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Abstract

This paper investigates whether disclosure crowds out pro-social behavior using a public goods experiment. In a between-subject design, we investigate different degrees of disclosure. We find a small positive but insignificant effect of disclosure treatments on contributions to the public good. Thus, our empirical findings are consistent with crowding theory.

***Key words*:** Disclosure; image motivation; public goods experiment.

***JEL classification*:** C91; H41.

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1. Introduction

Over the last few decades, many different types of external interventions have been implemented in various areas ranging from environmental protection to charitable giving with the aim of increasing people's pro-social behavior. However, as pointed out by Frey and Jegen (2001) and Nyborg and Rege (2003), it has been documented in the literature that external interventions may enhance intrinsic motivations (crowding-in) when the external intervention is perceived by subjects as supportive, or reduce intrinsic motivations (crowding-out) when the intervention is perceived by subjects as controlling. In cases where the decrease in intrinsic motivation is larger than or equal to the increase in other types of motivations from the intervention, crowding-out has occurred. For example, Titmuss (1970) argued that if people were paid for blood donations, the supply of blood would decrease. In a recent field experiment by Mellström and Johannesson (2008), Titmuss's argument is partly supported by the empirical findings. In a similar vein, Frey and Oberholzer-Gee (1997) find that the acceptance of "not-in-my-backyard-projects" is reduced if monetary compensation is offered, while a study by Gneezy and Rustichini (2000) shows that an imposed fine for late pick up of children from daycare increases the number of late pick-ups. To affect pro-social behavior in the desired direction, it is important to understand the underlying motivational factors. Benabou and Tirole (2006) discuss three broad motivations to why individuals behave pro-socially: (i) intrinsic, (ii) extrinsic, and (iii) image motivation.[1] While intrinsic and extrinsic motivations focus on factors such as altruism and monetary rewards, image motivation focuses on the fact that an individual derives utility from how other people perceive her, i.e., social approval, and from the way she perceives

[1] There is a similar classification in, e.g., Ariely *et al*. (2009). For early work on intrinsic motivation, see, e.g., Deci (1975).

herself (e.g., self-image). Most of the research on testing the hypothesis of crowding-out has focused on monetary compensation, which directly affects extrinsic motivation.

The objective of the present paper is to investigate whether disclosure, as an external intervention, crowds out contributions to a public good by using an experimental approach, and more specifically, we test the effect of different degrees of disclosure on contribution levels in our public goods experiments. In contrast to the anonymous setting in public goods experiments, many situations in our daily lives contain an element of disclosure of both identities and contributions. Not surprisingly, disclosure has been used in many situations ranging from public announcements at fundraising events to official reporting of pollution levels of companies, with the common purpose of using image motivations to induce pro-social behavior. By using a one-shot public goods experiment based on the design in Fischbacher *et al.* (2001), we focus on the effect of three different types of disclosure on contributions to a public good, namely (i) out-group disclosure, where a subject's identity and contribution are disclosed to all subjects in the experimental session but group belonging is not disclosed, (ii) in-group disclosure, where each subject's identity and contribution are revealed to the group members only, and (iii) joint in-group and out-group disclosure, i.e., a subject's contribution is disclosed to all subjects of the session, together with a baseline treatment comprising of the standard setting of not disclosing group belonging.[2] To avoid confounded effects between disclosure and stereotyping based on gender and beauty (e.g., Andreoni and Petrie, 2008), group belonging and contribution were disclosed after all participants had made their contributions. These three types of disclosure schemes can be implemented in many local public good situations, e.g., in the context of water quality of rivers in different watersheds. In this situation, the local environmental authority has the possibility to choose a disclosure scheme, where subjects' behavior can be disclosed either in-

[2] It should be noted that a one-shot experiment rules out that strategic motives can play a role.

group to others situated along the same river, out-group to other firms/people in the region but not necessarily situated along the same river, or a combined approach. In our analysis, we go beyond the existing studies by disentangling the effect of in-group disclosure, i.e., decisions that are revealed only to the group members, and out-group disclosure, i.e., decisions that are revealed to everyone without stating group belongings, on pro-social behavior in a public good setting.

