

ABSTRACT

KUO, ERIC WEILIN. Social Distance and Initial Trust in Virtual Teammates. (Under the direction of Dr. Lori Foster Thompson.)

In existing literature, researchers have repeatedly demonstrated the importance of trust in maintaining inter-member relationships during virtual collaboration. Through the presentation and manipulation of social network information, this longitudinal experiment investigated whether the presence of social ties between an individual and a future virtual teammate influenced initial attitudes towards an unknown teammate and subsequent trusting behavior. Data from 68 participants were collected to test whether having a mutual acquaintance influences (a) perceived trustworthiness of teammate and (b) willingness to trust the teammate. The effects of individual propensity to trust were also assessed. Evidence did not support the hypothesized relationship between social ties and perceived trustworthiness of an unknown teammate. Furthermore, there was no significant relationship between propensity to trust and trusting behavior.

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Social Distance and Initial Trust in Virtual Teammates

by
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Social Distance and Initial Trust in Virtual Teammates

It is difficult to deny that technology is a major factor shaping modern society. For organizations, maintaining a competitive advantage now requires the ability to not only adapt to new technologies, but also utilize them in innovative ways. In order to acquire new ideas, organizations must look beyond national boundaries and access human resources with a diverse perspective. This need for innovative orientation combined with the advent of increasingly powerful communication technologies has facilitated the development of what is commonly known as virtual or computer-mediated teams.

Virtual teams often exist within the context of high-risk, high-stakes outcomes (Meyerson, Weik, & Kraimer, 1996). This situation in tandem with cultural differences associated with geographical dispersion among members puts the team at risk of dissociation. To facilitate group processes, literature maintains that initial trust amongst team members is essential (Gibson & Manuel, 2003; Jarvenpaa, Knowll, & Leidner, 1998). As such, there is a need to better understand the factors that contribute to initial levels of trust as new individuals join a virtual team. The purpose of this study is to investigate theoretically-derived predictors of initial baseline levels of trust among virtual collaborators. Central to this investigation is an examination of the effects of social networks, specifically the presence of triadic relationships, on the formation of trust. However, prior to moving forward, the contextual domain of virtuality in teams was established.

Highly-virtual Teams

Advances in technology have resulted in increasingly cheap, efficient, and powerful modes of computer-mediated communication. Businesses have attempted to capitalize on this by utilizing computer-mediated teams as opposed to face-to-face teams, which often have higher logistical costs (e.g., travel expenses and time). Because of the increasing reliance on computer-mediated teams, research is needed pertaining to the complexities of working in a virtual environment

Over the past twenty years, researchers have extensively studied teams and groups. According to previous research, teams are a type of group consisting of two or more individuals, a common goal, and interdependence. Teams are comprised of members with specialized knowledge and skills who engage in decision making within the context of a task and operate under conditions of high workload and time pressure (Guzzo & Dickson, 1993; Katzenbach & Smith, 1993; Salas, Bowers, & Cannon-Bowers, 1995).

Contrary to the notion that teams are dichotomously categorized as either virtual or face-to-face, real-world teams often vary along the continuum of virtuality (Cohen & Gibson, 2003; Kirkman, Rosen, Tesluk, & Gibson, 2004). Cohen and Gibson (2003) define virtuality as the extent to which teams are geographically dispersed (degree of physical separation) and electronically dependent (reliance on computer-mediated technology). For example, a work team where members are located on different continents is more virtual than one where members are in different departments within the same building. In addition, a work team

where members regularly communicate via email or teleconferences would be considered more virtual than one that usually meets face-to-face.

Highly-virtual teams typically possess a short lifespan and are often used in work with high-risk, high-stakes outcomes (Meyerson, Weik, & Kraimer, 1996). As discussed next, this situational context poses unique challenges for the development of trust.

Trust

As noted, highly-virtual teams may be both high in geographic displacement and electronic dependence. Consequently, factors that can facilitate trust, progress, and accountability during face-to-face interactions (e.g., opportunities to monitor teammates' progress and social control factors such as supervisory authority or similarity in backgrounds) may not necessarily present themselves during virtual collaboration (Gibson & Manuel, 2003).

Many definitions of trust exist. A recent review of extant trust literature by Fulmer and Gelfand (2012) provides a useful conceptualization of trust, which forms the basis of an updated, integrative, framework and is relevant to new teammates collaborating in a virtual context. Fulmer and Gelfand (2012) define trust as:

“A psychological state comprising willingness to accept vulnerability based on positive expectations of a specific other or others” (p.1174).

The literature has highlighted the importance of initial trust in virtual team success. The time-constrained context in which virtual teams exist (Meyerson, Weik, & Kramer, 1996) contributes to a phenomenon known as “swift trust.” Swift trust occurs when

individuals in temporary teams behave as if trust existed from the inception of the group (Jarvenpaa, Knoll, & Leidner, 1998). The short lifespan of virtual teams tasked with an important assignment potentially creates a context in which the presence of a common goal prompts members to expect a need for interdependence and cooperation (Meyerson, Weik, & Kramer, 1996). Under such circumstances, team members may come to trust one another quickly in efforts to attain a shared goal.

The importance of trust underscores the need to understand what contributes to initial baseline levels of trust, or even swift trust, among virtual teammates with no history of collaboration. There is reason to believe that key dispositional and relational factors predispose people to trust a new, virtual teammate prior to the initial point of contact. Although much previous literature has addressed trust-related phenomena *during* teamwork, there is a dearth of research examining factors that *precede* team formation. What encourages or discourages individuals to quickly trust a newly assigned teammate with whom they share no history? Research directed toward this question can provide insights into the expectations and associated behaviors people bring to their initial encounters with new, virtual collaborators.

The current study begins addressing this question by proposing a rudimentary model of initial trust (See Figure 1). As this model indicates, initial trust is a function of one's (a) perceptions of a new teammate's trustworthiness, (b) personal propensity to trust, and (c) social ties to the new teammate. For ease of exposition, an individual who is faced with the opportunity to trust a new, unknown, teammate shall be addressed as "subject."

Perceived Trustworthiness

One key antecedent to trust is perceived trustworthiness – that is, the subject’s judgment of the attributes of the trustee (Fulmer & Gelrand, 2011; Mayer et al., 1995). A 2007 meta-analysis provides support for this antecedent (Colquitt, Scott, & LePine, 2007). This implies that in order for a subject to trust a new teammate, the new teammate must possess a high degree of perceived trustworthiness in the eyes of the subject.

Perceived trustworthiness is comprised of three dimensions – ability, benevolence, and integrity (Mayer et al., 1995). Ability is the degree to which the trustee is believed to possess the necessary skills, competencies, and abilities within a specific domain (Mayer et al., 1995). It is the perception of whether the trustee will be able to function effectively, for instance on a task that is important to the accomplishment of a team objective.

