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Anonymity, Reciprocity, and Conformity: Evidence from Voluntary Contributions to a National Park in Costa Rica

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Abstract

We investigate the role of anonymity, reciprocity, and conformity for voluntary contributions, based on a natural field experiment conducted at a national park in Costa Rica. Contributions made in public in front of the solicitor are 25% higher than contributions made in private. Giving subjects a small gift before requesting a contribution increases the likelihood of a positive contribution. At the same time, the conditional contribution decreases. The total effect of giving a gift is positive but small, and taking the cost of the gift into account, it is far from profitable. When the subjects are told that the typical contribution of others is \$2 (a small contribution), the probability of a contribution increases and the conditional contribution decreases, compared with providing no reference information. Providing a high reference level (\$10) increases the conditional contributions. Overall, the total effects have the expected signs, although the magnitudes are smaller than what one might have expected based on existing evidence from laboratory experiments.

JEL-classification: C93, Q50

Key words: Voluntary contributions; anonymity; reciprocity; conformity; natural field experiment.

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1. Introduction

Although a large part of economic theory assumes a narrow definition of selfishness, much evidence suggests that people are often *not* motivated solely by own material payoffs. Besides straightforward observations of charity (see Andreoni, 2006 and Vesterlund, 2006 for excellent overviews), there is an overwhelming amount of recent experimental evidence (see for example Ledyard, 1995 and Camerer, 2003). Moreover, unlike the atomistic and amoral *Homo Economicus*, people often do not act independently of private and social norms. Most of us consider it important to be regarded positively by others (Brennan and Pettit, 2004; Kuran, 1995), but we also seem to prefer to have a positive view of ourselves independent of the view of others (Akerlof and Kranton, 2000; Benabou and Tirole, 2002, 2006; Santos-Pinto and Sobel 2005). As expressed by Adam Smith (1759): “The most sincere praise can give little pleasure when it cannot be considered as some sort of proof of praise-worthiness.” However, clear empirical evidence outside the lab of what influences altruistic or charitable behavior is still scarce. Using the terminology of Harrison and List (2004), this paper presents the results of a natural field experiment in Costa Rica, where the importance of anonymity, reciprocity, and conformity for people’s voluntary contributions to a national park are investigated.

Laboratory experiments have many advantages, in particular with respect to the possibility of holding other possible influences than the one under investigation fixed. Levitt and List (2006) argue that lab experiments therefore are useful in generating qualitative insights. Obviously, laboratory experiments also have drawbacks. Levitt and List (2006) argue that one needs to be very careful when generalizing quantitative findings outside the lab environment. They conclude that laboratory experiments and data generated in the field are complements rather than substitutes. We concur with this view.

In broad terms, several potential reasons for non-selfish behavior have been identified in the experimental literature, including the following: (i) People prefer to conform to what others do. Thus, people behave more unselfishly if they observe that others act unselfishly. (ii) People reciprocate; that is, if others have been nice to you, you tend to be nice to them. (iii) People are motivated both by their own view of

themselves as well as by how other people view them. This implies that people tend to act less altruistically if no one observes their actions.

The purpose of this paper is to test the absolute as well as the relative importance of these three reasons for non-selfish behavior. This is done by conducting a natural field experiment on voluntary contributions to a national park in Costa Rica, where international tourists were asked if they would like to contribute to the park. The effect of anonymity is tested by letting the subjects contribute their money either openly in the presence of the solicitor, or in a sealed envelope. The effect of reciprocity is investigated by handing over a small gift (a refrigerator magnet) to a sub-sample of subjects, prior to their contribution decision. With reciprocity we mean that people are reciprocal if they reward kind actions and punish unkind actions *towards them*; cf. Falk and Fischbacher (2006) and Rabin (1993). In principle, the kindness of the action can be evaluated both in terms of the consequences and in terms of intentions (Dufwenberg and Kirchsteiger, 2004; Rabin, 1993); simply put, kind actions appreciated for their good consequences can trigger punishing behavior if the intentions are regarded as bad. We investigate the effect of conformity by providing the subjects with information about the contributions of previous subjects. The information is varied among subjects and we include the case of providing no information as well. By conformity we mean that people care about their own contribution relative to the contributions of others; see Bernheim (1994) for an example of a model of conformity where people care about their status in terms of their relative contribution to a public good.

An attractive feature of our design is that it allows us to separate reciprocity from conformity, which is not possible in most studies of conditional cooperation.¹ For example, if people contribute more when others contribute more in public good games, this may in part reflect reciprocity and in part conformity.

Just looking at the raw data, our findings can be summarized as follows: Anonymity decreases contributions by about 25%. Giving a small gift (reciprocity) increases contributions by about 5%. However, this effect is not at all sufficient to cover the cost of the gift given to the subjects. A reference level of \$10 increases contributions by about 4% compared with not providing any reference contribution information. However, providing a lower reference level of \$2 decreases contributions by 23%

¹ A notable exception is Bardsley and Sausgruber (2005).

compared to the baseline of no reference level. The effects of anonymity, reciprocity, and providing social reference points are similar in a regression analysis. There are also some interesting asymmetric effects on the probability of contributing anything at all and on the contribution conditional on a positive contribution: In the reciprocity treatment more people contribute, while the average conditional contribution is lower. Increasing the reference level decreases the probability of a positive contribution, but increases the conditional contribution.

The remainder of this paper is organized as follows: Section 2 provides a brief literature review of earlier studies with an emphasis on field experiments, Section 3 presents our theoretical model, Section 4 the field-experimental design, Section 5 the corresponding results, while Section 6 concludes the paper.

