The Medium or the Message?

Communication Relevance and Richness in Trust Games

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Abstract

Subjects communicated prior to playing trust games; the richness of the communication media and the topics of conversation were manipulated. Communication richness failed to produce significant differences in first-mover investments. However, the topics of conversation made a significant difference: the amounts sent were considerably higher in the unrestricted communication conditions than in the restricted communication and no-communication conditions. Most importantly, we find that first-movers’ expectations of second-movers’ reciprocation strongly predict their levels of investment.

1. Introduction

In recent years there has been an upsurge in both the theoretical and the experimental study of trust. We contribute to this growing research area by focusing on the respective roles of communication and expectations in establishing trust and
reciprocity. We are especially interested in the possibility of trust and cooperation in computer-mediated environments, such as the Internet. Online, trust can ground cooperation in a variety of contexts, such as decentralized multinational organizations and auction sites. Lacking trust, agents may be deterred from mutually beneficial exchanges with unfamiliar and possibly anonymous others. Hence the importance of understanding the mechanisms through which communication supports trust and cooperation.

2. The Communication Effect as an Anomaly

A robust experimental finding in the study of social dilemmas is the positive effect of communication on cooperation, which Bicchieri (2006) denotes as the ‘communication effect.’ John Ledyard (1995), in an extensive survey of the experimental literature on public goods, singles out communication and the marginal per capita return as the two variables most conducive to cooperation. Likewise, David Sally (1995), in a meta-analysis of 35 years of social dilemma experiments, shows that the ability to communicate increases cooperation over base rates by 40%.

The communication effect has been mostly studied in face-to-face (FtF) settings. However, there is a growing body of research that looks at the influence of other forms of communication in social dilemma games, most notably computer-mediated communication (CMC). Bicchieri and Lev-On (2007) provide a summary of the main findings about the computer-mediated communication effect in social dilemma experiments:
1. The communication effect is still present in computer-mediated environments: CMC produces higher cooperation rates than equivalent environments in which communication is not allowed.

2. The communication effect varies in degree according to the richness of the communication channel. Videoconferencing produces cooperation rates very close to FtF communication, whereas text-based communication produces substantially less cooperation. Generally, the CMC effect approximates the FtF communication effect the closer the communication channel comes to reproduce the features of face-to-face communication.

3. Compared to FtF communication, it takes more time to establish cooperation, especially when using ‘poorer’ CMC channels. As in FtF communication, cooperation deteriorates over time in the absence of continuing communication. After communication resumes, cooperation rates improve again.

4. Especially with asynchronous communication, it is more difficult to establish ‘social contracts’ in CMC, and even when such agreements are reached, they are violated more frequently than agreements reached using FtF communication.

3. The Focus Theory of Norms

Such findings stand in sharp contrast to the predictions of traditional rational choice models, according to which the strategic structure of social dilemmas and trust games should be resilient to the influence of communication. Behaviors such as cooperation, trust and reciprocity should remain off the equilibrium path following
communication. In Social Dilemma and Trust games all talk should be considered cheap, and communication is empty at best and deceptive at worst. The choice of a communication medium should not influence cooperation rates in dilemma games either; if no ‘communication effect’ is expected, then the communication medium would obviously be inconsequential for cooperation, trust and reciprocity as well.

Instead, the ‘communication effect’ in such experimental games has recently been explained by Bicchieri (2006) in terms of her theory of social norms. Social norms are not universal moral rules insensitive to context; rather, they are sensitive to the particular situation faced by the decision-maker. Norms should be understood in terms of expectations and conditional preferences, and are susceptible to threshold effects. The very existence and motivational force of a social norm depend upon there being a sufficiently large number of people who believe that it exists and pertains to a given type of situation, and prefer to conform to it as long as:

(a) They expect that enough others follow the norm in similar contexts [empirical expectations], and

(b) They believe that enough others expect them to conform to the norm as well [normative expectations], and may even sanction transgressions [normative expectations with sanctions] (Bicchieri, 2006, p. 16).

According to the theory, when a social norm becomes situationally salient, it causes a shift in the agent’s focus, and can direct her actions towards norm compliance. Focusing people on a social norm means that they know that the situation is one to which the norm applies, expect a sufficiently large number of people to obey
the norm, and also believe that a sizable number of these other people expect them to obey the norm, and may even be prepared to sanction violations (Bicchieri 2006, p.98).

