The Economic Journal, **108** (*May*), 726–735. Published by Blackwell Publishers, 108 Cowley Road, Oxford OX4 1JF, UK and 350 Main Street, Malden, MA 02148, USA.

ARE WOMEN LESS SELFISH THAN MEN?: EVIDENCE FROM DICTATOR EXPERIMENTS*

Catherine C. Eckel and Philip J. Grossman

Research in social sciences other than economics indicates substantial differences in behaviour between men and women. The general conclusion drawn from this work is that women will be more socially-orientated (selfless), and men more individually-orientated (selfish). This paper reports the results of a double-anonymous dictator experiment designed to permit the emergence of basic gender differences in economic behaviour. Our results are intended to provide a baseline for further research. We find that women, on average, donate twice as much as men to their anonymous partners when any factors that might confound cooperation are eliminated.

> Woman seems to differ from man in mental disposition, chiefly in her greater tenderness and less selfishness .... Man ... delights in competition, and this leads to ambition which passes too easily into selfishness.
>
> — Charles Darwin (1874, p. 586)

Do the economic decisions of women and men differ systematically? Research in every other social and behavioural science indicates substantial differences in the behaviour of men and women in noneconomic settings.[1] The general conclusion drawn from this work is that women are more socially-orientated (selfless) and men are more individually-orientated (selfish). If these differences survive in economic decisions, when money is at stake, then theories that model agents as homogeneous, or drawn from a common distribution, may predict behaviour inaccurately. If instead the differences in behaviour are overwhelmed by monetary incentives, then economic decisions are fundamentally different from those examined in other social and behavioural sciences.

Attempts to test for differences in the behaviour of men and women in economic situations in the laboratory have met with mixed results.[2] Using

* This research was supported by the National Science Foundation (SBR 94-22867), the Gilder Foundation, and a Wayne State University Diversity Project Grant. We thank Laura Buchanan, Vernon Smith, Timothy Besley, four anonymous referees, and the staff of the Economic Science Laboratory at the University of Arizona. Any opinions, findings and conclusions or recommendations expressed in this article are those of the authors and do not necessarily reflect the views of the National Science Foundation.

[1] For example, in psychology, studies in moral behaviour, game playing, and helping behaviour find consistent sex differences (Eagly and Crowley, 1986; Gilligan, 1982; Uesugi and Vinacke, 1963; and Vinacke, 1959). In sociology, studies find sex differences in criminality and illicit and prescribed drug use (Cooperstock and Parnell, 1982; Gottfredson and Hirschi, 1990; Kandel and Logan, 1984; and Wilson and Herrnstein, 1985). Studies in political science report the development of a 'gender-gap' in political behaviour. Since the 1980 elections, women, relative to men, have shown a bias towards Democratic candidates. Women's voting behaviour is driven more by social issues than that of men (Baxter and Lansing, 1983; Christy, 1987; Goertzel, 1983; and Moore, 1996).

[2] Related research on the role of fairness reveals behaviour that seems inconsistent with standard game theory (Hoffman *et al.* 1994; Forsythe *et al.* 1994; Roth, 1995). Theoretical developments have followed suit, incorporating a preference for fairness into agents' utility functions (Young, 1994; Rabin, 1993).

variations on the Prisoner's Dilemma, some studies find women to be more cooperative or generous (e.g. Aranoff and Tedeschi, 1968; Meux, 1973; and Ortmann and Tichy, 1996); others find men to be more cooperative (e.g. Rapoport and Chammah, 1965; Kahn *et al.* 1971; and Mack *et al.* 1971); while others find inconsistent or no significant difference between the sexes (e.g. Dawes *et al.* 1977; Stockard *et al.* 1988; and Orbell *et al.* 1994). Mason *et al.* (1991) find no gender difference in a duopoly experiment. In public goods experiments, Brown-Kruse and Hummels (1993) find women contribute significantly less than men, while Nowell and Tinkler (1993) report significantly higher contributions by groups of women than by mixed-sex or all-male groups. Bolton and Katok (1995) find no differences between the play of men and women in dictator games.[3] The contradictory results may be caused by failure to control for important environmental factors that might confound basic gender differences. Diversity in the stakes, information, social distance, decision options, and other aspects of the experimental design may explain the differences in outcomes.