The little existing experimental evidence regarding using disclosure as an external intervention to increase pro-social behavior is mixed. A few laboratory experiments have investigated the effect of disclosure on cooperation using public goods experiments.[3] Rege and Telle (2004) tested whether social approval affects cooperation in a one-shot public good experiment using an in-group disclosure strategy. In the disclosure treatment, where the subjects themselves revealed their contributions to the other members of their own group, contributions to the public good were significantly higher compared to a standard setting with no disclosure. In contrast, Noussair and Tucker (2007) did not find a significant difference in a one-shot experiment with disclosure using a design similar to Rege and Telle (2004), while they did find significantly lower contributions in a multi-period public goods experiment with disclosure.[4] List *et al.* (2004) studied the effect of different degrees of anonymity when voting on whether or not all of the experiment participants have to contribute the whole participation fee to a public good. They found that random disclosure of donation to a public good resulted in a significantly higher

[3] Despite the fact that the standard public goods experiment is conducted anonymously, and in contrast to predictions of standard economic theory, subjects on average contribute a positive amount to public goods (e.g., Leyard, 1995; Zelmer, 2003).

[4] A related study by Burnham and Hare (2007) included a treatment where subjects were watched by a robot with eyes, and this significantly increased the contributions. There are some papers on the effect of disclosure in a multi-period public goods game. Gächter and Fehr (1999) studied the effect of social approval incentives introduced at the end of a 10 period public good game on contributions. A number of papers have investigated the effect of public disclosure of behavior but not identity. Croson (2001) found in multi-period public goods experiments that disclosing information to other group members about contributions without revealing any identities has no significant effect on contribution, while Sell and Wilson (1991) found, using a similar design, that disclosure of contribution, but not identity, does have a significant impact on contributions. Laury *et al.* (1995) test the differences in contributions in a double-blind versus a single-blind treatment, but did not find a significant difference in contribution levels related to disclosure.

share of yes responses compared to a treatment where the answer to the referendum was completely anonymous.[5] In a field experiment, Soetevent (2005) investigated church offerings among 30 churches in the Netherlands. He found that significantly higher donations to causes outside the church were made when open collection baskets were used instead of ”closed” collection bags. Yet, the effect vanished over time, and he did not find this effect for offerings with an internal cause.[6] His design could be seen as a large in-group treatment with partial disclosure since only neighbors could potentially see the amount donated by someone else. By using a lab experiment and a field experiment to test for social approval, Ariely *et al*. (2009) found that donations increase in size if they are seen by others in a treatment. As discussed in Blackman (2008), disclosure has been frequently used in a number of countries to reveal the pollution levels among firms. Although the results of using disclosure as an external intervention to regulate pollution are mixed, the main effect seems to be reduced pollution among the heaviest polluting firms.[7] The main finding of our public goods experiments is that disclosure increases contributions to the public good, yet the effect is statistically insignificant at conventional levels. This indicates crowding-out in a similar manner as monetary rewards. The rest of the paper is organized as follows: Section 2 presents the experimental design and procedures. Section 3 contains the results from our analysis. Finally, Section 4 offers a discussion and concluding remarks.

[5] Andreoni and Bernheim (2009) found that the proportion of equal split in a dictator game increases as the probability of disclosure decreases.

[6] Alpizar *et al.* (2008) found in a field experiment on donations to a national park that donations made in front of a solicitor are significantly higher than those made anonymously.

[7] A related literature explores the effects of leading by example on contributions to public goods. In this type of experiment, the leader decides and announces her contribution before the other group members make their contributions. Such leadership has been found to increase contributions in comparison with the standard anonymous and simultaneous contribution to the public good (e.g., Güth *et al*., 2006; Rivas and Sutter, 2009).

