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Closeness as an agent of trust:

The effects of social and spatial distance on online trusting behavior

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by

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Abstract

The present study investigated the effects of spatial distance on trust (Study 1), trustworthiness (Study 2), and perceived social distance (Study 1 & Study 2) in an online setting. Participants played an online Trust Game (TG) against a stranger, with either a small (0 to 50 miles), medium (200 to 500 miles), or large (1000 to 1500 miles) distance between them. About half of the participants were willing to trust the other player and about three quarters of the trusted players were willing to reciprocate this trust. Although we found that spatial distance did not affect trusting behavior, there were indications of an effect of spatial distance on other prosocial behavior. Moreover, while our first study implied that there was no effect of spatial distance on perceived distance, our second study did. We concluded that people do not distinguish between people that are near or far away when they are considering to trust or to reciprocate trust. We propose that this is due to people regarding all other Internet users as a homogenous group.

Introduction

Trust is important in our society. Not only does it strengthen social cohesion (Hooghe, 2007), but it is also strongly related to economic development (Knack & Keefer, 1997). Although most people intuitively understand what trust means and why it may be beneficial, the exact function of trust is still an active subject of sociological, psychological, and economic research. The most generally accepted definition of trust is by Rousseau, Sitkin, Burt, and Camerer (1998), who described it as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or the behavior of another" (p. 395).

There is a large body of research dedicated to pinpoint the conditions under which trusting behavior is most likely to arise. One way to test the prerequisites of trust is by employing a Trust Game (TG). This game, originally coined the Investment Game by Berg, Dickhaut, and McCabe (1995), is widely used in economic research as a behavioral measurement of trust. In short, the game is as follows: there are two players in the game, Player A and Player B, who are both anonymous to each other. Player A (the Trustor) receives a sum of money and is given two options: the first is to distribute the initial amount of money between both players on his or her own, with Player B having no say in this. The second is to hand Player B (the Trustee) the money, which will then be tripled, and let him or her divide the money. As a consequence, Player A will then not be able to influence the situation. In the first scenario, both receive the money as distributed by Player A, and the game ends. In the second scenario, Player B decides on the distribution of the tripled amount of money between both players. After Player B decided, the money is split accordingly and the game ends.

The decision of Player A to send the money to Player B is taken as a measurement of trust, whereas a decision to keep the money is taken as a measurement of distrust. Once trust is given, trustworthiness is measured by the amount of money that Player B returns to Player A. Berg et al. (1995) found that around two-thirds of players is willing to trust their counterpart, even if this person is completely anonymous. These findings are

interesting for social scientists, economists in particular, as we will see in the next paragraph.

Trust is often regarded as a lubricant that makes economic exchanges possible (Arrow, 1972). In any buyer/seller transaction, a certain level of trust is required as one can never be entirely certain that the other party will hold up their end of the bargain. This is especially true in online transactions, where people typically can not see each other. However, as we have seen, previous research showed that the majority of people has a tendency to engage in trusting behavior, even if the other person is completely anonymous.

Because online trading and shopping is getting increasingly important in our lives, researchers have been trying to find out how trust functions in online settings. Although this is a fairly new area of research, researchers seem to agree that people behave differently in online trust games compared to offline trust games. For instance, subjects in virtual online worlds act less trustworthy than the laboratory control group with the same virtual world interface (Fiedler, Haruvy & Xin Lin, 2011). Füllbrunn, Richwien, and Sadrieh (2011) found that return schedules in virtual worlds are much more erratic than in real world settings, concluding that this likely due to the social structures still evolving on the Internet.

These outcomes are part of a larger body of research that show that trust games do not universally yield the same results. For instance, previous research found differences in Trust Game outcomes depending on priming (Burnham, McCabe & Smith, 2000), social history (Berg et al., 1995), familiarity (Binzel & Fehr, 2013), nationality (Bohnet & Frey, 1999), group identity (Guth, Levati & Ploner, 2005), anonymity (Füllbrunn et al., 2011), and information about the other player, such as his or her race or sex (Eckel & Wilson, 2003).

Considering these differences, it is plausible that the type of environment (i.e., offline versus online) also has a distinctive effect on trusting behavior. This could be due to the distance that interacting individuals experience between each other. In this study,

we will look at two types of distance: social distance and spatial distance. Social distance is defined as the perceived dimension of emotional distance between interacting individuals (Charness & Rabin, 2000; Dufwenberg & Muren, 2006). Spatial distance refers to the physical distance between people. Research has shown that perceived social distance has different effects on trust in online settings compared to offline settings (Fiedler et al., 2011). Generally, people are more willing to trust socially distant others when the interaction takes place in offline settings, instead of online ones. The direct effects of spatial distance on online trusting behavior have not yet been researched. However, some interesting effects on other social behavior have been found, which we will discuss later.