It is important to investigate why economic research has been unable to reach a consistent conclusion on gender differences. In this paper, we report the results of an experiment designed to permit the emergence of basic gender differences in economic behaviour. We start with a simple design that removes possible confounding factors. Our results are intended to provide a baseline for further research. Based on the findings from the other social sciences, we expect to observe that women are less selfish than men. If this difference in behaviour is observed, this suggests that the confounding factors may be responsible for the inconsistent results of prior studies.

Our vehicle is the dictator experiment conducted under the double-anonymous conditions developed by Hoffman *et al.* (1994). The dictator 'game' is not a game at all, but an allocation exercise. Nevertheless, it can be used to inform theory. The advantage of the double-anonymous dictator environment over others is that it eliminates considerations of: (1) strategic risk; (2) subject/subject interactions; and (3) subject/experimenter interactions.[4] It

[3] While Bolton and Katok (1995) employ the same game structure as our own, their experimental environment differs in three ways. First, their study involves a small sample of subjects in each of three variations. Second, they restrict the choice set of the dictator in several ways. For example, the choice set in one variation was restricted to giving nothing or 50% of the pie. If, as Bolton and Katok argue, '...when confronted with a choice of leaving more or less than they would freely choose, dictators choose less' (p. 290), then this restricted choice set may conceal any sex differences. Third, between-subject anonymity may be compromised. Although subjects did not know the identity of their partner(s), all subjects were initially recruited to the same room. These factors may affect subjects' play. For example, the work of Hoffman *et al.* (1994, 1996) suggests that factors which reduce subject/subject anonymity, can increase the generosity of offers in the dictator setting. Therefore, we: (1) place no restrictions on subjects' choices; (2) have all subjects play the same game; and (3) maintain between-subject anonymity by using different rooms for dictators and respondents.

[4] There is some question whether subject-experimenter effects are significant. Hoffman, et al. (1994) report a significant difference in the play of subjects between dictator experiments without subject-experimenter anonymity (20% of the dictator subjects offer $0) and dictator experiments with subject-experimenter anonymity (60% of dictator subjects offer $0). Roth (1995) reviews a number of other studies that report no significant effect. In light of the controversy, we elect to adopt the more conservative approach of, to the extent feasible, controlling for all possible confounding effects. This approach also is our justification for using different rooms for dictators and respondents.

offers a pure test of basic male/female differences in selfishness. Having thus provided a baseline for comparison, research into the impact on behaviour of the environmental variations delineated above is then possible.

1. Why the Inconsistent Results?

The inconsistencies in the studies of sex differences may be related to the factors listed above. Social dilemma (Ledyard, 1995) and ultimatum experiments (Thaler, 1988) are strategic environments; subjects must consider the likely actions of their partners in making their own decisions. Both involve strategic risk. Social dilemma experiments give subjects the opportunity to choose a cooperative strategy which carries the risk of a particularly low payoff.[5] In ultimatum game experiments an unequal proposal carries the risk of rejection. If women differ from men only in their selfishness, the results of both types of experiments should be similar, with women behaving more generously in both. But if they differ only in their degree of risk aversion, the results should differ, with women making decisions that reflect greater risk aversion: less generous contributions in the social dilemma, and more generous offers in the ultimatum game. Thus in these environments an observed difference between the play of men and women may reflect either a basic difference in the selfishness of the sexes, or a difference in how they respond to risk.