Face-to-face (FtF) communication with other agents involved in a social dilemma is a very effective mechanism to focus agents on pro-social norms. In particular, exchanging promises places agents in a familiar context associated with daily experiences where people who make promises tend to keep them. In such contexts, promises are not perceived as cheap talk, but have a clear binding force on agents. Promises in dilemma settings focus agents on the norm of promise-keeping, even if the norm is not backed by an enforcement mechanism. Promises to cooperate are typically communicated through verbal utterances, and are supported by contextual cues such as tone of voice, gestures, eye contact and so on. When promises are perceived to be credible, they support judgments about the trustworthiness of others, and consequently elicit pro-social behavior.

4. Why Communication Relevance Matters

In this paper we report our experimental results about two dimensions of the communication effect in Trust games: one is the influence of communication relevance, the other is the influence of the richness of the communication medium. There are good reasons to expect that both communication relevance and richness of the medium would affect trust and reciprocation in Trust games.
Let us start with the hypothesized importance of *relevant* communication, by which we mean the ability to communicate about the strategic situation that experimental subjects are facing, including the ability to make non-binding pledges about future actions. From the short introduction above, it seems clear that 'relevant communication' may produce more trust and cooperation than 'irrelevant communication', and that when discussion lacks explicit promising, it can lose its effectiveness in supporting trust. Failing to establish the normative environment required for informed decisions about trust and reciprocity, risk-averse agents may fail to behave in a pro-social way.

Experimental work largely supports such hypotheses. Most notably, Bouas and Komorita (1996) enabled subjects to interactively communicate in a social dilemma game. While in one treatment subjects were allowed to talk about any topic, including the dilemma, in the other treatment they were explicitly forbidden to discuss the dilemma (and, by implication, to make promises about future actions) and were only permitted to discuss tuition levels. When subjects were allowed to discuss the dilemma and make promises, the cooperation rate was 81%. By contrast, when they were allowed to communicate but not discuss the dilemma, the cooperation rate was only 17%. Similar results were obtained in an earlier study by Dawes, McTavish and Shaklee (1977) in which the permitted conversation topic was the percentage of people at different income levels in Eugene, Oregon, and by Gächter and Fehr (1999), who let subjects engage in 'personal conversations' about their studies and hobbies.
There are a few exceptions, though. In other experiments, high cooperation rates were recorded even when subjects were involved in conversation irrelevant to the game, especially when the topics of conversation were ‘personal’. Notably, Buchan, Croson and Johnson (2006) report that in a Trust game with a ‘personal’ irrelevant communication condition (subjects introduced themselves and talked about birthdays), and an ‘impersonal’ irrelevant communication condition (subjects answered questions from the world almanac), cooperation in the first condition was significantly higher than in the second condition. The experiment did not include a control no-communication condition. The authors hypothesize that even non-strategic communication can make a difference, but only if is 'personal'. They claim that “personal communication prompts greater ‘otherregardingness’ than does impersonal communication. The mere act of communicating more about themselves on a personal topic prompted participants to be significantly more concerned with others” (Buchan, Croson and Johnson 2006, p. 392).

Such conjectures are to some extent supported by other experimental work by Rocco (1998), where subjects had a 45 minute social activity prior to a Social Dilemma game. Yet Gächter and Fehr (1999) found no increase in cooperation following a 'personal' communication prior to a Social Dilemma game. Such mixed findings make the study of 'the kinds of non-strategic communication that make a difference' an even more worthwhile pursuit.
5. Why Promise Richness May Matter

A second factor that may influence the degree and characteristics of a 'communication effect' is the degree of media richness available for communication. Richness may matter because it affects the background conditions under which the speech act of promising occurs. As argued before, such conditions are crucial in conveying the credibility of mutual intentions.

