



# Generosity, anonymity, gender

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## Abstract

We examine experimentally how a person's generosity depends on the degree of anonymity between giver and recipient, as well as on the parties' sexes. Less is given when the giver is paid on stage rather than in private; men receive less than women; fewer men than women give non-zero amounts. The results suggest that it may be problematic to organize experimental data in terms of social distance. © 2005 Elsevier B.V. All rights reserved.

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## 1. Introduction

How does a person's generosity depend on the degree of anonymity between giver and recipient, as well as on the sex of either party? We provide answers based on an experiment.

Our approach relies on *the dictator game*, a popular tool in experimental research introduced by Forsythe et al. (1994) and possibly the simplest vehicle for investigating generosity: one person (*the dictator*) divides a sum of money between her-/himself and

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another person (*the recipient*), and payments are made accordingly. We manipulate the degree of anonymity between subjects by varying the circumstances under which payments are made. In treatments with *private payment (PP)*, subjects pick up their payments without directly identifying themselves to others while in treatments with *on stage payment (OS)*, the dictators receive their payments in a lecture hall with a few hundred co-students present (clapping and cheering, as it turned out and could reasonably have been expected). In addition, the dictator is informed about the sex of the recipient via the wording of the instructions, and we observe the sex of the dictator.

We report results concerning the importance of each of the three controls in our  $2 \times 2 \times 2$  design (payment condition, dictator's sex, recipient's sex). In a nutshell, *less is given with payments on stage rather than in private, men receive less than women, and fewer men than women give non-zero amounts*. In our discussion of these results, we concentrate mainly on the first result, which is where we feel we have something useful to say. We argue that it may be problematic to organize experimental data in terms of "social distance" if this notion is taken to vary one-to-one with anonymity. As anonymity is manipulated it is likely that other motivationally relevant aspects change as well, introducing serious confounding factors.

We present our design, the results and our discussion (including citations of related work) in Sections 2, 3 and 4.

## 2. The design<sup>1</sup>

The experiment was run in the spring of 2000 at Stockholm University. We addressed 388 students enrolled in the introductory microeconomics course. Participation was voluntary and involved answering a question concerning how to divide 1000 Swedish kronor ( $\approx$ US\$ 110 at the time) between oneself and another student in the course referred to either *as a randomly selected female student* or *as a randomly selected male student*. We explained that one thus created student pair would be selected at random to receive payments in accordance with the chosen division.<sup>2</sup>

Participants had to specify a "code number" consisting of the student's initials plus the last four digits of her/his social security number. In Sweden, this reveals a person's sex, which we could thus observe.<sup>3</sup> The instructions then described how a subject (if selected) would be paid. Depending on treatment, the subject who made the division would either *pick up the payment in private (by showing up at our offices)* or *would have to come on stage during an auditorium lecture (the amount being announced, a few hundred people watching)*. The recipient's payment was made in private.

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<sup>1</sup> The working paper version of our paper, Dufwenberg and Muren (2002), includes a more detailed version of this section as well as the experimental instructions. Go to [http://www.ne.su.se/paper/wp02\\_02.pdf](http://www.ne.su.se/paper/wp02_02.pdf).

<sup>2</sup> We explained that the selection would be made at an auditorium lecture to which all students were invited. We actually paid 1000 kronor to one pair of students *for each version* of the instructions, but we did not mention that beforehand in order not to indicate that different treatments were involved.

<sup>3</sup> Swedish SSNs have 10 digits, specifying year–month–day of birth plus four digits where the penultimate one is *even* for a woman and *odd* for a man.

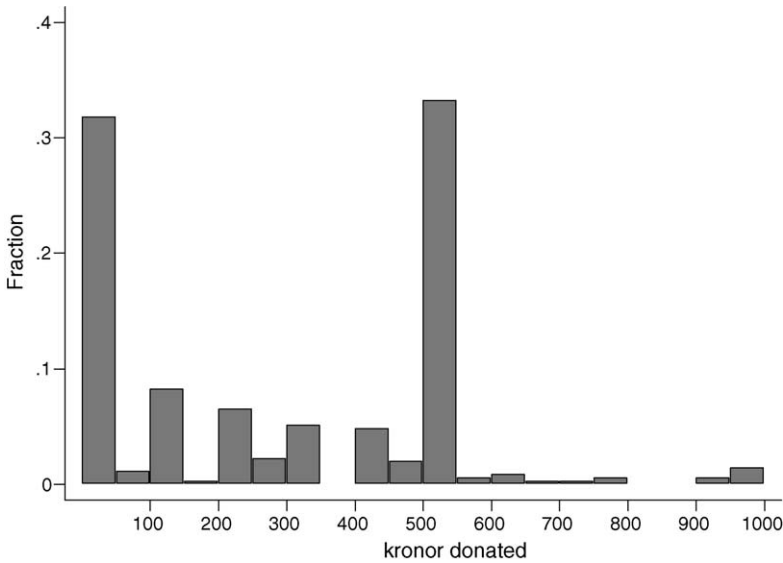


Fig. 1. Amounts donated for the whole sample (N=352).