In addition to considerations of risk, men and women may react differently to their partner or to the experimenter. In a study of helping behaviour, Eagly and Crowley (1986) suggest that men may exhibit chivalrous or victimising behaviour toward weaker partners. The decision environment is likely to influence which behaviour emerges. In another example from our own research, Eckel and Grossman (1996*b*) report evidence from ultimatum games that women display solidarity with female partners; female dyads rarely fail to reach an agreement, in sharp contrast to what happens in male or mixed dyads. In addition, women may be more sensitive to the judgement of others, and so more affected by the potential judgement of the experimenter. A stronger 'experimenter effect' (the effect of the experimenter knowing the individual's decision) for women would complicate the interpretation of their behaviour.

In our experiments, we eliminate risk by adopting the dictator setting. In addition, we employ the double-anonymous procedures developed in Hoffman *et al.* (1994) to minimise subject-interaction and experimenter effects.[6]

[5] Ingram and Berger (1977) report that women, in experiment debriefings, indicated that they chose the competitive strategy for fear of falling into the 'sucker' role – choosing cooperation when the other defects (p.504). The 'sucker effect' occurs when individuals free-ride out of fear that others will too. It was first identified by Orbell and Dawes (1981) as a justification for free-riding behaviour.

[6] There may also be a sex difference in how subjects respond to the sex of the experimenter. In all sessions, Eckel conducted the experiment in the room with the dictators.

2. Experiment Design and Procedure

Our subjects participate in a dictator experiment in which the dictator is asked to determine the division of $10 between himself/herself and an anonymous respondent.[7] A dictator must sacrifice earnings dollar-for-dollar in order to reward her partner (see Eckel and Grossman, 1996*a*). Complete selfishness implies that the dictator will keep the full pie for herself. A less selfish dictator will divide the pie more evenly.

Ten sessions were conducted with fourteen dictators each.[8] In half of the sessions, all dictators were men, and in the other half, women.[9] Subjects were recruited from introductory courses in accounting, economics, finance, psychology, and sociology at the University of Arizona (UA) and Virginia Polytechnic Institute and State University (VPI), during the spring, summer and fall terms, 1995, and spring term, 1996.[10] Four sessions (two with men and two with women dictators) were conducted at UA and six sessions (three with men and three with women) were conducted at VPI.

The procedure is identical to the Hoffman *et al.* (1994) design. A copy of the instructions is included in the Appendix. For each session, 29 subjects are recruited, 15 to one room (the dictator room) and 14 to a separate room (the recipient room). All subjects receive a $5 show-up fee, and are informed that subjects in the other room had received it, too. After signing a permission release, subjects in both rooms are given the instructions for the experiment. A monitor is chosen in the dictator room, and he/she conducts the experiment and verifies that the procedures are followed. The experimenter is in the room for the duration of the experiment.

Fourteen envelopes – twelve containing 10 one-dollar bills and 10 blank slips of paper and two containing 20 blank slips of paper – are randomly distributed to the subjects. (The two envelopes containing 20 blank slips of

[7] Forsythe *et al.* (1994) provide an analysis of behaviour in dictator games with no payment, low payment ($5 pie) and high payment ($10 pie).

[8] Four additional sessions were conducted at VPI. Data for these sessions are not included in the analysis. We suspect that the data for these four sessions are contaminated. They were conducted within two days of another set of two sessions during the summer term, 1995. After conducting these sessions we observed that subjects in room *A* appeared to know subjects in room *B*, and to wait around near room *B* for them to be finished. Subjects were recruited from different Business classes, but the pool of summer school subjects is small enough for subjects to have discussed the experiment among themselves. So it is not implausible that after 58 summer school subjects had participated in the first two sessions (conducted on the same day), the subjects in the four subsequent sessions knew ahead of time the nature of the experiment, and at least some of the subjects in the other room. In addition, one of the male dictator subjects in one of these sessions mentioned as he was leaving that he had read our work on gender differences in ultimatum games.

[9] The double anonymous procedure requires the use of single-sex dictator groups. Using mixed groups and surveying for subjects' sex would compromise subject anonymity. Respondent groups were not restricted to one sex. When asked by the dictators about the makeup of the respondent group, the experimenter informed them the respondents were a random sample of subjects. While there is evidence that knowledge of a partner's sex can influence the decisions of subjects (Eckel and Grossman, 1996*b*), there is no evidence that single-sex groupings, such as we have employed, influence subjects' play.

