., "Person A's behavior was mostly shaped by the situation"). Items were modified to refer to the characters in the vignette (i.e., Kurt, Marcus, and Madison), although the items referring to Kurt were of most interest because he was the main actor in the vignette. The other characters were included so as not to raise suspicion. Participants rated the items on a 7-point scale (1 = strongly disagree, 7 = strongly agree). Cronbach's alpha was .71 for the Kurt dispositional scale and .77 for the Kurt situational scale. Cronbach's alpha for the items referring to Marcus were .77 for the dispositional scale and .75 for the situational scale. The items referring to Madison had Cronbach alpha values of .73 for the dispositional scale and .74 for the situational scale.

Behavior Identification Form. The Behavior Identification Form (BIF; Vallacher & Wegner, 1988) was included in the study as an alternate measure of construal level. All items are presented in Appendix E. Although the form was originally used to examine individual differences in preferences for level of action identification, some studies (e.g., Fujita et al., 2006) have used this scale to measure construal level. In each item on the form, participants were given an action (e.g., "Reading") and then asked to select which of two ways to describe the action they preferred (e.g., "Following lines of print" or "Gaining knowledge"). Although Vallacher and Wegner found their measure to have a Cronbach alpha coefficient of .85 in their original study, the internal reliability for the measure was -.25 in this study. According to Magnusson (1967), this

may occur when the reliability coefficient is zero (as cited in Krus & Helmstadter, 1993). Consequently, it was not included in any analyses. .

3. RESULTS

Data from 287 participants were collected for this study. Two cases were dropped due to missing data, and three other cases were dropped due to suspicions that the participants had been inattentive to the vignette. Consequently, only data from 282 participants were used to test the hypotheses. The number of participants in each condition was similar; there were 71 participants in the virtual team with situational information condition, 71 participants in the virtual team without situational information condition, 68 participants in the collocated team with situational information condition, and 72 individuals in the collocated teams without situational information condition. Means, standard deviations, and correlations between variables are presented in Table 1.

Manipulation Checks

To determine whether the team type and situational information manipulations were effective, 2 x 2 (Team Type x Situational Information) ANOVAs were performed on the responses to three manipulation check questions. Table 2 summarizes the ANOVA results for the team type manipulation check item ("According to what you read, you and your teammates worked in the same physical location"), revealing significant main effect for team type, $F(1, 278) = 1091.11$, $p < .001$, $\eta_p^2 = .80$. This result demonstrates that participants understood they were in the same physical location more when they were in the collocated condition ($M = 4.31$, $SD = 1.00$) compared to the virtual condition ($M = 1.14$, $SD = 0.56$). However, we also found a significant main effect for situational information, $F(1, 278) = 4.66$, $p = .03$, $\eta_p^2 = .02$. Participants

understood they were in the same physical location more when they read the situational information (M = 2.79, SD = 1.80) compared to when they did not read the situational information (M = 2.63, SD = 1.77). The interaction was not significant, $F(1, 278) = 0.07$, $p = .80$, $\eta_p^2 = .00$.

The results of the analyses for the situational information manipulation checks are presented in Tables 3 and 4. The ANOVA for the first situational manipulation check item ("According to what you read, all of your teammates experienced problems with technology") found a significant main effect for situational information, $F(1, 278) = 589.82$, $p < .001$, $\eta_p^2 = .68$. Participants who received the situational information (M = 4.50, SD = 0.80) agreed that their teammates experienced problems with technology to a greater extent than participants without the situational information (M = 1.96, SD = 0.95). The main effect of team type was not significant ($F(1, 278) = 0.02$, $p = .90$, $\eta_p^2 = .00$), nor was there a significant interaction effect ($F(1, 278) = 1.40$, $p = .24$, $\eta_p^2 = .01$).

The ANOVA of the second situational information manipulation check item ("According to what you read, technological problems interfered with communication with your teammates.") also revealed a significant main effect for situational information, $F(1, 278) = 71.92$, $p < .001$, $\eta_p^2 = .21$. Participants who received the situational information (M = 4.63, SD = 0.73) agreed that technological problems interfered with teammate communication to a greater extent than participants who did not receive this situational information (M = 3.61, SD = 1.24). The main effect for team type was not significant at the $p = .05$ level, $F(1, 278) = 3.52$, $p = .06$, $\eta_p^2 = .01$. There was, however a trend. Participants in the collocated condition (M = 4.22, SD = 1.22)

agreed that technological problems interfered with teammate communication to a greater extent than participants in the virtual condition (M = 4.01, SD = 1.24). The interaction was not significant, $F(1, 278) = 1.38$, $p = .24$, $\eta_p^2 = .01$.

Controls

2 x 2 ANOVAs showed that participants did not differ in how familiar they were with software programming and the perceived realism of the vignettes (see Tables 5 and 6). Participants had also been asked to indicate how familiar they were with each location mentioned in the vignette (e.g., "How familiar are you with Houston?") on a five-point scale. Responses to all five locations were averaged to create a familiarity index. Cronbach's alpha for the index was .79. Table 7 indicates there was a significant main effect for team type on location familiarity, $F(1, 278) = 6.67$, $p = .01$, $\eta_p^2 = .02$. Participants in the virtual condition (M = 2.44, SD = 0.89) were more familiar with the locations than participants in the collocated condition (M = 2.18, SD = 0.82). However, none of these control variables correlated significantly with any of the outcome variables (see Table 1). Including them as covariates also did not affect the pattern of results, thus all reported results exclude them from subsequent analyses.

Psychological Distance

A 2 x 2 ANOVA was performed to test Hypothesis 1, which stated that individuals in virtual teams would report greater psychological distance than individuals in collocated teams. The results are summarized in Table 8. There was a significant main effect for team type on psychological distance, $F(1, 278) = 168.96$, $p < .001$, $\eta_p^2 = .38$. Participants in the virtual condition perceived more psychological distance (M = 4.05,

SD = 0.66) than participants in the collocated condition (*M* = 2.50, *SD* = 0.91). There was no significant main effect of situational information ($F(1, 278) = 3.70$, $p = .06$, $\eta_p^2 = .01$), although it did show a trend. Participants who read the situational information (*M* = 3.30, *SD* = 0.82) reported more psychological distance than those who did not (*M* = 3.14, *SD* = 0.80). The interaction was not significant ($F(1, 278) = 0.68$, $p = .41$, $\eta_p^2 = .00$). Overall, these results support Hypothesis 1.

