Social Comparisons and Pro-social Behavior

Testing 'Conditional Cooperation' in a Field Experiment

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Forthcoming: ***American Economic Review***

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 the more that 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 should be 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: 34-35), 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

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We are grateful for helpful comments from Matthias Benz, Andrew Clark, Armin Falk, Ernst Fehr, Christina Fong, Simon Gächter, Lorenz Götte, Reto Jegen, Simon Lüchinger, Dina Pomeranz, Rupert Sausgruber, Alois Stutzer, and two anonymous referees. We wish to thank the administration of the University of Zurich, especially Thomas Tschümperlin, for their support of the project.

cooperation, but not conclusive, as causality is not clear. Behavior may influence expectations, and not the other way round. Only a few laboratory experiments get around these problems and explicitly test conditional cooperation (e.g. Urs Fischbacher et al., 2001). These studies conclude that roughly 50 percent of the 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 as well. However, the effect varies depending on past contribution behavior. Those who never contributed in the past do not change their behavior, while people who are indifferent about the contributions react to the information about others' behavior the strongest. Section I presents the field experiment and the empirical strategy to test the hypotheses. Section II shows the results. Section III offers concluding remarks.

I. Design of Field Experiment

Each semester, every student at the University of Zurich has to decide anonymously whether or not he or she wants to contribute to two Social Funds – in addition to the compulsory tuition fee. They can make a voluntary donation of CHF 7 (about US$ 4.20) to a Fund which offers cheap loans to students in financial difficulties and/or CHF 5 (about US$ 3) to a Fund supporting foreign students, or they can choose not to donate to either fund. Students decide anonymously at home about the contribution to the two Social Funds.

[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 of the people in one's social reference group increase by an average of 10%, then one's own contribution rises by about 2% to 3%. 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%; as a result donations increased by a factor of six.

The panel data includes the decisions of *all* 37,624 students over nine semesters. For the field experiment, 2,500 students of the student population (non-freshmen) were selected at random. The University administration provided 2,000 of them with differing information about the behavior of other students. All other non-freshmen constitute the control group. 1,000 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 a further 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 applies to the last winter semester contributions while the lower percentage indicates the average contribution over the last ten years. As some of the subjects did not renew their registration, we observe somewhat less than 1,000 subjects in each treatment group.

In a third treatment group, expectations about the behavior of others were elicited for a group of 500 students by asking them to guess what percentage of the total student population contributed to both of the Funds. There were monetary incentives for the students to give their best guesses. 258 made guesses (out of the 431 students in this treatment group who decided to renew their registration). 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 generalized outside of the laboratory situation. Our field experiment enables this gap to be narrowed down, while still controlling for relevant variables. Second, the panel structure of the data set allows an analysis of how people with heterogeneous pro-social preferences identified from past behavior react to social comparison.

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

II. Analysis and Results

We report the results in three steps. Firstly, the relationship between expectations and behavior is presented. Secondly, we report the effect of the field experiment and compare the magnitude of the effect with the correlation between expectations and willingness to contribute. Thirdly, we analyze whether the treatment effect differs for heterogeneous people.

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 Social 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 (e.g. Lee Ross et al., 1977). It is therefore important to experimentally induce beliefs: 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', 77.0 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, $p<0.231$). However, such a result may be due to heterogeneity in people's preferences. Some students derive high utility from contributing and others

presumably would get disutility if they had to contribute. As the decision is censored to either contributing or not contributing, those who always gave or never gave should not be that much affected by social comparison. Students whose utility gain is somewhere between the two extremes should be more likely to respond. To control for such individual 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.

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-effects and time dummies are incorporated. The control group consists of all non-freshmen not in the treatment groups. This model tests the effect on contributions of being in one of the two treatment groups and, more importantly, whether there are differences between the two treatments groups.

[Table 1 about here]

Table 1 supports 'conditional cooperation': people presented with a high contribution rate are more likely to contribute than people who are told that not so 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. Firstly, 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

[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.

as providing even stronger support for 'conditional cooperation'. Secondly, 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 decisions. 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 the subjects 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.

[Table 2 about here]

The results of panel A confirm that individuals contribute more to the two Funds when they know that many others do so 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 also shows that past behavior is indeed an important determinant of present behavior and may capture the heterogeneous preferences towards contributing to the Funds.

It is possible to compare the behavioral effect due to the experimentally induced cooperation standards of 46 percent and 64 percent, with the behavioral effect of a change in reported expectations of the same magnitude. Panel B shows the probit model with the elicited beliefs incorporated as an independent variable. As the marginal effect of a one-percentage change in expectations is 0.006, the change from 46 percent to 64 percent changes

the probability of contributing by around 11.5 percentage points. 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 on 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 one-percentage change in expectations is 0.003. 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 pay more attention to other people's behavior. [4] 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 further increase (decrease) their contribution. People who are more indifferent to contributing or not contributing react the most to the information about cooperation rates in the field experiment.

[Figure 1 about here]

[4] The results are supported in a probit regression, which looks at a dichotomous decision whether to contribute or not, with an interaction term for *treatment 'high'* * *coefficient of past behavior* (Frey and Meier, 2003).

III. Discussion and Conclusion

This paper presents evidence from a large-scale field experiment on conditional cooperation: people behave pro-socially conditional on the pro-social behavior of other persons. When students were presented with the information that many others donated to two Social Funds at the University of Zurich, their willingness to contribute increased compared to the situation where they were informed that not so many others contributed. 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: firstly, people may want to behave in an appropriate way and to conform to a social norm (e.g. David Messick, 1999); secondly, people have some sort of fairness preferences, such as reciprocity (e.g. Matthew Rabin, 1993); or thirdly, contributions by others may serve as a signal for the quality of the public good, or for the organization which provides the good (e.g. a charity) (e.g. 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 try to discriminate between the various explanations are ambiguous. Some experimental studies indicate that conformity can explain conditional cooperation better than reciprocal considerations (e.g. Iris Bohnet and Richard Zeckhauser, 2002), while others come to the opposite conclusion (e.g. Armin Falk et al., 2003; Robert Kurzban et al., 2001). Yet other laboratory experiments find evidence for the third mechanism that cooperative behavior of others is used as a signal for 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.