When promises are made in FtF contexts, a variety of cues allow subjects to assess intentions and form expectations about each other, all of which can make their mutual promises credible. Such indicators include visual cues (i.e. body language, eye contact, facial expressions, etc.), verbal cues (tone of voice, phrasing, fluency, manner of expressing moral rhetoric, etc.) and social cues (status, group membership, gender, etc). Such cues are frequently correlated by agents with trustworthiness, and their presence or absence can have important motivational consequences via the formation (or impairment) of mutual expectations of promise-keeping behavior. When a norm of promise-keeping is activated, mutual expectations, beliefs and a conditional preference for following the norm will also be simultaneously activated in the vast majority of participants (Bicchieri 2006). However, when the environment and the means of communicating promises differ significantly from familiar settings in which promises are usually made, agents may become focused on the ‘poverty’ of the normative environment, fail to develop expectations about the future actions of promise-makers, and as a result they may refuse to cooperate.
There are relatively few social dilemma experiments that study the effects of communication in computer-mediated contexts. When experiments allow for unrestricted computer-mediated communication, including promising, cooperation rates in social dilemma experiments are significantly higher than in a control no-communication condition, although typically lower than in a FtF control condition (see Brosig, Ockenfels and Weimann, 2003; Frohlich and Oppenheimer, 1998; Bos et al., 2001; Rocco, 1998; Zheng et al., 2002).

However, when the kinds of communication used for promise-making are restricted, cooperation rates typically falter. For example, when non-binding promises were generated through a computerized text message or were written on a piece of paper (Palfrey and Rosenthal, 1991; Chen and Komorita, 1994), cooperation rates did not differ significantly from the no-communication condition.

In a ten-round Public-good game, Bochet, Page and Putterman (2006) also found no significant differences in cooperation rates between a no-communication control condition and a ‘numerical cheap talk’ (NCT) condition where subjects could anonymously send via computer a non-binding message about how much money they intended to contribute before each period. In a follow-up paper, Bochet and Putterman (2007) added another condition (similar to NCT) in which anonymous subjects, before making a contribution, could make a non-binding statement explicitly formulated as a
promise after the initial round of cheap talk. Again, there were no significant differences in actual contributions between the ‘numerical cheap talk with promising’ (NCTwP) condition and the no-communication condition.

Such experimental work suggests that the further removed the speech act of promising is from daily contexts where promises are made, the less it can promote cooperation. It is realistic to assume that agents did not perceive others’ promises as credible, and may have even been aware that their own promises might have been regarded with skepticism by the other parties. In this case, both empirical and normative expectations falter, and it is not surprising that one should not feel bound by a norm of promise-keeping that almost no one expects or is expected to follow.

6. What Kind of Promise?

In this paper we further explore the act of promise-making to clarify why and how it is conducive to cooperation. We focus specifically on computer-generated promises to further understand when and if normative behavior survives in computer-mediated environments.

Our paper gives two main contributions to the literature on communication and promising in mixed-motive games in computer-mediated settings. First, the effects of

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\[1 \text{ Subjects were asked to choose one of the following statements: ‘I do not wish to make a promise at this time,’ or ‘I promise to contribute ---- to the group account this period.’ If they chose the second option, they had to type an integer between 0 and 10.}\]
irrelevant communication have so far been studied in face-to-face settings only. We are the first to explore whether the same differences between strategy-relevant and irrelevant communication occur when communication is computer-mediated as well.

Second, the communication effect has been studied almost exclusively in Social Dilemma games. Experimental work that directly tests the effects of interactive communication on behavior in trust games is just emerging. Our paper thus makes a significant contribution to the study of a 'communication effect' – i.e., a positive and significant influence of communication on trusting and reciprocating behavior- in Trust games as well.

Trust games are close cousins of Social Dilemma games; in essence they are one-sided sequential dilemma games. In a typical Trust experiment, subjects are assigned to one of two roles: first-mover and second-mover. Such experiments contain two decision periods.² In the first decision period, each first-mover receives an endowment and then decides to send some, all, or none of it to the second-mover. The amount the first-mover does not send is hers to keep. In the second decision period, the amount first-movers sent to second-movers is multiplied (by a given factor) by the experimenter. Then, the second-mover can send some, all, or none of this amount to the first-mover. The amount the second-mover does not send is hers to keep. The

² By contrast, in social dilemma experiments there is only one decision period, and no role assignment to the players.
original amount given to first movers as well as the multiplication factor are common knowledge among the players.

