# Social Comparisons and Pro-social Behavior: Testing "Conditional Cooperation" in a Field Experiment

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Many important activities, such as charitable giving, voting, and paying taxes, are difficult to explain by the narrow self-interest hypothesis. In a large number of laboratory experiments, the self-interest hypothesis was rejected with respect to contributions to public goods (e.g., John O. Ledyard, 1995). Recent theories on pro-social behavior focus on "conditional cooperation": people are assumed to be more willing to contribute when others contribute. This behavior may be due to various motivational reasons, such as conformity, social norms, or reciprocity. According to the theory of conditional cooperation, higher contribution rates are observed when information is provided that many others contribute. This prediction is not trivial: if people behave according to pure altruism theories (e.g., Charles Clotfelter, 1997), they reduce their own contribution when informed that others are already contributing.

Testing for social comparison in the field encounters many difficulties (e.g., Charles Manski, 2000). For example, a positive correlation between expectations about the mean behavior of the reference group and one's own behavior is consistent with conditional cooperation, but not conclusive, as causality is not clear. Behavior may influence expectations, and not the other way round. Only a few laboratory experiments circumvent these problems and explicitly test conditional cooperation (e.g., Urs Fischbacher et al., 2001). These studies conclude that roughly 50 percent of people increase their contribution if others do so as well. To our knowledge, this paper is the first to go further and to test conditional cooperation in a field experiment.[1]

Our field experiment about charitable giving supports the theory of conditional cooperation: contributions increase, on average, if people know that many others contribute. The effect varies, however, depending on past contribution behavior. Those who never contributed do not change their behavior, while people who are indifferent about contributions react most strongly to information about others' behavior. Section I presents the field experiment and the empirical strategy to test the hypotheses, Section II shows the results, and Section III offers concluding remarks.

## I. Design of Field Experiment

Each semester, every student at the University of Zurich is asked to decide anonymously whether to contribute to two charitable funds in addition to the compulsory tuition fee. They can make a voluntary donation of CHF 7 (about $4.20) to a fund that offers low-interest loans to students in financial difficulty and/or CHF 5 (about $3) to a fund supporting foreign students. They have the further option not to donate to either fund.

The data include the decisions of *all* 37,624 students over a nine-semester period. For the

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[1] A number of results of laboratory experiments are consistent with "conditional cooperation" (e.g. Claudia Keser and Frans van Winden, 2000). James Andreoni and John Karl Scholz (1998) find in a field study that if contributions in one's social reference group increase by an average of 10 percent, then one's own contribution rises by about 2 to 3 percent. In a somewhat related field experiment, John List and David Lucking-Reiley (2002) exogenously increased the "seed money" in a donation campaign, which can be interpreted as the donations by others, from 10 to 67 percent; as a result donations increased by a factor of six. See also Armin Falk (2004).

field experiment, 2,500 nonfreshman students were selected at random. The university administration provided 2,000 of them with differing information about the behavior of other students. All other nonfreshmen constitute the control group. One thousand students were given the information that a relatively *high* percentage of the student population (64 percent) contributed to the two funds in the past (treatment "High"), and an additional 1,000 students that a relatively *low* percentage (46 percent) contributed to the two funds (treatment "Low"). We did *not* deceive students by giving fictitious data: the higher percentage reflected contributions during a recent semester, while the lower percentage represented the average contribution over the last ten years. As some students did not reenroll, we observed somewhat fewer than 1,000 subjects in each test group.

In a third group, expectations about the behavior of others were elicited from 500 students by asking them to guess what percentage of the total student population contributed to both funds. There were monetary incentives for the students to give their best guess; 258 out of the 431 students in this group who renewed their registration participated. This constitutes a return rate of 58 percent.[2]

The design of the field experiment has two clear advantages over previous studies. First, while experimental research in laboratories leads to many insights about human behavior, it is still unclear exactly how these results can be applied outside of the laboratory. Our field experiment enables this gap to be narrowed, while still controlling for relevant variables. Second, the panel structure of the data set allows an analysis of how people with heterogeneous prosocial preferences, identified from past behavior, react to social comparison.

