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Frontiers in the Economics of Gender
Edited by Francesca Bettio and Alina Verashchagina

Frontiers in the Economics of Gender

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**Francesca Bettio and
Alina Verashchagina**

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Frontiers in the Economics of Gender

Gender is now recognized as a fundamental organizing principle of economic as well as social life, and related research has grown at an unprecedented pace in recent decades across branches of economics. This book takes stock of the research, proposes novel analytical frameworks and outlines further directions. The book has grown out of the Summer School of International Research in Pontignano, University of Siena, which traditionally brings together the most prominent scholars in the field.

The thirteen essays included in this book cover recent advances in gender related issues across disciplinary branches, from economic history and the history of economic thought to macroeconomics, household economics, the economics of care work, labour economics, and institutional and experimental economics.

The book is primarily addressed to graduate students in economics and is an essential companion for researchers in the area of gender economics. For intrinsic reasons, however, research on gender tends to transcend disciplinary boundaries. The author's effort to use non technical language whenever feasible makes most texts accessible to a wider audience, including students and specialists in sociology, demography and history.

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12 The gender effect in the laboratory

Experimenter bias and altruism

Alessandro Innocenti and Maria Grazia Paziienza

Introduction

The finding that people care about others' utilities or payoffs is very common in experimental economics.¹ Despite the self-seeking behaviour assumption of mainstream economics, there are also many formal models which seek theoretically to explain why individuals make sacrifices in order to increase the utilities or payoffs of others.² The gender variable has been taken into account to predict altruistic behaviour in social environments. According to the conventional view, women are more socially-oriented than men (Eckel and Grossman 1998). This difference would justify the introduction of gender differences in economic models. Recent laboratory work supports this position. There is evidence that men and women exhibit different propensities to trust and to reciprocate. This finding can be attributed to the fact that women have more other-regarding preferences than men (Innocenti and Paziienza 2006).

This result has significant implications for the theory that non-selfish behaviour may be based on the expectation of reciprocity (Rabin 1993; Levine 1998). In this light, gender may signal how altruistic other players may be, and hence increase the propensity to trust. However, the hypothesis that women may be perceived by others as potentially less selfish than men is difficult to test in the laboratory, because subjects' expectations are usually investigated by means of self-assessment questionnaires that may be biased by the tendency of respondents to answer questions in a socially desirable fashion. In this chapter we take a different approach by reporting study of this issue by means of an actual experiment which checks whether the presence in the laboratory of a male or a female experimenter affects individual behaviour. According to the concept of experimenter bias, laboratory data may be influenced by the supposed expectations of the person collecting the data. Our test was intended to investigate if the gender of the experimenter would induce changes in experimental subjects' propensity to trust and to reciprocate and if these changes would be motivated by their perceptions of gender differences in altruism.

The chapter is organized as follows. The next section describes the object of our experiment and surveys the background literature. The experimental design is

illustrated in the third section and the results are presented and discussed in the fourth section. The last section draws some conclusions.

Experimental purpose

Our experiment tests the trust game, also known as the investment game. This game is played by two players, who are paired off anonymously and respectively named the 'sender' and the 'responder'. The sender is given a certain amount of money and told that he or she can keep the entire amount or send some or all of it to the responder. Any money passed from the sender to the responder is tripled by the experimenter and then given to the responder. The responder can keep the entire amount or give some or all of it back to the sender. When the sender receives the amount returned by the responder the game ends.

This game-theoretical framework gives a simple measure of the propensity to trust, which is the proportion of the initial endowment sent by the sender, and to reciprocate, which is the ratio between the amount returned and the amount received by the responder. The backward induction solution of the game predicts that the responder will not send any money back. Anticipating the responder's decision, the sender will not send any money to the responder.

Results from earlier experiments are inconsistent with the standard game theory prediction. Table 12.1 provides a summary of previous results on the trust game.

Even if there are significant variations across tests, the backward induction prediction is refuted.³ Other studies examine gender differences in the trust game. Table 12.2 summarizes these experimental results.

Men generally exhibit greater levels of trust and lower levels of reciprocity than women do, even if the difference between genders is not always statistically significant.