A possible explanation for the differences between online and offline trusting behavior was proposed by Charness, Haruvy, and Sonsino (2007). They argue that the Internet is regarded as a "multinational environment". Thus, when people interact over the Internet, they automatically assume that spatial distance is high. This would also subconsciously increase social distance because they assume that others belong to their outgroup: a social group that he or she does not identify with (Tajfel, Billig, Bundy & Flament, 1971). However, this might have been the case when the Internet was fairly new and mostly used to facilitate communication over long distances. Today, Internet has become such an integral part of our lives that we also use it to communicate with the people that are closest to us. Thus, interactions that take place over the Internet do not necessarily have to be with geographically distant others, but can also occur between people that are socially and spatially close. This paper aims to disentangle the effects of social and spatial distance in order to better understand under which conditions trust can thrive.

Social distance

The role of social distance in economic behavior has been researched experimentally in many different ways, using different manipulations. A frequently used social distance manipulation comes from research conducted by Jones and Rachlin (2006). Participants

imagined that they made a list of 100 people, ranging from their dearest friend or relative on the #1 position, to a mere acquaintance on the #100 position. Keeping this in mind, participants answered questions about hypothetical distributions of sums of money between them and a certain person on this list. They found that the amount of money a person was willing to forgo in order to give $75 to another person decreased as a hyperbolic function of the perceived social distance between them.

Social distance has also been studied by using Trust Games (TGs). In their experimental study, Binzet and Fehr (2013) let people on the streets of Cairo play TGs with either friends (low social distance) or strangers (high social distance). They found that trust is higher between people that are socially close to each other. Similar results have been found in online environments. For instance, Fiedler et al. (2011) recruited participants in the virtual world Second Life and let them choose the person that they would want to play a TG with. They found that participants prefer to trust the people that they had previous online interactions with. In turn, these socially close counterparts reciprocated by returning a higher proportion of the money compared to the socially distant respondents.

Another manipulation of social distance is related to the information that participants receive about the other person. For instance, in a study of anonymity in e-commerce, Charness and Gneezy (2008) closed social distance between participants by providing each other's family names. It appeared that the more participants knew about each other, the more trustful they behaved in TGs. Fiedler and Haruvy (2009) found more trusting behavior in TGs when participants first discussed unrelated subjects such as their last vacation or their upcoming birthday. Similarly, Eckel and Wilson (2003) closed social distance by letting subjects view a picture of their counterpart, which prompted them to return more money in TGs than when they did not view a picture.

Social distance has also been studied in other economic game paradigms. For instance, Bohnet and Frey (1999) found more generous offers in Dictator Games when social distance was decreased. Participants that shared personal details about themselves

(such as their name, hobbies, and hometown) were given more generous offers than those who remained anonymous or only made eye contact. Another game paradigm, called the Lost Wallet Game, proposes a hypothetical situation where a participant finds a wallet with money in it. The participant decides how much of the money to return to the owner, and the owner decides how much of the money to give as a reward. Charness et al. (2007) found that people were more likely to return money when the other person was attending the same university, as opposed to a different university.

All previously mentioned papers examined the effects of social distance in different ways under different manipulations, but generally did so in a hypothetical setting. The strength of the TG lies in its ability to measure real life behavior, which is a major reason why we will use it in the present study to investigate social distance.

Spatial distance

As opposed to social distance, the role of spatial distance in trusting behavior has not yet been extensively researched. However, there is some proof indicating that people behave differently in interactions when spatial distance is large. For instance, Sensenig (1972) found that there was less cooperation in a Prisoner's Dilemma Game when people were 20 feet apart, as opposed to 3 feet apart. In another interesting experiment, Kim and Moon (1998) let participants collaborate in completing different tasks. Participants did not see each other but communicated through computers. The only difference between conditions was the location of the other person, which was either in the same room, the same city, or the other side of the country. The results indicated that people were less honest in their communication when they believed that their counterpart was far away, compared to when they believed that they were closer. Similar results were found by Bradner and Mark (2002), who let participants solve different problems through an online chat application. When participants believed that the other was in a different city, there was less cooperation and more deception.