Construal Level

Hypothesis 2 predicted that individuals in virtual teams would use more abstract levels of construal than individuals in collocated teams to describe their team members' behavior. Table 9 indicates that this hypothesis was not supported. There was no significant main effect of team type on construal level ($F(1, 278) = 0.21$, $p = .65$, $\eta_p^2 = .00$), although there was a significant main effect of situational information ($F(1, 278) = 6.21$, $p = .01$, $\eta_p^2 = .02$). Participants who read the situational information (*M* = 2.18, *SD* = 0.34) used more abstract language than participants who did not read the situational information (*M* = 2.09, *SD* = 0.29). There was no significant interaction between team type and situational information, $F(1, 278) = 0.27$, $p = .60$, $\eta_p^2 = .00$.

Causal Attributions

The ANOVA results for dispositional attributions and situational attributions are presented in Tables 10, 11, 12, 13, 14, and 15. Although the primary focus was on Kurt because he was the main actor in the vignette, analyses were also run on attributions for Marcus and Madison to see if the pattern of results differed. Hypothesis 3A predicted that individuals in virtual teams will be more likely to use dispositional attributions to

explain teammate behavior compared to individuals in collocated teams. The ANOVA results in Table 10 show that this hypothesis was not supported. There were no significant main effects of team type on dispositional attributions for Kurt ($F(1, 278) = 0.13$, $p = .71$, $\eta_p^2 = .00$), Marcus ($F(1, 278) = 0.23$, $p = .64$, $\eta_p^2 = .00$), or Madison ($F(1, 278) = 0.13$, $p = .72$, $\eta_p^2 = .00$).

Hypothesis 3B predicted that individuals in virtual teams would be less likely to use situational attributions to explain teammate behavior compared to individuals in collocated teams. Although the ANOVA results in Tables 13 and 15 show that there were no significant main effects of team type for Marcus ($F(1, 278) = 1.19$, $p = .28$, $\eta_p^2 = .00$) or Madison ($F(1, 278) = 1.38$, $p = .24$, $\eta_p^2 = .01$), Table 10 reveals that there was a significant main effect of team type on situational attributions for Kurt, $F(1, 278) = 4.73$, $p = .03$, $\eta_p^2 = .02$. Participants in the virtual condition ($M = 3.85$, $SD = 0.99$) used situational attributions to explain behavior more than participants in the collocated condition ($M = 3.60$, $SD = 0.90$) when judging Kurt's behavior. This result is opposite in direction to what Hypothesis 3B predicted. Thus, Hypothesis 3B was not supported.

Hypothesis 4A predicted that individuals provided with situational information would be as likely to make situational attributions for teammate behavior as individuals without access to situational information. In contrast, Hypothesis 4B predicted that individuals provided with situational information would be more likely to make situational attributions for teammate behavior compared to individuals without access to situational information. As Tables 10 through 15 show, there were no significant main effects at the $p = .05$ level for situational information for either dispositional or

situational attributions for Kurt, Marcus, and Madison, nor were there significant interactions. Thus, Hypothesis 4B was not supported, but Hypothesis 4A was supported.

4. SUMMARY AND CONCLUSIONS

Many different theories have been used to explain the effect that aspects of virtuality have on teams (Schiller & Mandviwalla, 2007). These theories generally assume that these dimensions work through different mechanisms, which Wilson et al. (2013) say is a problem as it contributes to the fragmentation of research and theory in the virtual team literature. They propose that CLT might pose a solution to this issue as it assumes one mechanism for different facets of virtuality: psychological distance. The purpose of this study was to test hypotheses derived from the Wilson et al.'s framework to see if CLT is a plausible explanation for the effects of virtuality on team cognitions.

We used an experimental design rather than correlational field research to test our hypotheses because it allowed us to manipulate team type cleanly and the amount of situational information known about the team. Consequently, we feel more confident about the causal effects of these factors. Overall, the results of this study partially supported Wilson et al.'s (2013) framework. We did find that there was a difference in psychological distance between participants who read the distributed team vignette rather than the collocated team vignette. Being part of a distributed team rather than a collocated team was associated with greater perceived psychological distance from the team. This finding is consistent with Wilson et al.'s (2013) framework and CLT: the greater the physical separation in the distributed team condition, the more that the participants felt distant from their teammates.

Nonetheless, Hypotheses 2, 3A, and 3B were not supported in this study. According to the Wilson et al. (2013) framework, individuals in distributed teams should use more abstract construals when thinking about their teammates than individuals in collocated teams. Yet, we did not find a difference in language use between individuals in the virtual and collocated conditions. Instead, the main effect for situational information was significant. Past research (e.g., Nussbaum et al., 2003) has shown that the presence of situational information can be used to manipulate construal level. However, based on those studies we would predict that the presence of situational information would cause participants to use lower level construals, and we found the opposite. Furthermore, while the presence of situational information led to higher levels of psychological distance, participants who read the situational information were more likely to understand that their team worked in the same physical location. The latter could be because participants do not consciously associate the use of technology with distance. Gilson et al. (2015) suggest that there may be generational differences with technology use. Our sample of college students would likely be used to communicating with nearby friends and family via technology. This could be why they were also more likely to endorse that technological problems interfered with communication. Thus, technology use may be more consciously associated with proximity than distance for them. Subconsciously, however, the reminder that all team members relied on electronic technology to communicate might cause participants to feel more distant from the team and consequently use more abstract construals.

Interestingly, situational information did not affect the type of causal attributions made for teammate behavior. Although these findings are consistent with CLT (Hypothesis 4A), it is difficult to say that this hypothesis was supported because the direction of the team type main effect on situational attributions was opposite from the expected pattern based on Hypothesis 3B. While the use of situational attributions was expected to be lower in distributed teams than collocated teams, the results showed that individuals in distributed teams used situational attributions more than those in collocated teams. Also, contrary to our expectations based on Cramton's (2002) attributional bias framework, team type had no effect on dispositional attributions.