A possible explanation of these results can be couched in terms of altruism. It can be argued that trust and trustworthiness depend on different factors. Trust is usually perceived as an investment in the trustee's reliability, and consequently as a decision dependent on risk attitude or on the perception of vulnerability to the action of others. Trustworthiness seems to be better explained by institutional, psychological or moral factors, such as social distance or inequality aversion, and it is justified by ethical values. However, it is quite evident that both trust and reciprocity may be the result of altruistic preferences. If utility increases in other individuals' utility or consumption, the truster may find it rational to trust even if they do not expect the trustee to be trustworthy. Similarly, the trustee may exhibit reciprocity without any economic incentive to reciprocate.

To detect the effect of altruism, Cox (2002, 2004) proposes an experiment that discriminates between transfers resulting from trust or trustworthiness and transfers resulting from altruistic preferences. Cox's findings show that subjects are also driven by altruistic preferences. His conclusion is that utility should not be assumed to be independent of other individuals' payoffs, and altruistic preferences should be included in the rational model of economic behaviour.

Table 12.1 Experimental results on the trust game

Author	Study	Trust ^a				Reciprocity ^a	
		No history	Social history	Only US	All	Single role	Both roles, no prior
Berg et al. (1995) ^b							
Buchan et al. (2000) ^b							
Schwieren and Sutter (2003)							
Burks et al. (2003) ^b							
Chaudhuri and Gangadharan (2003)							

Notes
^a Trust = Average fraction sent (Amount sent/Initial endowment); Reciprocity = Average fraction returned (Amount sent back/Amount received).
^b In the social history treatment by Berg et al. (1995) subjects were given a summary of the no history treatment results as part of the instructions. Buchan et al.'s (2000) international experiment tested the trust game in China, Japan, Korea and the United States. Burks et al. (2003) compared three treatments: the first (single role) in which subjects played either the sender or responder role, the second (both roles, no prior) in which subjects played both roles but they did not know it before sending, and the third (both roles, prior) where subjects knew that they had played both roles before any decisions were made.

Table 12.2 Experimental results on gender differences in the trust game

	<i>Ashraf et al. (2003)</i>		<i>Buchan et al. (2004)</i>		<i>Chaudhuri and Gangadharan (2002)</i>		<i>Cox (2002)</i>		<i>Crosan and Buchan (1999)</i>	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Trust ^a	47	41	74	61	53	34	64	53	63	63
Reciprocity ^a	27	26	24	32	15	20	40	40	28	37

Note

^a Trust = Average fraction sent (Amount sent/Initial endowment); Reciprocity = Average fraction returned (Amount sent back/Amount received).

We replicated Cox's experiment by highlighting gender differences and modifying the information given to the subjects (Innocenti and Paziienza 2006). Our test showed that women exhibit a higher degree of altruism than men do, for both trust and reciprocity, but the difference between genders in the degree of altruism is greater for trustworthiness than for trust. This result supports the hypothesis that women's higher propensity to reciprocate compared with men is motivated by a greater degree of altruism.

Experiments of this kind test trust and reciprocity in a double blind laboratory environment, where each participant is assured that neither the experimenter nor the other participants are able to attribute individual choices to individual subjects. This condition is imposed to minimize the effect of experimenter bias⁴ whereby the experimenter's acts may unconsciously convey to the subjects how they should behave in relation to some characteristics of the design, so that they consequently produce biased results. Another case is participant bias, also known as 'demand characteristics', which applies to experiments in which participants act in ways they believe correspond to what the experimenter wants. Thus, if participants modify their spontaneous behaviour to match the real or presumed aims of the experimenter, the results are also biased. These sources of bias are differentiated by the fact that the former explicitly relates to some specific act or characteristic of the experimenter, while the latter refers generically to the experimental design, but it is not always easy to discriminate between them.

What matters most is that in both cases some features of the laboratory environment may induce subjects to change their choices in order to comply with the experimental purpose. Once the experimenter has become aware of this effect, data interpretation must be revised in order to evaluate the laboratory findings correctly.

The very robust experimental result that subjects prefer fair to maximized payoffs has been also attributed to the influence of the experimenter's observation. Hoffman *et al.* (1994) and Bolton and Zwick (1995) term this effect the 'anonymity hypothesis', and they give two reasons for it. The first relates to the subjects' participation in future experiments. If the experimenter's presumed aim is to find evidence against self-seeking behaviour, a subject's preference for fair payoffs may increase his or her probability of being recruited again by the same experimenter.

experimenter's judgement and believe that he or she does or does not disapprove of maximized choices. Both arguments can be criticized. Experimenters usually prefer inexperienced to experienced subjects so that they can gain better control over learning processes. The beliefs held by experimenters about economic or moral principles are not easily predictable by the participants in experiments. Orme (1962) offers another explanation:

The subject's performance in an experiment might almost be conceptualized as problem-solving behavior; that is, at some level he sees it as his task to ascertain the true purpose of the experiment and respond in a manner which will support the hypotheses being tested. Viewed in this light, the totality of cues which convey an experimental hypothesis to the subject become significant determinants of subjects' behavior. (Orme 1962: 778).