## II. Analysis and Results

We report the results in three steps. First, the relationship between expectations and behavior is presented. Second, we report the effect of the field experiment and compare the magnitude of the effect with the correlation between expectations and willingness to contribute. Third, we analyze whether the effect differs for heterogeneous groups.

We observe that the higher the expectation of the students about the average group behavior, the *more likely* it is that they contribute. Students expect, on average, 57 percent of their fellow students to contribute to both funds. They underestimate the actual contribution rate of 67 percent. The coefficient of correlation between the expressed expectations and the contribution to at least one fund is 0.34 ($p < 0.001$). This result corresponds with the results of many laboratory studies. From this result, however, causality cannot be established, because behavior can also influence expectations, e.g., through a "false consensus" effect (Lee Ross et al., 1977). It is therefore important to induce beliefs experimentally: How do individuals react when faced with the relatively *high* or *low* contribution rate of other people?

The results of the field experiment are consistent with the hypothesis that people are partly driven by conditional cooperation: the probability of students contributing correlates positively with the mean contribution rate in the reference group. The percentage of students contributing to at least one of the funds increases by more than 2.3 percentage points when they receive the information that 64 percent of the other students contribute, compared to the information that only 46 percent contribute (the contribution rates being 74.7 percent for treatment "Low," 77 percent for treatment "High," and 72.9 percent for the control group). This difference between the two treatments is not statistically significant at any conventional level ($t$-value $= 1.199$, $p < 0.231$). Such a result may, however, be due to heterogeneity in people's preferences. Some students derive high satisfaction from contributing and others presumably do not. As the decision is censored to either contributing or not contributing, those who always gave or never gave should not be significantly affected by social comparison. Students whose utility gain is somewhere between the two extremes should be more likely to respond. To control for such heterogeneity, we estimate a conditional logit model with individual fixed-effects. The average effect, therefore, is not very representative and its estimation comes with a large standard error.

[2] For more details on the three treatments, see Frey and Meier (2003).

TABLE 1—CONDITIONAL COOPERATION
Dichotomous dependent variable: Contribution to at least one fund (=1)
Conditional logit model with individual fixed effects

| Variable | Coefficient (*z*-value) | $P > \|z\|$ |
|---|---|---|
| *Treatment "High"* (64%) | 0.363** | 0.006 |
| | (2.73) | |
| *Treatment "Low"* (46%) | −0.063 | 0.633 |
| | (−0.48) | |
| Individual fixed effects | included | |
| Semester dummies | included | |
| *N* | 71,658 | |
| Log likelihood | −26981.483 | |

*Notes:* Test of differences for treatment *"High"—"Low"* = 0.0: $\chi^2(1) = 5.44, p < 0.0197$

Level of significance: * $0.01 < p < 0.05$, ** $p < 0.01$

Table 1 presents the conditional logit model, where the dependent variable takes the value 1 when the subject decides to contribute to at least one fund, and 0 otherwise.[3] Individual fixed-effect and time dummies are incorporated. The control group consists of all nonfreshmen not in the treatment groups. This model tests the effect on contributions of being in one of the two treatment groups and, more important, whether there are differences between the two groups.

Table 1 supports conditional cooperation: people presented with a high contribution rate are more likely to contribute than people who are told that not many others contribute to the funds. The difference between the two coefficients for the two treatment groups is statistically significant at the 95-percent level ($\chi^2(1) = 5.44$, $p < 0.0197$). The effect on behavior is substantial, especially if the specific features of the naturally occurring decision setting are considered. First, as the experimental intervention is based on *actual* contribution rates, we do not provide information about very high or very low cooperation rates. The difference between 46 percent and 64 percent of students contributing is relatively modest compared to previous laboratory studies where people are confronted with extreme cases, such as zero contribution rates (e.g., Joachim Weimann, 1994). Our results can be seen as providing even stronger support for conditional cooperation. Second, the students face a dichotomous decision of whether to contribute or not. This leaves little room for marginally adjusting one's behavior. Again, it is remarkable that students change their behavior at all. Thus, the results from the field experiment show that, even in a naturally occurring situation, people react to relatively small changes in the reported cooperation rate of others.