These findings for situational attributions are inconsistent with what would be expected using both CLT and Cramton's (2002) attributional bias framework, but they do match what would be expected by Bazarova and Walther (2009). Bazarova and Walther (2009) provide an alternative theoretical framework that predicts that people use dispositional attributions to explain the behavior of their collocated teammates rather than situational attributions because the situation has not changed. Hence, individual differences (i.e., dispositions) must be to blame for teammate behavior. Members of virtual teams would not be able to rule out differences in situations as explanations for individual behavior, therefore they would be more likely to make situational attributions. While we did not find a difference in dispositional attributions between conditions, we did see a difference in situational attributions for Kurt, lending credence to this idea.

Limitations

This study is not without its limitations. One limitation is that the effects of distance and the effects of technology are potentially confounded; there is no way to tell whether the increased psychological distance observed in the distributed team condition is due to physical distance or electronic technology. The literature on technology-mediated communication is split. One line of research would suggest that technology may enhance psychological distance because it is deficient in many ways compared to face-to-face communication (FTF; see Walther & Parks, 2002 for a review). According to this perspective, computer-mediated communication (CMC) is less information rich than face-to-face communication (Culnan & Markus, 1987). Because CMC is unable to transmit many of the nonverbal cues people use to communicate, CMC seems more impersonal (Daft & Lengel, 1986). Consequently, we would expect that technology would enhance psychological distance using this perspective.

Another line of research suggests the opposite effect: technology may be able to curtail psychological distance when given enough time. Walther (1996) suggests that CMC is not deficient in the amount of personal information that can be shared when compared to FTF communication. The difference between CMC and FTF is in how quickly the information can be shared. This approach predicts that interactions in virtual teams can become just as personal as interactions in collocated teams if given enough time. Based on this temporal perspective (Walther, 2002), technology would mitigate the effects of physical separation on psychological distance. Future research should disentangle reliance on electronic technology from physical distance to understand the

effects of technology use. For instance, distributed teams that mainly rely on FTF communication and collocated teams that rely on CMC can be included along with the more traditional team types in vignette designs.

In addition, the results for the construal level analyses may have been affected by the vignette format. Many of the studies (e.g., Fujita et al., 2006) that used the linguistic categorization model and found effects on construal level have presented participants with a video. However, participants were presented with written text in the vignettes used in this study. It is possible that participants were influenced by the words used in the vignette, thus making their responses more similar to one another. This reduced variability in written responses would consequently make it difficult to determine whether the manipulations had any effect. Future research should examine how the stimulus medium can affect the language used in the written responses.

Future Directions

Although our construal level and causal attribution hypotheses were not supported, we believe that future research should continue to examine these issues. Future research should consider the development of more precise measurements for construal level. As this study shows, use of the linguistic categorization model may not work for all study designs. Yet researchers interested in CLT will find that it is the most commonly used way to measure construal level. The BIF, although also commonly used, was originally intended as a measure of individual differences. Its use as a manipulation measurement should be investigated.

As for causal attributions, future research should continue examining how the type of causal attribution made depends on team virtuality. While CLT predicts that virtual teams should rely more on dispositional attributions and less on situational attributions than collocated teams, the framework proposed by Bazarova and Walther (2009) proposes the opposite. The results of this study support the latter more than the former, suggesting that there could be something about a team context that affects the types of attributions people make. Prior research on CLT that found the hypothesized differences in attributions (e.g., Henderson et al., 2006; Rim et al., 2009) had participants make attributions about individuals they would presumably never interact with. Anticipating interaction may make people consider other factors that affect the attributions they make.

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APPENDIX A

Distributed Teams, Situational Present

You have been working at the Houston, Texas branch of Programari, a large software engineering company, for a while. As part of your job, you are part of a software development team that has been charged with creating a new program for a customer. Your team consists of five people. The team leader (Madison) is from and located in London, England, and one of your coworkers (Marcus) is from and located in Montevideo, Uruguay. Another of your coworkers (Kurt) is from and located in Berlin, Germany, while the other (Ye-Rim) is from and located in Seoul, South Korea. Because of the thousands of miles separating your teammates, you frequently communicate with them via email and text messaging. The entire project team meets weekly via teleconference to ensure the team is on track with the required project tasks.

At the beginning, work on the project went smoothly. You and your teammates got along with one another. Madison is a fair, albeit stern, team leader. Marcus is quiet, and Ye-Rim is diligent. Kurt is friendly, although he can be disorganized. It seemed like the team would have no problem meeting the project deadline. Yet recently, there have been several problems that have led to setbacks delaying your team's progress significantly. All of your teammates have reported technological issues, such as computer glitches and faulty cellphone signals, that led to communication failures between members. Even you have had problems with a downed server that prevented

you from receiving and sending emails. Because of these setbacks, everyone has been on edge lately as the project deadline creeps closer. It is now only three weeks away.

To add to this, more problems arise at the next team teleconference. Kurt is responsible for designing part of the graphical user interface, and until he is finished with his part not much else can be done. It is becoming clear, however, that he has not made any progress on his task. During the teleconference, he bluntly tells Madison that he has not worked on it since the meeting last week because Marcus never emailed him the information he needed to continue working. Marcus and Kurt then begin arguing over whether or not the email had been sent. Things get heated quickly as the two begin insulting one another and tempers flare. Madison has to step in and regain control of the situation. She tells Marcus and Kurt to quit arguing, and reprimands both of them for not staying on top of their work. She also creates a new team policy that everyone must send a receipt confirmation when reading emails from team members. Despite this, the atmosphere remains tense throughout the rest of the teleconference. After the meeting concludes, you think about what just happened.

Distributed Teams, Situational Absent

You have been working at the Houston, Texas branch of Programari, a large software engineering company, for a while. As part of your job, you are part of a software development team that has been charged with creating a new program for a customer. Your team consists of five people. The team leader (Madison) is from and located in London, England, and one of your coworkers (Marcus) is from and located in Montevideo, Uruguay. Another of your coworkers (Kurt) is from and located in Berlin, Germany, while the other (Ye-Rim) is from and located in Seoul, South Korea. Because of the thousands of miles separating your teammates, you frequently communicate with them via email and text messaging. The entire project team meets weekly via teleconference to ensure the team is on track with the required project tasks.