Experimenter bias may be important because subjects are greatly concerned to view their performance as meaningful. During the experiment, they constantly wonder about what the experimenter is trying to test, and any cue that enables them to answer this question may influence their behaviour. If the design incorporates explicit suggestions as treatment variables, the data interpretation is unbiased. Otherwise, expectations about the supposed experimental purpose may affect the subjects' behaviour and consequently distort the results.

The observable characteristics of the experimenter may be among these cues. Indeed, the experimental purpose can also be inferred from his or her gender. For instance, if the design informs the subjects of their counterparts' gender, the presence of a female experimenter may cause the subjects to believe that the experiment is related in some way to discrimination against women.

Although experimental research is increasingly focused on the gender issue, we are not aware of laboratory tests that seek to analyse the effect of experimenter bias across gender differences.⁵ The purpose of our experiment was to provide evidence on this issue by testing three different treatments of the trust game. In the first two treatments there were a female and a male experimenter respectively, while in the third treatment we adopted a double blind procedure.

Our test followed almost the same design as in Berg *et al.* (1995), but introduced two variants: first, we imposed that each subject would play the roles of both sender and responder; second, when participants played as senders, they were informed about the gender of the responder with whom they had been paired off.⁶ This latter variation served two purposes. First, it enabled us to test the relevance of gender pairing in bilateral relationships. This has been analysed experimentally by Sutter *et al.* (2003), who find that cooperation between players is lower when bargaining partners have the same gender than when they have the opposite gender. Second, it was intended to focus the subjects' attention on the gender variable. In this way, an explicit signal about the experimental purpose was conveyed to all subjects, each of whom acted as both sender and responder. If they conjectured that the purpose of the experiment was to study gender differences in trust and reciprocity

Specifically, our conjecture was that, in the double blind treatment, subjects would exhibit behaviour significantly different from that in the other two treatments. In addition, we expected subjects to change their behaviour significantly in relation to the experimenter's gender. Taking up Orne's (1962) suggestion, we presumed that the subjects would try to guess the experimental purpose. Our hypothesis was that the presence of the female experimenter, differently from that of the male experimenter, would induce subjects to believe that the experimental purpose was in some way related to non-selfish behaviour. We thus conjectured that, because women were perceived by the experimental subjects as more altruistic than men, the female experimenter would induce an increase in the degree of altruism in all subjects. The subjects' attempt to conform to the supposed experimental purpose should have had two effects. First, the senders who were informed of the paired responder's gender would increase the degree of trust in women in the female treatment in comparison with the other treatments, because trust is mainly understood to be an economic investment in the trustee's reliability. Second, responders who did not know the paired sender's gender would reciprocate subjects of both genders more in the female than in the male treatment because reciprocity is mainly motivated by altruism, and because the gender effect was not relevant for responders in our experimental design.

Experimental procedures

The experiment was carried out in the spring of 2004. We submitted the trust game to 94 subjects: 46 women and 48 men. They were undergraduate students in economics from the University of Siena and in political sciences from the University of Florence, recruited from first and second year courses through notices posted on the web pages and around the campuses of the two universities.

The experiment was run manually. The participants were paid according to the euros earned. There was no participation fee.

We ran three treatments. The only difference between the first and the second treatment was that a female and a male respectively played the role of experimenter.⁷ It was made clear to the subjects that in these treatments only the experimenter was able to attribute individual choices to individual people. However, anonymity between subjects was guaranteed. The third control treatment adopted a double blind procedure.

Table 12.3 presents the number of participants for each session and treatment.

In the female and male treatments, subjects were first identified by numbers. These numbers were randomly assigned and determined the pairings of senders and responders. Then each subject was directed to an isolated desk so that they could make their decision privately. At the desk subjects received written instructions. The first part of the instructions was read aloud by the experimenter of the pertinent gender. The second part contained a short questionnaire, which was answered at the end of the experiment.