[10] During class time, the experimenters called for volunteers. Volunteers were asked to provide their names and telephone numbers and told they would be contacted at a later date to set the time and place for their participation. Subjects for any particular session were recruited from the master list, encompassing volunteers from all classes approached to date. When called, subjects were told to appear at one room if they were to be dictators and a separate room if they were to be respondents.

paper are included as an additional guarantee of anonymity.) Subjects, in private, remove 10 units – any combination of dollar bills and paper – from the envelope, seal the envelope, drop it in a box, and leave. After all subjects have deposited their envelopes and departed, the envelopes are randomly distributed to subjects from the Recipient room. Envelopes are opened and the money recorded and given to the subject.

3. Results

Before considering gender differences, we conduct a Kolmogorov-Smirnov test and an Epps-Singleton test of the hypothesis that there is no difference in the distributions of men's and women's donations by school (UA vs. VPI), and a χ^2 contingency table test of the hypothesis that the probability of a specific donation being made by men (women) is independent of the dictator's school. In all three tests the null hypothesis of no difference in the distributions of donations by school cannot be rejected.[11] Based on these results, we pool the UA and VPI data.

Our results show that women are more generous to their partners than men: women donate, on average, about twice what men donate. The results are summarised in Table 1. Table 2 contains results from six statistical tests; all suggest that the observed difference in generosity is statistically significant.

We first consider a z-test of the hypothesis that men and women's average donations are equal. Women donate on average \$1.60 to their anonymous partner; men donate \$0.82, slightly more than half as much. The t-statistic (119 degrees of freedom) is 2.44, statistically significant with a p-value less than 0.01.

Table 1
Percent of Decisions for Each Amount Donated

Amount donated	Women	Men
\$ 0	46.67	60.00
\$ 1	10.00	26.67
\$ 2	13.33	3.33
\$ 3	11.67	5.00
\$ 4	3.33	0.00
\$ 5	15.00	3.33
\$ 6	0.00	0.00
\$ 7	0.00	0.00
\$ 8	0.00	0.00
\$ 9	0.00	0.00
\$10	0.00	1.67
Average donation	\$1.60	\$0.82
Observations	60	60

[11] The Kolmogorov-Smirnov, Epps-Singleton, and χ^2 contingency table statistics for women are 0.17 (p-value $>$ 0.20), 2.46 (p-value = 0.65), and 3.52 (p-value = 0.62). For men the respective statistics are 0.11 (p-value $>$ 0.20), 2.46 (p-value = 0.65), and 1.23 (p-value = 0.75).

Table 2
Statistical Test Results

Test description:	Statistic	p-value
z-test of equal average donations*	2.44	< 0.01
χ^2 test of equal medians**	4.29	< 0.05
χ^2 contingency table test that donations are independent of sex ***	15.32	< 0.01
χ^2 contingency table test that donations, conditional on giving, are independent of sex ****	12.71	0.01
Kolmorogov-Smirnov test of donations distributions+	0.30	0.01
Kolmorogov-Smirnov test of donations, conditional on giving, distributions++	0.48	0.01
Epps-Singleton test of donations distributions+++	15.18	0.004
Epps-Singleton test of donations, conditional on giving, distributions+++	16.53	0.002
Logit Analysis		
Probability of Donating (*DONATE*)†	0.54‡	
	(1.46)	$< 0.10^{c}$
Amount Donated (*AMOUNT*)‖	1.60 ‡	
	(3.48)	< 0.01§
Amount Donated Conditional on Donating (*AMOUNT**)††	1.35 ‡	
	(2.29)	< 0.025§

* Critical value for significance of 0.99 = 2.36, one-tailed test.
** Distributed $\chi^2(1)$, critical value for significance of 0.95 = 3.84.
*** Distributed $\chi^2(4)$, critical value for significance of 0.99 = 13.28.
**** Distributed $\chi^2(3)$, critical value for significance of 0.99 = 11.34.
+ Critical value for significance of 0.99 = 0.297.
++ Critical value for significance of 0.99 = 0.440.
+++ Distributed $\chi^2(4)$, critical value for significance of 0.95 = 9.49.
† *DONATE* = 1 if donation > 0
‡ Coefficient on *SEX* (= 1 if female), t-statistic in parentheses.
§ One-tailed test.
‖ *AMOUNT* = 1 if donation ⩾ 2.
†† *AMOUNT** = 1 if donation ⩾ 3.