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Collocated Teams, Situational Present

You have been working at the Houston, Texas branch of Programari, a large software engineering company, for a while. As part of your job, you are part of a software development team that has been charged with creating a new program for a customer. Your team consists of five people. The team leader (Madison) is from London, England, and one of your coworkers (Marcus) is from Montevideo, Uruguay. Another of your coworkers (Kurt) is from Berlin, Germany, while the other (Ye-Rim) is from Seoul, South Korea. Because your offices are close to one another in the same building, you frequently communicate with your teammates in the hallways during breaks. The entire project team meets weekly face-to-face in one of the conference rooms to ensure the team is on track with the required project tasks.

At the beginning, work on the project went smoothly. You and your teammates got along with one another. Madison is a fair, albeit stern, team leader. Marcus is quiet, and Ye-Rim is diligent. Kurt is friendly, although he can be disorganized. It seemed like the team would have no problem meeting the project deadline. Yet recently, there have been several problems that have led to setbacks delaying your team's progress significantly. All of your teammates have reported technological issues, such as computer glitches and faulty cellphone signals, that led to communication failures between members. Even you have had problems with a downed server that prevented you from receiving and sending emails. Because of these setbacks, everyone has been on edge lately as the project deadline creeps closer. It is now only three weeks away.

To add to this, more problems arise at the next team meeting. Kurt is responsible for designing part of the graphical user interface, and until he is finished with his part not much else can be done. It is becoming clear, however, that he has not made any progress on his task. During the meeting, he bluntly tells Madison that he has not worked on it since the meeting last week because Marcus never emailed him the information he needed to continue working. Marcus and Kurt then begin arguing over whether or not the email had been sent. Things get heated quickly as the two begin insulting one another and tempers flare. Madison has to step in and regain control of the situation. She tells Marcus and Kurt to quit arguing and reprimands both of them for not staying on top of their work. She also creates a new team policy that everyone must send a receipt confirmation when reading emails from team members. Despite this, the atmosphere remains tense throughout the rest of the meeting. After the meeting concludes, you think about what just happened.

Collocated Teams, Situational Absent

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APPENDIX B

DIRECTIONS: Imagine yourself in the scenario you just read and respond to the following questions. Please circle the number on the scale that best corresponds to your position.

Siebdrat et al. (2014)

1. It would be easy to visit most team members with whom I collaborated.

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

2. It would be easy to get the team members together in one place for spontaneous meetings (e.g., for discussions and decisions).

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

3. In this team we could have frequent face-to-face meetings with all team members.

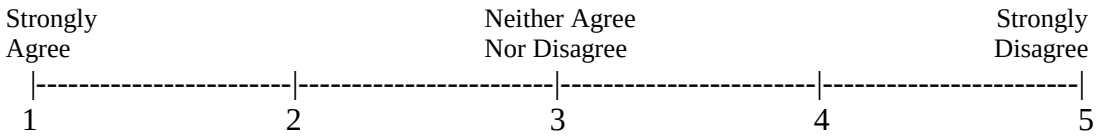
Strongly Agree		Neither Agree Nor Disagree		Strongly Disagree
1	2	3	4	5

O'Leary et al. (2014)

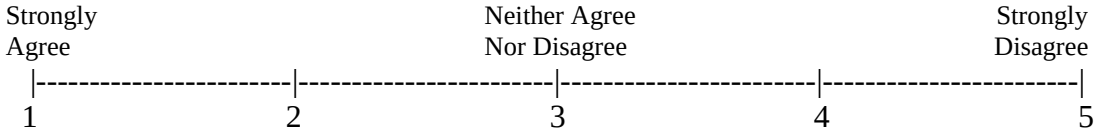
4. I would feel closer to my team members than the actual physical distance would suggest.

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

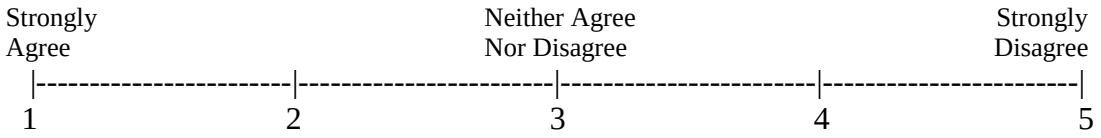
5. Physical distance wouldn't matter in my relationship with my team members.



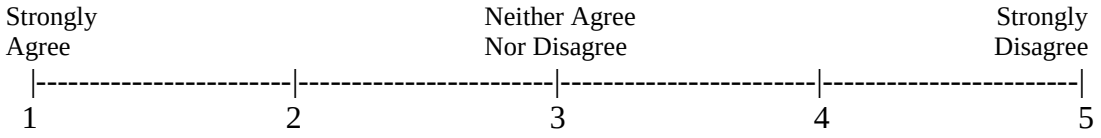
6. When I think about my team members, the distance between us generally would feel small.



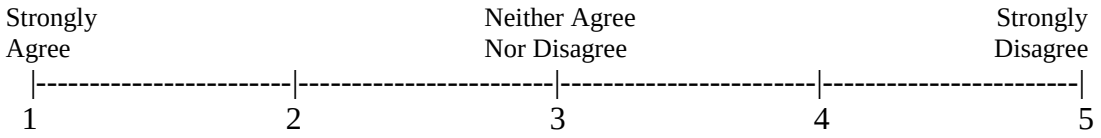
7. When I think of my team members, they seem close.



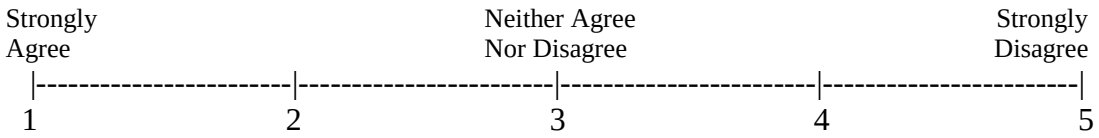
8. I would feel connected to my team members.