A few studies demonstrate that the communication effect exists in Trust games as well. Among them, the only study we know of that allowed *interactive* communication is by Ben-Ner and Putterman (2006). Their Trust games involved four relevant pre-play communication conditions: no-communication, a one-stage computerized negotiation between first- and second-mover where subjects could make choices out of a table of possible distributions and could enter into a contract; a three-stage computerized negotiation along similar lines; and a computerized pre-play chat. The authors found significant differences in terms of both trust and reciprocation between all communication conditions and the no-communication condition, and in particular they found significant differences between the non-binding chat and the negotiations conditions.

Other studies have allowed *non-interactive* communication prior to Trust games, and it is useful to survey these results as well. Charness and Dufwenberg (2006) allowed pre-play communication in the form of an unrestricted written message from second-movers to first-movers. They found significant differences between the communication and the no-communication conditions in terms of both trusting and reciprocating behaviors (similar results were obtained by Ellingsen and Johannseeon 2004). However, when first-movers sent an unrestricted written message to second-movers, there were no significant differences in trust or reciprocation between the communication and the no-communication conditions.
In the above-mentioned study by Buchan, Croson and Johnson (2006), the authors allowed subjects to be involved in non-strategy-relevant communication in groups composed of approximately 12 members, before dividing them into pairs (the experiment lacked a control no-communication condition.) The authors found that, following personal communication, subjects sent and returned significantly greater amounts than after impersonal communication.

Bohnet and Baytelman (2007) conducted surveys in which senior executives were asked about their choices in simulated Trust games. Treatments included an anonymous one-shot Trust game scenario without communication, and a one-shot Trust game scenario with *face-to-face* communication before making a decision. The authors found significant differences between the communication and no-communication conditions in terms of amounts sent and received, and the expectations of both first- and second-movers. They also found that after face-to-face communication second-movers returned greater portions of the amounts sent to them by first-movers. The survey, however, did not include CMC treatments, and did not involve monetary incentives to subjects.

7. Experimental Procedure

To further study the effects of communication relevance and medium richness in trust games, we designed the following experiment that includes the four conditions shown in Table 1, plus a no-communication control condition. A total of 96 subjects
participated in this experiment. Subjects were students at the University of Pennsylvania, who were recruited using standard procedures in place at the university.

Subjects participated in three short and consecutive sessions. Since the pairing differed across treatment and subjects were not paired with the same person twice (and knew that), the three experiments were independent of each other. First-movers did not learn about the amounts returned by second-movers before continuing to the next session. All 96 subjects first participated in the no-communication control treatment. Next, subjects participated in a CMC treatment, and finally in a FtF treatment. The communication in subsequent conditions was either relevant or irrelevant. The numbers of subjects who participated in each treatment appear in the table below. Altogether, the sessions produced 112 data points for analysis (since 112= \[96+36+36+28+28\]/2).

Table 1

<table>
<thead>
<tr>
<th>Number of Subjects and Sessions per Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>No Communication</td>
</tr>
<tr>
<td>Irrelevant CMC</td>
</tr>
<tr>
<td>Irrelevant FtF</td>
</tr>
<tr>
<td>Relevant CMC</td>
</tr>
</tbody>
</table>
Subjects were paid their earnings for two out of the three conditions they participated in, and did not know in advance which condition they would not be paid for; the two paid sessions were chosen at random at the end of the experiment. Average earnings were $18.40 (including a $5 show-up fee, sd=$5.93). Subjects were in the lab for about one hour.

Participants were read and received written general instructions about the Trust game. Then they were randomly divided into pairs, and (in the communication conditions) engaged in communication with the person with whom they were paired. In the face-to-face conditions, the communication period was two minutes long. In the CMC conditions, subjects had five minutes to communicate via a computer chat program. In the relevant-communication conditions, subjects were told they could talk about anything they wished, including the game they were about to play. In the irrelevant-communication conditions, subjects could only talk about one of four 'impersonal' issues (somewhat like in Buchan, Croson and Johnson [2006]): *What are the three most populated cities in the world? What are the three most populated cities in the US? How many people live in Philadelphia and the surrounding suburbs? How many counties are there in Pennsylvania?*). Subjects were explicitly instructed not to talk with their partner about the game they were about to play. The experimenters monitored subjects' conversations to ensure that the instructions were adhered to. Copies of the communication instructions are available from the authors.
At the end of the communication period, subjects played the actual Trust games. First-movers received an endowment of six dollars and made their computerized investment decisions privately. After making their decisions, first-movers were asked about their expectations of second-mover reciprocation.