2. Previous studies

There are several public good laboratory experiments that look at the role of anonymity; see e.g. Andreoni and Petrie (2004), Bohnet and Frey (1999), Laury et al. (1995), Masclet et al. (2003), and Rege and Telle (2004). For example, Rege and Telle (2004) considered a standard public good game with ten subjects in each group. In one subsample the subjects had to reveal their contribution to the whole group after making the contribution decision. The average contribution almost doubled with public observability. Andreoni and Petrie (2004) find that giving information about both the identity and the contribution of others increases contributions significantly in a public good experiment. Interestingly, a treatment where subjects had the option to remain anonymous resulted in the highest level of contributions. List et al. (2004) analyzed charitable contributions to a Center for Environmental Policy Analysis at the University of Central Florida. They used three different information treatments: (i) completely anonymous responses, (ii) the experimenter knows the response, and (iii) the whole group knows the response. The largest share of yes responses was obtained when the whole group was informed of the response, followed by the case when only the experimenter knew the response. We have only found one field experiment investigating the role of anonymity. Soetevent (2005) investigated the role of anonymity in Dutch churches using closed and open collection bags. The use of open baskets, where close neighbors in the church could identify a donor's contribution, increased

overall contributions by about 10% in the second offering of the services.

There is much evidence from laboratory experiments consistent with reciprocity; see for example Fehr and Gächter (2000), Hoffman et al. (1996) and Roth (1995). Cialdini (2001) provides a number of real world examples from fund raising to politics where the principle of reciprocity plays an important role. Falk (2007) is the only field experiment we are aware of that studies reciprocity directly, i.e. how people respond to someone after a gift has been given to them. He found a strong and significant effect of including a gift with the donation letter; participation increased by 2 percentage points if a small gift (1 post card) was included and by 9 percentage points if a large gift (four post cards) was included.²

Many experimental results can be interpreted in terms of conditional cooperation. Some public good studies can be questioned based on unclear causality, since contributions may affect the expectation of others' contributions rather than the other way around. However, Fischbacher et al. (2001) provide clear evidence based on the strategy method: They found that about 50% of the subjects increase their contribution in a one-shot public good game if others do so as well. This is also consistent with field evidence of Andreoni and Scholz (1998), who, based on a consumer expenditure survey, found that donors respond positively to an increase in contributions by others in their reference group, which was defined in terms of socioeconomic variables. Bohnet and Zeckhauser (2004) found that informing respondents about the average offer in an ultimatum bargaining game significantly increases offers and offer-specific rejection probabilities. Potters et al. (2005) find that sequential moves in a public good game results in a larger provision of the good, because the follower mimics the action of the leader. Bardsley and Sausgruber (2005) use an innovative design of a public-good game that allows them to distinguish between reciprocity and conformity. They find that conformity account for around one third of the increase in contributions due to an increase in others contributions.

We are aware of four field experiments that analyze the effect of conformity or conditional cooperation. Frey and Meier (2004) analyzed the behavior of students in Zurich who had the opportunity to contribute to two social funds every semester. The

² The motives of the postcards were painted by kids together with the text, "Our benefits lie in children's smiles." One may imagine that they were much more effective than what most other motives would have been.

contributions were higher when they were informed that many other students were contributing, although the effect was not statistically significant. Shang and Croson (2006) investigated how information about a typical contribution to a radio station affects subject contributions. They found that the highest reference amount (\$300) gives a significantly higher contribution than giving no information at all. The direction for smaller amounts (\$75 and \$180) was the same, although not statistically significant. Heldt (2005) found that Swedish cross-country skiers were more likely to contribute to the track maintenance if many others contributed. Martin and Randal (2005) found that visitors to a museum put more money into a transparent box, thereby donating money to the museum, when there was money in the box compared to when the box was empty.

3. The Model

Consider a simple model where people care about their own income Y , the public good G (the national park in this case), their identity, I , and the social approval, S . Thus, as in the models by Brekke et al. (2003) and Johansson-Stenman and Martinsson (2006) they want to see themselves as generous and socially responsible persons,³ and as in for example Ellingsen and Johannesson (2007) they want others to see them as generous and socially responsible persons too. Then we have:⁴

$$U = Y + \alpha_G G + \alpha_I I + \alpha_S S, \quad (1)$$

where we assume that $\alpha_G, \alpha_I, \alpha_S > 0$, and that $\alpha_G < 1$ so that the marginal utility of private income is larger than the marginal utility of money given to the public good (for a constant level of identity and social approval). Private income is given by initial income Y^0 minus the contribution D :

$$Y = Y^0 - D. \quad (2)$$

Similarly, the amount provided of the public good is given by own contribution, D , plus the level before the contribution, G^0 , so that

$$G = G^0 + D. \quad (3)$$

³ Thus, the way we model identity here can be seen as an extension of the warm-glow theory by Andreoni (1989, 1990). For broad discussion of how identity can be incorporated into economics, see Akerlof and Kranton (2000).

⁴ For our purpose it is sufficient to interpret U in an ordinal way, meaning for example that the linearity in income in (1) has no meaning. Moreover, we are only concerned with small changes of Y and G , which further motivates the simple functional form chosen.

We assume that people may want to see themselves as generous to a good cause *per se*, and also that they would like to fulfil two different norms: a conformity norm and a reciprocity norm. The conformity norm stipulates that people would like to give equally much as do others on average in a similar situation, \hat{D} . The reciprocity norm, on the other hand, implies that if people have received a gift with a value V (from the park authorities in our case), they would like to exactly reciprocate this gift (in our case with a contribution to the park authorities). Consequently, we assume that individuals face a disutility from deviating from these norms.⁵ We can then write a persons identity or self-image as:

$$I = I^0 + \beta_{UA}D - \beta_C(D - \hat{D})^2 - \beta_R(D - V)^2, \quad (4)$$

where I^0 is the person's initial identity before the potential contribution situation, and where $\beta_C, \beta_R > 0$ reflect the weights given to the conformity and reciprocity norms, respectively. If $\beta_{UA} > 0$ then the person's identity would increase as a result of an unconditionally altruistic contribution. Note that when $\hat{D} = V = 0$ it follows that I is maximized when $D = 0.5 \beta_{UA} / (\beta_C + \beta_R)$, which is clearly positive when $\beta_{UA}, \beta_C, \beta_R > 0$. Thus, the individual's identity is increasing in own contributions even when others are not contributing and when there is no gift, provided that $\beta_{UA} > 0$.