Table 1

Means (medians) donated, N=352

	Private payment		On stage payment	
	To female	To male	To female	To male
From female	334 (425)	323 (400)	264 (250)	226 (200)
From male	352 (499)	276 (223)	269 (139)	180 (1, 10) <sup>a</sup>

<sup>a</sup> This cell has 46 observations and any value between the two middle observations, 1 and 10, is a median (see DeGroot, 1975, pp. 315–316).

### 3. Results

Of the 388 students, 352 took active part in the experiment.<sup>4</sup> The raw data is in Appendix A. Fig. 1 indicates the overall frequencies of donated amounts in categories 0–50, 51–100, ..., 951–1000. The average is 275 kronor. The distribution is concentrated around 0 and 500 kronor.<sup>5</sup>

Table 1 displays means (and medians) of donation for each of our eight cells

<sup>4</sup> Among the remaining 36 subjects, in three cases the code number did not correspond to the four-digit standard and in one case it was illegible. The remaining 32 chose not to participate; 20 of these came from the OS condition with a female recipient, and a Fisher exact test rejects independence of the (dichotomous) variables “Participation” and “OS payment” for female recipients, as well as of “Participation” and “Female dictator” for the OS payment condition ( $P=0.002$  and  $0.001$ , respectively).

<sup>5</sup> The overall distribution is reasonably consistent with previous dictator findings, although equal splits seem more frequent. Compare the results surveyed by Roth (1995).

Table 2  
Proportions of non-zero donations,  $N = 352$

	Private payment		On stage payment	
	To female	To male	To female	To male
From female	0.96	0.81	0.79	0.70
From male	0.84	0.72	0.65	0.65

Visual inspection suggests that dictators overall donate less money in the OS than in the PP treatment and that more money is donated to women, particularly from men. To determine whether these results are statistically significant, we first split the whole data set into two parts according to which treatment variable is in focus and apply the non-parametric Wilcoxon–Mann–Whitney test.<sup>6</sup> *Results:* The donations made in the PP and OS treatments differ ( $P = 0.001$ ), donations to men and women differ ( $P = 0.01$ ), and donations by men and women do not differ ( $P = 0.16$ ).<sup>7</sup>

Our data can also be analyzed by focusing on the proportions of subjects who give strictly positive amounts to the recipient. Restricting attention to the 269 out of 352 data points involving non-zero donations, we can no longer reject any of the three hypotheses of no differences between treatment groups.<sup>8</sup> In light of this, we create a new variable, “non-zero donation”, for which Table 2 shows the proportions across cells.

To test for statistical significance, we use the Chi-square test.<sup>9</sup> *Results:* The frequency of non-zero donations differs between the PP and OS treatments ( $P = 0.001$ ), differs according to the recipient’s sex ( $P = 0.03$ ) and differs according to the dictator’s sex ( $P = 0.01$ ).<sup>10</sup> The first two of these results are in spirit with our earlier ones, but the last result is different since we had no significant gender difference in donated amounts.

#### 4. Discussion, in particular regarding social distance

We have reported results concerning the impact on generosity of: (i) anonymity, (ii) the sex of the person giving and (iii) the sex of the receiving person. We have little more to say

<sup>6</sup> In this test, the data is ranked and the test assumes a continuous distribution where the probability of a tie is zero. When ties occur, as in our data, average ranks are assigned to tied data and the test statistic is calculated accordingly. The effect of correcting for ties is small (see Siegel and Castellan, 1988, pp. 134–136). All tests are two-tailed.

<sup>7</sup> The (parametric) analysis of variance (ANOVA) gives the same results: the effects of “OS payment” and “Female recipient” are significant ( $P = 0.002$  and  $0.03$ ); the effect of “Female dictator” is not ( $P = 0.57$ ).

<sup>8</sup> Significance levels for the Wilcoxon–Mann–Whitney tests are  $P = 0.17$ ,  $0.21$  and  $0.43$ . The hypothesis that the non-zero donations are normally distributed is not rejected, and ANOVA tests confirm the result ( $P = 0.14$ ,  $0.23$  and  $0.22$  for the variables “OS payment”, “Female dictator” and “Female recipient”).