9. I would feel close to my team members.

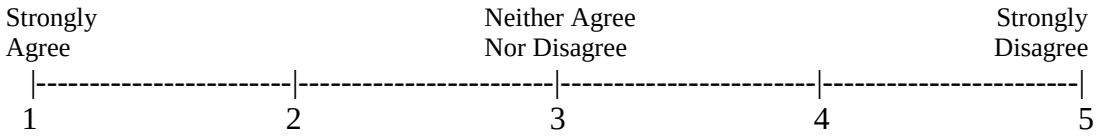


10. I would have a warm feeling about my team members.

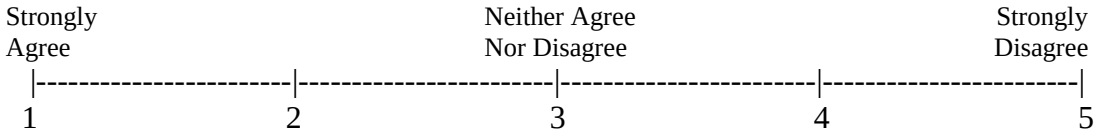


Lim et al. (2012)

11. I would feel I was in the same place as other members of our group.



12. I would feel our group was spatially close



APPENDIX C

In three to five sentences, describe the events that occurred at the meeting. If you had been the team leader (Madison), what would you have done when your teammates (Kurt and Marcus) began arguing?

APPENDIX D

DIRECTIONS: Think about Kurt's actions during the meetings and answer the following questions. Please circle the number on the scale that best corresponds to your position.

1. Kurt's conduct was typical for people with his personality.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

2. Kurt's behavior was determined by the way his partners acted.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

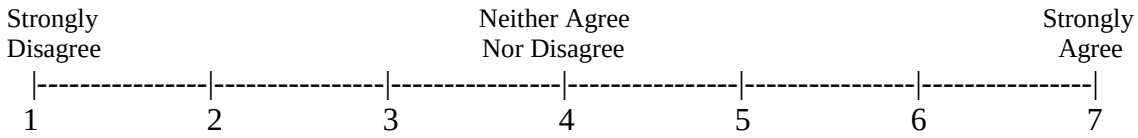
1. Kurt's conduct can be explained by the situation.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

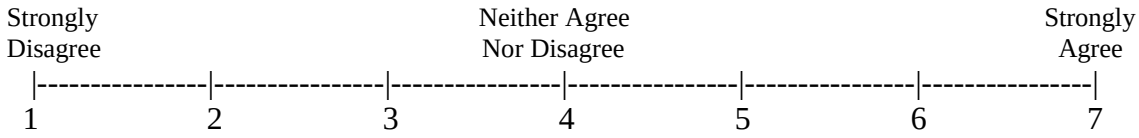
3. Kurt's behavior was largely determined by his geographical distance from other partners.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

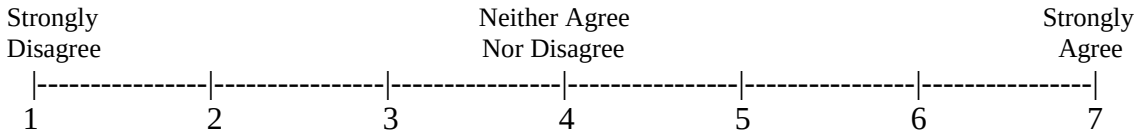
4. Kurt's behavior in the group was mainly influenced by other group members.



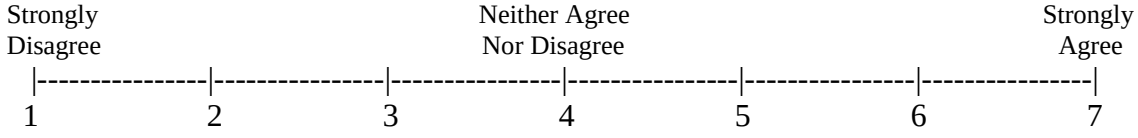
6. Kurt's behavior was determined by his disposition.



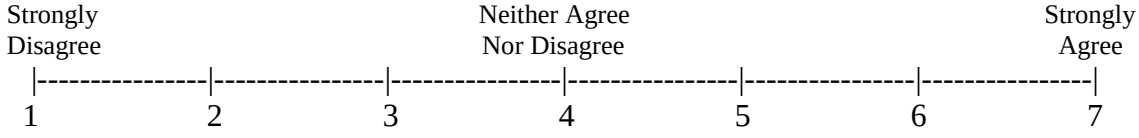
7. Kurt's behavior was largely shaped by the technology-based communication system.



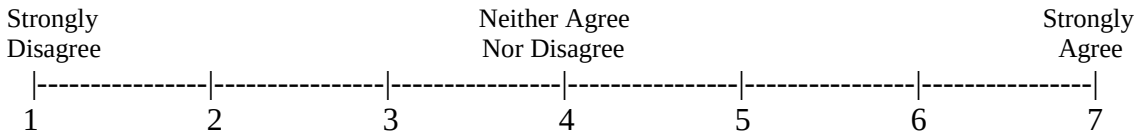
8. Kurt behaved the way he did mainly because of having to discuss things using technology.



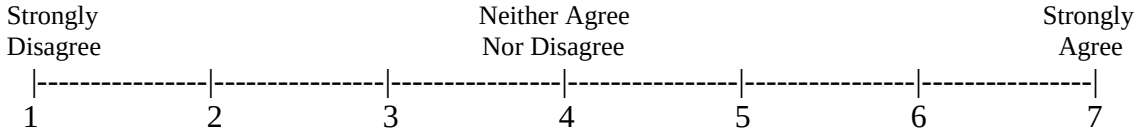
9. Kurt's behavior was consistent with his personality.



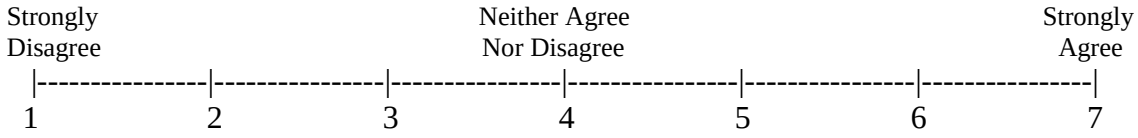
10. Kurt's behavior was mostly shaped by the situation.



11. Kurt's role in the discussion was determined by his personal nature.



12. Kurt's behavior was influenced by how physically close the discussion partners were to one another.



DIRECTIONS: Think about Marcus's actions during the meetings and answer the following questions. Please circle the number on the scale that best corresponds to your position.