The social approval of an individual is related to the identity as well, and as in Andreoni and Bernheim (2007) people want to be perceived as fair.⁶ For simplicity, we assume that the change in social approval depends on the same underlying variables as identity. The only difference being that the change in social approval also depends on the degree of anonymity, a , of the action. Thus, when identity increases by ΔI , social approval increases by $(1 - a)\Delta I$ where $0 \leq a \leq 1$. The social approval of an individual is then given by:

⁵ Here we do not model explicitly why conformity and reciprocity contributes to a positive identity and social approval; this is simply assumed based on a large psychological literature. Bernheim (1994) provides a model explaining why it may be rational for an individual to conform. Gintis et al. (2005) provides a good overview of evolutionary reasons behind reciprocal and other kinds of non-selfish behavior.

⁶ The concern for social approval can in part be interpreted as a concern for status; see Vesterlund (2006) for a discussion on the status motive in charity.

$$\begin{aligned}
S &= S^0 + (1-a)(I - I^0) \\
&= S^0 + (1-a)\beta_{UA}D - (1-a)\beta_C(D - \hat{D})^2 - (1-a)\beta_R(D - V)^2,
\end{aligned} \tag{5}$$

where S^0 is the initial social approval. Thus, in the case of complete anonymity, $a = 1$, social approval does not change at all when the contribution change. Substituting (2)-(5) into (1) we obtain

$$U = U^0 - (1 - \alpha_G)D + (\alpha_I + (1-a)\alpha_S) \left(\beta_{UA}D - \beta_C(D - \hat{D})^2 - \beta_R(D - V)^2 \right) \tag{6}$$

where $U^0 \equiv Y^0 + \alpha_G G^0 + \alpha_I I^0 + \alpha_S S^0$ is the initial utility level. Assuming an interior optimum, we can then solve for an optimal contribution level D^* :

$$D^* = \frac{\beta_{UA}}{2(\beta_C + \beta_R)} + \frac{\beta_C}{\beta_C + \beta_R} \hat{D} + \frac{\beta_R}{\beta_C + \beta_R} V - \frac{1}{2(\beta_C + \beta_R)} \frac{1 - \alpha_G}{\alpha_I + (1-a)\alpha_S}, \tag{7}$$

so that $\frac{\partial D^*}{\partial \hat{D}} = \frac{\beta_C}{\beta_C + \beta_R}$, $\frac{\partial D^*}{\partial V} = \frac{\beta_R}{\beta_C + \beta_R}$ and $\frac{\partial D^*}{\partial a} = -\frac{\alpha_S}{2(\beta_C + \beta_R)} \frac{1 - \alpha_G}{(\alpha_I + (1-a)\alpha_S)^2}$.

Consequently, since all involved parameters are assumed to be positive, the model suggests the testable hypotheses that the contribution will increase with the reference level of others' contributions, \hat{D} , and with the value of a potential received gift, V , and decrease with the degree of anonymity a (the latter since $\alpha_G < 1$). Moreover, for the special case when $\hat{D} = V = 0$ the model predicts that $D^* > 0$ if $\beta_{UA} = \frac{1 - \alpha_G}{(\alpha_I + (1-a)\alpha_S)^2}$.

Thus, a positive contribution is predicted even when others are not expected to contribute and when there is no gift to reciprocate, if the parameter that transforms unconditionally altruistic contributions to identity, β_{UA} , is sufficiently large.

4. Design of field experiment

The natural field experiment concerns contributions of visiting international tourists to the Poas National Park (PNP) in Costa Rica in 2006. Much effort was spent on ensuring that the situation was realistic and credible, and there was nothing indicating that this was a university study with the aim of analyzing people's behavior. This is potentially very important since, as noted by Levitt and List (2006), a perceived experimental situation may highlight people's sense of identity or self-image to a larger extent than outside the experimental situation; cf. Akerlof and Kranton (2000).

Our five solicitors were officially registered interviewers of the Costa Rican Tourism Board. We initially sent invitations via email inviting them to a first screening meeting where we evaluated their personalities and abilities to speak fluently in both Spanish and English. Out of ten potential solicitors interviewed, we chose five who fulfilled all our requirements. The five solicitors participated randomly in all parts of the experiment, except for one person who could not participate in the reciprocity treatments; in the regression analysis we therefore control for solicitor effects. The solicitors underwent extensive, paid training sessions both in the classroom and in the field. Once they were ready to start, we dedicated a whole week to testing their performance and to making small adjustments in the survey instrument. In addition, there were daily debriefing questions and regular meetings with the whole team to make sure that all solicitors were using the exact wording of the scenarios.

Solicitors approached international tourists right after they had visited the volcano crater, which is the main attraction of the park, and before they entered the visitor's center. They were approached at an "interview station" decorated with the logos of the PNP, the National System of Protected Areas (SINAC), and CATIE,⁷ in the area outside the restaurant and souvenir shop. The solicitors wore uniforms with the logos of the PNP and CATIE plus formal identification cards that included a photo and signatures of the park authorities. The uniforms were very similar to those used by the park rangers at PNP. A formal letter authorizing the collection of contributions was also clearly visible.