In order to estimate the magnitude of the effect, we test the treatment effect in a probit model, controlling for past behavior as a proxy for heterogeneity of persons. The coefficient of past behavior indicates the fraction of previous situations in which the subject decided to contribute. More than 50 percent of the students contributed in all previous situations. Around 10 percent never contributed to either of the two funds. The rest fall somewhere in between. The probit model of Table 2 incorporates only students who are part of one of the two treatment groups. Treatment "Low" constitutes the reference group. The computed marginal effect shows how much the probability of a contribution changes compared to the reference group.

The results of panel (A) confirm that individuals contribute more to the two funds when they know that many others do as well ($p < 0.01$). The marginal effect of 4.6 percentage points is large when taking into account that the intervention is not strong. Table 2 shows that people who contributed in the past are more likely to contribute in the present decision. This may indicate that people's attitudes to contribute to the funds vary.

The change in behavior from an induced cooperation rate of 46 percent to 64 percent can be compared to a change in the elicited expectation of the same magnitude. How much does the probability of contributing change when students believe either that 46 percent of other students contribute or 64 percent of other students contribute? Panel (B) shows the probit model with the elicited beliefs incorporated as an independent variable. As the marginal effect of a 1-percentage point change in expectations is 0.6, the change from 46 percent to 64 percent alters the probability of contributing by around

[3] Contributions to at least one fund are used as the dependent variable, because it constitutes the lower limit of contributions. If contributions to both funds are taken as a dependent variable, the results literally do not change. The respective regressions can be obtained from the authors on request.

TABLE 2—CONDITIONAL COOPERATION CONTROLLING FOR PAST BEHAVIOR
Dichotomous dependent variable: Contribution to at least one fund (=1)
Probit estimate

| | Panel A | | Panel B | | Panel C | |
|---|---|---|---|---|---|---|
| Variable | Coeff. (*z*-value) | Marginal effect (in percent) | Coeff. (*z*-value) | Marginal effect (in percent) | Coeff. (*z*-value) | Marginal effect (in percent) |
| *Treatment "High"* (64%) | 0.180** (2.20) | 4.6 | | | | |
| *Treatment "Low"* (46%) | Reference group | | | | | |
| Elicited expectations | | | 0.0215** (5.17) | 0.6 | 0.0128* (2.31) | 0.3 |
| Coefficient of past behavior | 2.721** (24.30) | 69.1 | | | 2.821** (8.95) | 63.8 |
| Constant | −1.162** (−12.59) | | −0.414 (−1.79) | | −1.759** (−5.18) | |
| *N* | 1754 | | 250 | | 250 | |
| Log likelihood | −594.28409 | | −122.02608 | | −70.236785 | |

*Note:* Level of significance: * $0.01 < p < 0.05$, ** $p < 0.01$

11.5 percentage points.[4] This effect is more than twice the behavioral change actually occurring due to conditional cooperation. The correlation between elicited expectations and behavior therefore greatly overestimates the effect of conditional cooperation. This can be explained by a false consensus effect: Individuals' preferences regarding contribution may influence expectations about the pro-social behavior of others. Panel (C) of Table 2 controls for individual heterogeneity by incorporating the coefficient of past behavior in the probit model. The marginal effect of a 1-percentage-point change in expectations is 0.3. A change in expectations from 46 percent to 64 percent corresponds to a change in the probability of contributing by around 5.3 percentage points. This effect is more in line with the behavioral change due to induced beliefs, because the coefficient of past behavior captures part of the false consensus effect.