<sup>9</sup> We test the hypothesis of independent variables for the dichotomous variable “Non-zero donation” against the three treatment variables one at the time.  $N = 352$ , there are at least 26 observations per cell and expected frequencies are at least 38 for each of the cells. Thus, the Chi-square test for  $2 \times 2$  tables is appropriate (see Siegel and Castellan, 1988, pp. 111–124). All tests are two-tailed.

<sup>10</sup> In a logistic regression of the variable “Non-zero donation” on the three treatment variables simultaneously, each has a significant effect ( $P = 0.001$ ,  $0.01$  and  $0.05$  for “OS payment”, “Female dictator” and “Female recipient”). The direction of the effect is positive for “Female dictator” and “Female recipient” and negative for “OS payment”. The results are thus confirmed.

about (ii) and (iii). Our findings speak to the associated experimental literatures on gender differences and on discrimination.<sup>11</sup> Results in these areas seem to be (to cite a referee) “all over the map”, and we do not feel confident drawing far-reaching conclusions beyond presenting our data. We do feel that we have something useful to say regarding (i), however, which is what we do in the remainder of this paper.

The term “social distance” is defined by the Encyclopedia of Psychology (Kazdin, 2000) as “the perceived distance between individuals or groups”. The concept has a long history in social science research. Bogardus (1928) developed a scale to measure it based on statements such as “I would marry this person” and “I would have this person excluded from the country”, suggesting that he had a rather multi-faceted notion in mind. When economists picked up on the concept, they focused on one particular aspect: *anonymity*. Hence, there is a connection to (i). Two influential studies are Hoffman et al. (1994, 1996), who investigate dictator games and find that selfishness increases with anonymity. These findings have inspired or spawned several other studies.<sup>12</sup>

The PP and the OS treatments in our study involve far less anonymity than any in Hoffman et al., but since OS involves less anonymity than PP it may seem natural to expect dictators to donate more money in the former case.<sup>13</sup> Against this background, we were surprised to find that our results go in the opposite direction.

In retrospect, we feel that there is a lesson in this, namely that it is problematic to organize experimental data in terms of social distance if this notion is taken to vary one-to-one with anonymity. As anonymity changes other things may change alongside so that confounding factors may inadvertently be introduced. A stark example of this is provided by Frohlich et al. (2000), who report that as anonymity is increased in dictator games, subjects in the dictator position may start disbelieving the very *existence* of a recipient. In our design, other confounding factors are conceivable, as going on stage in the OS treatment may involve a whole new array of considerations (for example, if a dictator suffers from stage fright or is an exhibitionist) on top of the reduction of anonymity.<sup>14</sup>

<sup>11</sup> Bolton and Katok (1995), Eckel and Grossman (1998), Andreoni and Vesterlund (2001) and Ben-Ner et al. (2004) have results regarding gender differences and generosity. The last two of these, as well as Fershtman and Gneezy (2001), Holm (2000), Eckel and Grossman (2001) and Holm and Engfeld (2001) have results about discrimination. Dufwenberg and Muren discuss these results in more depth.

<sup>12</sup> See Bohnet and Frey (1999a,b), Bolton et al. (1998), Charness and Gneezy (in press), Frohlich et al. (2000, 2004) and Johannesson and Persson (2000).

<sup>13</sup> Results by Rege and Telle (2004) could fuel this expectation further. In a public goods experiment, they find that subjects increase their contributions if their identity and contribution are revealed.

<sup>14</sup> See also Frohlich et al. (2004), who report evidence suggesting other ways in which changes in design alter how subjects perceive the experimental context. We suspect that similar concerns may have influenced the results of other studies. As an example, consider Johannesson and Persson (2000) who replicate the highest social distance treatment in Hoffman et al. (1994), with subjects being students at the Stockholm School of Economics. The treatment is compared with a control in which the recipients are randomly selected persons from the Swedish public, to whom (positive) donations are sent by mail. Johannesson and Persson suggest that since the interacting subjects are no longer students at the same university, this “removes any possible remaining reciprocity” in the design. We find it reasonable to suspect, however, that their imaginative design introduces a completely new aspect in the minds of dictators. They may feel intrigued by the thought of the unexpected recipient opening a letter to find a lot, or a little, money inside. This may in itself influence dictators’ decisions.