We reject the null hypothesis of no difference in mean donations. We also consider a median test of the hypothesis that the two populations have the same median donation. The $\chi^2(1)$ test statistic equals 4.29 (critical value = 3.84), p-value less than 0.05. We reject the null hypothesis of equal median donations.

We next consider a χ^2 contingency table test of the hypothesis that the probability of a specific donation being made is independent of the dictator's sex (see Steel and Torrie, 1980).[12] As shown in Table 1, 47% of women donate nothing, compared with 60% of men. Thirty percent of women donate at least three dollars, compared with only 10% of men. The statistically significant test statistic, which is distributed $\chi^2(4)$, equals 15.32 (critical value = 13.28), p-value less than 0.01; we cannot conclude that the amount donated is independent of the donor's sex. We also consider whether the amount donated, conditional on giving, is independent of the donor's sex. The $\chi^2(3)$ test statistic equals 12.71 (critical value = 11.34), p-value less than 0.01. Again, we are unable to conclude that the amount donated is independent of the donor's sex.

Next, we apply the Kolmogorov-Smirnov test and the Epps-Singleton test of the hypothesis that there is no difference in the distributions of donations

[12] We classify our data into a 2 (sex) × 5 (offers of \$0, 1, 2, 3, and 4+) table. Offers of \$4 or more are grouped due to the small number of observations for men in the \$4 to \$10 range.

made by men and women. See Epps and Singleton (1986). The Kolmogorov-Smirnov D statistic is 0.30 (critical value = 0.297), statistically significant with a p-value of 0.01. The Epps-Singleton test statistic, which is distributed $\chi^2(4)$, is 15.18, statistically significant with a corresponding p-value of 0.004. We also considered the distribution of donations, conditional on giving. The Kolmogorov-Smironov D statistic is 0.479 (critical value = 0.440), p-value of 0.01; the Epps-Singleton test statistic is 16.53, p-value of 0.002. All four tests reject the null hypothesis of no difference in the distributions of donations by sex.

Finally, we perform Logit analysis on the data. First we consider if women are more likely to donate, regardless of the amount, than men. We regress *DONATE* (= 1 if donation > 0) on *SEX* (= 1 if female). The coefficient on *SEX* is 0.539, p-value less than 0.10, one-tailed test. This indicates that the probability that women will donate is higher than the probability that men will donate (53% probability versus 40%, respectively).

Second, we consider if *SEX* influences the amount donated. We defined *AMOUNT* as donations greater than or less than the mean donation for the sample ($1.21). We regress *AMOUNT* (= 1 if donation ⩾ 2) on *SEX*. The Logit coefficient on *SEX* is 1.604, p-value less than 0.01, one-tailed test. The probability that women will donate more than the mean amount (43%) is greater than that for men (13%).

Finally, we consider, conditional on giving, if *SEX* influences the amount donated. We defined *AMOUNT** as donations greater than or less than the mean donation for this limited sample ($2.59). We regress *AMOUNT** (= 1 if donation ⩾ 3) on *SEX*. The coefficient on *SEX* is 1.350, p-value less than 0.025, one-tailed test. The probability that women who donate will donate more than the mean donation (56%) is, again, greater than that for men (25%).[13]

4. Discussion

Previous experimental work designed to test whether women are less selfish than men has been inconclusive. A drawback to these studies is that they fail to control for factors that might confound gender effects. It is therefore impossible to conclude if the observed behaviour reflects the relative selfishness of men and women, or rather reflects their response to the particular strategic environment of the experiment.