The amounts sent by first-movers were tripled by the experimenters, and second-movers were informed about the amount of money available to them. Then they made their investment decision privately and anonymously. At the end of each session, first-movers received no information about the amount of money sent over by second-movers.

8. Results

Overview. We were interested in the effects of communication relevance and communication medium on three variables: 1) trust – the amount in dollars sent by the first-mover ($0 through $6); 2) reciprocation – the amount returned by the second-mover, controlling for the amount sent; and 3) expected reciprocity – the amount the first-mover expected to be returned by the second-mover. We modeled these variables as binomial or quasibinomial responses using the generalized linear model (GLM) framework.\textsuperscript{3} To assess the main effects and the interaction of communication

\textsuperscript{3} Using ordinary least squares is inappropriate for all three variables, since analyses indicated that their distributions were non-normal. Furthermore, many of the regressions revealed evidence of overdispersion, making the quasi-binomial model necessary in several cases.
relevance (control, relevant, or irrelevant) and communication medium (control, FtF, or CMC), we sequentially tested pairs of nested models using the F-statistic, where appropriate.

Table 2 summarizes the responses across the five combinations of communication relevance and medium. Figure 1 shows the distributions of the amount received and returned by the second-mover. Because gender did not significantly predict trust ($F(1,110) = 0.45, p = .50$), reciprocation ($F(1,88) = 1.03, p = .31$), or expected reciprocity ($F(1,88) = 0.56, p = .46$), we do not further analyze this variable.

**Table 2**

Mean Trust, Trustworthiness, and First-Mover Expectations by Communication Relevance and Medium

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control</th>
<th>FtF- Relevant</th>
<th>CMC- Relevant</th>
<th>FtF- Irrelevant</th>
<th>CMC- Irrelevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>2.92</td>
<td>5.57</td>
<td>5.14</td>
<td>4.17</td>
<td>3.28</td>
</tr>
<tr>
<td></td>
<td>(.36)</td>
<td>(.46)</td>
<td>(.57)</td>
<td>(.49)</td>
<td>(.61)</td>
</tr>
<tr>
<td>Reciprocation</td>
<td>1.92</td>
<td>7.57</td>
<td>5.14</td>
<td>3.33</td>
<td>1.94</td>
</tr>
<tr>
<td></td>
<td>(.48)</td>
<td>(.96)</td>
<td>(1.33)</td>
<td>(1.05)</td>
<td>(.78)</td>
</tr>
<tr>
<td>Expected Reciprocation</td>
<td>3.54</td>
<td>8.36</td>
<td>7.43</td>
<td>5.56</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td>(.53)</td>
<td>(.69)</td>
<td>(.96)</td>
<td>(.91)</td>
<td>(.93)</td>
</tr>
</tbody>
</table>
Note. Parenthesized values are standard errors of the mean.

Figure 1. The amounts received and returned by the second-mover, sorted first by the amount received and then by the amount returned.
Trust. Figure 2 shows the distribution of trust across the five conditions. The interaction of communication medium and relevance did not significantly predict trust (F(1,106) = 0.01, p = .92), nor did whether the medium was CMC or FtF (F(1,107) = 1.53, p = .22). Furthermore, trust was not significantly different between the irrelevant communication condition and the control condition (F(1,108) = 1.89, p = .17).

Table 3 shows the estimated coefficients (on the log-odds scale) for the final model. Trust is significantly higher in the two relevant communication conditions than in the other three conditions. Table 4 shows that the probability of sending each dollar versus not sending each dollar is at chance levels in the control and irrelevant communication conditions, while it is significantly higher in the relevant communication conditions.
Summary of Quasi-Binomial GLM Estimates for Factors Predicting Trust ($N = 112$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control / Irrelevant Communication</td>
<td>0.18</td>
<td>0.18</td>
<td>0.95</td>
</tr>
<tr>
<td>Relevant Communication</td>
<td>1.95</td>
<td>0.55</td>
<td>3.57***</td>
</tr>
</tbody>
</table>

Note. Treatment contrasts are used with control / irrelevant communication as the baseline level. Residual deviance: 530.44 on 110 degrees of freedom. Estimated dispersion: 4.24.