Benevolence refers to the degree to which the subject believes that the trustee will engage in behavior that will benefit the well-being of the subject (Mayer et al., 1995). Often, benevolence has been associated with perceptions of the motives and intentions of the trustee (Mayer et al., 1995). It can be viewed as the subject’s evaluation of his or her relationship with the trustee.

Finally, integrity pertains to the degree to which the trustee is believed to follow principles and guidelines that are accepted by the subject (Mayer et al., 1995). Subjects tend to perceive a higher degree of integrity in trustees with whom they share beliefs and values in common.

Past research outside of the context of new, virtual teammates has supported the link between all three dimensions of perceived trustworthiness and trust (Colquitt et al., 2007). Thus, perceived trustworthiness is expected to affect baseline levels of trust experienced by new virtual collaborators.

H₁: Perceived trustworthiness is positively related to trusting behavior in a new virtual teammate.

H_{1a}: Perceived ability is positively related to trusting behavior in a new virtual teammate.

H_{1b}: Perceived benevolence is positively related to trusting behavior in a new virtual teammate.

H_{1c}: Perceived integrity is positively related to trusting behavior in a new virtual teammate.

Propensity to Trust

Existing trust literature emphasizes that one's disposition is a strong predictor of trust especially within the context of virtual collaboration (Mayer et al., 1995; Wildman et al., 2012; Yakovleva, Reilly, & Werko, 2010). Mayer and colleagues (1995) define propensity to trust as the "general willingness to trust others" (p. 715). Support for this antecedent is rooted in the notion that the decision to trust is ultimately made by the individual, suggesting that dispositional attributes are ever-present (Lewis & Weigert, 1985). A meta-analysis by Colquitt and colleagues (2007) supports this claim.

Prior research has suggested that uncertainty and the presence of information can influence the nature of the relationship between propensity to trust and trust (Bigley & Pearce, 1998; Gill, Boies, Finegan, & McNally, 2005). In the absence of extensive information about a prospective teammate, subjects have little or no basis for judging the new teammate's trustworthiness. Under such circumstances, people with a predisposition or propensity to trust are, in laypersons' terms, especially likely to give new teammates the benefit of the doubt. Their general, baseline level of trust for people they do not know should be relatively high. Thus, they are prone to trusting others at the outset, suggesting a direct link from trust propensity to initial trusting behavior, particularly when faced with limited information about the new collaborator.

H₂: Propensity to trust will be positively related to initial trust in a new virtual teammate.

Admittedly, people are typically provided with some, albeit limited, information about prospective teammates before collaboration begins. For example, prior to working together, teammates could gain information about each other's job title, experience, tenure, coworkers, political leanings, hobbies, or other background factors. Whereas background information about a prospective teammate may trigger skepticism among those with a low trust propensity, it may signal trustworthiness to people with a predisposition to trust (Yakovleva et al., 2010). Thus, propensity to trust was expected to both influence trust directly, as suggested above as well as indirectly affect trust by shaping subjects' perceptions of a teammate's trustworthiness. Said another way, those with a predisposition to trust would engage in trusting behaviors because they are especially inclined to (a) trust people without

knowing their trustworthiness (direct link; H2); and (b) view new teammates as trustworthy based on limited information (indirect link; H3).

H₃: Perceptions of a new teammates' trustworthiness will partially mediate the relationship between propensity to trust and trusting behavior.

H_{3a}: Perceptions of a new teammates' ability will partially mediate the relationship between propensity to trust and trusting behavior.

H_{3b}: Perceptions of a new teammates' benevolence will partially mediate the relationship between propensity to trust and trusting behavior.

H_{3c}: Perceptions of a new teammates' integrity will partially mediate the relationship between propensity to trust and trusting behavior.

Opportunities to trust new teammates do not emerge in a vacuum. Lewis and Weigert (1985) state that trust is a “property of collective units, not of isolated individuals” (p. 968). When studying the relationship between members of any dyad or team, it is important to consider the social network within which the members exist. Kramer (1999) argues that third parties within organizations are important in the spread of trust. This suggests that the others with whom they, themselves, are connected can influence how individuals interact with, and perceive people they do not know. Despite the importance of the broad social environment, existing research has often studied trust between individuals as isolated dyads (e.g., Kuo & Yu, 2009; Neves & Caetano, 2009). Only a handful of studies have attempted to include social context in the examination of trust between coworkers (e.g., Ferrin, Dirks, & Shah,

2006; Lau & Liden, 2008). The present study begins to fill this gap in research by looking at trust formation within the context of social networks

Social Networks and Social Ties

Social networks provide one indication of the social context surrounding virtual teammates. Wasserman and Faust (1994) define social networks as “sets of actors and the ties among them” (p. 9). Social network analysis (SNA) refers to the process of modeling/studying the structure of these relationships. Sociological in origin, SNA has been extensively used in studying topics such as communities (Wellman & Wortley, 1990), groups (Bavelas, 1950; Leavitt, 1951), and the distribution of power (Cook, Emerson, Gillmore, & Yamagishi, 1983). Recently, psychologists have also begun using SNA within the workplace and in the context of groups/teams (Houghton et al., 2006; Zhou, Shin, Brass, Choi, & Zhang, 2009).

Online social networking. Particularly relevant to the context of virtual collaboration is the concept of social distance (also known as “distance” or “degrees of separation”), which Wasserman and Faust (1994) define as the length of the path between two actors (represented by nodes) within a social network. Paths are defined as the distinct links between two individuals. For example, as seen in Figure 2, the path between Cameron (N_1) and Jamie (N_3) consists of N_1 , I_1 , N_2 , I_2 , and N_3 , where “N” stands for “Node” and “I” stands for “link.” The distance between Cameron and Jamie is a length of two because there are two lines (I_1 and I_2) separating the individuals. It can thus be stated that Cameron and Jamie are two degrees of separation apart. Within a given social network, the distance between individuals can vary

from a length of one (i.e., one degree of separation or a direct connection, as is the case with Cameron and Sam in Figure 2) to a many. It is also possible for an individual to share no connections or links with another person.

In the context of the current study, focus is placed on these two extremes whereby new teammates either directly share one connection (two degrees of separation), denoting social ties and a direct triadic relationship, or share no connection at all thus suggesting absolutely no network similarity.