- (5) On-stage payment, female dictator, male recipient:  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 20, 50, 100, 100, 150, 200, 200, 200, 200,  
200, 200, 200, 200, 300, 400, 400, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500,  
500, 500, 500, 500, 500.
- (6) Private payment, female dictator, male recipient:  
0, 0, 0, 0, 0, 10, 100, 100, 200, 300, 300, 400, 400, 400, 500, 500, 500, 500,  
500, 500, 500, 500, 500, 999.
- (7) On-stage payment, male dictator, male recipient:  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 10, 100, 100, 200, 200, 250,  
250, 250, 300, 300, 400, 400, 400, 500, 500, 500, 500, 500, 500, 500, 500, 500, 600.
- (8) Private payment, male dictator, male recipient:  
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 10, 100, 100, 100, 100, 100, 200, 223, 300,  
300, 300, 400, 495, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500, 500,  
500, 600, 750, 900, 999.

## References

- Andreoni, J., Vesterlund, L., 2001. Which is the fair sex? Gender differences in altruism. *Quarterly Journal of Economics* 116, 293–312.
- Ben-Ner, A., Kong, F., Putterman, L., 2004. Share and share alike? Gender-pairing, personality, and cognitive ability as determinants of giving. *Journal of Economic Psychology* 25, 581–589.
- Bogardus, E.S., 1928. *Immigration and Race Attitudes*. Heath, Boston.
- Bohnet, I., Frey, B., 1999a. Social distance and other-regarding behavior in dictator games: comment. *American Economic Review* 89, 335–339.
- Bohnet, I., Frey, B., 1999b. The sound of silence in prisoner's dilemma and dictator games. *Journal of Economic Behavior and Organization* 38, 43–57.
- Bolton, G., Katok, E., 1995. An experimental test for gender differences in beneficent behavior. *Economics Letters* 48, 287–292.
- Bolton, G., Katok, E., Zwick, R., 1998. Dictator game giving: rules of fairness versus acts of kindness. *International Journal of Game Theory* 27, 269–299.
- Charness, G., Gneezy, U. What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior and Organization*, in press.
- DeGroot, M.H., 1975. *Probability and Statistics*. Addison-Wesley, Reading.
- Dufwenberg, M., Muren, A., 2002. Discrimination by gender and social distance. Working Paper 2002:2. Department of Economics, Stockholm University.
- Eckel, C., Grossman, P., 1998. Are women less selfish than men? Evidence from dictator experiments. *Economic Journal* 108, 726–735.
- Eckel, C., Grossman, P., 2001. Chivalry and solidarity in ultimatum games. *Economic Inquiry* 39, 171–188.
- Fershtman, C., Gneezy, U., 2001. Discrimination in a segmented society: An experimental approach. *Quarterly Journal of Economics* 116, 351–377.
- Forsythe, R., Horowitz, J., Savin, N., Sefton, M., 1994. Fairness in simple bargaining experiments. *Games and Economic Behavior* 6, 347–369.
- Frohlich, N., Oppenheimer, J., Moore, B., 2000. Some doubts about measuring self-interest using dictator experiments: the costs of anonymity. *Journal of Economic Behavior and Organization* 46, 271–290.
- Frohlich, N., Oppenheimer, J., Kurki, A., 2004. Modeling other-regarding preferences and an experimental test. *Public Choice* 119, 91–117.
- Hoffman, E., McCabe, E., Shachat, K., Smith, V., 1994. Preferences, property rights, and anonymity in bargaining games. *Games and Economic Behavior* 7, 346–380.

- Hoffman, E., McCabe, E., Smith, V., 1996. Social distance and other-regarding behavior in bargaining games. *American Economic Review* 86, 653–660.
- Holm, H.J., 2000. Gender based focal points. *Games and Economic Behavior* 32, 292–314.
- Holm, H.J., Engsel, P., 2001. Choosing bargaining partners—an experimental study on the impact of information about income and gender. Working Paper 2001:10. Department of Economics, Lund University.
- Johannesson, M., Persson, B., 2000. Non-reciprocal altruism in dictator games. *Economics Letters* 69, 137–142.
- Juvonen, J., Murdock, T.B., 1993. How to promote social approval: Effects of audience and achievement outcome on publicly communicated attributions. *Journal of Educational Psychology* 85, 365–376.
- Kazdin, A. (Ed.), 2000. *Encyclopedia of Psychology*. Oxford University Press, New York.
- Rege, M., Telle, K., 2004. The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics* 88, 1625–1644.
- Roth, A., 1995. Bargaining experiments. In: Kagel, J., Roth, A.E. (Eds.), *Handbook of Experimental Economics*. Princeton University Press, Princeton, pp. 253–348.
- Shogren, J., 1989. Fairness in bargaining requires a context: an experimental examination of loyalty. *Economics Letters* 31, 319–323.
- Siegel, S., Castellan Jr., H.J., 1988. *Nonparametric Statistics for the Behavioral Sciences*. McGraw Hill, New York.