2. Experimental design

Our experiment builds on the experimental design by Fischbacher *et al.* (2001).[8] The key features of their design are elicitation of both unconditional and conditional contributions to a public good. In the unconditional setting, subjects are asked how much they would like to contribute to a public good, which replicates a standard one-shot public good experiment. In the conditional contribution setting, the strategy method is used, i.e., subjects are requested to fill in a conditional contribution table that specifies how much they would like to contribute to a public good conditional on each of the possible average contribution levels of the other members of their group (rounded to the nearest integer). In the standard experimental set-up, neither group belonging nor contributions at the individual level are revealed to subjects before, during, or after the experiment. In the disclosure treatments, contributions and identity are revealed following completion of all contributions, and the exact information on the disclosure procedure is thoroughly described in the instructions read prior to the contribution decisions.[9]

We use a standard linear public goods experiment. Each subject is endowed with 20 tokens and the marginal per capita return from the public good is set to 0.4. Each group consists of four members. Thus, subject *i*'s payoff in tokens is given by

$$\pi_i = 20 - c_i + 0.4\sum_{i=1}^{4} c_i \,, \qquad (1)$$

where c_i is the amount invested in the public good by individual *i*. In order to make each of the choices incentive compatible, for three of the subjects in each group, the unconditional

[8] For other studies using this design, see, e.g., Fischbacher and Gächter (2010), Herrmann and Thöni (2009), and Kocher *et al*. (2008).

[9] It should be noted that this is different from previous experiments. In Andreoni and Petrie (2004), subjects could see photos of their group members, but their decisions were not revealed to others in a face-to-face situation. In Rege and Telle (2004), the subjects made their decisions in front of the other members of their respective groups. Given gender and beauty stereotypes (see, e.g., Andreoni and Petrie, 2008), it is difficult to know whether and in what direction such disclosure can be expected to affect contributions.

contribution counts as their contribution to the public good. The contribution from the fourth subject, who is randomly selected from the group, is based on her conditional contribution table. More exactly, the conditional contribution she reported for the average unconditional contributions of the other three members is taken as her contribution to the public good. Thus, by adding the three unconditional contributions and the conditional contribution by the fourth member, the total contribution by the group to the public good can be calculated using equation (1).

Our 2x2 experimental design is summarized in Table 1. The two dimensions in our experiment are disclosure to members of own group, i.e., in-group disclosure, and disclosure to all subjects in a session, i.e., out-group disclosure. The no-disclosure treatment is a standard public goods game setting with complete anonymity regarding both the identities of and the contributions made by the subjects. In the out-group disclosure treatment, each subject is asked one at a time, by using the experimental identification numbers, to stand up in front of the group after the completion of the experiment, whereby her income-relevant decision is publicly announced by the experimenter to all subjects in that session, without any reference to group belonging. In the in-group disclosure treatment, the contributions of the subjects are disclosed to group members only. In this treatment, the four group members come together, one group at a time, in a room next door. Once the four group members are seated, each subject is asked one at a time by using experimental identification numbers to stand up in front of the others, whereby her income-relevant decision is publicly announced by the experimenter. In the joint disclosure treatment, the four group members are asked, one group at a time, to sit on four chairs in front of all participants in the session. Then, the income-relevant decision is revealed by the experimenter, using the same procedure as in the other two disclosure treatments.

>>> Table 1

An experimental session consisted of the following stages: At the beginning of a session, participants completed the Mach-IV test (Christie and Geis, 1970).[10] According to Vecchio and Sussmann (1991), the resulting test score can be used as a proxy of the degree of an individual's selfishness. The purpose was to be able to test whether the fraction of selfish subjects was the same across treatments. Once all participants had completed the Mach-IV test, the experimental instructions were handed out and read aloud to the subjects.[11] Several examples and individual exercises were provided as well. To check for the subjects' understanding of the experiment, the experimenter publicly solved the exercises once all participants had finished answering them. Any additional questions the subjects had were then answered in private. The subjects simultaneously decided how much to contribute unconditionally to the public good, and filled in the conditional contribution table, where they indicated their contribution to the group account given the average contribution (rounded to the nearest integer) of the other three group members. After the decision sheets had been collected, the participants were asked in writing about their beliefs regarding the total unconditional contribution levels of the other three participants to the public good account. As in Gächter and Renner (2006), we monetarily rewarded subjects by using tokens for accurate guesses. Then the subjects completed a socio-economic questionnaire. By using the random number generator in EXCEL, the experimenter randomly selected one member in each group for whom the conditional contribution was the income relevant decision and then calculated the amount to be paid to each subject. In the disclosure treatments, the contribution-revealing stage was conducted and finally all subjects were paid privately in cash.