Only international tourists who could speak either Spanish or English participated in the experiment. The subjects were approached randomly, with the exception that two people in the same group of visitors were never approached. The selection was one of the key elements of the training sessions, and we checked for biases in the selection of subjects daily. No corrections were required after the pilot sessions.

Initially, subjects were asked if they were willing to participate in an interview about their visit to the PNP. No mention of voluntary contributions took place at this stage, so we expect that participation was not affected by monetary considerations. Overall participation rates were very high (above 85% each day). Once we established that they were international tourist and that they had already visited the crater, the solicitors proceeded with the interview. Since all interviews took place in private in the

⁷ Spanish acronym for the Tropical Agricultural Research and Higher Education Center, which had the main responsibility for data collection.

interview station, other potential participants could not observe the behavior of the interviewed person (an exception being if they refused to participate in the interview). Before the actual experiment, subjects were asked a few questions regarding their visit to Costa Rica and to the national park. The solicitors were provided with standardized replies to the most common questions regarding the survey, the experiment, the institutions involved, etc. For further information the participants were advised to talk to the main supervisor of the contribution campaign.

The experiment involved three different treatments: (1) An examination of the role of anonymity for individual contributions, (2) an exploration of the effect of giving a small gift before asking for a contribution to the national park, and (3) a study on the effect of providing a changing social reference point on individual contributions. Each treatment required slight modifications of the interviewing script, but we were very careful in limiting the differences among the treatments. Subjects also received a card where they could read the scenario and the instructions for the voluntary contribution. The actual experiment began with the following sentence:

“I will now read to you some information about the funding of national parks in Costa Rica. Here is a paper with the information I will read.”

In the reciprocity treatment, the solicitor then gave the gift to the participant and said:

“Also, this is a little gift in appreciation of your time.”

The treatments without reciprocity simply did not include any gift or the associated information. The gift was a colorful, handcrafted refrigerator magnet, depicting the main attractions of the PNP: the lagoon, the crater, and the forest. The retail value of the gift is \$3 and its cost for the park administration is approximately \$1.50. Since the participants were approached right after visiting the park and before they entered the visitor’s center, they had no explicit knowledge about the exact value of the gift.⁸ Moreover, in order to avoid confusion and cross contamination between the treatments

⁸ For this reason we do not believe that the donations are largely influenced by anchoring, in the sense that people for purely cognitive reasons choose to donate the same (or a similar) amount as the price of the gift; cf. Tversky and Kahneman (1974).

with and without gifts, these were done sequentially. After this, the participants were told about the main purpose of the request for a contribution:

“The System of National Parks in Costa Rica is now suffering from the lack of funds to achieve a good management of the parks, both for biodiversity conservation and tourism. Available funds are simply not enough and national parks are trying to obtain new funds. We are now testing a system at Poas National Park where visitors can make donations to the park. The entrance fee remains the same seven dollars, but people have the possibility to make voluntary donations to the park in addition to the fee. Contributions will be used to improve the standard of living of park rangers, to provide for better trails and to make sure that this beautiful and unique ecosystem is well taken care of.”

The effect of a social reference point is analyzed through providing the subjects with information about a typical previous contribution of others. If a reference point was provided, the following sentence was read:

“We have interviewed tourists from many different countries and one of the most common donations has been 2 / 5 / 10 US dollars.”

The monetary reference values used were obtained from a pilot study conducted at the same park right before the main experiment. In the treatments with no mentioned reference amount, the above sentence was simply omitted.

Finally, the actual request for a contribution differed depending on whether the contribution was to be anonymous or not. In the anonymous case, subjects were asked to go into a private area that was part of our interviewing station and put their contribution, if any, in a sealed envelope and into a small ballot box, making the contribution completely anonymous to the solicitor.⁹ In this case, the following text was read:

⁹ In order for us to identify the contributions and link them to the questions in the questionnaire, an ID number was written on the envelope. The subjects were informed about the ID number and the reason for using it. The important point here is that the solicitors were not able to observe the contributions, not even afterwards.

“How much are you willing to donate to this fund? Please go to the booth and put the amount of money you would like to donate in the envelope. Remember that donations will be used exclusively to maintain and improve the Poas National Park, as described before. When you are done, please seal the envelope and put it in this box. Do not show it to me, because your donation should be completely anonymous. Please put the envelope in the box even if you do not wish to donate anything.”

We provided a locked ballot box in which the contributions were put. This box was actually part of the interviewing station where the subject and the solicitor would sit for the experimental session. In the non-anonymous setting, the following text was read:

“How much are you willing to donate to this fund? Remember that donations will be used exclusively to maintain and improve the Poas National Park, as described before. When you are done reading, please give the envelope and your contribution to me so that I can count and register your donation before sealing the envelope. Please return the envelope even if you do not wish to donate anything.”

Thus, in this treatment the subjects were well aware that the solicitor was observing each contribution.

Table 1 summarizes the experimental design for all three treatments. In total 997 subjects participated in the experiment. The different treatments were conducted at the same time, and they were randomly distributed both in terms of the order during the day and among solicitors. The only exception is that we, for practical reasons, did not conduct interviews with and without gifts at the same time.

<<Table 1 about here>>

Besides the differences described above, everything else was identical in all interviews and the typical variations of a field experiment (weather, type of tourist, etc) are expected to randomly affect our results.

5. Results

Table 2 presents the basic results from the field experiments. As can be observed, in total 52% of the subjects chose to contribute and the average contribution was \$2.49 for the whole sample. In total 997 subjects were approached and we raised \$2,775.

<<Table 2 about here>>

The distribution of the contributions is skewed, with a large fraction of zeros and a few very large contributions; the largest contribution was \$100. The first histogram in Figure 1 shows the distribution of conditional contributions for the whole experiment. Note that the rightmost bar is contributions larger than \$10.