With the creation of social networking websites such Facebook and MySpace, social networks and social distance have become increasingly explicit and visible. This has implications not only for personal relationships but for professional relationships as well. Social networking sites have emerged for professional purposes and have provided means for individuals/organizations to network with colleagues. At the time of this writing, LinkedIn serves as a prominent example. In February 2013, LinkedIn membership exceeded 200 million (Braga, 2010), thus providing an indication of the continuously growing popularity of this business-oriented social-networking tool. LinkedIn allows users to post information regarding professional qualifications (e.g., educational background, job title, and work experience). It is similar to personal social networking tools such as Facebook and MySpace in that it allows users to formally “connect” or affiliate with other users (often called “friending” on personal social-networking sites). However, some of the more “social” features (e.g., photo sharing, instant messaging) are not present with LinkedIn.

While their particulars can vary across websites and over time, online social-networking tools share important features on common. One particularly noteworthy characteristic of personal and professional social networking sites is the degree to which social networks are made apparent. For example, LinkedIn provides users with the names of potential connections – people the user may know and to which the user may wish to link. Such suggested connections are based upon an analysis of information taken from the user’s own existing connections. When users are provided with suggested connections, they are also shown the degrees of separation between themselves and the candidate for connection. Such functionality provides but one example of how degrees of separation are made explicit to people who use online social networking tools.

Social ties and perceived trustworthiness. As suggested in Figure 1, the degree to which people perceive a new, unknown, virtual teammate as trustworthy should be influenced by the presence of social ties – information that is often made visible by today’s online social networking tools. Various principles from social psychology support the contention that social ties should affect a subject’s perceptions of a new teammate’s trustworthiness. Each of us has groups with which we identify. Others who belong to these groups constitute our in-groups (Turner, Brown, & Tajfel, 1979). In-groups are characterized by group identification and in-group favoritism. According to Tajfel (1982), group identification requires awareness of membership, evaluation of the value of membership, and a degree of emotional investment in the awareness and evaluation. Presumably, individuals included in a subject’s online social network typically belong to one or more of the subject’s

in-groups. In general, we tend to favor and trust members of our in-group, even those whom we have never met (Turner et al., 1979). Knowing that a new, unknown, prospective teammate is connected to someone in our in-group increases the probability that the unknown teammate belongs to one of our in-groups – in particular, the in-group(s) we share in common with the known individual (hereafter referred to as “colleague”) through whom we are connected to the unknown teammate. In terms of social distance, the closer the unknown teammate is to us (i.e., the fewer the degrees of separation), the higher the probability that the unknown teammate belongs to our in-group and the higher the probability that we will trust the unknown teammate accordingly.

In addition, individuals gravitate toward and are persuaded by those perceived as similar to ourselves (Mcpherson, Smith-Lovin, & Cook, 2001). Accordingly, we are likely to view colleagues we have chosen to include in our online social networks as at least somewhat similar to ourselves. By extension, we may view those to whom we are not directly linked as similar to ourselves and trustworthy if they are linked and perceived as similar to colleagues in our social network (Fulmer & Gelfand, 2011). In effect, the mutual colleague lends credibility to the unknown teammate by encouraging us to presume similarities between the unknown teammate and ourselves. Perceptions of trustworthiness ensue. This effect should weaken as the degrees of separation between our colleague and the unknown teammate increase.

People who are similar to us influence our opinions on matters that are subjective (Mcpherson et al., 2001), such as perceived trustworthiness. A colleague’s willingness to

affiliate with someone we do not know may lend credibility to the unknown teammate by signaling our colleague's endorsement of that individual (Fulmer & Gelfand, 2011).

Leadership research has shown support for this notion. Sherony and Green (2002) found that leader-member relationships influenced coworker relationships; more specifically, employees enjoying positive relationships with the same leader share positive relationships amongst each other. Subsequent research by Lau and Liden (2008) found that coworkers tend to trust an unknown coworker when a leader exhibits behaviors indicating trust toward the unknown other. This suggests that a known entity (e.g., leader, colleague) can function as a conduit for trust in an unknown teammate. Just as people are susceptible to "liking by association," or liking strangers who remind them of someone they like (Lewicki, 1985), so too may they "trust by association" – that is, trusting new teammates associated with familiar members of their social network.

H₄: Social ties will affect perceptions of a new teammate's trustworthiness.

H_{4a}: Social ties will affect perceptions of a new teammate's ability.

H_{4b}: Social ties will affect perceptions of a new teammate's integrity.

H_{4c}: Social ties will affect perceptions of a new teammate's benevolence.

Method

Participants

Participants were 74 individuals recruited from three sources. The first was Amazon's Mechanical Turk (MTurk), an online marketplace that allows sellers (e.g., researchers) to hire individuals (e.g., participants) to complete tasks (Buhrmester, Kwang, & Gosling, 2011).

Sources also included volunteers from the Craigslist online classified advertisements, and undergraduate students at a large Southeastern university in the United States. I collected data at two time points with the second part occurring one week after completion of the first part. Overall, 175 participants completed the first part with 74 completing the second part indicating a 53% response rate to the follow up.

Of the participants who completed the demographic items, 45 (60.8%) were women and 29 (42.6%) were men. The average age was 27.51 years ($SD = 10.39$). With regard to ethnicity, the breakdown was as follows: 78.4% Caucasian and/or European American; 6.8% Asian and/or Asian American; 5.4% African and/or African American; 4.1% Native American or Alaskan Native; 1.4% Hispanic; and 4.1% who self-reported an “other” option, when queried. A total of 59.5% of participants indicated either full- or part-time employment. As a criterion for selection, I required participants to have a LinkedIn account. Therefore, all participants were presumably familiar with the concept of a professional social networking website.

Design

I utilized a between-subjects design with random assignment to each condition. There was one independent variable (presence of social ties) and one continuous subject variable (propensity to trust), which functioned as a predictor. The research model (see Figure 1) also consisted of one multi-dimensional mediator (perceived trustworthiness) and one dependent variable (trusting behavior). For the presence of social ties, I had two conditions in which a

subject is either (a) not linked to a new, unknown teammate or (b) linked to an unknown teammate through a mutual colleague.

Procedure

I used the web-based survey software tool, Qualtrics, for collecting responses. Participants first read and signed an informed consent form indicating that the current study was a three-part investigation that asked participants to answer questions about themselves, provide information about their social network, and collaborate with a virtual teammate. In actuality, the study only consisted of two parts. Prior to beginning the study, participants were asked to refrain from signing up if they did not intend to complete all three phases.

Those who agreed to participate received a study overview, shown in Appendix A, indicating that we sought to beta test a newly developed program called TeamNet™, which used existing social networks such as LinkedIn to help organizations formulate and staff cross-disciplinary virtual teams. They were then informed that TeamNet™ begins with a single team member and uses that member's online networks to identify potential teammates with relevant backgrounds. I then informed participants that each session was one week apart with Session 1 being used to gather background information. During the week that follows, I deployed TeamNet™ to identify a teammate with whom the subject would later work. During Session 2, I assigned subjects to their future teammate and asked them to engage in an asynchronous, online, kickoff game with the individual. I then informed participants that Session 3 entailed collaborating with the new teammate on developing an online guide for

creating résumés. All of the information in this cover story was fictitious: TeamNet™ does not actually exist. In reality, Session 3 would never occur.