When the experiment began, the subjects were given a large unmarked envelope which contained the money to be invested (5 euros, which could be transferred

Table 12.3 Number of participants per treatment by gender

Session	Treatment	Participants (Female + Male)
1	Female experimenter	8 + 6
2	Female experimenter	7 + 9
3	Male experimenter	7 + 9
4	Male experimenter	8 + 8
5	Double blind	8 + 8
6	Double blind	8 + 8
Total		46 + 48

in steps of half units), a card marked with the identification number, and a small envelope marked with a circle that was either pink or blue. Subjects were asked to remember their numbers. The correspondence between each number and each participant remained unknown to the other participants but not to the experimenter, and this was made clear to the participants. The subjects were also informed that if the circle was pink (blue), the person to whom they were to send money was a female (male). In this way, the sender knew the responder's gender but the sender's gender remained unknown to the responder.

Senders decided how many euros to keep and how many euros they wanted to send to their partner by inserting them in the small envelope. The experimenter collected the small envelopes, privately recorded the amount sent, tripled it and placed the tripled money into the same envelope for delivery to the appropriate responder. Responders then opened their envelopes and decided how much of the money received they would return to the sender. The experimenter again collected the envelopes, recorded the amounts returned and gave the envelopes back to the senders. Subjects were informed in the written instructions that they would be playing the roles of both sender and responder, but also that the responder with whom they were paired as sender would not be their sender when they played the role of responder.

In the double blind treatment, the design had to assure the participants that the experimenter was unable to attribute individual choices to individual subjects, and to avoid giving any hint about the experimenter's gender. The subjects were gathered in a room where two undergraduate students, a male and a female previously instructed to play the role of monitors, gave them instructions to read privately. When the experiment began, the subjects were given a large unmarked envelope containing 5 euros, a smaller envelope, and a numbered identification card. The small envelope was marked with a pink or a blue circle. As in the previous treatments, the subjects were informed that the coloured circle on the small envelope identified the gender of their paired responder. Moreover, they were asked to remember their numbers. The correspondence between these numbers and the identities of the subjects remained unknown to the experimenters, to the monitors and to the other participants at all times, and this was made clear to the participants.

Once senders had decided how much money to send to their partners in the small envelopes, they had to insert the identification cards in the smaller envelopes. Moreover, each subject had to write the letter *F*, if female, or the letter *M*, if male, on the identification card. The sealed envelopes were collected in a closed urn and taken by the monitor to the experimenters in another room. After recording the amount sent and tripling it, the experimenters marked each larger envelope with the number identifying a responder of the appropriate gender. The envelopes in the closed urn were delivered by the monitor to the subjects' room. At this time, subjects were called one at a time by the monitor. Once called, a subject had to privately choose the envelope with her or his identification number from the urn placed on an isolated desk. Having decided how much of the money received to return to the sender, subjects sealed their envelopes. The monitors again collected the envelopes, and took them to the experimenters' room, where the experimenters recorded the amounts returned and gave the envelopes back for distribution to senders by the same procedure used before. When the experiment was over, all subjects left the room without revealing their identities.

To summarize, our variations with respect to the reference design by Berg *et al.* (1995) were the following:

- 1 All subjects played both roles (sender and responder), and they knew this before any decision was made.⁸
- 2 Senders were informed of their responder's gender, but responders did not know their sender's gender.
- 3 Only the third treatment was double blind, whereas in the first and in the second treatment, the experimenter (but not the subjects) was able to attribute individual choices to individual subjects, and this was made clear to the subjects.

Results

Our experiment was intended to verify the effect of experimenter bias by testing three hypotheses.

- Hypothesis 1: Subjects' behaviour in the double blind treatment would be significantly different from that in the other two treatments, in which the experimenter was able to associate each participant with his or her choices.
- Hypothesis 2: In the female treatment, senders would exhibit a higher level of trust in women than they did in the other two treatments.
- Hypothesis 3: In the female treatment, responders would exhibit a higher degree of reciprocity than in the male treatment.

Our discussion of the experimental findings addresses the question of whether men and women make different choices across the three treatments, first for trust, and then for reciprocity.

Table 12.4 Trust per treatment by sender's gender

Treatment	Female experimenter		Male experimenter		Double blind		Total
	Mean	StdD	Mean	StdD	Mean	StdD	
Sender's gender							
Women	43.3	35.4	39.3	22.2	32.5	23.8	38.3
Men	28.0	27.0	24.1	18.4	39.4	27.2	30.4
Total	35.7	31.9	31.3	21.4	35.9	25.4	34.3

Table 12.4 presents senders' behaviour in the three treatments across gender.