<<Figure 1 about here>>

We also present the results from a regression analysis. As argued by Botelho et al. (2005), it is important to correct for possible differences when using subjects who typically have a larger variation in terms of socio-economic characteristics than students have. Another advantage of the regression analysis is that it allows us to handle extreme responses in a systematic way.

The dependent variable, contributions, is censored since it equals zero for a substantial fraction of the subjects. In addition, there are two issues of interest here: whether to contribute anything at all and how much to contribute, given a positive contribution. Since there are good reasons to consider these as two different decisions, a basic Tobit model would be inappropriate. Here we will therefore instead use a simple two-stage model. The decision whether to contribute anything or not is modeled with a standard probit model. The decision concerning how much to contribute, given a positive contribution, is modeled with a regression model using only subjects with a positive contribution.¹⁰ However, the contribution distribution is skewed due to a few outliers. A standard ordinary least squares model would therefore put an inappropriately large weight on the outliers. In order to deal with this problem we apply a robust regression.¹¹

¹⁰ We also estimated a sample selection model allowing for a correlation between the probit and the regression models. However, we could never reject the hypothesis of no sample selection.

¹¹ We use the `rreg` command in STATA. First a standard regression is estimated, and observations with a Cook's distance larger than one are excluded. In our case 19 observations are excluded. After that, the model is estimated iteratively: it performs a regression, calculate weights based on absolute residuals, and regresses again using those weights (STATA, 2005). See Rousseeuw and Leroy (1987) for a description of the robust regression model.

The base case in the regression models is the anonymous treatment without reciprocity and no mention of a reference contribution. Table 3 presents the marginal effects for the two estimated models together with the total marginal effect, i.e. including the effects of the probit stage; all marginal effects are calculated at sample means.¹² The total marginal effect is calculated as

$$\frac{\partial E[C_i]}{\partial x_i} = \frac{\partial P[C_i > 0]}{\partial x_i} E[C_i | C_i > 0] + \frac{\partial E[C_i | C_i > 0]}{\partial x_i} P[C_i > 0],$$

where $E[C_i]$ is the expected contribution of individual i , $P[C_i > 0]$ is the probability that individual i contributes anything at all, and x_i is a covariate. Both the probit model and the regression models include a constant, solicitor dummy variables, and a few individual socio-economic characteristics.¹³

<<Table 3 about here>>

Anonymity

From Table 2 we see that the share of subjects contributing is higher in the non-anonymous treatment, but using the chi-square test of equal proportions contributing we cannot reject the hypothesis of equal proportions ($p = 0.433$). The average contribution is 25% higher compared with the anonymous treatment, but using the non-parametric Wilcoxon-Mann-Whitney test of equal underlying contribution distributions for the two treatments, we cannot reject the hypothesis of equal distributions ($p = 0.166$). We do find that the average conditional contribution is 19% higher in the non-anonymous treatment and using the Wilcoxon-Mann-Whitney test we can reject the hypothesis of

¹² For the probit model the marginal effect for dummy variables is for a discrete change of the variable from zero to one.

¹³ The individual characteristics included in the regressions are gender and age of the subjects, whether they are members of an environmental organization, whether they saw the volcano, a dummy variable for US subjects, and a dummy variable for European subjects. Among other things, we find that male subjects are more likely to contribute, but that there is no difference in the conditional contribution. One explanation for this could be that four of our five solicitors were females. As shown by Landry et al. (2006), contributions are positively correlated with the physical attractiveness of female solicitors for male contributors. Among the five solicitors, one female solicitor has a larger proportion of subjects contributing. This solicitor also has a higher conditional contribution. We also find that older subjects are more likely to contribute and that they on average contribute more, possibly indicating that there is a positive relationship between age and non-selfish preferences; cf. List (2004). However, since we cannot accurately control for income, another possible reason is simply that older people have higher income. We also find that members of an environmental organization are more likely to contribute, but on average they do not contribute more. Finally, we tested for differences among subjects from Europe, the US, and South America, without finding any statistically significant differences.

equal distributions ($p = 0.09$). The results can be compared to List et al. (2004) who found that the proportion of subjects voting in favor of a proposal of financing a public good is significantly lower in a treatment where subjects are completely anonymous (20%) compared with a treatment where the solicitor observes the behavior (38%).

However, if we then look at the results of the regression models we see that anonymity only plays a role in the reciprocity treatment. In the models with interaction effects, the dummy variable for the non-anonymous treatment is insignificant. However, the parameter associated with the interaction variable between the non-anonymous and the reciprocity treatments is significant in both the probit model and the robust regression.¹⁴ Thus, in the case of reciprocity, non-anonymity increases the probability of contributing but decreases the conditional contribution. This difference between reciprocity and no-reciprocity treatments is also confirmed using the Wilcoxon-Mann-Whitney test; it is only for the reciprocity treatments that there is a significant difference in contribution distributions between the anonymous and non-anonymous treatments.