[10] The Mach-IV test has been applied in previous experiments, e.g., Gunnthorsdottir *et al*. (2002).
[11] The instructions are available from the authors upon request.

3. Experimental results

Our subjects were students at Universidad Nacional de Colombia-Sede Medellín, Colombia. Participants were randomly selected from a list of people who registered in response to an e-mail invitation to participate in the experiment. We ran four treatments (with two sessions per treatment) corresponding to the 2x2 design described in Table 1. In each session, there were 24 participants randomly allocated to groups of four. Each token earned in the experiment equaled 750 Colombian pesos.[12] We began by investigating the homogeneity between subjects in different treatments. Using the Kruskal-Wallis test we can neither reject the null hypothesis of no differences between treatments in degree of selfishness (based on the Mach IV index) nor the null hypothesis of the same gender composition using a chi-square test. On average, subjects earned 24,000 Colombian pesos (approximately 10.5 USD) in the 90 minutes that the sessions lasted, including an additional show-up fee of 5,000 Colombian pesos (approximately 2.3 USD).

3.1 Unconditional Contributions to the Public Good

The mean unconditional contribution for the four treatments is shown in Table 2, where a subject's contribution is denoted in percent of her maximum possible contribution of 20 tokens. In the standard public goods game (without disclosure), subjects on average contributed 7.98 tokens (39.9% of the endowment). Introducing only out-group disclosure increases the average contribution to 8.77 tokens (43.8%). Introducing out-group disclosure when in-group disclosure was already implemented resulted in an increase from 8.64 tokens (43.2%) in the in-group disclosure treatment to 9.62 tokens (48.1%) in the joint disclosure treatment. In a similar way, the

[12] At the time of the experiment, 2,275 Colombian pesos = 1 USD.

effect of in-group disclosure can be made conditional on out-group disclosure. Introducing only in-group disclosure increases the average contribution to 8.64 tokens (43.2%). Introducing in-group disclosure when out-group was already implemented resulted in an increase from 8.77 tokens (43.8%) to 9.62 tokens (48.1%). Finally, the overall effect by combining out-group and in-group disclosure compared to no disclosure consisted of an increase from 7.98 tokens (39.9%) to 9.62 tokens (48.1%). We conducted a Kruskal-Wallis test to test the null hypothesis of equal distribution of unconditional contributions across the four treatments, and we cannot reject the hypothesis at the 5% significance level (p-value=0.68). Similarly, the null hypothesis of equal distributions of unconditional contributions in all treatment pairs is not rejected at the 5% level based on a Wilcoxon-Mann-Whitney.[13]

>>> Table 2

Figure 1 shows the distribution of unconditional contributions per treatment using histograms. In the analysis below, we focus on comparing the different disclosure treatments to the base case of no disclosure. Compared to the no-disclosure treatment, the main effect of out-group disclosure is an increase in the proportion of subjects contributing 50% of the endowment. A similar effect is found for in-group disclosure, but additionally, there is an increase in the proportion of unconditional contributions of full endowment. Interestingly, the joint disclosure treatment results in a more uniformly distributed contribution pattern than in out-group or in-group disclosure, i.e., heterogeneity in contribution increases. Following Rege and Telle (2004), we examined the behavior in more detail by first studying the number of subjects who gave

[13] We performed a Kolmogorov-Smirnov test of the null hypothesis of equal distributions in treatment pairs, and we cannot reject the null hypothesis at the 5% significance level in any of the pair-wise tests.

everything or nothing in the unconditional contribution treatment. The null hypothesis of equal proportions of full contributors in all four treatments is not rejected at the 5% significance level (p-value=0.09) using a chi-square test. Moreover, the proportion of zero contributors is not statistically different across the four treatments (p-value=0.75) using the same test. We then conducted pair-wise tests between treatments of the null hypothesis of equal proportions of full contributors and zero contributors respectively, and we only reject the null hypothesis of equal proportions of full contributors between out-group disclosure and joint treatment at the 5% significance level (p-value=0.03). Using a chi-square test, we cannot reject the null hypothesis of equal proportions of subjects contributing 50% of the endowment at the 5% significance level except between the out-group disclosure and the joint disclosure treatments (p-value=0.04).