During Session 1, subjects provided their name and email address and completed a questionnaire assessing demographic variables, their propensity to trust, and personality measures. Upon completing these questionnaires, I asked them to provide the URL for their LinkedIn account and reminded them that TeamNet™ attempts to use information from networks such as LinkedIn to match individuals to teams and projects. I then asked participants to list the names of 5 trusted individuals from their LinkedIn network, ostensibly to facilitate this process. Concurrently, I assured participants that the names would remain confidential and that the individuals they list would not be contacted for this study. See Appendix B for the exact instructions provided. Once completed, I informed participants that Session 2 would occur in one week.

After one week, I contacted participants by email (See Appendix C) and provided the link to the second part of the study, where they again entered their name and email address. I reminded them of the cover story and informed them that TeamNet™ identified a teammate for them. Following this, participants received a brief LinkedIn profile (See Appendix D) describing their future teammate's background. All subjects received the same profile of an individual named Alex Moore. The profile was based heavily on a real profile drawn from a genuine LinkedIn user's LinkedIn page and provided information regarding professional history, educational background, group memberships, and so forth.

In addition to the profile, participants received a diagram showing how, if at all, they were connected to Alex Moore. This constituted the experimental manipulation. I presented participants with the social network manipulation in the form of a simplified social network diagram detailing the structural nature of their relationship with their new teammate. For subjects who were connected to their new teammate, I customized the diagram such that one of first three names identified by the subject as a trusted member of his/her LinkedIn network appeared as a node alongside the subject's name. Figure 3 depicts the diagrams that I showed to those randomly assigned to each condition.

Next, participants completed a questionnaire assessing their expectations regarding their future teammate's trustworthiness (ability, benevolence, and integrity). I reassured participants that the information they provide would remain confidential, would not be shared with their teammate and would be used solely for research purposes.

Finally, I presented participants with an opportunity to trust the new teammate, which I framed as an online kickoff exercise, to be completed asynchronously with the teammate prior to the following week's collaboration. The kickoff exercise entailed the completion of trust game (see Appendix E), which researchers have used extensively in past research assessing trust (e.g., Berg, Dickhaut, & McCabe, 1995; Haselhuhn, Schweitzer, & Wood, 2010; Stirrat & Perret, 2010). I gave a hypothetical scenario to the participant where they were allotted \$10, and asked to select an amount to be provided to his/her teammate. I informed participants that the new teammate would receive triple the amount selected and they then decide how much of the tripled amount to return. Finally, participants made the

first move and were told that their future teammate would respond within 48 hours. In actuality, this first move completed the task. Upon making this first move, I informed participants that the study was complete, and that there was no third session. They then filled out measures that assessed cover story believability and accuracy of responses. I then debriefed, thanked, and dismissed the participants.

Measures

Demographics (5 items). I administered five items to assess age, gender, ethnicity, work status, and occupation (see Appendix F) to facilitate a description of the study sample.

Personality (50 items). I assessed conscientiousness (10 items, $\alpha = .86$), openness to experience (10 items, $\alpha = .82$), agreeableness (10 items, $\alpha = .70$), extraversion (10 items, $\alpha = .83$), and neuroticism (10 items, $\alpha = .86$) using items from Goldberg's (1999) International Personality Item Pool (see Appendix G). All measures used a 5 point Likert-type scale (1 = *Very Inaccurate*; 5 = *Very Accurate*). I used these measures only to test for potential differences between the final study sample and those who completed the first part of the study but did not complete the second.

Perceived trustworthiness (17 items). I assessed perceived trustworthiness using a modified version of Mayer and Davis's (1999) scale (see Appendix H). Modifications took the form of altered items to produce a focus on a new teammate. For example, "Top management is very capable of performing its job," was changed to "My new teammate seems capable of performing his/her job." Of the 17 items, I used six items ($\alpha = .92$) to measure perceived ability (e.g., "I feel confident about my new teammate's skills), five items

($\alpha = .88$) for perceived benevolence (e.g., “My new teammate would not knowingly do anything to hurt me”), and six ($\alpha = .81$) for perceived integrity (e.g., “My new teammate has a strong sense of justice”). All items had a 5 point Likert-type scale with anchors ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Propensity to trust (24 items, $\alpha = .70$). I used the 25-item Rotter (1967) scale of interpersonal trust to measure propensity to trust. A sample item is “Most people can be counted on to do what they say they will do.” Participants rated each item using a 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) Likert-type scale (see Appendix I). I removed the item, “A large share of accident claims filed against insurance companies are phony,” from the scale due to low item-total correlation.

Trusting behavior (1 objective measure). I used one objective item to evaluate trust. Participants began a game where they were responsible for allocating money (up to \$10) to the new teammate with the possibility of making a profit or losing money depending on the teammate’s decisions and actions. The amount of money allotted informed the level of trust whereby a higher amount represents higher levels of trust. (See Appendix E)

Manipulation check (2 items). I utilized two questions to assess the experimental manipulation. One item measured attention, and had a no/yes scale to indicate whether the TeamNet™ system matched participants to someone they already knew prior to this study. The second item used a no/yes scale to indicate whether the participant and their new teammate shared one or more mutual acquaintances. I used this item to determine the effectiveness of the social tie manipulation.

Cover Story Believability (2 items). I used one rating-based and one open-ended question to assess the believability of the cover story. The rating-based question asked participants to “select the statement that which [expressed their] attitude towards the study.” Participants selected either (a) "I believed the story," (b) "The story was a little unbelievable, but plausible," or (c) "The premise was unbelievable." The open-ended question asked, “Was there any part of the study which you thought was fake or unrealistic? If so, please state which parts seemed fake and why.”

Results

I used SPSS 21 for hypothesis testing (see Table 1 for means and standard deviations by condition). I calculated means for all variables of interest with the exception of propensity to trust, which required the summation of all ratings (Rotter, 1967). Preliminary descriptive analyses indicated normality for all measures except perceived integrity, which was positively skewed. A subsequent logarithmic transformation resolved issues with kurtosis and skewness. Because attrition occurred during this longitudinal study, I conducted additional preliminary analyses to test for systematic differences between those who did and did not complete the study to determine whether the final study sample was representative of the initial participant pool. Results from a MANOVA yielded no significant differences between those who did and did not complete the study with respect to personality and propensity to trust ($F(6, 168) = .43, p = .86, \eta^2_p = .02$).