In this study we have examined the selfishness of men and women in the context of the double-anonymous dictator game experiment. The double-anonymous dictator setting removes risk, the possibility of gender-related subject interactions, and the experimenter effect, leaving only underlying selflessness as an explanation for donating money.

Our results indicate that women are less selfish than men when confounding

[13] We reran the Epps-Singleton test and Logit regressions, including the contaminated data. In all cases, inclusion of the contaminated data slightly weakens our results: Epps-Singleton statistic = 9.10 (p = 0.06); coefficient for: *DONATE* = 0.386 (t-statistic = 1.23, p < 0.20); *AMOUNT* = 0.95 (t-statistic = 2.64, p < 0.01); and *AMOUNT** = 0.92 (t-statistic = 1.89, p < 0.05).

factors are eliminated.[14] Women, on average, donate twice as much as men to their anonymous partners. Having established this baseline difference in men and women, it is appropriate now for research to address the issue of how other parameters of the experimental setting influence the behaviour of women and men.

National Science Foundation and Virginia Polytechnic Institute and State University

University of Texas at Arlington

Date of receipt of first submission: February 1996
Date of receipt of final typescript: September 1997

References

Aranoff, D. and Tedeschi, J. T. (1968). 'Original stakes and behavior in the prisoner's dilemma game.' *Psychonomic Science*, vol.12, pp.79–80.

Baxter, S. and Lansing, M. (1983). *Women and Politics: The Visible Majority*. Ann Arbor, MI: University of Michigan Press.

Bolton, G. E. and Katok, E. (1995). 'An experimental test for gender differences in beneficent behavior' *Economic Letters*, vol. 48, pp.287–92.

Brown-Kruse, J. and Hummels D. (1993). 'Gender effects in laboratory public goods contributions: do individuals put their money where their mouth is?.' *Journal of Economic Behavior and Organization*, vol. 22, pp.255–68.

Christy, C. A. (1987). *Sex Differences in Political Participation: Process of Change in Fourteen Nations*. New York, NY: Praeger.

Cooperstock, R. and Parnell, P. (1982). 'Research on psychotropic drug use: a review of findings and methods.' *Social Science and Medicine*, vol. 16, pp.1179–96. .

Darwin, C. (1874). *The Descent of Man, and Selection in Relation to Sex*. New York, NY: Hurst and Company.

Dawes, R. M., McTavish, J. and Shaklee, H. (1977). 'Behavior, communication, and assumptions about other people's behavior in a common dilemma situation.' *Journal of Personality and Social Psychology*, vol. 35, pp.1–11.

Eagly, A. H. and Crowley, M. (1986). 'Gender and helping behavior: a meta-analytic review of the social psychological literature.' *Psychological Bulletin*, vol. 100, pp. 283–308.

Eckel, C. C. and Grossman, P. J. (1996a). 'Altruism in anonymous dictator games.' *Games and Economic Behavior*, vol. 16, pp. 181–91.

Eckel, C. C. and Grossman, P. J. (1996b). 'Chivalry and solidarity in ultimatum games.' Virginia Polytechnic Institute and State University, Department of Economics Working Paper.

Epps, T. W. and Singleton, K. J. (1986). 'An omnibus test for the two-sample problem using the empirical characteristic function.' *Journal of Statistics and Computer Simulation*, vol. 26, pp. 177–203.

Forsythe, R., Horowitz, J. L., Savin, N. E. and Sefton M. (1994). 'Fairness in simple bargaining experiments.' *Games and Economic Behavior*, vol. 6, pp. 347–69.

Gilligan, C. (1982). *In a Different Voice: Psychological Theory and Women's Development*. Cambridge, MA: Harvard University Press.

Goertzel, T. G. (1983). 'The gender gap: sex, family income, and political opinions in the early 1980's.' *Journal of Political and Military Sociology*, vol. 11, pp. 209–22.

Gottfredson, M. R. and Hirschi, T. (1990). *A General Theory of Crime*. Stanford, CA: Stanford University Press.