1. Marcus's conduct was typical for people with his personality.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

2. Marcus's behavior was determined by the way his partners acted.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

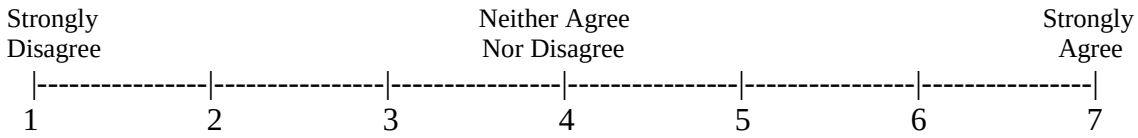
3. Marcus's conduct can be explained by the situation.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

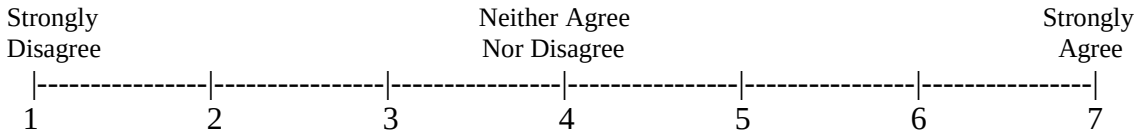
4. Marcus's behavior was largely determined by his geographical distance from other partners.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

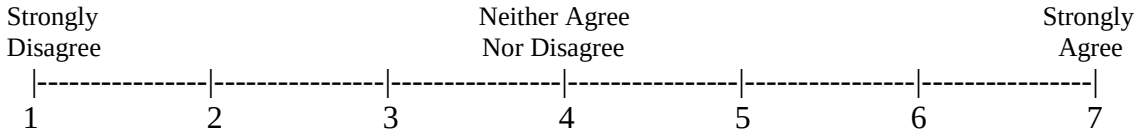
5. Marcus's behavior in the group was mainly influenced by other group members.



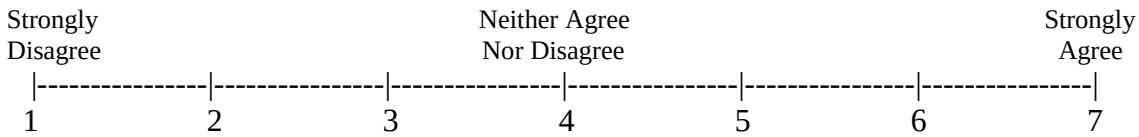
6. Marcus's behavior was determined by his disposition.



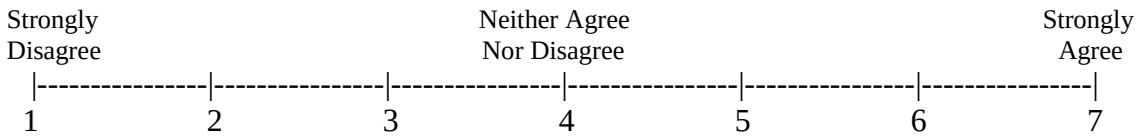
7. Marcus's behavior was largely shaped by the technology-based communication system.



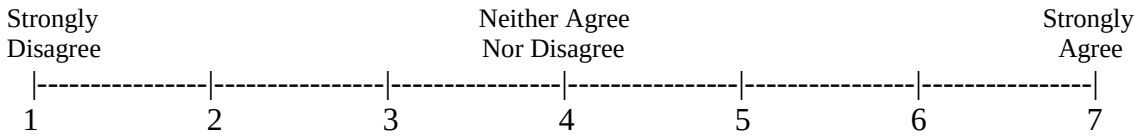
8. Marcus behaved the way he did mainly because of having to discuss things using technology.



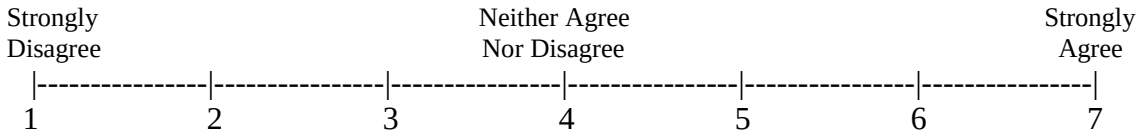
9. Marcus's behavior was consistent with his personality.



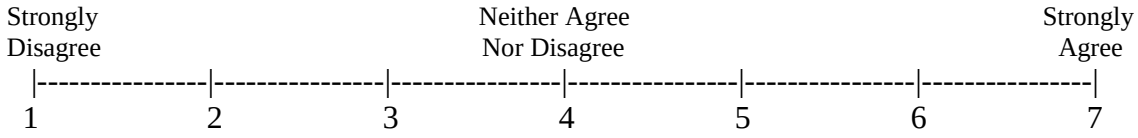
10. Marcus's behavior was mostly shaped by the situation.



11. Marcus's role in the discussion was determined by his personal nature.



12. Marcus's behavior was influenced by how physically close the discussion partners were to one another.



DIRECTIONS: Think about Madison's actions during the meetings and answer the following questions. Please circle the number on the scale that best corresponds to your position.

1. Madison's conduct was typical for people with her personality.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

2. Madison's behavior was determined by the way her partners acted.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

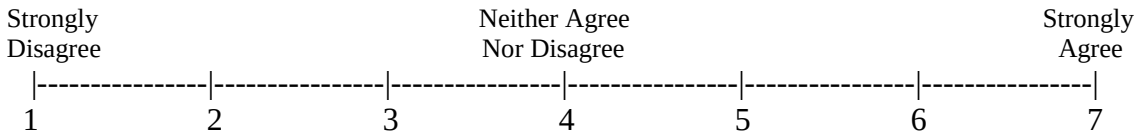
3. Madison's conduct can be explained by the situation.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

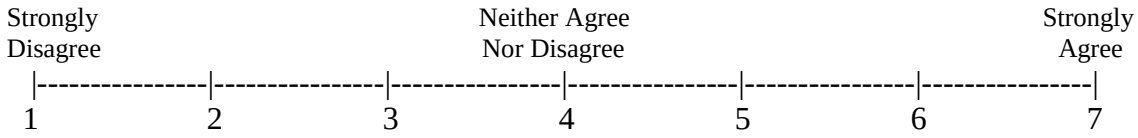
4. Madison's behavior was largely determined by her geographical distance from other partners.