*** $p < .001$

Table 4

Bias in Favor of Sending Each Dollar, By Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Odds</th>
<th>Probability</th>
<th>Different from chance?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control / Irrelevant Communication</td>
<td>1.20</td>
<td>0.54</td>
<td>No</td>
</tr>
<tr>
<td>Relevant Communication</td>
<td>8.33</td>
<td>0.89</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Note. Odds of 1 represent an equal probability of sending versus keeping each dollar.

Reciprocation. Figure 3 shows the distribution of reciprocation by communication medium and communication relevance. For 22 data points, the amount trusted was zero. Because trustworthiness necessarily is zero for these data, we omitted them from the analyses in this section.

Figure 3. Distribution of trustworthiness by communication medium and relevance.

As a predictor of trustworthiness, trust did not depend on communication relevance \( (z = 0.02, p = .99) \) or on the combination of medium and relevance \( (z = 0.34, p = .73) \). However, controlling for communication relevance, trustworthiness was affected by whether the medium was CMC (see Table 5; \( z = -2.72, p < .01 \)). Graphs the model’s predictions: The probability of returning versus not returning each dollar increases with the amount trusted, but increases more steeply for the FtF and control conditions than for CMC.
Table 5

Summary of Binomial GLM Estimates for Factors Predicting Trustworthiness

(N = 90)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-3.59</td>
<td>0.48</td>
<td>-7.42****</td>
</tr>
<tr>
<td>Relevant communication</td>
<td>0.63</td>
<td>0.14</td>
<td>4.43****</td>
</tr>
<tr>
<td>Trust</td>
<td>0.46</td>
<td>0.09</td>
<td>5.36****</td>
</tr>
<tr>
<td>Computer-mediated chat</td>
<td>1.59</td>
<td>0.82</td>
<td>1.93*</td>
</tr>
<tr>
<td>Trust x CMC</td>
<td>0.34</td>
<td>0.15</td>
<td>-2.38*</td>
</tr>
</tbody>
</table>

Note. The residual deviance is 356.49 on 85 degrees of freedom. We did not find evidence of overdispersion, since the data are sparse.

*p < .05

****p < .0001
Figure 4. Predicted reciprocation as a function of trust.

Expectations. To determine whether expected reciprocity predicted the first-mover’s level of trust, we converted expected reciprocity into the *expected percentage reciprocity* (the amount expected to be returned divided by the amount available), and then regressed trust on this variable using ordinary least squares.\(^4\) This conversion was

\(^4\) Model diagnostics identified two observations as high leverage outliers, which we excluded from the analysis. Specifically, half-normal plots of the jackknife residual errors and Cooks’ distance revealed extreme values for these points. Additionally, residual errors were over three standard deviations from the mean for these observations.
necessary to control for the dependency of the maximum amount that could be returned on the amount sent.

The estimated coefficients in Table 6 show that trust increases with the expected percentage reciprocity. When the first-mover expected nothing to be returned, the predicted amount sent was only .36 dollars. For each percent of the amount sent that the first-mover expected to be returned, however, the first-mover sent an additional .10 dollars. Thus, the median expected reciprocity (proportion) of .45 resulted in a $5 increase in the amount returned. Moreover, the $R^2$ value of 0.79 indicates that a large percentage of the variance in trust is explained by the expected percentage reciprocity.

Table 6

Summary of Estimates for Expected Reciprocity (Proportion) as a Predictor of Trust (N = 112)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>SE</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.36</td>
<td>0.20</td>
<td>1.82</td>
</tr>
<tr>
<td>Expected Percentage</td>
<td>10.20</td>
<td>0.50</td>
<td>20.26****</td>
</tr>
</tbody>
</table>

Reciprocity

Note. $R^2 = 0.79.$

**** $p < .0001$
We also examined the relationship between expected reciprocity and actual reciprocation, and found that the amount the first-mover expected to be returned predicted reciprocation better than trust itself did ($F(1,88) = 0.13, p = 0.72$). Table 7 shows the model estimates for expected reciprocity as a predictor of reciprocation. Figure 5 illustrates how the odds that the second-mover would return each dollar increased with the amount the first-mover expected to be returned.