References

Andreoni, James and John Karl Scholz. "An Econometric Analysis of Charitable Giving with Interdependent Preferences." *Economic Inquiry,* 1998, 36(3), pp. 410-28.

Bohnet, Iris and Richard Zeckhauser. "Social Comparisons in Ultimatum Bargaining." Working Paper Series, Harvard University, 2002.

Clotfelter, Charles T. "The Economics of Giving." in Barry, John W. and Bruno V. Manno, eds., *Giving Better, Giving Smarter*. Washington, D.C.: National Commission on Philanthropy and Civic Renewal, 1997, pp. 31-55.

Falk, Armin, Urs Fischbacher and Simon Gächter. "Living in Two Neighborhoods – Social Interactions in the Lab." Working Paper Series No. 150, University of Zurich, 2003.

Fischbacher, Urs, Simon Gächter and Ernst Fehr. "Are People Conditionally Cooperative? Evidence from a Public Goods Experiment." *Economics Letters*, 2001, 71(3), pp. 397-404.

Frey, Bruno S. and Stephan Meier. "Social Comparisons and Pro-Social Behavior: Testing 'Conditional Cooperation' in a Field Experiment." Working Paper Series No. 162, University of Zurich, 2003.

Keser, Claudia and Frans van Winden. "Conditional Cooperation and Voluntary Contributions to Public Goods." *Scandinavian Journal of Economics*, 2000, 102(1), pp. 23-39.

Kurzban, Robert, Kevin McCabe, Vernon L. Smith and Bart J. Wilson. "Incremental Commitment and Reciprocity in a Real-Time Public Goods Game." *Personality and Social Psychology Bulletin*, 2001, 27(12), pp. 1662-73.

Ledyard, John O. "Public Goods: A Survey of Experimental Research." in Kagel, John and Alvin E. Roth, eds., *Handbook of Experimental Economics*. Princeton: Princeton University Press, 1995, pp. 111-94.

List, John A. and David Lucking-Reiley. "The Effects of Seed Money and Refunds on Charitable Giving: Experimental Evidence from a University Capital Campaign." *Journal of Political Economy,* 2002, 110(1), pp. 215-33.

Manski, Charles. "Economic Analysis of Social Interactions." *Journal of Economic Perspectives*, 2000, 14(3), pp. 115-36.

Messick, David M. "Alternative Logics for Decision Making in Social Settings." *Journal of Economic Behavior and Organization*, 1999, 39(1), pp. 11-28.

Potters, Jan, Martin Sefton and Lise Vesterlund. "Why Announce Leadership Contributions? An Experimental Study of the Signaling and Reciprocity Hypothesis." Working Paper, Tilburg University, 2001.

Rabin, Matthew. "Incorporating Fairness into Game Theory and Economics." *American Economic Review*, 1993, 83(5), pp. 1281-302.

Ross, Lee, David Greene and Pamela House. "The 'False Consensus Effect': An Egocentric Bias in Social Perception and Attribution Processes." *Journal of Experimental Social Psychology*, 1977, 13, pp. 279-301.

Vesterlund, Lise. "The Informational Value of Sequential Fundraising." *Journal of Public Economics*, 2003, 87(3-4), pp. 627-657.

Weimann, Joachim. "Individual Behaviour in a Free Riding Experiment." *Journal of Public Economics*, 1994, 54(2), pp. 185-200.

Table 1: Conditional Cooperation

Dichotomous dependent variable: Contribution to at least one Fund (=1)
Conditional logit model with individual fixed effect

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

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

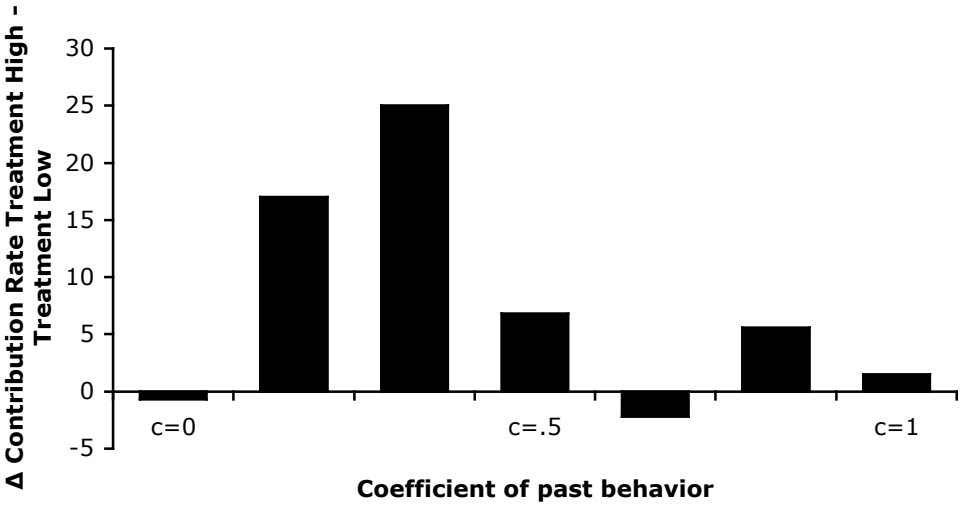

Figure 1: Different reactions to others' behavior