Strongly Disagree			Neither Agree Nor Disagree			Strongly Agree
1	2	3	4	5	6	7

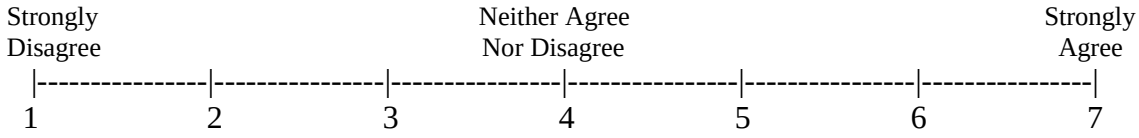
5. Madison's behavior in the group was mainly influenced by other group members.



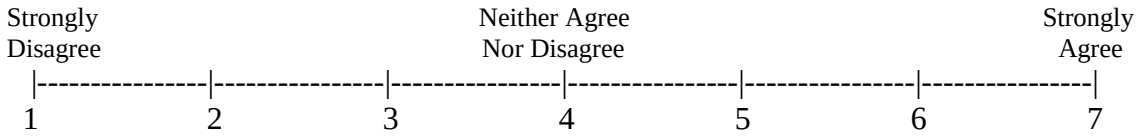
6. Madison's behavior was determined by her disposition.



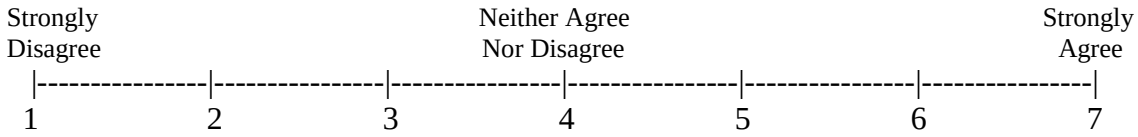
7. Madison's behavior was largely shaped by the technology-based communication system.



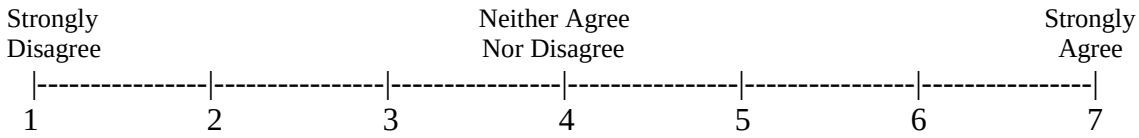
8. Madison behaved the way she did mainly because of having to discuss things using technology.



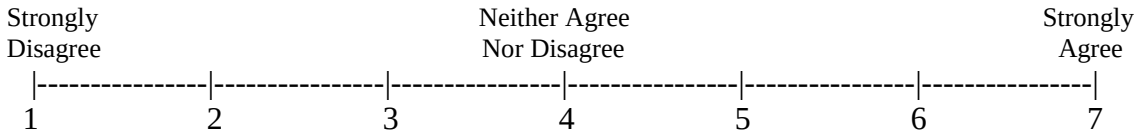
9. Madison's behavior was consistent with her personality.



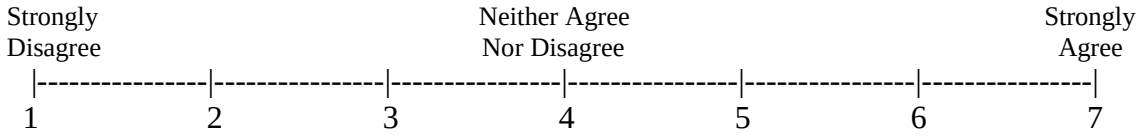
10. Madison's behavior was mostly shaped by the situation.



11. Madison's role in the discussion was determined by her personal nature.



12. Madison's behavior was influenced by how physically close the discussion partners were to one another.



APPENDIX E

Any behavior can be identified in many ways. For example, one person might describe a behavior as "typing a paper," while another might describe the behavior as "pushing keys." Yet another person might describe the behavior as "expressing thoughts." We are interested in your personal preferences for how a number of different behaviors should be described. On the following pages you will find several different behaviors listed. After each behavior will be two choices of different ways in which the behavior might be identified.

Here is an example:

1. Attending class

__ a. sitting in a chair

__ b. looking at the blackboard

Your task is to choose the identification, *a* or *b*, that best describes the behavior for you. *Simply place a check mark in the space beside the identification statement that you pick. Please mark only one alternative for each pair.* Of course, there are no right or wrong answers. People simply differ in their preferences for the different behavior descriptions, and we are interested in your personal preferences. Be sure to mark your choice for each behavior. Remember, choose the description that *you personally believe* is more appropriate in each pair.

1. Growing a garden

__ a. Planting seeds

__ b. Getting fresh vegetables

2. Joining the Army

__ a. Helping the Nation's defense

__ b. Signing up

3. Voting

__ a. Influencing the election

__ b. Marking a ballot

4. Chopping down a tree

__ a. Wielding an axe

__ b. Getting firewood

5. Cleaning the house

__ a. Showing one's cleanliness

__ b. Vacuuming the floor

6. Having a cavity filled

__ a. Protecting your teeth[e]

__ b. Going to the dentist

7. Pushing a doorbell

__ a. Moving a finger

__ b. Seeing if someone's home

8. Painting a room

__ a. Applying brush strokes

__ b. Making the room look fresh

9. Eating

__ a. Getting nutrition

__ b. Chewing and swallowing

10. Toothbrushing

__ a. Preventing tooth decay

__ b. Moving a brush around in one's mouth

11. Washing clothes

__ a. Removing odors from clothes

__ b. Putting clothes into the machine

12. Traveling by car

__ a. Following a map

__ b. Seeing countryside

13. Paying the rent

__ a. Maintaining a place to live

__ b. Writing a check

14. Caring for houseplants

__ a. Watering plants

__ b. Making the room look nice

15. Making a list

__ a. Getting organized

__ b. Writing things down

16. Climbing a tree

__ a. Getting a good view

__ b. Holding on to branches

17. Locking a door

__ a. Putting a key in the lock

__ b. Securing the house

18. Taking a test

__ a. Answering questions

__ b. Showing one's knowledge

19. Greeting someone

__ a. Saying hello

__ b. Showing friendliness

20. Reading

__ a. Following lines of print

__ b. Gaining knowledge

21. Resisting temptation

__ a. Saying "no"

__ b. Showing moral courage

22. Filling out a personality test

__ a. Answering questions

__ b. Revealing what you're like

23. Picking an apple

__ a. Getting something to eat

__ b. Pulling an apple off a branch

24. Measuring a room for carpeting

__ a. Getting ready to remodel

__ b. Using a yardstick

25. Talking to a child

__ a. Teaching a child something

__ b. Using simple words

APPENDIX F

Table 1.