Social and spatial distance effects are regularly intertwined because one often

goes hand in hand with the other. For instance, in the experiment by Charness et al. (2007), the Lost Wallet Game was played with students from another university. These counterparts were thus at the same time socially distant (another subgroup) as spatially distant (another city). This means that when researchers manipulate social distance in their experiments, they often also manipulate spatial distance, and vice versa. It is therefore important that when one aims to compare the effects of spatial and social distance, these overlapping properties are being taken into account. Unfortunately, until now these two factors have not been analyzed separately within one experiment.

The present study

So far we have seen that both spatial and social distance have an effect on (economic) behavior. People interact differently when they are separated, when they have more social distance between them, or have to interact using the Internet. But what exactly causes people to act distrusting, untrustworthy, and even betray each other's trust? The goal of this study is to examine how spatial and social distance affect trust (Study 1) and trustworthiness (Study 2) in an online setting. Unlike other studies, we will analyze both types of distance independently, so that their effects are not intertwined. Additionally, this study will go beyond the hypothetical studies that thus far have been conducted, and will use real-life responses in a TG, that have real-life consequences. Many experimental studies regarding trust were conducted in laboratories, even if they were to measure behavior in online settings. We will instead analyze trust in a true online setting, outside of the laboratory. This ensures more natural results regarding spatial distance and will hopefully contribute to a better understanding of the mechanics of trust in online environments. In our design, spatial distance will be manipulated by indicating at which distance the participant's counterpart is located. Social distance, on the other hand, will be measured instead of manipulated to prevent the situation from becoming merely hypothetical.

Based on previous research we would expect trust and trustworthiness to decrease

when spatial distance increases, and therefore trust and trustworthiness to increase when spatial distance decreases (Hypothesis I). To disentangle the effects of social and spatial distance, we will also look at the perceived social distance under the different spatial distances. We expect the perceived social distance to increase along with spatial distance (Hypothesis II). Additionally, we expect that the effect of spatial distance on trust is mediated by the social distance between two individuals (Hypothesis III). This would mean that trust and trustworthiness will be less affected by high spatial distance when social distance is low, rather than high.

Study 1

In our first study, we examined the relation between spatial distance and trust by letting participants play the TG online, while taking on the role of Player A (the Trustor).

Method Study 1

Participants and design. Participants of Study 1 consisted of 144 users of Internet marketplace MTurk (69 females and 75 males; M_{age} = 36.20, SD = 11.06). All participants were paid $1 to participate in a 5-to-10 minute survey and had a chance of winning their part of the allocated funds in the TG.

Study 1 measured the effects of distance on trusting behavior of Player A in the TG and had a between-subjects design with three possible conditions to which participants were randomly assigned. The different conditions were characterized by the spatial distance between the participant and their counterpart, which in reality was computer simulated. This distance was either between 0 and 50 miles (small distance condition; *small*), between 200 and 500 miles (medium distance condition; *medium*) or between and 1000 and 1500 miles (large distance condition; *large*).

Procedure. For Study 1 (Trust), participants recruited on MTurk were asked to log on to an online survey named "Study on social decision making." After agreeing to the terms of the questionnaire, participants were asked a series of social-demographic questions regarding their current whereabouts, sex, and age. They then waited for the

program to connect them to another player. In reality, they watched an animation of a supposed connection being created and played against a computer. Participants were then informed about their role in the TG, which in this study was Player A (the Trustor). After this, participants learned about the demographic profile of their counterpart. In all cases, age and sex was the same (32 and male), while the distance to the participant changed depending on the condition. Participants received the instructions for the TG and when it was made sure that participants understood its rules by answering comprehension questions, they played the TG. After playing the TG, participants filled in additional measures (see: dependent variables) to investigate the underlying proceses of their trusting behavior. Finally, a series of control questions followed after which the participants were debriefed, thanked, and rewarded for their participation.

To ensure that players made realistic decisions, instructions in both studies indicated that in addition to the standard MTurk fee, each pair of players had a chance of receiving the actual outcomes of the TG.

Trust game. The setup of the TG has been adapted from the original Investment Game by Berg et al. (1995). To prevent the participants from associating certain game-related terms with a situation where there is a winning strategy, while there is none, we used the terms “interaction” and “persons” for “game” and “players”, respectively. See Appendix A for the instructions that participants received.

Dependent variables. Study 1 had one independent variable (spatial distance) and two main dependent variables: trust and perceived social distance.

Social distance was measured by asking to what degree participants felt similar and connected to the other player. They also indicated their relation to the other player on a “other-in-self-scale”, adopted from research by Aron, Aron, and Smollan (1992). This scale featured an illustration of seven different circles, ranging from completely separated to completely combined, from which participants had to choose the image that best represented their relation with the other player. Finally, we measured the participant’s

perception of fairness and risk (e.g., "What would you consider a fair distribution of $30?" and "I find it risky to let Player B divide $30").