Descriptive statistics suggested that the participants paid attention to the study information with 71 (95.9%) of the participants indicating pairings with an unknown

teammates as intended. Results also indicated that 97% of participants in the control (no social ties) and 80% of those in the experimental (shared social tie) condition accurately answered the question regarding whether they shared a mutual acquaintances with the new unknown teammate. A subsequent Chi-square test corroborated these findings ($\chi^2 (1) = 44.17, p < .01, \phi = -.77$) with those in the social tie condition being significantly more likely than those in the no social tie condition to believe that they shared a mutual acquaintance with their unknown teammate. Our frequency analysis of the rating-based cover story item indicated that 95.9% of participants found the study premise to be either believable or plausible.

As planned, I separately tested discrete parts of the model (shown in Figure 1); that is I tested each hypothesis independently rather than testing the model as a single entity. This ensured adequate power as well as consistency between the analyses employed, and the distinct hypotheses articulated in this study. For hypotheses 1 and 2, I calculated bivariate correlations. Hypothesis 1 examined the relationship between dimensions of trustworthiness (ability, benevolence, and integrity) and trusting behavior. As seen in Table 2, there were no significant relationships between trusting behavior and ability ($r = .11, p = .34$), benevolence ($r = -.11, p = .37$), or integrity ($r = -.11, p = .36$) indicating that hypothesis 1 was not supported.

Hypothesis 2 examined the relationship between propensity to trust and trusting behavior. Results yielded no significant relationship ($r = .18, p = .13$) between propensity to trust and trusting behavior. These findings, when taken together with the non-significant

correlations between propensity to trust and the perceived trustworthiness dimensions - ability ($r = .00, p = .99$), benevolence ($r = .06, p = .59$), and integrity ($r = .00, p = .99$), indicate a lack of support for hypothesis 3, which posited that perceived trustworthiness partially mediates the relationship between propensity to trust and trusting behavior.

Hypotheses 4a-4c investigated the effect of social ties on perceived trustworthiness. Using Wilk's criterion, results from a MANOVA with one independent variable (social ties) and three dependent variables (ability, benevolence, and integrity) yielded no significant effects ($F(3,70) = .88, p = .45, \eta^2_p = .04$). In summary, there was no support for hypotheses 4a-4c. See Table 3 for results from follow-up univariate ANOVAs. For exploratory purposes, I used a univariate ANOVA to investigate the relationship between social ties and trusting behavior. Results from this analysis also yielded no significant findings ($F(1, 72) = .45, p = .45, \eta^2_p = .01$).

Discussion

Existing research has emphasized the importance of initial or swift trust in highly-virtual contexts demonstrating a need for research that studies antecedents of trust in teams. To address this need, I tested whether social ties between an individual and an unknown future teammate can influence initial trust during the formation of highly-virtual teams (see Figure 1 for full model). This topic has become important as professional networking websites such as LinkedIn have made such ties increasingly, and explicitly, visible.

Overall, results yielded no evidence that the presence of social ties affected perceived trustworthiness at the initial point at which team members are about to engage with each

other. In addition, the present study failed to replicate findings of previously supported links such as the relationship between perceived trustworthiness and trusting behavior (hypothesis 1) and the relationship between propensity to trust and trusting behavior (hypothesis 2).

Implications for Theory and Practice

The present study contributed to existing intra-team trust literature in multiple ways. It is the first to use a social network framework to begin investigating whether an individual's social ties influences attitudes and trust towards an unknown teammate. Whereas existing research often focused on trust within isolated dyads, the present study takes into account the broader social context. The study further expands upon trust research by attempting to replicate previous findings using a behavioral measure of trust. This allowed us to begin investigating the nature of the relationship between antecedents of trust, willingness to trust, and behavioral reflections of trust without mono-method bias.

Overall, the non-significant relationships between social ties and perceived trustworthiness in tandem with the inability of the current study to replicate past findings suggests the possibility of a complex relationship between social ties, antecedents of trust, and trusting behavior. The present study utilized a theory-driven, tightly controlled, believable, longitudinal experimental paradigm to examine the phenomenon at hand, yet under these circumstances, I found no significant results. It is possible that the effect of social ties may depend on unidentified factors that influence trust under specific circumstances. For instance, if a strong negative outcome was associated with failure on a task, subjects may place more emphasis on the endorsement of a colleague by a mutual acquaintance. The same

may hold true for tasks high in terms of risk where endorsement by a trusted other may serve to lower perceptions of uncertainty regarding the behavior of an unknown other.

In practice, the increased visibility and emphasis of social ties on professional network websites (e.g., LinkedIn) creates an implicit assumption that seeing the presence of social ties influences attitude formation. However, to date, no research has shown that such information matters. The results from the current study suggest that by itself, information regarding shared acquaintances does not facilitate the development of trust between an individual and an unknown other. In the context of team formation, the present findings suggest that using an individual's mutual acquaintances to create customized teams affects little in the way of initial trusting behavior.

Limitations and Future Research

As with all studies, the present one possessed limitations that require acknowledgment. First, effects due to attrition could have resulted in a sample that is different from the starting population with implications for the external validity of the present study. While our results suggested no significant differences between those who did and did not complete the study, it does not necessarily mean that the final respondents are accurate representations of the original sample. Future longitudinal research attempting to replicate these findings should find means of further reducing attrition if adopting a similar design.

Second, the theoretical scope of the study is limited inasmuch that existing social networks are rather complex with individuals sharing multiple acquaintances. The present study did not address variables associated with complex networks such as shared

acquaintances and group memberships based on network clusters. At present, there is a dearth of existing research on the topic of social networks and trust formation. Future research on the topic of team development and social networks should begin investigating trust formation in the context of complex network structures.

I also acknowledge that the scope of the study was necessarily limited with respect to generalizability. The teamwork task with which subjects believed they would engage was only one of many possible team-related activities, each with varying levels of complexity with regard to technical skill requirements as well as varying levels of interdependence, risk, consequences, and stakes. In addition, the present study looks at trust at the point of team member selection. Future research could use longitudinal designs to investigate long-term effects of trust development between teams created using mutual acquaintances. Such a design could determine whether the effects of social ties take hold later once initial interactions have begun.

In general, it would be interesting to see whether the findings of this study would be replicated in real world, highly-virtual teams. Such research could answer the question of whether or not teams created based only on the demands of the project differ from ones that also take the team leader's professional network into consideration. Though it would have to be balanced with concerns regarding internal validity and methods allowing the investigation of causality, field research in this domain could begin to address the possibility of complex relationships between social ties and trusting behavior. Ideally, data would be collected from

multiple teams working on a variety of tasks, each with varying levels of skill requirements, risk, time constraints, and positive/negative outcomes.