Means, Standard Deviations, and Correlations for Study Variables.

	Variables	*M* (*SD*)	1	2	3	4	5	6	7	8	9	10	11	12
1.	Team Type	0.50 (0.50)	—											
2.	Situational Information	0.49 (0.50)	-.01	—										
3.	Psychological Distance	3.22 (0.81)	-.61	.10	—									
4.	Construal Level	2.13 (0.32)	.03	.15	.14	—								
5.	Kurt Dispositional	4.36 (1.05)	-.02	.07	.06	.10	—							
6.	Kurt Situational	3.73 (0.95)	-.13	.08	.07	-.07	-.10	—						
7.	Marcus Dispositional	3.33 (1.11)	-.03	.03	.04	.14	.32	.04	—					
8.	Marcus Situational	4.32 (0.91)	-.07	.10	.04	-.06	.11	.62	.12	—				
9.	Madison Dispositional	5.55 (0.91)	-.02	.10	-.03	-.01	.29	.09	-.11	.28	—			
10.	Madison Situational	4.44 (0.90)	-.07	.10	-.07	-.04	.03	.33	.20	.40	.25	—		
11.	Location Familiarity	2.31 (0.86)	-.15	-.03	.03	.02	.00	.04	.06	-.08	-.07	-.03	—	
12.	Knowledge	2.17 (1.23)	.04	.05	-.02	-.01	-.02	-.01	-.00	-.02	.01	.04	-.03	—
13.	Realistic	4.24 (0.84)	-.03	.04	-.01	.09	-.04	.02	.06	.06	.08	.07	-.00	-.05

Note. All *N*s = 282. Absolute values over .13 significant at $p < .05$.

Table 2.

ANOVA Results for Team Type Manipulation Check.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	711.10	1	711.10	1091.11	.00	.80
Situational Information	3.04	1	3.04	4.66	.03	.02
Team Type x Situational Information	0.04	1	0.04	0.07	.80	.00
Error	181.18	278	0.04			
Total	894.16	281				

Table 3.

ANOVA Results for First Situational Information Manipulation Check Item.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.01	1	0.01	0.02	.90	.00
Situational Information	457.01	1	457.01	589.82	.00	.68
Team Type x Situational Information	1.09	1	1.09	1.40	.24	.01
Error	215.40	278	0.78			
Total	673.23	281				

Table 4.

ANOVA Results for Second Situational Information Manipulation Check Item.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	3.63	1	3.63	3.52	.06	.01
Situational Information	74.31	1	74.31	71.92	.00	.21
Team Type x Situational Information	1.42	1	1.42	1.28	.24	.01
Error	287.24	278	1.03			
Total	366.37	281				

Table 5.

ANOVA Results for Familiarity with Software Programming

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.64	1	0.64	0.42	.52	.00
Situational Information	1.12	1	1.12	0.74	.39	.00
Team Type x Situational Information	0.23	1	0.23	0.14	.70	.00
Error	425.18	278	1.53			
Total	427.60	281				

Table 6.

ANOVA Results for Perceptions of Realism.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.20	1	0.20	0.28	.60	.00
Situational Information	0.27	1	0.27	0.38	.54	.00
Team Type x Situational Information	0.44	1	0.44	0.61	.44	.00
Error	198.69	278	0.72			
Total	199.60	281				

Table 7.

ANOVA Results for Location Familiarity.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	4.88	1	4.88	6.67	.01	.02
Situational Information	0.25	1	0.25	0.34	.56	.00
Team Type x Situational Information	0.65	1	0.65	0.89	.35	.00
Error	203.08	278	0.73			
Total	208.76	281				

Table 8.

ANOVA Results for Psychological Distance.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	69.62	1	69.62	168.96	.00	.38
Situational Information	1.52	1	1.52	3.70	.06	.01
Team Type x Situational Information	0.28	1	0.28	0.68	.41	.00
Error	114.54	278	0.68			
Total	186.17	281				

Table 9.

ANOVA Results for Construal Level.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.02	1	0.02	0.21	.65	.00
Situational Information	0.61	1	0.61	6.21	.01	.02
Team Type x Situational Information	0.03	1	0.03	0.27	.60	.00
Error	27.36	278	0.10			
Total	28.01	281				

Table 10.

ANOVA Results for Kurt's Dispositional Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.15	1	0.15	0.13	.71	.00
Situational Information	1.41	1	1.41	1.28	.26	.01
Team Type x Situational Information	0.88	1	0.88	0.78	.37	.00
Error	307.73	278	1.11			
Total	310.19	281				

Table 11.

ANOVA Results for Kurt's Situational Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	4.24	1	4.24	4.73	.03	.02
Situational Information	1.64	1	1.64	1.83	.18	.01
Team Type x Situational Information	0.50	1	0.50	0.55	.46	.00
Error	248.80	278	0.90			
Total	255.28	281				

Table 12.

ANOVA Results for Marcus's Dispositional Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.28	1	0.28	0.23	.64	.00
Situational Information	0.33	1	0.33	0.27	.61	.00
Team Type x Situational Information	0.57	1	0.57	0.46	.50	.00
Error	344.11	278	1.24			
Total	345.29	281				

Table 13.

ANOVA Results for Marcus's Situational Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.98	1	0.98	1.19	.28	.00
Situational Information	2.16	1	2.16	2.64	.11	.01
Team Type x Situational Information	0.02	1	0.02	0.02	.89	.00
Error	228.00	278	0.82			
Total	231.20	281				

Table 14.

ANOVA Results for Madison's Dispositional Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	0.11	1	0.11	0.13	.72	.00
Situational Information	2.32	1	2.32	2.79	.10	.01
Team Type x Situational Information	0.02	1	0.02	0.02	.89	.00
Error	231.71	278	0.83			
Total	234.18	281				

Table 15.

ANOVA Results for Madison's Situational Attributions.

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Team Type	1.11	1	1.11	1.38	.24	.01
Situational Information	2.26	1	2.26	2.83	.09	.01
Team Type x Situational Information	0.86	1	0.86	1.08	.30	.00
Error	222.37	278	0.80			
Total	226.65	281				