Hoffman, E., McCabe, K., Shachat, K. and Smith, V. (1994). 'Preference, property rights and anonymity in bargaining games.' *Games and Economic Behavior*, vol. 7, pp. 346–80.

Hoffman, E., McCabe, K. and Smith, V. (1996). 'Social distance and other-regarding behavior in dictator games.' *American Economic Review*, vol. 86, pp. 653–60.

Ingram, B. L. and Berger, S. E. (1977). 'Sex-role orientation, defensiveness, and competitiveness in women.' *Journal of Conflict Resolution*, vol. 21, pp. 501–18.

Kahn, A., Hottes, J. and Davis, W. L. (1971). 'Cooperation and optimal responding in the prisoner's dilemma game: effects of sex and physical attractiveness.' *Journal of Personality and Social Psychology*, vol. 17, pp. 267–79.

Kandel, D. B. and Logan, J. A. (1984). 'Patterns of drug use from adolescence to young adulthood: 1. periods of risk for initiation, continued use, and discontinuation.' *American Journal of Public Health*, vol. 74, pp. 660–6.

[14] Generalisations should be made with caution: our subject pool consists of university-enrolled women. Other groups of women may behave differently.

Ledyard, J. (1995). 'Public goods: a survey of experimental research.' In *The Handbook of Experimental Economics* (eds. J. H. Kagel and A. E. Roth), pp. 111–94. Princeton, NJ: Princeton University Press.
Mack, D., Auburn, P. N. and Knight, G. P. (1971). 'Sex role identification and behavior in a reiterated prisoner's dilemma game.' *Psychonomic Science*, vol. 24, pp. 280–2.
Mason, C. F., Phillips, O. R. and Redington, D. B. (1991). 'The role of gender in a non-cooperative game.' *Journal of Economic Behavior and Organization*, vol. 15, pp. 215–35.
Meux, E. P. (1973). 'Concern for the common good in an N-person game.' *Journal of Personality and Social Psychology*, vol. 28, pp. 414-8.
Moore, D. W. (1996). 'Clinton's increased support over past year: older independents, richest and poorest Americans.' Gallup News Service, vol. 60, no. 48.
Nowell, C. and Tinkler, S. (1994). 'The influence of gender on the provision of a public good.' *Journal of Economic Behavior and Organization*, vol. 25, pp. 25–36.
Orbell, J. and Dawes, R. (1981). 'Social dilemmas.' In *Progress in Applied Social Psychology*, vol. 1. (eds. G. Stephenson and J. H. Davis). Chichester, England: Wiley.
Orbell, J., Dawes, R. and Schwartz-Shea, P. (1994). 'Trust, social categories, and individuals: the case of gender.' Mimeo, University of Oregon.
Ortmann, A. and Tichy, L. K. (1996). 'Understanding gender effects in the laboratory: a double-blind design and experimental results.' Unpublished manuscript, Bowdoin College.
Rabin, M. (1993). 'Incorporating fairness into game theory and economics.' *American Economic Review*, vol. 83, pp. 1281–302.
Rapoport, A. and Chammah, A. M. (1965). 'Sex differences in factors contributing to the level of cooperation in the prisoner's dilemma game.' *Journal of Personality and Social Psychology*, vol. 2, pp. 831–8.
Roth, A. E. (1995). 'Bargaining experiments.' In *The Handbook of Experimental Economics* (eds. J. H. Kagel and A. E. Roth), pp. 253–348, Princeton, NJ: Princeton University Press.
Steel, R. G. D. and Torrie, J. H. (1980). *Principles and Procedures of Statistics: A Biometrical Approach*. New York, NY: McGraw-Hill.
Stockard, J., Van De Kragt, A. J. and Dodge, P. J. (1988). 'Gender roles and behavior in social dilemmas: are there sex differences in cooperation and in its justification?' *Social Psychology Quarterly*, vol. 51, pp. 154–63.
Thaler, R. (1988). 'Anomalies: the ultimatum game.' *Journal of Economic Perspectives*, vol. 2, pp. 195–206.
Uesugi, T. K. and Vinacke, E. W. (1963). 'Strategy in a feminine game.' *Sociometry*, vol. 26, pp. 75–88.
Vinacke, W. E. (1959). 'Sex roles in a three-person game.' *Sociometry*, vol. 22, pp. 343–60.
Wilson, J. Q. and Herrnstein R. J. (1985). *Crime and Human Nature*. New York, NY: Simon and Schuster.
Young, P. (1994). *Equity in Theory and Practice*. Princeton, NJ: Princeton University Press.