Contrary to earlier experimental evidence (see Table 12.2), on average the women in our experiment show a higher degree of trust than men, but the difference between the two means (38.3 and 30.4) is not significantly different from zero. However, the order between genders is reversed in the double blind treatment, the results of which conform to the previous experimental findings. The lack of anonymity seems to represent a 'social cue' that influences men and women differently. Experimenter's observation increases women's and decrease men's propensity to trust.

Inspection of the difference among treatments shows that, on average, the value of trust is higher in the female treatment than in the male treatment (35.7 vs. 31.3). Both women and men trust more in the female treatment, and the difference in the fraction of the amount sent between women and men is not significant using either a *t*-test (with a *t*-value of 0.04 and a *p*-value of 0.97) or a Wilcoxon rank sum test (with a *z*-value of 9.11 and a *p*-value of 0.63).

Figure 12.1 summarizes data on trust with box plots reporting the median of the data distribution, and the interquartile range to measure the data dispersion. The dispersion of data, which is higher in the female experimenter treatment, explains why the mean differences are not statistically significant. Nevertheless, the figure shows that the difference between the men's and the women's median values is greater than the difference between the corresponding average values.

In our design, senders were informed of their paired responder's gender in order to emphasize the effect of experimenter bias. Table 12.5 presents the average values of trust by responder's gender. In the aggregate, senders trust men (35 per cent) slightly more than women (33 per cent), but the difference between the two average values is not significant and the medians are nearly identical (Figure 12.2). In the male and in the female experimenter treatments, senders exhibit a higher degree of trust in men than in women, while in the double blind treatment the reverse is the case. Also to be noted is that there is no gender pairing effect, because the degree of trust is quite similar across pairs of the same gender and of opposite gender.

The box plots depicted in Figure 12.2 show that the amount of money sent to both men and women is more dispersed in the female experimenter treatment than in the other two treatments.

These findings partially support our conjectures on sender's behaviour. In conformity with our first hypothesis, trusting behaviour exhibits systematic differences

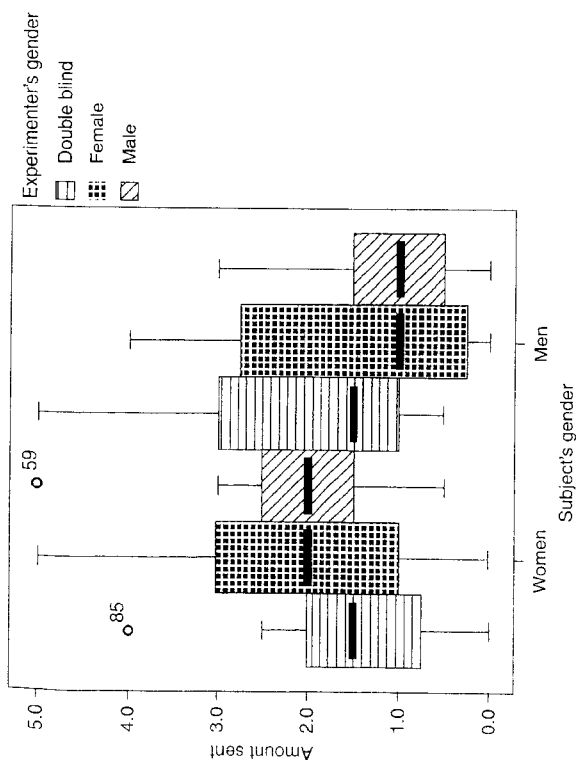


Figure 12.1 Distribution of trust per treatment and sender's gender.

Table 12.5 Trust per treatment by responder's gender

	Treatment		
	Female experimenter	Male experimenter	Double blind
Total (N = 94)			
Responder's gender			
Women	30.7	26.7	41.9
Men	40.7	35.3	30.0
Total	35.7	31.3	35.9
Male senders (N = 48)			
Responder's gender			
Women	21.2	21.0	50.0
Men	35.7	28.6	28.7
Total	28.0	24.1	39.4
Female senders (N = 46)			
Responder's gender			
Women	41.4	38.0	33.7
Men	45.0	40.0	31.2
Total	43.3	39.3	32.5