Reciprocity

Comparing the treatments with and without reciprocity in Table 2, we see that the share of subjects contributing a positive amount is 8 percentage points higher in the reciprocity treatment. However, the conditional average contribution is smaller in the treatment with reciprocity. One possible explanation is that more subjects with a low willingness to contribute decide to contribute, while the contribution of those who would give without a gift is relatively unaffected. Still, the effect on the share of subject contributing dominates, resulting in a slightly higher average sample contribution. The average contribution in the whole sample is a little bit more than 5 percentage points higher in the reciprocity treatment. All these effects are significant: Using the Wilcoxon-Mann-Whitney test we can reject the hypothesis of equal distributions both for the conditional sample ($p = 0.040$) and for the whole sample ($p = 0.096$); and using the chi-square test of equal proportions contributing we can also reject the hypothesis of equal proportions ($p = 0.007$). The total effect of reciprocity is an increase in average contributions by \$0.13. This can be compared with the cost of the gift of \$1.50. Thus,

¹⁴ The reason why the regression results show a lower conditional contribution for the non-anonymous treatment, while the descriptive results show the opposite is that a few outliers affect the average conditional contribution.

not considering any other effects, giving a gift before subjects are asked to contribute is far from profitable. This is consistent with the casual observations that most organizations that raise money in similar ways do not use gifts to invoke reciprocity.¹⁵ An exception sometimes mentioned is Hare Krishna. According to Cialdini (2001), their strategy of handing over a small gift such as a book or a flower was initially very successful in invoking reciprocity and thus increasing contributions. However, over time this strategy became less efficient when people became aware that this was in fact just a strategy to raise more money. We believe that this points to something fundamentally important that also concerns the results in our experiment, namely that not only the consequences of an action matter, but also the intentions (cf. Dufwenberg and Kirchsteiger, 2004; Rabin, 1993). In our case, a reason for the somewhat small degree of reciprocity may well be that many subjects felt that the intention of giving the gift was to increase contributions.

The regression analysis reveals that giving a small gift to the subject increases the probability that the subject contributes anything at all by around 10 percentage points. At the same time, the average conditional contribution is around \$0.80 lower when the contribution is anonymous. The net effect is quite small and insignificant. When we interact anonymity with reciprocity, we can see that basically all of the probability effect is obtained in the non-anonymous treatment, and that this effect is more or less completely off-set by a decrease in conditional contribution. Thus, it seems that the effects of reciprocity are much larger in a non-anonymous context, which is also intuitively reasonable.

Conformity

For reference contributions, we can make a number of comparisons. Compared with not giving any information about other people's contributions, it can be observed from Table 2 that the share of subjects contributing is higher if a \$2 reference contribution is communicated, and the difference is significant ($p = 0.002$). However, while the average contribution and the conditional average contribution are lower, it is only the difference in distribution for the latter that is significant ($p = 0.001$). If we then compare

¹⁵ There could of course be other positive effects of giving a small gift, either before or after a contribution. Subjects may feel more attached to the organization and may support it in other instances. It can also result in increased contributions over time.

the different treatments with a reference contribution, the share of subjects contributing decreases as the reference level increases, although the difference in shares between \$5 and \$10 is not significant. At the same time, the average conditional contribution increases, and the difference in the distributions is significant in all cases. To gain additional insights on the differences among the treatments, Figure 1 presents histograms for the conditional contribution for all treatments; the rightmost bar is again contributions greater than \$10. One clear difference is that the \$2 reference contribution results in fewer larger contributions. As expected, the most common contribution is \$2 if a reference point of \$2 is given. Similarly, \$5 is the most common if a \$5 reference is given, and \$10 is the most common if a \$10 reference is given.

The results from the regression analysis largely confirm the results from the non-parametric analysis. The likelihood of contributing anything at all is significantly higher in the \$2 reference contribution treatment compared with all other treatments. At the same time, the average conditional contribution decreases by \$1.10 compared to the treatment without a reference contribution; these two opposite effects results in an insignificant total effect. Since the total effect is insignificant, some of those who would have contributed anyway ended up contributing less than without the reference contribution. This may be because subjects without any information tended to believe that a typical contribution is higher than \$2, which is correct since according to Table 1 others contributed on average around \$5 in the no treatment case. This new knowledge creates two effects. On the one hand, when faced with a typical average contribution of only \$2, those who would have contributed anyway responded by on average lowering their contributions. On the other hand, the other subjects realized that it is rather cheap to adhere to the typical practice and hence agreed to a positive contribution. In this way the result is an increased participation but lower conditional contributions.

The \$10 reference contribution results in an average conditional contribution that is around \$0.70 higher compared with not giving any reference information. The total effect is almost \$0.50; thus, presenting a \$10 reference contribution increases average contributions by 50 cents compared with not giving any information at all.¹⁶ This difference is somewhat larger than what the simple comparison between average contributions revealed in Table 2.

¹⁶ The effect compared with for example a \$2 reference contribution is of course even larger.

In order to compare our results with Shang and Croson (2006), we need to focus on average conditional contributions since, by the nature of their experiment, they were able to look only at positive contributions. If we take the average conditional contribution for the no reference treatment (\$6) as given, providing a reference contribution of \$10 results in an increase of almost 12%. This can be compared with Shang and Croson (2006) who also found an increase in contributions for their highest reference contribution. However, they found increasing conditional contributions for reference contributions that were below the average contribution in the baseline case as well, whereas we find negative or insignificant effects for our two such reference levels (i.e. the \$2 and \$5 reference treatments, respectively).

It is also interesting to test whether the social reference contribution has a stronger effect if it is expressed in the same currency as the subjects are used to. The reference contributions were expressed solely in US dollars, but the subjects were free to contribute in any currency, and some subjects actually contributed in several currencies; 51%, contributed only in dollars and 45% contributed only in colones.¹⁷ To test if the behavior differed between these two groups we estimate an additional robust regression for the conditional contribution. This regression includes a dummy variable equal to one if the contribution was made only in dollars. This dummy variable is also interacted with the reference contribution dummy variables. The results of the regression are reported in the last two columns of Table 3. Most importantly, we find that people who contributed in dollars are the subjects who “react” to the \$10 reference contribution. Thus, our result that a \$10 reference contribution results in a large average contribution is driven by this sub-sample. We do not find any significant interaction effect for the other reference levels. A possible explanation is that a subject who contributes in a currency other than dollars has to calculate how much the reference contribution is worth in that currency. A subject will therefore face the choice of whether it is worthwhile undertaking this calculation exercise. Suppose that the subject has a very rough perception of the order of magnitude of the reference amount. If the reference level is a low amount, the subject knows that others have contributed a rather small

