

Being there versus seeing there: Trust via video

Nathan Bos, Darren Gergle, Judith S. Olson, Gary M. Olson

Collaboratory for Research on Electronic Work (CREW)

School of Information, University of Michigan

701 Tappan Suite E2420

Ann Arbor, MI USA 48019

+1 734-647-7730

{serp, dgergle, jsolson, gmo}@umich.edu

ABSTRACT

We studied the emergence of trust in a social dilemma game in four different communication situations: face-to-face, video, audio, and text chat. Three-person groups did 30 rounds of a social dilemma game and we measured trust by the extent to which they cooperated vs. competed. The face-to-face groups quickly achieved cooperative behavior, while the text chat groups continued to compete throughout. The video groups achieved the same levels of trust as the face-to-face groups, although perhaps a bit more slowly. The audio group was intermediate. These results show that trust can emerge through mediated communication.

Keywords

Trust, social dilemmas, communication, media

INTRODUCTION

There is increasing interest in the nature of trust over the Internet. The organizational consultant Charles Handy [1] has received widespread attention for his strong claim that “trust takes touch.” Does it? A study by Rocco [2] showed how powerful even brief direct contact can be. She found that groups meeting over email could not develop enough trust to reach the optimal outcome in a social dilemma, whereas groups meeting face-to-face did so easily and quickly. However, in a third condition, groups that interacted via e-mail developed trust if they had a brief face-to-face meeting prior to the experiment.

Our research sought to extend Rocco’s results. We asked whether other forms of computer-mediated-communication (CMC) might lead to the formation of trust. In particular, we looked at groups doing a social dilemma task who interacted over video, over phone conferencing, and via a text chat. All these media are more interactive than e-mail, but less “rich” than face-to-face interactions.

We expected that video might be sufficiently rich to allow trust to emerge in a social dilemma game. Audio only was less clear, since it clearly offers fewer cues than video. Chat

seemed as if it would be close to e-mail, though it is a bit more interactive than the latter. So our range of conditions offers a way to assess the character of communication needed for trust to emerge in this setting.

METHOD

Forty-five three-person groups played a game called Daytrader, where they periodically communicated with other players via one of four media: face-to-face, videoconference, phone conference, or in an Internet chatroom.

The Daytrader game is in the general class of games called social dilemmas. Well-known social dilemmas include the Prisoner’s Dilemma and the Problem of the Commons. Social dilemmas are defined as situations where the best interest of the group as a whole conflicts with the best interest of each individual, so that if each looks out only for oneself, all lose. In a multi-round social dilemma, the maximum group benefit accrues only when the group develops a level of trust, and each individual agrees to act cooperatively.

In the Daytrader game, players are given 30 tokens each round of the game and must decide whether to invest as an individual or risk investing with the group. The individual investment yields a guaranteed doubling of the payoff every round. In the group investment all three players’ contributions are lumped together, multiplied by 3, and then distributed back evenly. So an individual can receive triple from the group when everyone contributes, but also risks losing when other players hold back. There was also a bonus of 90 tokens is given every five rounds to whichever player made the most money in the previous five rounds. This bonus has the effect of giving a windfall profit to players who contribute less than other group members. (When players invest identical amounts for five rounds, i.e. cooperate, the bonus is split.) Groups play 30 rounds of this game in total, with discussions held every five rounds via one of four media channels.

Subjects for this experiment were mostly students or others affiliated with the University. All were unacquainted before the study, and never interacted with each other except via their particular experimental condition. Subjects

were paid according to how well they did in the game, with each 'token' worth 1 cent, and each participant guaranteed to make at least \$15.

RESULTS

We used the total payoff earned by a group to measure the degree of cooperation – the higher the total group payoff the more the cooperation. By implication this measures trust.