>>> Figure 1

As expected, the distribution of the guessed contributions of the other group members follows a similar pattern as the distributions of own unconditional contributions. In Figure 2 below, we show the histograms of the difference between own unconditional contribution and the guessed average contributions of the other group members. In all four treatments, Figure 2 shows a spike at 0, meaning that most subjects guessed that others unconditionally contribute the same as themselves. In a pair-wise chi-square test, where we categorized behavior into three groups (i.e., own contribution is less than, the same as, or higher than the guessed average contribution by others), we cannot reject the null hypothesis of no difference between any of the pairs at the 5% significance level.

>>> Figure 2

In Table 3, Model 1 presents the results of the Tobit regression of the unconditional contribution on the disclosure treatments. We observe that none of the treatment variables are significant. This means that the unconditional contribution to a public good is not significantly different under any of the disclosure treatments compared to the unconditional contribution in the anonymity treatment. In Model 2, when the subjects' guessed average contributions of others is included as an additional explanatory variable, we observe that guessed contribution has a positive and significant effect on unconditional contributions. When the belief about others' contributions increases by 1 token the unconditional contribution increases by 0.31 tokens. This indicates that, on average, subjects are imperfect conditional cooperators. The effects of the dummy variables for in-group, out-group and joint disclosure on unconditional contributions have the expected positive sign, yet they are not significant at conventional levels.

>>> Table 3

3.2 Types of contributors

We use the conditional contribution tables to analyze the relationship between a subject's own conditional contribution and the average contribution of the other members in her group. Following Fischbacher *et al.* (2001), we plot the relation between the average own conditional contribution (on the vertical axis) and the other members' average contribution (on the horizontal axis). Figure 3 shows the results. The figure shows that, on average, a subject's own conditional

contribution increases when the average contribution of the other members increases, which indicates that subjects on average behave as conditional contributors. The fact that the slope is less than one, this indicates imperfect conditional cooperation, which is similar to the regression results reported in Table 3 based on unconditional contributions. As can also be seen, when the average contribution of others is zero, subjects on average contribute more than zero in all treatments, indicating some degree of altruism. These patterns are consistent with, e.g., Fischbacher and Gächter (2010), Fischbacher *et al*. (2001), and Kocher *et al*. (2008).

>>> Figure 3

We classify subjects into the five categories of contribution behavior types as defined by Fischbacher *et al*. (2001): free-riders, conditional cooperators[14], unconditional cooperators (excluding free-riders), hump-shaped contributors, and others. The proportions of subjects in the different categories are shown in Table 4 together with the average unconditional contribution and the guessed average unconditional contribution of each type. In the no-disclosure treatment, 62.5% are classified as conditional cooperators, while in the joint treatment, 75% are classified as conditional cooperators. Comparing our results in the standard public good game setting with no disclosure with results in for example Fischbacher *et al.* (2001) and Kocher *et al.* (2008), we find that the proportion of conditional cooperators in our case is higher than the 50% obtained by Fischbacher *et al*. (2001), but lower than the 80.6% obtained by Kocher *et al.* (2008) in their US

[14] We classify subjects as conditional cooperators if their contribution is monotonically increasing with the average contribution of other group members. We classify subjects with non-monotonically increasing contributions as conditional cooperators if the Spearman rank correlation coefficient between own and others' contributions is significant at the 1% level (as in, e.g., Fischbacher *et al.*, 2001, and Fischbacher and Gächter, 2009).

sample.[15] The proportion of free-riders in our standard pubic goods experiment is much lower than in the other studies, i.e., around 5% in all treatments except in joint disclosure where it is 12.5%. The latter is in line with the increased heterogeneity found in that treatment. The proportion of subjects in the "others" category is roughly the same as in previous studies, but in our joint disclosure treatment the fraction is substantially lower.