¹⁷ \$1 = 500 Costa Rican Colones. Note that only international tourists participated in the experiment. 57% of those who contributed only in dollars and 53% of those who contributed only in colones were Americans. There is no significant difference with respect to gender or age between these two groups. Finally, those who only contributed in dollars, contributed on average \$1.10 more than the other subjects.

amount. He may then be tempted to calculate exactly how much others have contributed, since such information would not be potentially damaging for his self-image. If, on the other hand, others have contributed a lot, such as \$10, an exact calculation of how much this corresponds to would make the reference level more salient, which in turn might be damaging for the subject's self image since it would likely mean that he himself is willing to contribute less than others. Alternatively, saving his self image would be expensive to him. Such an explanation is consistent with much psychological evidence, suggesting that people often interpret external evidence in a self-serving way (Baumeister, 2000). For example, people discover flaws in evidence easier when they are portrayed in an unflattering light than when they are portrayed in a good light (Pyszczynski, Greenberg and Holt, 1985), and people typically spend less time to process critical compared to positive feedback (Baumeister and Cairns, 1992).

6. Conclusions

Using a natural field experiment, we have quantified the importance of anonymity, reciprocity, and conformity through the provision of social reference levels in order to explain voluntary contributions to a national park in Costa Rica. All total effects of the various treatments have the expected signs.

Anonymity decreases contributions, even if this effect is not statistically significant. Contributions in front of the solicitor are on average 25% larger than contributions made in private. That the difference is not larger suggests that identity effects of being a generous or socially responsible person, irrespective of other people's opinions or social approval, is an important explanation of contribution behavior. We also found that the reciprocity treatment induces more people to contribute, while decreasing the average conditional contribution. Something similar applies for the comparison between providing no reference information and providing a reference of \$2. These two treatments seem to "force" contributions from subjects who would not otherwise contribute, but in line with their baseline preferences, they tend to contribute less than others. The net effect of providing a reference amount of a magnitude similar to the mean contribution in the base case (with no reference contribution) has virtually no

effect on the conditional contribution. Providing a smaller or larger reference amount decreases and increases the size of the contribution, respectively.

The overall effects are perhaps smaller than expected, compared with findings from laboratory experiments. There are several possible explanations to this. One is that decisions in the laboratory to a larger extent than real world decisions may influence people in asking themselves “what type of person am I?” for the simple reason that they know that they are participating in an experiment and are being observed. Consequently, subjects may be affected more by different treatments in a lab environment. Another explanation is that field experiments concern earned wealth, while many laboratory experiments involve wind-fall money. In fact, Cherry et al. (2002) find that in a lab experiment, earned endowments substantially reduce offers in dictator games. A third potential explanation is that the social distance to the solicitor and the other subjects/visitors is larger in the field than in the lab. Although it is an important step to move outside the lab, the findings can of course not be generalized to all possible real-life situations. For example, the importance of being perceived by others as generous, and perhaps committed to a good cause, may depend on who is observing one’s behavior. The solicitor is presumably not that important for the subjects, and it is only one person. Hence, one may expect anonymity to be much more important in other contexts. Similarly, the effects of reciprocity may of course depend on the particular gift given, and also on the perceived intention behind the gift.

There are several interesting areas for future research. For example, what is the influence of the type of gift, and of who gives? Does the willingness to conform depend on the social distance so that subjects are more willing to conform to other subjects from the same country or of the same gender? And what is the effect on behavior of making their contribution known to more people by for example giving contributors a small badge saying that they are supporters of the park? We leave these and other extensions to future research.

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Table 1. Experimental design for all treatment combinations.

	No reciprocity		Reciprocity		Total
	Anonymous	Non-anonymous	Anonymous	Non-anonymous	
No reference donation	62 observations	63 observations	62 observations	63 observations	250
Reference donation: \$2	61 observations	63 observations	62 observations	63 observations	249
Reference donation: \$5	62 observations	62 observations	62 observations	63 observations	249
Reference donation: \$10	62 observations	62 observations	62 observations	63 observations	249
Total	247 observations	250 observations	248 observations	252 observations	997

Table 2. Descriptive field-experimental results.

	Observations	Share pos. contribution	Conditional average contribution (std)	Sample average contribution (std)
No reciprocity	497	0.48	5.09 (5.74)	2.43 (4.70)
Reciprocity	500	0.56	4.56 (6.97)	2.56 (5.69)
Anonymous	495	0.51	4.36 (4.79)	2.21 (4.05)
Non-anonymous	502	0.53	5.21 (7.65)	2.77 (6.15)
No Reference	250	0.47	6.00 (10.49)	2.84 (7.79)
Reference: \$2	249	0.61	3.61 (3.99)	2.20 (3.58)
Reference: \$5	249	0.50	3.95 (2.84)	1.98 (2.82)
Reference: \$10	249	0.49	5.97 (6.06)	2.95 (5.20)
Total	997	0.52	4.80 (6.43)	2.49 (5.22)

Figure 1. Distribution of contributions for reference contribution treatments. The rightmost bar is contributions larger than 10 USD.