The question can be asked whether people with different preferences for pro-social behavior react differently to the treatments. Figure 1 analyzes whether the treatment effect interacts with past behavior. Subjects who never contributed ($c = 0$) or always contributed ($c = 1$) are quite insensitive to the treatments. In contrast, subjects who changed their behavior in the past are more attuned to other people's behavior.[5] The higher sensitivity is consistent with a model where people have heterogeneous preferences. As the decision is censored, people who have strong (weak) pro-social preferences are not able to increase (decrease) further their contribution. People who are more indifferent to contributing react most strongly to the information about cooperation rates in the field experiment.

## III. Discussion and Conclusion

This paper presents evidence from a large-scale field experiment on conditional cooperation: people behave pro-socially depending on the pro-social behavior of other persons. When students were presented with the information

[4] We calculated the difference between the contribution probabilities at the two points of interest on the cumulative standard normal function: $\Phi(\text{constant term} + 64*\beta_{\text{expectation}}) \cdot \Phi(\text{constant term} + 46*\beta_{\text{expectation}})$. If there are other variables in the equation, they are included at their mean value.

[5] The results are supported in a probit regression, which looks at the dichotomous decision whether to contribute or not. The effect of the experiment for subjects with different pro-social preferences is captured by an interaction term for *treatment "High"* * *coefficient of past behavior* (Frey and Meier, 2003).

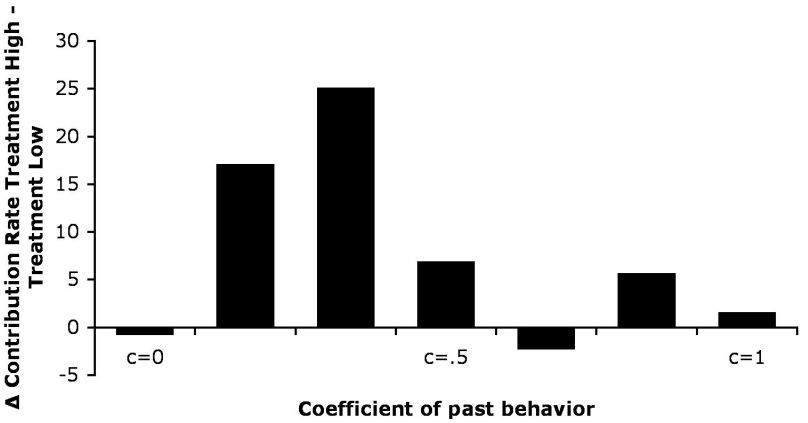


FIGURE 1. DIFFERENT REACTIONS TO OTHERS' BEHAVIOR

that many others donated to two charitable funds at the University of Zurich, their willingness to contribute increased. This constitutes a first test of social interaction effects in charitable giving in a field experiment.

The behavior resulting from conditional cooperation is consistent with at least three theoretical approaches: first, people may want to behave in an appropriate way and to conform to a social norm (David M. Messick, 1999); second, people have some level of fairness preferences, such as reciprocity (Matthew Rabin, 1993); or third, contributions by others may serve as a signal of the quality of the public good, or of the organization that provides the good (e.g., a charity) (Lise Vesterlund, 2003). The results of the field experiment do not inform us as to which theoretical approach is the most appropriate for explaining conditional cooperation. Results from previous experiments that attempt to discriminate among the various explanations are ambiguous. Some experimental studies indicate that conformity can explain conditional cooperation better than reciprocal considerations (Iris Bohnet and Richard Zeckhauser, 2004), while others come to the opposite conclusion (Falk et al., 2003; Robert Kurzban et al., 2001). Yet other laboratory experiments find evidence supporting the third mechanism, that cooperative behavior of others is used as an indication of the quality of the public good (Jan Potters et al., 2001). Future research should concentrate on testing in the field under which conditions the motives that lead to conditional cooperation prevail.

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