Results & Discussion Study 1

Manipulation checks. As a manipulation check, we asked about the distance between the participant and the other player at the end of the questionnaire. Only one participant answered incorrectly and was removed from the dataset. There were also 13 duplicate entries, from the same participants, which were also removed. All participants made no more than two mistakes in the five control questions before the TG, indicating sufficient understanding of the rules. This left 143 participants for the analysis.

Trust game. Overall, 66 participants (46.2%) chose to distribute the money themselves, while 77 participants (53.8%) let Player B decide. In the *small* condition, participants were most likely to distribute the money themselves (52.0% did so). By contrast, participants in the *medium* and *large* condition were more likely to let Player B distribute the funds (58.0% and 54.5%, respectively). However, a chi-squared test turned out to be non-significant, $\chi^2(2) = 1.03$, $p > .05$. This indicates that there was no relation between the spatial distance condition and TG decision to trust the other player or not. In other words, the amount of distance between participants did not affect trusting behavior.

Allocations. Out of the 66 participants that chose to allocate the $10 themselves, 64.2% kept the full amount ($10), 22% choose to divide the money equally ($5 each), and 13.8% gave Player B an amount between $1 and $4. None of the participants gave Player B more than themselves. On average, participants in the *large* condition kept the most for themselves: $9.40 (*SD* = 1.57) of $10, while participants in the *medium* condition kept $8.57 (*SD* = 2.04) and participants in the *small* condition kept the least: $7.96 (*SD* = 2.39). However, a MANOVA showed no significant effect of condition on TG allocations, $F(4)=1.62$, $p > .05$, $\eta^2 = .02$. This indicates that there was no relation between spatial distance and the amount of money participants allocated to the other player.

(Un)fair allocations. There was no significant difference between the conditions in terms of average funds allocated, but perhaps there are other patterns to be found in the allocations. We coded the allocations into *fair* ($5 for each player), *selfish* ($6 or more for Player A), and *generous* ($6 or more for Player B). We saw that participants in the *small* condition were most likely to make fair decisions (60%), followed by the *medium* condition (26.7%) and the *large* condition (13.3%). Conversely, participants in the *large* condition were most likely to act selfish (39.5%), followed by the *medium* condition (32.6%) and the *small* condition (27.9%). A chi-squared test found no significant relation between spatial distance and allocation outcome, $\chi^2(2) = 3.86$, $p > .05$.

Participants that let the other player allocate the money ($N = 77$) were asked what they thought would be a fair allocation of the $30. All participants in the *small* condition ($N = 24$) chose an equal share of $15 for themselves and $15 for the other player. Participants in the *medium* condition chose an average of $14.86 for themselves ($SD = .51$), while participants in the *large* condition chose an average of $14.58 ($SD = 1.12$). A MANOVA on condition and 'fair allocation' turned out to be non-significant, $F(2) = 1.95$, $p > .05$, $\eta^2 = .05$. This indicates that the distance between players did not affect the fairness of the allocations.

Risk. There were three different items which showed a moderate internal consistency, as indicated by Cronbach's Alpha ($\alpha = .70$) and moderate item-total correlations (Pearson's $r > .55$). When the three items were combined to form "riskiness", an ANOVA for condition and riskiness showed no significant relation between the variables, $F(2) = 2.66$, $p > .05$, $\eta^2 = .01$. This means that participants in the *small* condition ($M = 5.39$, $SD = 1.17$) did not significantly differ in their risk perception from participants in the *medium* ($M = 4.99$, $SD = 1.54$) or *large* condition ($M = 5.40$, $SD = 1.25$).

Social distance. Three items were used to measure social distance. Two were questions on a 7-point Likert scale (i.e., "How similar do you feel you and Person B are?") and one where participants indicated the social distance between them and their counterpart on a "other-in-self-scale". Cronbach's Alpha for the three social distance items

was .79, while every item-total correlation was above .60. The three items were combined to form the new variable "social closeness". On average, participants in the *small* condition indicated the most social closeness (M = 3.05, SD = 1.15), followed by the *medium* condition (M = 2.73, SD = 1.16) and the *large* condition (M = 2.66, SD = 1.13). However, an ANOVA showed no significant effect of spatial distance on social closeness, $F(2) = 1.51$, $p > .05$, $\eta^2 = .02$. This means that participants with a small distance between them did not report more social closeness than those with a medium or large distance between them.