The proportions of types of contributors are not significantly different at the 5% level across treatments based on a chi-square test (p-value=0.40). In a more detailed analysis, we test the null hypothesis of equal proportions of types in treatment pairs using a chi-square test. We cannot reject the null hypothesis of equal proportion in any of the pairs at the 5% significance level. We conducted a Wilcoxon-Mann-Whitney test of the null hypothesis of equal distributions of unconditional contributions for each type of subject in treatment pairs. The hypothesis that the distribution of unconditional contribution by subjects classified as cooperators under joint disclosure and conditional cooperator types under out-group disclosure is equal is rejected at 5% significance level (p-value=0.03). Based on a Wilcoxon-Mann-Whitney test, we cannot reject the null hypothesis of equal distribution of guessed average unconditional contributions in treatment pairs. This indicates that disclosure schemes do not impact beliefs about others' contributions.

>>> Table 4

[15] The fraction of conditional contributors in our study falls between the numbers obtained by Kocher *et al* (2008) in the US (80.6%) and those obtained in Austria (44.4%) and in Japan (41.7%). The proportion of conditional contributors in our study is larger than the figures obtained by Herrmann and Thöni (2009), where 48-60% are conditional contributors depending on location in Russia.

4. Discussion and conclusions

In this paper, we have experimentally analyzed whether disclosure as an external intervention crowds out intrinsic motivation. By using a public goods experiment based on the design developed by Fischbacher *et al*. (2001), we implemented three different disclosure treatments, namely in-group disclosure, out-group disclosure, and joint disclosure, in addition to a treatment with no disclosure (i.e. a standard public goods experiment), using a between-subject design. Our design explores beyond previous experiments by testing the effect of different degrees of disclosure.

We present evidence indicating that the incentives provided by the three disclosure treatments increase unconditional contributions to the public good compared to the no-disclosure treatment, although the effect is not statistically significant at conventional levels. This shows that the expected positive effect (crowding-in) of image motivation on may be offset by two other effects: (i) a crowding-out effect of image motivations given by the desire to appear intrinsically motivated rather than motivated by appearances; (ii) a crowding-out effect of intrinsic motivations consistent with the crowding theory of Frey and Jegen (2001). Our results are therefore consistent with the crowding theory. Future research on disentangling the effects of disclosure schemes on image motivations from the effects on intrinsic motivations is needed.

We find that, when implementing joint in-group and out-group disclosure, the proportion of subjects contributing the whole endowment significantly increases, compared to the no disclosure treatment, while the proportion of non-contributors does not change significantly. The fact that the distribution of contributions varies across treatments is an indication of heterogeneous image concerns among our participants. Our results constitute empirical support for the theoretical prediction of Benabou and Tirole (2006) model, which sustains that

when individuals are heterogeneous in image concerns, pro-social behavior under disclosure might be suspected of being triggered by appearances rather than by intrinsic motivations, limiting the effectiveness of the policy.

Our paper contributes to the ongoing discussion on whether external interventions crowd out pro-social behavior. Many of the external interventions investigated previously are of a one-shot nature. Thus, a natural extension is to investigate the effect of disclosure over time. From the findings in Gächter and Fischbacher (2010), where contribution type was found to be stable over time, we would predict that higher unconditional contribution levels combined with a larger share of conditional cooperator types would result in a relatively slower decay in contributions over time. However, in the joint treatment, the fractions of free-riders as well as of conditional cooperators were larger, which have an ambiguous effect on the speed of decay over time. From a policy perspective, future research should focus on investigating the effect of different degrees of disclosure in real life. One approach would be to conduct a field experiment using a design similar to the one used here. Such an experiment could establish whether there exists an optimal degree of disclosure or whether crowding-out theory is generally supported.

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Table 1. The experimental design of the public goods experiments.

		Out-group disclosure *(Contributions and identity announced to all participants in the session)*	
		No	Yes
In-group disclosure *(Contributions and identity announced only to group members)*	No	***No disclosure*** Standard public good game without disclosure	***Out-group disclosure*** Public good game with only out-group disclosure
	Yes	***In-group disclosure*** Public good game with only in-group disclosure	***Joint disclosure*** Public good game with both in-group and out-group disclosure

Table 2. Average unconditional contributions in the different treatments (contributions in percentage of endowment in parentheses).