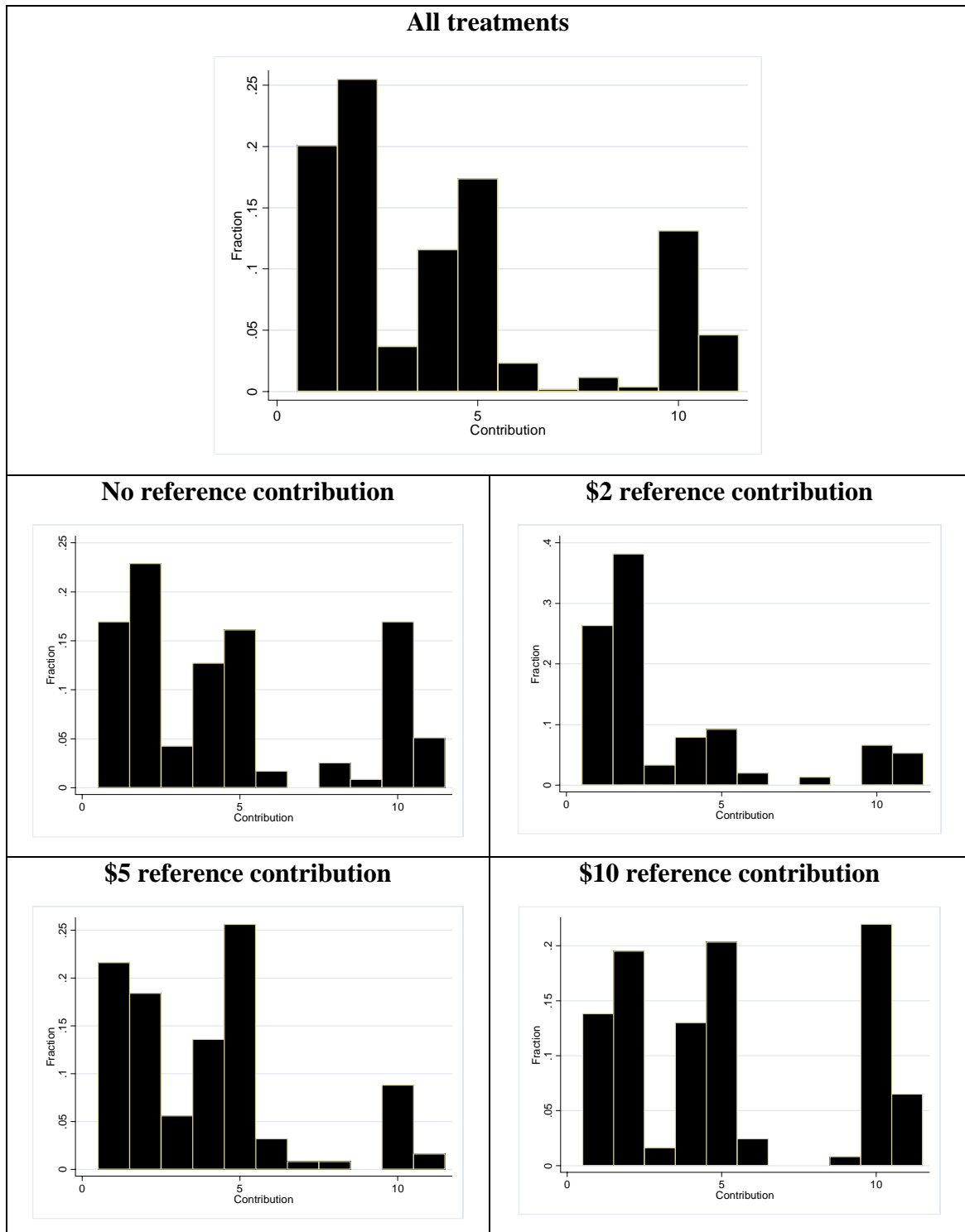


Table 3. Regression analysis of contributions to the national park. The coefficients reflect marginal effects evaluated at sample means. All models include an intercept, solicitor dummy variables and subject characteristics variables. P-values in parentheses.

	2-stage robust regression (main effects)			2-stage robust regression (with interaction effects for anonymity and reciprocity)			Robust regression of conditional contribution (main effects)	Robust regression of conditional contribution (interaction effects)
	Probit P(Contrib. >0)	Robust regression of conditional contribution	Total effect	Probit P(Contrib. >0)	Robust regression of conditional contribution	Total effect		
Non-anonymous treatment	0.023 (0.480)	0.232 (0.356)	0.230 (0.256)	0.018 (0.687)	-0.127 (0.736)	0.022 (0.940)	0.281 (0.238)	0.013 (0.970)
Reciprocity treatment	0.100 (0.003)	-0.484 (0.070)	0.228 (0.283)				-0.496 (0.050)	
Reciprocity treatment × Anonymous treatment				0.005 (0.935)	0.658 (0.201)	0.367 (0.369)		0.474 (0.326)
Reciprocity treatment × Non-anonym. treatment				0.089 (0.057)	-0.810 (0.036)	0.007 (0.982)		-0.726 (0.045)
Treatment with \$2 reference contribution	0.152 (0.001)	-1.123 (0.002)	0.147 (0.600)	0.148 (0.001)	-1.154 (0.001)	0.110 (0.697)	-1.174 (0.009)	-1.186 (0.009)
Treatment with \$5 reference contribution	0.049 (0.280)	0.035 (0.924)	0.254 (0.384)	0.046 (0.314)	-0.006 (0.986)	0.216 (0.461)	-0.116 (0.810)	-0.137 (0.780)
Treatment with \$10 reference contribution	0.028 (0.539)	0.711 (0.055)	0.503 (0.083)	0.018 (0.687)	0.664 (0.078)	0.458 (0.118)	-0.566 (0.258)	-0.604 (0.234)
Made contribution in dollars only							0.578 (0.249)	0.557 (0.271)
Contribution in dollar × \$2 reference contribution							0.049 (0.941)	0.056 (0.933)
Contribution in dollar × \$5 reference contribution							0.205 (0.769)	0.233 (0.740)
Contribution in dollar × \$10 reference contribution							2.379 (0.001)	2.399 (0.001)
Solicitor dummy variables	Included	Included	Included	Included	Included	Included	Included	Included
Subject characteristics variables	Included	Included	Included	Included	Included	Included	Included	Included