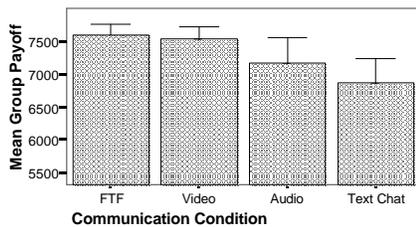


Figure 1. Average total group payoffs in four conditions

ANOVA showed a significant difference among the four conditions ($F(3,41) = 6.54, P < .002$). The means and deviations for the four conditions were: FTF $n=9$, mean=7599, $s.d.=211$; Video $n=14$, mean=7531, $s.d.=305$; Audio $n=13$, mean=7262, $s.d.=520$; Chat $n=9$, mean=6859, $s.d.=645$. The four conditions produced results ordered as we predicted, with face-to-face the most cooperative and quick to build trust, followed by video, audio, and text chat conditions. A post-hoc comparison using Bonferroni's test (regarded as a conservative test) found significant differences in f-t-f vs. chat and video vs. chat.

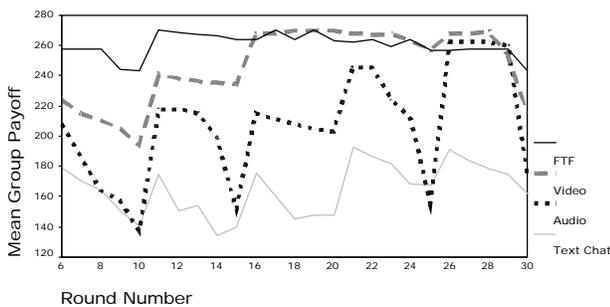


Figure 2. Round by round group contribution averages across four conditions

Figure 2 shows the trial-by-trial performance of the groups. The top line (FTF) indicates that trust in the face-to-face condition forms quickly, and continues throughout. Video also converges at the maximum, but takes somewhat longer, and the audio (phone) condition takes longer still, with more variation throughout. The text chat average does not converge on the maximum at any point, (although some individual chat groups did cooperate fully by the end).

Another noteworthy feature of figure 2 are the vertical dropoffs occurring on a 5 round cycle, with a final dropoff at the end. The dropoffs are the results of defections

within the game, typically where one player violates an agreement and the other players rapidly retaliate. The tops of the spikes are the rounds immediately after discussions, when cooperation has been re-established. The dropoff at the end, which is visible in all four conditions, is the result of last-round defections at the end of the game. A t-test comparing rounds 29 and 30 showed a large significant difference ($P < .000$) between the group investments in these rounds.

Post-questionnaires on group trust confirm the differences between the conditions. A 10-item scale measuring the trustworthiness of the group members ($\alpha = .96$) including items such as "the other players in the game could be trusted" was significantly different between conditions ($F(3, 142) = 8.16, P < .000$).

DISCUSSION

Videoconferencing may be as good as face-to-face for building trust. In this experiment video was indistinguishable from face-to-face, and both were significantly better than text chat. Although we cannot yet statistically separate the phone condition, it appears that phone is somewhere in between text chat and video for trust building.

It does appear that trust forms more slowly in mediated conditions. Figure 2 shows that it took video and audio some time to 'catch up' with the face-to-face groups. Groups using mediated communications seem more likely to form partial agreements (e.g. "lets all contribute 15, then 20...") rather than fully cooperate from the beginning.

The defections on trial 30 suggest that the kind of trust that was formed in all of these conditions may be vulnerable to opportunistic behavior, even when face-to-face. Late-round defections are a well-known phenomena in social dilemmas. Our data may allow more insight into when these are likely to occur, and how communication affects it. Additional analysis will examine both slow trust and defection events.

In sum, we have demonstrated that trust can emerge in mediated conditions. These results are a major extension of the work reported by Rocco [2], with application for many forms of distributed collaboration. But our data suggest that this kind of trust may be fragile. Additional experimental studies can help clarify this. Field studies will also be useful to examine whether these mediated interactions can lead to enduring trust in real organizations.

Acknowledgements

This work was supported by National Science Foundation grant IIS 9977923 to the Olsons.

References

[1] Handy, C. (1995) Trust and the virtual organization. *Harvard Business Review*. 73(3), 40-50.

[2] Rocco, E. Trust breaks down in electronic contexts but can be repaired by some initial face-to-face contact,

Conference proceedings on human factors in computing systems, 1998, pp496-502.