		Out-group disclosure			
		No	***Yes***	***Change***	***H_0: No difference (p-value)***
In-group disclosure	***No***	***No disclosure***	***Out-group design***		
		7.98 tokens (39.9%)	8.77 tokens (43.8%)	0.79 tokens (3.9%)	0.43
	Yes	***In-group disclosure***	***Joint disclosure***		
		8.64 tokens (43.2%)	9.62 tokens (48.1%)	0.98 tokens (4.9%)	0.50
					No-disclosure vs. Joint disclosure
Change		0.66 tokens (3.3%)	0.85 tokens 4.3%		1.62 tokens 8.2%
H_0: No difference (p-value)		0.64	0.61		0.24

Note: The pair-wise tests are based on a Wilcoxon-Mann-Whitney test while the overall test is based on the Kruskal-Wallis test.

Table 3. Results from Tobit regression model (Dependent variable: unconditional contribution).

	Model 1	***Model 2***
Independent variables	Marginal effects	Marginal effects
In-group disclosure	0.85	0.36
	(1.31)	(0.90)
Out-group disclosure	0.96	0.38
	(1.30)	(0.89)
Joint disclosure	2.09	1.63*
	(1.31)	(0.90)
Guessed average contribution of others		0.31**
		(0.02)

Note: * and ** denote significance at the 5%, and 1% level respectively. Standard errors reported in parenthesis.

Table 4. Distribution of contributor types per treatment.

Type of contributor	***Standard (anonymity)***		***Out-group disclosure***		***In-group disclosure***		***Joint disclosure***	
	Distri-bution	*Average unconditional contribution (tokens)*	*Distri-bution*	*Average unconditional contribution (tokens)*	*Distri-bution*	*Average. unconditional contribution (tokens)*	*Distri-bution.*	*Average unconditional contribution (tokens)*
Free-rider	4.17%	0.50 (0.71)	4.17%	9.00 (12.73)	6.25%	0.0 (0.00)	12.50%	0.67 (1.03)
Conditional cooperator	62.50%	9.33 (5.12)	70.83%	8.62 (3.81)	64.58%	9.06 (4.84)	75.00%	11.58 (5.48)
Unconditional cooperator	4.17%	0.50 (0.71)	0.00%	-	4.17%	20.00 (0.00)	0.00%	-
Hump-shaped	8.33%	8.75 (7.45)	8.33%	5.00 (3.56)	4.17%	3.00 (0.00)	6.25%	6.67 (2.89)
Others	20.83%	6.60 (3.95)	16.67%	11.25 (4.65)	20.83%	8.80 (2.79)	6.25%	7.00 (10.30)
Number of observations		48		48		48		48

Figure 1. Histograms unconditional contributions per treatment.