Table 7

Summary of Quasi-Binomial GLM Estimates for Expected Reciprocity as a Predictor of reciprocation ($N = 90$)

| Variable       | Estimate | Std. Error | z-value | Pr(|z| < 0) |
|----------------|----------|------------|---------|------------|
| Intercept      | -2.64    | 0.45       | -5.92   | $3.2 \times 10^{-9}$ |
| Expected Reciprocity | 0.21    | 0.05       | 4.21    | $2.6 \times 10^{-5}$ |

Figure 5. Predicted reciprocation as a function of expected reciprocity, based on the model estimates in Table 7.

9. Discussion and Conclusions

Our results suggest that, in Trust games, the behavior of first-movers is strongly determined by their expectations of second-movers' reciprocation. Note, however, that those expectations are rarely met, as expected reciprocation was significantly higher than the actual reciprocation, across all conditions.

Our results also suggest that the variable most conducive to creating such expectations is -- paraphrasing McLuhan (McLuhan and Fiore 1967) -- not the
medium, but rather the message. In other words, first-movers' investments were significantly higher following unrestricted communication than restricted or no communication. Recall that unrestricted communication could include strategic discussion of the game and promise-making; according to our transcripts, all subjects who participated in the unrestricted communication were involved in both.

However, the same was not true regarding media richness; there were no significant differences between the amounts sent following chat communication, FtF communication, and the no-communication control when communication was restricted. Controlling for type of communication, the medium had no significant effect on trust. By contrast, earlier experimental results that were previously discussed found significant differences in cooperation rates across media types (FtF vs. chat rooms or newsgroups). We suggest that this may have been due to the fact that these experiments allowed unrestricted communication (and thus promise-making, etc.) between subjects. As we mentioned earlier, we are the first to study the results of irrelevant (restricted) communication in Trust games, across media conditions. Our results are, however, in line with the experiments that allowed non-strategic-impersonal pre-play communication prior to Social Dilemma games (Bouas and Komorita, 1996 and Dawes, McTavish and Shaklee, 1977).

Another possible explanation of the discrepancy between our and others’ results is the presence of 'learning effects'. Since computer-mediated communication deeply penetrates the fabric of everyday lives, especially the lives of students who were the subjects in our experiments, it is possible that they got accustomed to
computer-mediated communication and, furthermore, found ways to overcome media poverty by using symbols, special acronyms etc. that frequently appear in our transcripts. It may turn out that, as years go by and users get more experienced in computer-mediated conversations, computer-mediated communication will yield results similar to FtF communication, especially in experiments like ours that allow extended conversations between exchange partners, not just short numerical messages or one-line text messages. Though experiments that use numerical messages or one-line text messages permit more control over the influence of communication on trust and reciprocity, they move further away from everyday life conditions where people communicate with each other via computer interfaces. This, in turn, jeopardizes the external validity of experiments that involve such limited forms of communication.

As time goes by and computer-mediated communication becomes an important part of our lives, we would expect people to become better able to use it proficiently and to form expectations about future behaviors of exchange partners, at least when the content of communication is relevant to the situations they face.

While trust did not differ significantly by communication medium, reciprocity did. Indeed, reciprocation increased with the amount sent by the first-mover, and this effect was more pronounced in FtF communication. This is consistent with earlier findings that individuals engage in positive reciprocation, especially following communication. It should also be noted that first-movers received no dividend on their investment in second-movers -- with the exception of the FtF-dyadic condition. First-movers seem to over-estimate the willingness of second-movers to send money back.
Our results have some institutional implications as well. Many online exchange sites allow some form of communication between future exchange partners. But these forms of communication vary widely; some allow individuals to send just a short numerical statement to each other or even just check a box (which is, of course, also a minimal form of communication). Others allow unlimited communication in terms of content, length etc. It is likely that the closer the sites come to the latter type of communication, the more conducive they will be to the trusting which is needed to trigger mutually-beneficial exchanges. On the other hand, when sites do not allow subjects to convey to each other much information relevant to their future exchanges, they may disable the formation of empirical and normative expectations, and thus jeopardize the success of computer-mediated exchanges.

References