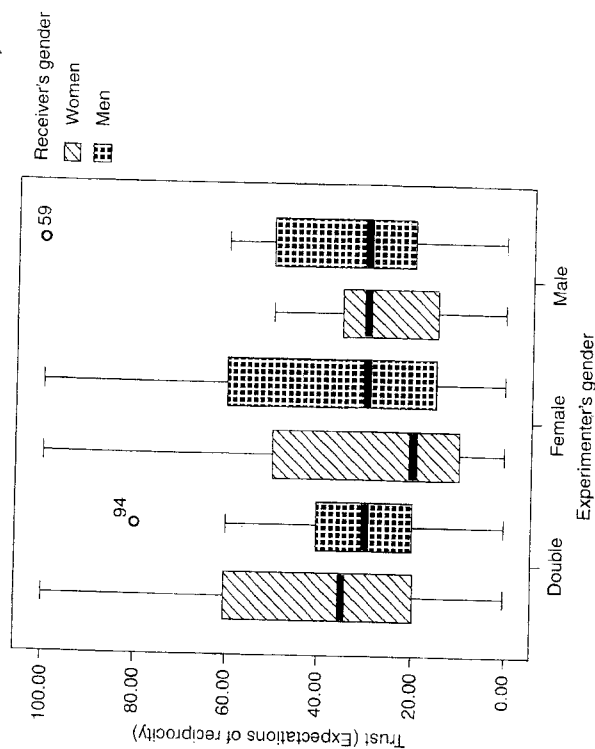


Figure 12.2 Distribution of trust per treatment and responder's gender.

between the double blind and the other two treatments. However, experimenter's presence influences the men and the women differently: it increases the degree of trust of women and decreases that of men. This result may be due to a presumed greater sensitivity of women to changes in the laboratory environment⁹ (Croson and Gneezy 2004). We also find evidence of a difference in trusting behaviour between the female and the male treatments. However, the presence of the female experimenter increases the degree of trust in subjects of both genders, and not just in women as predicted by our second hypothesis, which is consequently rejected.

We next turn to the analysis of responders' choices. Table 12.6 shows the degree of reciprocity measured by the average fractions returned by responders.

The strongest pattern of behaviour is that in which the presence of the female experimenter induces subjects of both genders to reciprocate more than in the other treatments. This result is confirmed by Figure 12.3, which presents the median values and the interquartile range of the distribution in the three treatments.¹⁰

The median values in the male experimenter treatment and in the double blind treatment are quite similar and significantly lower than in the female experimenter treatment. Statistical tests also corroborate this difference for the average values. Table 12.7 shows that both the *t*-test and the Wilcoxon test are significant at 95 per cent.

The box plots in Figure 12.4 show that male responders show a markedly lower degree of reciprocity in the male experimenter treatment.

Table 12.6 Reciprocity per treatment by responder's gender

	Treatment					
	Female experimenter		Male experimenter		Double blind	
Responder's gender	Mean	StdD	Mean	StdD	Mean	StdD
Women	27.3	27.0	21.0	17.9	20.4	20.8
Men	30.9	22.6	9.7	17.7	18.9	19.4
Total	29.1	24.4	15.2	18.4	19.7	19.8

Note
Reciprocity = Average fraction returned (Amount sent back/Amount received)

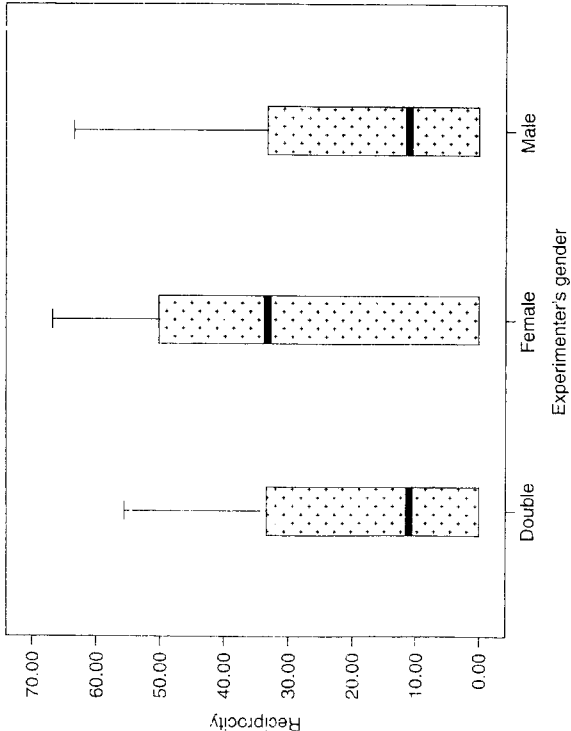


Figure 12.3 Distribution of reciprocity per treatment.