Discussion. In our first study, we found some interesting results that were in line with our expectations. About one third of the participants is willing to trust their counterpart in an online TG. There were also indications that distance had an effect on prosocial behavior: participants acted less selfish (and more generous), on average, when distance to their counterpart was small, compared to medium or large. Furthermore, participants in the small distance condition were more likely than participants in the medium or large distance condition to find an equal split of the money a fair outcome. However, we did not find enough evidence for a direct effect of spatial distance on trusting behavior (Hypothesis I): participants did not show varying degrees of trusting behavior when the distance between them and their counterpart was small, compared to medium or large. Furthermore, participants did not indicate feeling more socially close to others that are spatially close, compared to medium, or far away. In their decision making process, perceived riskiness appeared not to be a factor: participants did not report different perceived risk and uncertainty across the different distance conditions.

In the next study, we will analyse people's trustworthiness when they play the TG as Player B (the Trustee).

Study 2

In our second study we examined the effects of spatial distance on trustworthiness by letting participants play the same online TG as in Study 1, but now while taking on the role of Player B (the Trustee).

Method Study 2

Participants and design. Participants of Study 2 consisted of 175 MTurkers (80 females and 95 males; M_{age} = 38.94, *SD* = 11.03). They were all paid $1 to participate in a 5-to-10 minute survey and had a chance of winning their part of the allocated funds in the TG.

Study 2 measured the effects of distance on trustworthiness of Player B in the TG. It had the same between-subjects design as Study 1, with three possible conditions to which participants were randomly assigned. Spatial distance was either between 0 and 50 miles (small distance condition; *small*), between 200 and 500 miles (medium distance condition; *medium*) or between and 1000 and 1500 miles (large distance condition; *large*).

Procedure. The procedure of Study 2 (Trustworthiness) was nearly identical to that of Study 1. Instead of playing the role as Player A (the Trustor), participants now played as Player B (the Trustee). They learned that Player A decided to let Player B allocate the $30, therefore placing trust in them. After making a decision about the allocation of the funds between both Player A and Player B, participants answered additional DV questions and a set of control questions.

Dependent variables. In this study, spatial distance was the independent variable and trustworthiness and perceived social distance were dependent variables. Similar to Study 1, we measured the degree that participants felt similar and connected to the other player with questions on 7-point Likert scales and by having participants indicate their relation to the other player on a "other-in-self-scale". Finally, we measured the participant's perception of risk on a 7-point Likert scale (e.g., "If I would have been Player A, I would find it risky to let Player B divide $30").

Results & Discussion Study 2

Manipulation checks. As a manipulation check, we asked about the distance between the participant and the other player at the end of the questionnaire. Two participants did not give the correct distance and were therefore removed. Once again, there were duplicate entries from 14 participants that filled in the questionnaire multiple times, which were removed from the dataset. Overall, participants showed sufficient understanding of the TG: only two participants had more than two errors (and were removed from the dataset). Together, this resulted in 16 case removals, leaving 175 participants for analysis.

Allocations. Playing the TG as Player B, all participants were given the opportunity to divide $30 between the other player and themselves. 66.3% returned half of the money ($15) to Player A, while 18.3% returned nothing ($0) Player A. 12.0% gave Player A an amount between $1 and $14, which is less than themselves, and 3.4% gave Player A an amount between $16 and $30, which is more than themselves. This means that 69.7% of the participants acted trustworthy (i.e., returning $15 or more to the other player).

Of the $30, participants in the *small* condition kept the most to themselves, on average: $18.53 ($SD$ = 6.13) of $30. Participants in the *medium* condition kept $18.50 ($SD$ = 5.72) and participants in the *large* condition kept the least: $17.71 ($SD$ = 5.96). A MANOVA for condition and the TG allocations turned out to be non-significant, $F(2)=1.46$, $p > .05$, $\eta^2=.02$. This indicates that the amount of distance between participants did not have an effect on trustworthiness.

(Un)fair allocations. Given that the average TG allocations had relatively large standard deviations, perhaps looking at average allocations is not the best way to judge differences in behavior. We therefore grouped the outcomes into *fair* ($15 for each player), *selfish* ($16 or more for themselves) and *generous* ($16 or more for the other player). This resulted in 116 *fair* allocations (66.3%), 53 *selfish* allocations (30.3%) and 6 *generous* allocations (4.0%). However, we found no significant relation between condition and allocation outcome, $\chi^2(4) = 3.81$, $p > .05$.