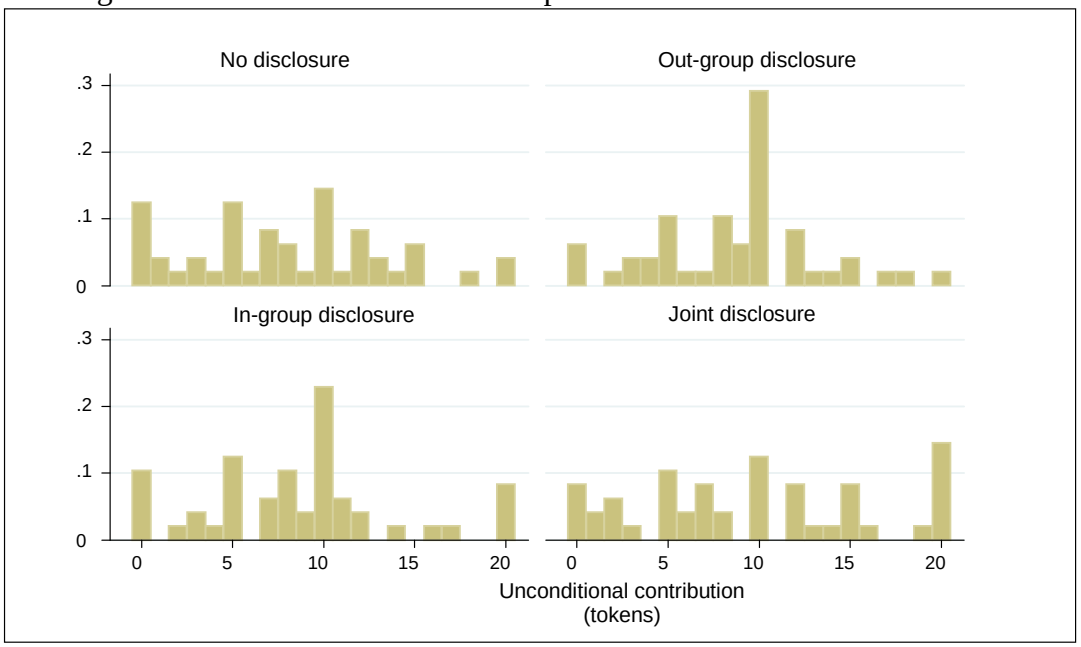

Figure 2. Histograms of differences between unconditional contribution and guessed contribution per treatment.

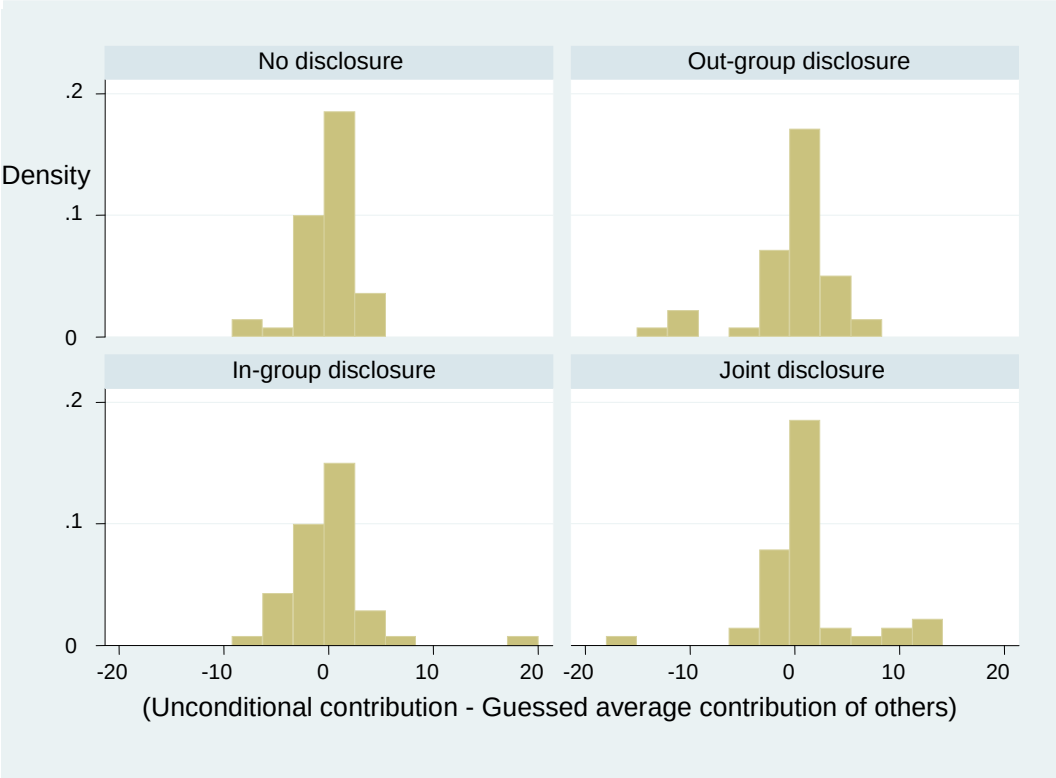

Figure 3. Average own contribution level for each average contribution level of other group members, by treatment.