In the spirit of also examining, understanding, and precisely identifying cause and effect relationships at play, another natural next step following the present study is to design a study which manipulates both the presence of social ties and characteristics of the task (e.g., risks, outcomes, and complexity). Whereas the current study focused primarily on individual perceptions, additional research could begin to explore situational factors that may influence trusting behavior. The design of the study would ideally also ask participants to complete a prolonged task with an unknown individual who ostensibly does or does not share social ties with the participant. By doing so, data on trusting behavior can be collected over time.

Conclusion

Social networking sites such as LinkedIN have arguably become an important aspect of professional life. Questions remain as to how information from one's social network can inform organizational practice. The present study investigated the use of social network information in the context of team formation and trust. While there were no significant findings linking the presence of social ties to trust, the study does present several avenues for future research to allow for a better understanding the relationship between social networks, trust, and team formation.

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Table 1

Means and Standard Deviations by Condition

Variable	No Social Ties		Social Ties	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Ability	4.15	.61	3.86	.76
Benevolence	3.49	.76	3.38	.56
Integrity	3.49	.55	3.43	.45
Trusting Behavior	\$7.19	\$2.86	\$6.64	\$3.27

Table 2

Means, Standard Deviations, and Correlations among Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Ability	4.01	.70	-			
2. Benevolence	3.43	.66	.57*	-		
3. Integrity	3.46	.49	.56*	.68*	-	
4. Propensity to Trust	65.96	8.35	.00	.06	.01	-
5. Trusting Behavior	6.89	3.08	.11	-.11	-.11	.18

* $p < .05$

Table 3

MANOVA Examining the Effect of Social Ties on Perceived Trustworthiness

Multivariate Results					Univariate Results				
Independent Variable	<i>F</i>	<i>df</i> (b/w, w/in)	<i>p</i>	η^2	Dependent Variable	<i>F</i>	<i>df</i> (b/w, w/in)	<i>p</i>	η^2_p
Social Ties	.88	3,70	.45	.04	Ability	2.49	1,72	.12	.03
					Benevolence	.50	1,72	.58	.01
					Integrity	.24	1,72	.63	.00

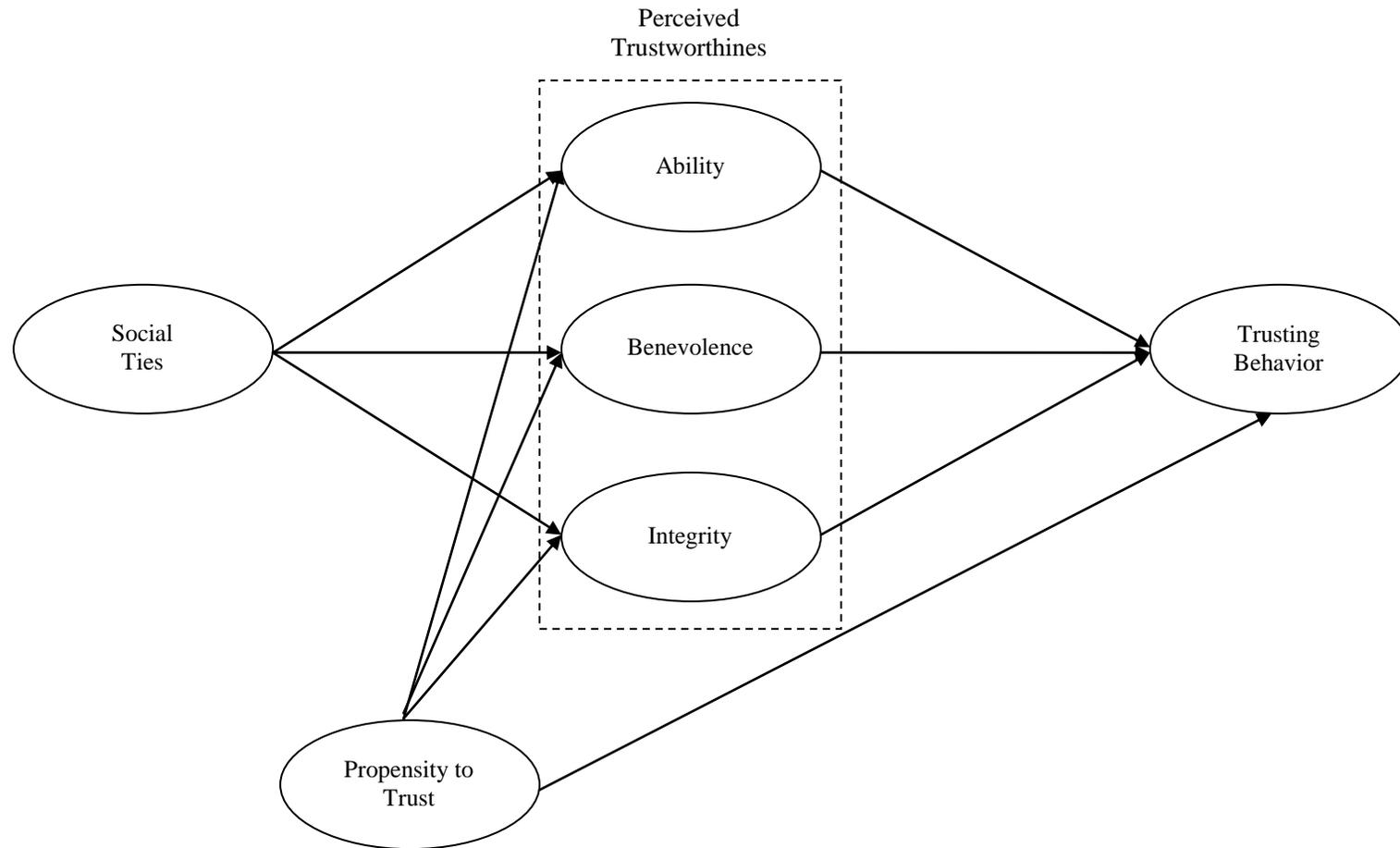


Figure 1. Relationship between Social Distance and Initial Trust in a New Teammate

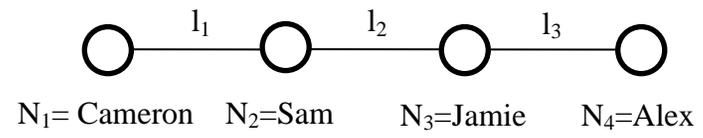
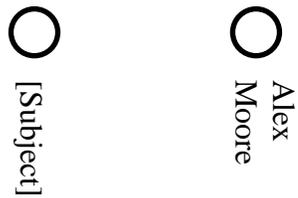


Figure 2. Distance in Social Networks

Control Group: No Social Ties

TeamNet indicates that Alex Moore is not in your social/professional network. As depicted below, you and Alex Moore do not know anyone in common.