The propensity to be 'fairer' in the female experimenter treatment is also confirmed by statistical analysis of men's behaviour.¹¹ Table 12.8 shows that the presence of a female experimenter induces male subjects to reciprocate significantly more than in the other two treatments, using either a *t*-test or a Wilcoxon rank sum test.

These findings support our third hypothesis. In the female treatment, responders' behaviour exhibits a higher propensity to reciprocate. According to the interpretation proposed, experimenter bias is effective only for the treatment in which the

Table 12.7 Statistical tests for reciprocity among treatments

<i>t</i> -test for equality of means	<i>N</i>	Mean	Mean diff.	<i>T</i>	Sig. (2-tailed)
Female experimenter treatment	24	29.12			
Male experimenter and double blind treatments	59	17.44	-11.67	-2.32	0.02
Wilcoxon test					
Wilcoxon <i>W</i>	2289.5				
<i>Z</i>	-1.95				
Sig. (2-tailed)	0.052				

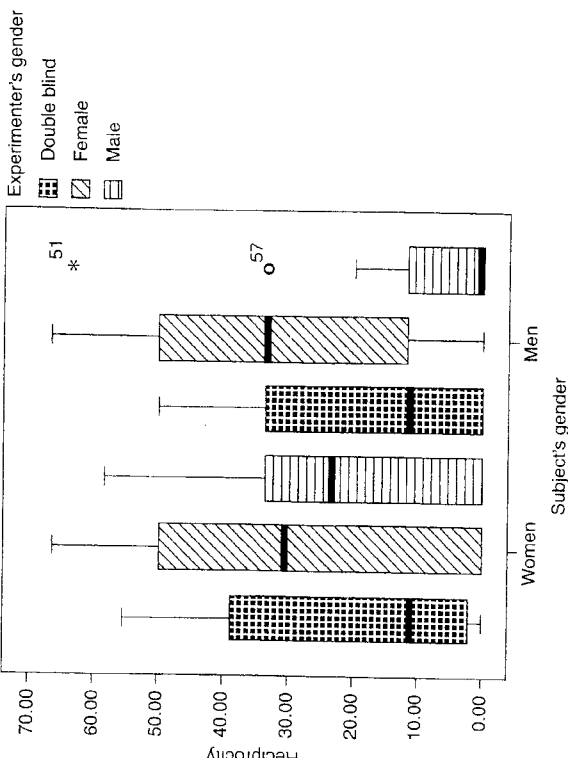


Figure 12.4 Distribution of reciprocity per treatment by subject's gender.

signal used to infer the experimental purpose is perceived by subjects as more evident, that in our case is the presence of the female experimenter.

Conclusion

This chapter has analysed the experimenter bias effect in a test on gender differences. It has assumed that experimental subjects seek to discover the true

Table 12.8 Statistical tests for reciprocity among treatments (men only)

<i>t</i> -test for equality of means	<i>N</i>	<i>Mean</i>	<i>Mean diff.</i>	<i>T</i>	<i>Sig. (2-tailed)</i>
Female experimenter treatment	12	30.92			
Male experimenter and double blind treatments	30	14.30	-16.62	-2.44	0.02
<i>Wilcoxon test</i>					
Wilcoxon <i>W</i>		563.5			
<i>Z</i>		-2.35			
<i>Sig. (2-tailed)</i>		0.02			

purpose of the experiment and may modify their spontaneous behaviour in order to confirm the experimenter's expectations. The gender of the experimenter may produce this bias if gender differences are explicitly considered as treatment variables.

We tested the trust game by differentiating subjects' information: trusters were informed of their paired trustee's gender, but trustees did not know their paired truster's gender. We observed behaviour in three different treatments: the female treatment and the male treatment, conducted respectively by a female and a male experimenter, and the double blind treatment, where complete anonymity among subjects and between subjects and experimenter was guaranteed.

Our findings show that:

- (i) there is significant evidence of difference in trusting behaviour between the double blind and the other two treatments;
- (ii) the presence of the female experimenter increased the degree of trust in subjects of both genders, although not in a statistically significant way;
- (iii) the presence of the female experimenter significantly increased the propensity to reciprocate of male and female subjects.

We interpret these results as generally confirming the importance of experimenter bias. In our interpretation, experimenter bias is effective when subjects receive a signal clear enough to convey a specific experimental purpose. The presence of the female experimenter was perceived by the subjects as evidence that the experiment's purpose was to corroborate the hypothesis of other-regarding behaviour. This conjecture increased the subjects' propensity to be altruistic and consequently improved both trust and reciprocity.