Risk. The items for perceived risk were the same three that were used in Study 1, which measured perceived riskiness, perceived uncertainty, and the perceived likelihood of being betrayed by the other player. The three risk items showed a high internal consistency, as indicated by Cronbach's Alpha (α = .86) and high item-total correlations (r > .68). When the three items were combined to form "riskiness", an ANOVA for condition and riskiness showed no significant relation between the variables, $F(2) = 2{,}64$, $p > .05$, $\eta^2 = .03$. This means that participants in the *large* condition ($M = 5.05$, $SD = 1.38$) did not experience more risk than participants in the *medium* ($M = 5.19$, $SD = 1.52$) or *small* condition.

Social distance. Similar to Study 1, social distance was measured using three different items on a 7-point Likert scale. These items have a high internal consistency, as indicated by Cronbach's Alpha (α = .80) and high item-total correlations (r > .62). When the three items were combined, an ANOVA showed that there was a significant effect of distance condition on the scale "social closeness", $F(2) = 4.123$, $p < .05$, $\eta^2 = .04$. The most social closeness was reported by participants in the *small* condition ($M = 3.48$, $SD = 1.31$), followed by the *medium* condition ($M = 2.93$, $SD = 1.28$), and the *large* condition ($M = 2.86$, $SD = 1.22$). There was a significant small-to-medium sized negative correlation between social closeness and perceived risk ($r = -.21$, $p < .05$).

Discussion. Based on the allocation outcomes, we found that about 70% of the participants reciprocated trust and therefore acted trustworthy. Furthermore, there was an effect of spatial distance on perceived social distance, which we did not find in Study 1. Participants reported less social distance when spatial distance was small, compared to when spatial distance was medium or large. But, similarly to Study 1, participants did not allocate the funds differently when the spatial distance was large, compared to medium or small. The spatial distance between players did not affect trustworthiness and did not affect the selfishness or generosity of their choices. With regard to the motivation behind participant's choices, we found that spatial distance did not influence perceived risk. These results suggest that although people's perceived social distance is affected by

spatial distance, this does not lead to a higher perceived risk and differences in their reciprocity of trust.

General discussion

The Internet makes it possible for millions of people to interact without necessarily being near one another. In many cases, they do not even have the slightest idea where the person on the other side is located. Nonetheless, we collectively engage in online trading, investing, and collaborating, which shows that people are willing to trust each other on the Internet. Trust is crucial for any economic activity (Arrow, 1972), but even more so when it takes place online. After all, it is very difficult to enforce a certain agreement when there is a large distance between you and the other person. Still, online marketplaces and collaboration tools have been reporting massive growth, and will probably continue to do so over the coming years. This makes it seem like there is no evident lack of trust between people in online settings. However, anti-scam tools such as TicketSwap (for concert tickets), eTrusted (for online shopping), and Kudos (for crowdsourcing campaigns) are also on the rise, indicating that people prefer having some kind of backup whenever a transaction is taking place. In other words, although trust is common on the Internet, online and offline interactions are still very comparable in the sense that there is a considerable risk of being deceived. Because previous research indicated that spatial distance has an effect on social behavior in interactions (Sensenig, 1972), we were curious to see whether people today still care about the distance that is between them and their online counterpart. More specifically, if knowledge about the spatial distance between them and their counterpart has an effect on trusting behavior on the Internet and whether this relates to the perceived social distance to the other party.

We examined the effects of spatial distance on trust and trustworthiness by letting participants play an online TG, of which we varied the amount of distance between the two players. The outcomes of the TG in our experiment were somewhat different from what previous research has shown. We found that about half of the participants were willing to trust the other player. Generally, about two-thirds of players in a TG trust their

counterpart (Fetchenhauer & Dunning. 2009). Furthermore, trust is reciprocated in about 90% of the TG interactions, while in our research this percentage was lower: about 70%. Although in slightly lesser degree than in previous research, our results indicate that even though people are not familiar with each other, cannot communicate with each other, and have dozens of miles between them, they are still willing to trust each other and reciprocate trust. With regard to our earlier question about online trust, we would conclude that trust is still prevalent online.

We expected spatial distance to affect perceived social distance, however our results were not conclusive. There was no such effect in our first study, while our second one showed that people felt socially closer to each other when they learned that the other person was spatially close as well, compared to far away. Against our expectations, we found that spatial distance did not affect trust or trustworthiness: the amount of distance between two individuals did not cause differences in trusting behavior. Because there was no main effect of spatial distance on trust and trustworthiness, we could not analyse the role of social distance as a possible mediator. This limited our ability to disentangle the effects of social and spatial distance on trust and trustworthiness, which was one of the main goals of this study.