Condition 2: Presence of Social Ties

TeamNet indicates that Alex Moore is linked to your social/professional network. As depicted below, you and Alex Moore know one person in common.

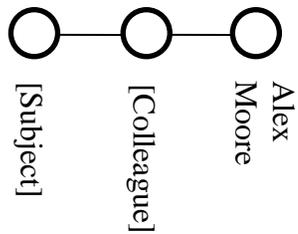


Figure 3. Social Ties Manipulations – Control Group and Social Tie Condition

APPENDICES

Appendix A

Study Overview

The study you have enrolled in is the beta-test for the recently developed software - TeamNet™. TeamNet™ is designed to help organizations customize and staff cross-disciplinary virtual teams when projects require a diverse array of knowledge, skills, and abilities. The software operates by using a member's online social network to identify potential teammates.

The current study consists of three sessions, each separated by one week. In Session 1, we will collect some background information. During the week that follows Session 1, we will identify a teammate with whom you will be later asked to work.

During Session 2, you will be given information about your future teammate, and will participate in an asynchronous, turn-based, online, kickoff exercise with that person.

In Session 3, you and your new teammate will be expected to work together towards the completion of a project. This project involves the creation of an online guide that teaches people how to create an effective resume. Depending on the qualifications and experience of you and your teammate, one of you will be asked to take the lead in determining what information people need to know about creating an effective resume. The other will be asked to serve as a sounding board during the development of the training content and take the lead on putting the resume training module online so that it looks and functions properly on a variety of website browsers (e.g., Internet Explorer, Firefox). The two of you will be expected to work collaboratively, providing input, advice, and assistance to each other during the development of the resume creation guide.

Appendix B

LinkedIn and Trusted Others

During the coming week, the TeamNet™ program will be utilized to identify and recruit a teammate who will work with you during a subsequent phase of this study. Although it does not draw teammates directly from your social network, TeamNet™ attempts to use information from networks such as LinkedIn to help identify potential teammates with relevant backgrounds. To facilitate this process, please list the names of up to 5 trusted individuals from your LinkedIn network.

Do not provide their contact information. These names will remain confidential. Under no circumstances will the individuals whose names you provide be contacted for this study or any future research related to this project.

1. _____
2. _____
3. _____
4. _____
5. _____

Note: Neglecting to provide the LinkedIn URL or the name of at least one trusted individual may result in disqualification from this study

Appendix C

Part II: Follow-up Email

*DISCLAIMER: Neither the researchers of the study nor TeamNet™ are affiliated with LinkedIn

[Insert Name Here]:

Thank you again for participating in our beta-test. About a week ago, you participated in the first of three sessions for the beta-testing of TeamNet™, a recently developed software program that uses online social networks to formulate members of a virtual team. Background information as well as the names of 5 trusted individuals from your LinkedIn network were collected.

This message is to inform you that TeamNet™ has paired you with a teammate, and we are now ready to begin Session 2. For this part of the beta-test, we are going to ask you to participate in a kickoff activity with your new teammate. The activity will entail a series of turn-based transaction games. The purpose of this activity is to give you and your teammate an opportunity to interact prior to the initiation of your teamwork, which will occur in Session 3. Session 3 will take place later and will involve working with your teammate to design an online guide that teaches people how to create an effective resume.

Prior to the start of this activity, you will be shown how, if at all, you are connected to this new teammate. To acquaint you with your new teammate, you will also be presented with his or her LinkedIn profile. In addition, you will be asked to complete a short survey regarding your expectations of your new teammate. Your responses on this survey will remain confidential at all times and will only be used for the purposes of evaluating the current software.

For your participation, you will be awarded <INSERT COMPENSATION HERE>

Thank you for your time.

Click here to begin part two of the beta-test.

Appendix D

Alex Moore – LinkedIn Profile

Alex Moore | LinkedIn

<http://www.linkedin.com/pub/alex-moore/35/a6b/199>

Alex Moore

Web and Graphics Designer

College Park, Maryland (Washington D.C. Metro Area) Graphics Design

Current • Freelance Web Designer at Freelance Web Designer (Self-employed)

Past • Resident Assistant - Residential Life at University of Maryland Baltimore County

Education • University of Maryland Baltimore County

Connections 23 Connections

Alex Moore's Summary

Specialties

Website Design, Graphical User Interface Design, Coding

Computer Skills:

- HTML/XHTML/Javascript/CSS/PHP
- Adobe Photoshop/Acrobat/Flash/Dreamweaver
- Microsoft Office: Word/Excel/PowerPoint

Alex Moore's Experience

Freelance Web Designer

Freelance Web Designer (Self-employed)

Internet Industry

August 2012 – Present College Park, Maryland

- Planning, design, and implementation of websites
- Design with emphasis on browser compatibility
- Media editing (audio and video) for the web

Resident Assistant – UMBC Residential Life

University of Maryland Baltimore County

Educational Institution; Higher Education Industry

June 2011 – May 2012 Baltimore, Maryland Area

- Maintained order within the dormitory
- Organized events
- Provided support to students in need

Alex Moore's Experience

University of Maryland Baltimore County

B.A., Visual Arts

2008 - 2012

Alex Moore's Additional Information

Honors and Awards: UMBC – Web Development Certificate (WEBC)

Appendix E

Trust Game

Instructions:

You and your teammate are about to engage in a kickoff exercise consisting of a series of five short, turn-based, games. In the first game, you and your teammate have been randomly assigned the role of Player 1 or Player 2. Player 1 will be given a \$10 credit. Player 1 will have to make a decision regarding how much of this money to transfer to his/her teammate (Player 2).

The amount of money Player 1 gives to Player 2 will be immediately tripled. Upon receiving the tripled amount, Player 2 will have complete freedom to decide how much money (if any) to return to Player 1. The money returned to Player 1 will be added to what is left of his/her initial amount. This amount will then be used in the start of the next game.

Subsequent rounds will use the same exact procedure, with the starting amount depending on the outcome of the previous round. At the end of the game, each player will receive a reward based on the amount of money he or she has earned.

Example 1:

Player 1 starts with \$10.00, and player 2 starts with \$0. He/she then decides to give player 2 \$5.00 out of the initial amount. Player 2 will receive \$15.00 (triple the \$5.00 player 1 provided). Player 2 then decides to return \$7.50 to player 1. At the end of this round, player 1 would have \$12.50 whereas player 2 will have \$7.50.