Appendix: Instructions

Instructions

You have been asked to participate in an economics experiment. For your participation today we have paid you $5 in cash. You may earn an additional amount of money, which will also be paid to you in cash at the end of the experiment.

In this experiment each of you will be paired with a different person who is in another room. You will not be told who these people are either during or after the experiment.

You will notice that there are other people in the same room with you who are also participating in the experiment. You will not be paired with any of these people. This is room A (B).

One of the persons in room A will be chosen to be the monitor for today's experiment. The monitor will be paid $10 in addition to the $5 already paid. The monitor will be in charge of the envelopes as explained below. In addition the monitor will verify that the instructions have been followed as they appear here.

The experiment is conducted as follows: Fourteen unmarked envelopes have been placed in a box. Twelve of these envelopes contain 10 one dollar bills and 10 blank slips of paper. The remaining envelopes contain 20 blank slips of paper. The monitor will be given a list of names of people in the room. He or she will call one person at a time to the back of the room, and hand each person an envelope from the box. The person who was called will then go to one of the seats, with a large box on top, in the back of the room. The envelope will then be opened privately inside the box.

Each person in room A must decide how many dollar bills (if any) and how many slips of paper to leave in the envelope. The number of dollar bills plus the number of slips of paper must add up to 10. The person then pockets the remaining dollar bills and slips of paper. Example: (1) Leave $2 and 8 slips in the envelope, pocket $8 and 2 slips; (2) Leave $9 and 1 slip in the envelope, pocket $1 and 9 slips. These are examples only, the actual decision is up to each person. Also note that no one else, including the experimenter will know the personal decisions of people in room A.

Once you have made your decision you will seal your envelope inside the large box, and then place it in the box at the front marked return envelopes. The monitor will check that your envelope is sealed.

After signing the receipt form which states that you received the $5 appearance fee and giving it to the experimenter, you may then leave the room.

After all fourteen envelopes have been returned the monitor will take the box to room B. There are 14 people in room B. Each of these persons has been paid $5 to participate. The monitor will be given a list of names of people in room B. The monitor will then call up the people in room B. The monitor will choose an envelope from the box, open the envelope, and record its contents, and give the contents of the envelope to the person called up. That person is then free to leave. The monitor will continue until all the envelopes have been handed out and everyone else has left the room. The experiment is then over.

Appendix: Table

Data

Number of Subjects by Amount Donated

	Arizona			VPI	
			Women		
Amount donated	Session 1	Session 2	Session 3	Session 4	Session 5
$ 0	6	7	5	3	7
$ 1	2	1	0	2	1
$ 2	0	1	4	2	1
$ 3	2	1	1	2	1
$ 4	0	1	1	0	0
$ 5	2	1	1	3	2
$ 6	0	0	0	0	0
$ 7	0	0	0	0	0
$ 8	0	0	0	0	0
$ 9	0	0	0	0	0
$10	0	0	0	0	0
			Men		
Amount donated	Session 1	Session 2	Session 3	Session 4	Session 5
$ 0	8	8	6	9	5
$ 1	3	3	4	2	4
$ 2	0	0	0	1	1
$ 3	1	0	1	0	1
$ 4	0	0	0	0	0
$ 5	0	1	0	0	1
$ 6	0	0	0	0	0
$ 7	0	0	0	0	0
$ 8	0	0	0	0	0
$ 9	0	0	0	0	0
$10	0	0	1	0	0