Although we did not find the main effect of distance on trusting behavior that we predicted, the results of our first study suggest that participants act more social towards one another when they are spatially close, rather than far from each other. The smaller the distance between two individuals, the more generous and less selfish they acted. This is in line with what previous research showed, such as that by Bradner and Mark (2002), who found more cooperation and less deception between two people when they were close to each other, rather than far away from each other.

In conclusion, our study had some interesting results that were in line with our expectations. However, our results did not indicate a main effect of spatial distance on trust and trustworthiness. This went against our initial expectations, which were based on the insight that physical distance affects trust and reciprocity in interactions that involve

money (Charness et al., 2007; Fiedler et al., 2011). An explanation for our findings might be the fact that the world has changed a lot in terms of technology since much of the early TG research was conducted. In this day and age, most people have accumulated years of online experience, including countless online interactions with strangers from all over the world. Perhaps, as far as strangers on the Internet go, relative distance does not matter anymore. It could very well be that 'the Internet' is now viewed as a common space, where the only difference is whether the person on the other side is someone they know, or do not know. Whereas before, interacting with others on the Internet might prompt people to think about the other person's nationality or ingroup membership, perhaps now everyone is viewed as being part of one homogenous group of Internet users. The results of our first study support this: perceived social distance was not affected by spatial distance. This shows that people experience the same level of social distance (or social closeness) with all non-familiar others on the Internet, irregardless of their spatial distance.

It is also plausible that our methodology affected our results. The fact that otherwise predictable TG outcomes were not in line with previous research, suggest that there something was different with either the participants and/or the environment our research was conducted in. First off, the platform of MTurk might not be ideal for an experiment like this. People who are on MTurk ("a marketplace for work") are there because they want to earn money. We might therefore assume that their TG decisions were also driven by this motivation, which is different from previous TG research, where people were approached on the street (Binzel & Fehr, 2013), outside their university class (Burnham et al., 2000), or even while playing a game online (Fiedler et al., 2011). In all of these cases, participants were not actively occupied with earning money. On MTurk, employers 'advertise' the duration and reward for tasks, so that MTurk workers can calculate their expected yield. A calculative mindset, which MTurkers are likely to have when they want to maximize profit, is known to lead to more self-interested decision

making (Wang, Zhong & Murnighan, 2014), which might have affected the outcomes of our study.

Furthermore, with a running time of two weeks, it took our study considerably longer to reach the required number of participants, compared to previous research. This could be due to our reward being too small, or our experiment description not being appealing enough. Either way, it could have attracted a particular set of MTurkers, different from the average MTurker, which caused skewed results. Finally, because MTurk workers are described on the website as "Workers" and "MTurkers", it could be possible that they regard each other as being an ingroup member. This would mean that they are less affected by spatial distance (Charness et al., 2007).

The non-significant results could also be explained by our manipulation not being strong enough. In our study, the distance between the participant and the other player was either small (0 to 50 miles), medium (200 to 500 miles) or large (1000 to 1500 miles). Perhaps, these distances were hard to grasp for our participants, especially because they were presented without context. Hsee (1996) discovered that hard-to-evaluate attributes, such as distance in miles, have less impact in separate evaluations than in joint evaluations. It might therefore be better to present distances in a way that allows for joint, instead of separate, evaluation. But perhaps spatial distance should not be indicated in miles at all, as people rely on memory and mental representations to estimate certain distances (Sadalla, Staplin & Burroughs, 1979). In our study, distances were expressed by a number of miles, which might not trigger any mental representations. In the future, research could express distance visually or audibly, to trigger representations of a far or close distance. In a Prisoner's Dilemma study conducted by Sensenig (1972) for instance, participants were simply put closer or further away from each other in a large open space, thus providing a visual point of reference for spatial distance.

The two concepts spatial distance and social distance are often intertwined. Thus far, their effect on trusting behavior has not been assessed independently. Our research

was the first to do so, in an online setting outside of the lab. Although our results did not fully confirm our hypotheses about trust and trustworthiness, they show that people do not distinguish between people that are near or far away when they are considering to trust or to reciprocate trust. This could be an indication that the Internet is evolving into a place where individual differences do not matter as much as they once did. We believe that is something to be excited about.

References

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of personality and social psychology, 63(4)*, 596.

Arrow, K.J. (1972). Gifts and exchanges. *Philosophy & Public Affairs, 1*, 343-362.

Becchetti, L., Degli Antoni, G., Faillo, M., & Mittone, L. (2011). The economic value of a meeting: Evidence from an investment game experiment. R*ationality and Society, 23(4)*, 403-426.

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. *Games and economic behavior, 10(1)*, 122-142.

Binzel, C., & Fehr, D. (2013). Social distance and trust: Experimental evidence from a slum in Cairo. *Journal of Development Economics, 103*, 99-106.