Example 2:

Player 1 starts with \$10.00, and player 2 starts with \$0. He/she then decides to give player 2 \$10.00 out of the initial amount. Player 2 will receive \$30.00 (triple the \$10.00 player 1 provided). Player 2 then decides to return \$0 to player 1. At the end of this round, player 1 would have \$0 whereas player 2 will have \$30.00. In this situation, the game would end as player 1 will have no money to continue.

Example 3:

Player 1 starts with \$10.00, and player 2 starts with \$0. He/she then decides to give player 2 \$10.00 out of the initial amount. Player 2 will receive \$30.00 (triple the \$10.00 player 1 provided). Player 2 then decides to return \$30 to player 1. At the end of this round, player 1 would have \$30 whereas player 2 will have \$0. This situation represents the most potential benefit for both players as the total amount of money for the next round has been maximized.

Exercise Information:

Name: <Participant Name>

Role Assignment: Player 1

Appendix F

Demographic Questionnaire

Please fill in the blank or select the number that corresponds to your answer to the following questions. All information will remain confidential and will only be used for the purposes of this study.

1. Name (First & Last): _____
2. Email Address: _____
3. What is your gender?
 - 1) Female
 - 2) Male
4. What is your ethnicity?
 - 1) African and/or African American
 - 2) Asian and/or Asian American
 - 3) Caucasian and/or European American
 - 4) Hispanic
 - 5) Native American or Alaskan Native
 - 6) Native Hawaiian or Pacific Islander
 - 7) Other (Please specify): _____
5. What is your age?
____ years
6. What is your current work status? (Check all that apply)
 - 1) Work full time
 - 2) Work part time
 - 3) In training
 - 4) Student
 - 5) Unemployed or Laid off
 - 6) Other (Please specify): _____
7. What kind of work do/did you do (Job Title)?

Appendix G

Personality Measure

On the following pages, there are phrases describing people's behaviors. Please use the rating scale below to indicate how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence.

Please read each statement carefully, and then fill in the bubble that corresponds with your response.

- 1 = Very Inaccurate
- 2 = Moderately Inaccurate
- 3 = Neither Inaccurate nor Accurate
- 4 = Moderately Accurate
- 5 = Very Accurate

Conscientiousness

1. Am always prepared
2. Pay attention to details
3. Get chores done right away
4. Carry out my plans
5. Make plans and stick to them
6. Waste my time*
7. Find it difficult to get down to work*
8. Do just enough work to get by*
9. Don't see things through*
10. Shirk my duties*

Extraversion

1. Feel comfortable around people
2. Make friends easily
3. Am skilled in handling social situations
4. Am the life of the party
5. Know how to captivate people
6. Have little to say*
7. Keep in the background*
8. Would describe my experiences as somewhat dull*
9. Don't like to draw attention to myself*

10. Don't talk a lot

Agreeableness

1. Have a good word for everyone
2. Believe that others have good intentions
3. Respect others
4. Accept people as they are
5. Make people feel at ease
6. Have a sharp tongue*
7. Cut others to pieces*
8. Suspect hidden motives in others*
9. Get back at others*
10. Insult people*

Neuroticism

1. Often feel blue
2. Dislike myself
3. Am often down in the dumps
4. Have frequent mood swings
5. Panic easily
6. Rarely get irritated*
7. Seldom feel blue*
8. Feel comfortable with myself*
9. Am not easily bothered by things*
10. Am very pleased with myself*

Openness to Experience

1. Believe in the importance of art
2. Have a vivid imagination
3. Tend to vote for liberal political candidates
4. Carry the conversation to a higher level
5. Enjoy hearing new ideas
6. Am not interested in abstract ideas*
7. Do not like art*
8. Avoid philosophical discussions*
9. Do not enjoy going to art museums*
10. Tend to vote for conservative political candidates*

* reverse scored item

Appendix H

Perceived Trustworthiness Measure

Background information about your new teammate has been provided to you. If you have never met or worked with your new teammate, please answer the questions below based on what you know about him/her so far. Your honesty and candor in answering these questions is essential to the integrity of this research. All of your responses will remain confidential and will be used for research purposes only. Your responses will not be singled out or shared with your teammate or anyone other than the researchers.

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

Ability

1. My new teammate seems capable of performing his/her job
2. My new teammate is probably known to be successful at the things he/she tries to do
3. My new teammate seems to have much knowledge about the work that needs to be done
4. I feel confident about my new teammate's skills
5. My new teammate has specialized capabilities that can increase our performance
6. My new teammate is well qualified

Benevolence

1. I expect that my new teammate will be concerned about my welfare
2. My needs and desires will be important to my new teammate
3. My new teammate would not knowingly do anything to hurt me
4. My new teammate will look out for what is important to me
5. My new teammate will go out of his/her way to help me

Integrity

1. My new teammate has a strong sense of justice
2. I will never have to wonder whether my new teammate will stick to his/her word
3. My new teammate will try hard to be fair in dealings with others
4. I do not expect my new teammate's actions and behaviors to be consistent*
5. I like what I know of my new teammate's values
6. Sound principles seem to guide my new teammate's behaviors

* reverse scored item.

Appendix I

Propensity to Trust Measure

Indicate the degree to which you agree with the following statements by using this scale:

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

1. Hypocrisy is on the increase in our society*
2. In dealing with strangers, one is better off to be cautious until they have provided evidence that they are trustworthy*
3. This country has a dark future unless we can attract better people into politics*
4. Fear and social disgrace or punishment rather than conscience prevents most people from breaking the law*
5. Using the honor system of not having a teacher present during exams would probably result in increased cheating*
6. Parents usually can be relied on to keep their promises
7. The United Nations will never be an effective force in keeping world peace*
8. The judiciary is a place where we can all get unbiased treatment
9. Most people would be horrified if they knew how much news that the public hears and sees is distorted*
10. It is safe to believe that in spite of what people say most people are primarily interested in their own welfare*
11. Even though we have reports in newspapers, radio, and T.V., it is hard to get objective accounts of public events*
12. The future seems very promising
13. If we really knew what was going on in international politics, the public would have reason to be more frightened than they now seem to be*
14. Most elected offices are really sincere in their campaign promises
15. Many major national sports contests are fixed in one way or another
16. Most experts can be relied upon to tell the truth about the limits of their knowledge
17. Most parents can be relied upon to carry out their threats of punishments*
18. Most people can be counted on to do what they say they will do
19. In these competitive times one has to be alert or someone is likely to take advantage of you
20. Most idealists are sincere and usually practice what they preach
21. Most salesmen are honest in describing their products

22. Most students in school would not cheat even if they think they were sure of getting away with it*
23. Most repairmen will not overcharge even if they think you are ignorant of their specialty
24. Most people answer public opinion polls honestly

* reverse scored item.