Communication and Cooperation

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Communication has a positive effect on collaboration. Bicchieri, Lev-On, and Chavez [1] provide an experimental evidence in favor of this claim. In this short note I will summarize their findings, discuss possible extensions, and argue for the need of a more general theory.

1 The experiment

The authors focus on trust games in the context of two aspects of communication: *content* (relevant vs. irrelevant communication) and *media-richness* (face to face, FtF, vs. computer-mediated communication, CMC). In the trust game they studied, there are two players: first-mover and second-mover. The first-mover received 6$ and she could decide to send any discrete amount of dollars to the second-mover. The amount second-mover received was tripled by the experimenter. Then, from this new amount, the second-mover could send any discrete dollar amount back to the first-mover. Participants were paired randomly and played 3 games in the following order: no-communication game (base condition), relevant or irrelevant CMC communication game, and lastly, relevant or irrelevant FtF communication game. In the two latter cases the communication preceded the execution of the moves. The researchers were interested in 3 dependent variables: *trust* – defined as the amount of dollars sent by the first-mover, *reciprocity* – the amount returned by the second-mover, and *expectation* – the amount the first-mover expected to get back. In general, across all conditions relevance and FtF had positive effects on all dependent variables. Looking into the interactions within conditions, the statistical analysis returned the following main findings (see Fig. 1 for the graph of dependencies among the variables):

(1) Trust was positively influenced by relevance.
(2) Reciprocity increased with trust.
(3) Reciprocity increased in FtF communication.
(4) Trust increased with expectations.
(5) Expectations predicted reciprocity better than trust itself did.

2 Discussion

Let us explore the possibility of a simplified picture of the observed interdependencies. The experimental findings suggest that reciprocity is better predicted

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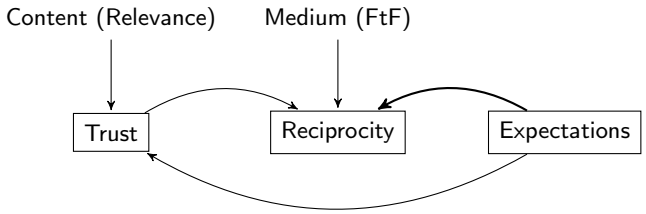

Fig. 1. Dependencies between experimental variables as discovered by statistical analysis.

by expectations than by trust. On the other hand, trust is influenced by the act of promising when relevant communication is allowed. Intuitively, the act of promising should trigger higher expectations of the first-mover and in turn the expectations should influence trust. In other words, one could hypothesize that in relevant communication, the act of promising influences only expectations that in turn imply various levels of trust. Therefore, one could expect that Figure 2 correctly depicts the dependencies in a simpler way. The authors do not discuss the relationship between content and expectations. Is such an interpretation consistent with the experimental findings?

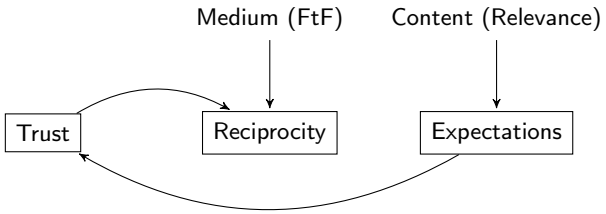

Fig. 2. An alternative (simpler?) model.

Moreover, reciprocity differed significantly by medium. Namely, in the FtF conditions subjects engaged in a positive reciprocation to the highest extent. This supports the authors hypothesis that promises focus participants on social norms and motivate them to reciprocate. I find this hypothesis intuitively very convincing. However, looking at Figure 1 we still see that reciprocity is also dependent on trust and expectations. However, the dependency on expectation may be only statistical in nature. The second-movers took their decision without knowing the first-movers' expectations. Taking into account agents' information processing capabilities, the reciprocity should rather depend only on trust (that signals expectations). The amount of money send by the first-mover signals the

strength of the social norm of 'honoring the deal' and motivates the second-mover's level of reciprocation (see Fig. 2).

FtF communication seems to encourage a more 'social' interpretation of the game on at least two levels. Firstly, in such games the players see each other, they can draw conclusions about the social standing of their opponent. For instance, the age or gender can play a role of the 'peer-defining' category. We know that gender turned out to be insignificant across the experimental conditions. But was it also an insignificant factor within the FtF condition? Secondly, note that in the experiment the ordering of conditions was fixed. All participants first played no-communication games, then CMC, and finally FtF. Therefore, they started with a scenario promoting strategic (selfish) behavior and then gradually moved towards a more 'social' setting where other factors except pay-off maximization could play a bigger role. The authors mention the problem but they claim that there should be no ordering effect as pairings for each game were unique. Still the players had to first develop a strategy for no communication condition. Arguably, they could then use the same strategy throughout the whole experiment. What would happen if the players started with FtF condition? The latter resembles to a lager extend our everyday strategic interactions that are rarely played once and never again. It seems that we are evolutionary programmed to think about social situations in terms of long-term exchanges. This can explain the positive levels of reciprocity observed in trust games [2]. When starting with FtF communication subjects should reciprocate even more.

3 The need of cognitive models

To better understand the above issues it would be helpful to have some theory of how subjects arrive at their decisions. What is the reasoning behind the formation of certain expectations and trust? What is the second-movers' reasoning leading to a particular reciprocation decision? Having a theory like that could help in designing experiments looking more into the dynamics of cognitive processes involved in trust games.

The discipline of behavioral game theory could profit from a general framework that would allow to *a priori* predict the dependencies between various variables and to compare different models. In such a framework we could answer, for instance, the questions like: Is the model from Fig. 2 simpler than model from Fig. 1? Do they predict different cognitive processes? Will changing the order of games influence subjects' reasoning?

At first glance such a framework seems improbable, as behavioral game-theory deals with an extremely complicated facet of our cognition. However, cognitive processes related to language and communication do not seem significantly simpler, and yet psycholinguistics offers many formal and computational cognitive models. These models usually draw from logic, (evolutionary) game-theory, probability theory, and computer science – yet another facet of 'communication effect' between disciplines. Recently, the network of collaborations between game-theory, logic, and computer science has been constantly growing –

this volume is a very witness to it. Also, the interest in cognitive science among logicians and game-theorists is slowly increasing (see, e.g., the recent papers where techniques from logic, game-theory, and computer science are combined to predict subjects' behavior in various games [3, 4]). Hopefully within coming years we will observe an increase in communication between researchers doing formal work and cognitive scientists. As the paper by Bicchieri and colleagues exemplifies, this communication can result in increased trust and collaboration between the communities, maybe even leading to a cognitive turn in logic and game-theory.

References

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