Bohnet, I., & Frey, B. S. (1999). Social distance and other-regarding behavior in dictator games. *American Economic Review,* 335-339.

Bradner, E., & Mark, G. (2002). Why distance matters: effects on cooperation, persuasion and deception. *In Proceedings of the 2002 ACM conference on Computer supported cooperative work*, 226-235.

Burnham, T., McCabe, K., & Smith, V. L. (2000). Friend-or-foe intentionality priming in an extensive form trust game. *Journal of Economic Behavior & Organization, 43(1),* 57-73.

Charness, G., & Gneezy, U. (2008). What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior & Organization, 68(1)*, 29-35.

Charness, G., Haruvy, E., & Sonsino, D. (2007). Social distance and reciprocity: An Internet experiment. *Journal of Economic Behavior & Organization, 63(1)*, 88-103.

Charness, G., & Rabin, M. (2000). *Social Preferences: Some Simple Tests and a New Model.* Unpublished manuscript, Department of Economics, University of California, Berkely, USA

Dufwenberg, M., & Muren, A. (2006). Generosity, anonymity, gender. *Journal of Economic Behavior & Organization, 61(1)*, 42-49.

Eckel, C. C., & Wilson, R. K. (2003). Conditional trust: sex, race and facial expressions in a trust game. *Trust and Institutions*, Harvard University, April, 24(26).

Eckel, C. C., & Wilson, R. K. (2004). Is trust a risky decision? *Journal of Economic Behavior & Organization, 55(4)*, 447-465.

Fetchenhauer, D., & Dunning, D. (2009). Do people trust too much or too little? *Journal of Economic Psychology, 30*, 263-276.

Fiedler, M., & Haruvy, E. (2009). The lab versus the virtual lab and virtual field—An experimental investigation of trust games with communication. *Journal of Economic Behavior & Organization, 72(2)*, 716-724.

Fiedler, M., Haruvy, E., & Li, S. X. (2011). Social distance in a virtual world experiment. *Games and Economic Behavior, 72(2)*, 400-426.

Füllbrunn, S., Richwien, K., & Sadrieh, A. (2011). Trust and trustworthiness in anonymous virtual worlds. *Journal of Media Economics, 24(1)*, 48-63.

Guth, W., Levati, M. V., & Ploner, M. (2005). The effect of group identity in an investment game, Working Paper.

Hooghe, M. (2007). Social capital and diversity generalized trust, social cohesion and regimes of diversity. *Canadian Journal of Political Science, 40(03*), 709-732.

Hsee, C. K. (1996). The evaluability hypothesis: An explanation for preference reversals between joint and separate evaluations of alternatives. *Organizational behavior and human decision processes, 67(3)*.

Jones, B., & Rachlin, H. (2006). Social discounting. *Psychological Science, 17(4)*, 283-286.

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A cross-country investigation. *The Quarterly Journal of Economics, 112*, 1251-1288.

Kim, J., & Moon, J. Y. (1998). Designing towards emotional usability in customer interfaces—trustworthiness of cyber-banking system interfaces. *Interacting with computers, 10(1)*, 1-29.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of management review, 23(3)*, 393-404.

Sadalla, E. K., Staplin, L. J., & Burroughs, W. J. (1979). Retrieval processes in distance cognition. *Memory & Cognition, 7(4)*, 291-296.

Sensenig, J., Reed, T. E., & Miller, J. S. (1972). Cooperation in the prisoner's dilemma as a function of interpersonal distance. *Psychonomic Science, 26(2)*, 105-106.

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European journal of social psychology, 1(2)*, 149-178.

Wang, L., Zhong, C. B., & Murnighan, J. K. (2014). The social and ethical consequences of a calculative mindset. *Organizational Behavior and Human Decision Processes, 125(1)*, 39-49.

Appendix A

Our Trust Game instructions were as follows:

In this task, Person A & B will distribute money. Person A starts the task with $10. Person A can choose between two options:

Option 1: Person A will distribute the money him/herself. If he/she chooses this option, Person A can decide how much of the $10 he/she wants to share with Person B. Person A will then be the person who decides how the $10 will be divided. Note that Player B will have no say in this."

Option 2: Person A lets Person B distribute the money. If Person A chooses this option, the money first gets tripled to $30. Note, however, that in this case the distribution on how the money will be divided will be totally up to Person B. If Person A chooses for option 2, it is Person B who decides how the $30 will be divided. Person B can decide how much of this $30 you want to share with Person A. Note that, in this case, Person A will have no say in this.