Finally, our experiment supports the hypothesis that women are perceived by others as potentially less selfish than men. If altruism is enhanced by the assessment of how altruistic others are in return, the gender variable may be a useful signal to implement non-selfish behaviour.

Acknowledgements

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Appendix

Translation of the instructions

A. Female and male experimenter treatments

This is an experiment in the economics of decision-making. The Ministry of University and the University of Siena have provided funds to conduct this research. The instructions you are about to read are self-explanatory. If you follow them closely and make appropriate decisions, you can earn an amount of money that will be given to you in cash at the end of the experiment. If you have any question, please raise your hand and the experimenter will come to you and answer your question.

In this experiment, each of you will be paired with a different person. You will not be told who these people are either during or after the experiment, nor will they be told who the others are. The only information you will have is the gender of the person with whom you are paired. The experimenter will be in charge of the envelopes as explained below. In addition, they will verify that the instructions have been followed as they appear here.

Each person will be given 5 euros and will have the opportunity to send in an envelope, some, all or none of 5 euros to the person with whom they have been paired. The amount sent will be tripled. For example, if you send an envelope that contains 2 euros, the envelope will contain 6 euros when it reaches the paired person. If you send an envelope that contains 4 euros, the envelope will contain 12 euros when it reaches the paired person. The paired person will then decide how much money to send back to you and how much money to keep.

Each person will play both roles in the experiment. Each of you will be paired with two people. In one pair, you will be the person who decides how much of the 5-euros to send to another person, who will receive the amount sent tripled by the experimenter. In the other pair, you will be the person who receives the amount sent by another person and tripled by the experimenter, and you will decide whether to send back some, all or none of the amount received to the sender. So each of you will make two decisions. However, the important thing to bear in mind is that you are not paired with the same person as sender and responder. Rather, you are paired with two different people.

The remainder of these instructions will explain exactly how the experiment will be run. It is structured so that no one except the experimenter will know the personal decisions of the subjects. Since your decision is private, we ask you not to tell anyone about your decision during or after the experiment.

The experiment will be conducted as follows: a number of large unmarked envelopes have been placed in a box. Each of these envelopes contains 5 euros, a card marked with an identification number that you are asked to remember, and a smaller envelope marked with a circle, which will be coloured pink or blue. The experimenter will hand one person at a time an unmarked envelope from the box. Once a person has an envelope, he or she will privately open the unmarked envelope and place as many euros in the smaller circled envelope as she/he wants, keeping the rest. Examples: (1) put 2 euros in the smaller envelope and keep 3 euros; (2) put 4 euros in the smaller envelope and keep 1 euro. These are examples only; the actual decision is up to each person.

It is important to bear in mind that the person who receives the amount you send will be a female if the smaller envelope is marked with a pink circle, and he will be a male if the smaller envelope is marked with a blue circle. This process will continue until everyone has made his or her decision.

Once everyone has made their decisions, the experimenter will collect all the larger, unmarked envelopes, and return them to the box. Note that each returned envelope will look exactly the same.

After all the envelopes have been put in the return box, the experimenter will then privately, one at a time, take the smaller envelopes out of the larger envelopes, record on a sheet of paper the number of the identification card and the amount of money inside the smaller envelope. The experimenter will then triple the amount of money in the smaller envelope and place the smaller envelope back into the larger envelope. At this point, the experimenter will transfer the envelopes to the return box.

The experimenter will then give to each person, one at a time, an unmarked envelope from the box. Each of you will privately open the larger envelope and must decide how many euros to leave in the smaller envelope. The person keeps the remaining euros. The smaller envelope should then be placed in the larger envelope. When everyone has had the opportunity to make his or her decision, the experimenter will collect the larger envelopes and return them to the box. The experimenter will then privately, one at a time, open the larger envelopes and record how much is in the smaller envelope. After recording how much was in the smaller envelope, the experimenter will put the smaller envelope in the larger envelope, and will replace them in the return box.

Then the experimenter will choose one person at a time to go to the box marked 'return envelopes' to retrieve the smaller envelope with the appropriate identification number marked on it. You should not open your envelope yet. This process will continue until everyone has retrieved his or her envelope and returned to his or her seat. When everyone is finished, the experimenter will ask if everyone has retrieved the correct envelope. If everyone has taken the correct envelope, the experiment is finished. If, however, an envelope has ended up with the wrong person, then the experimenter will collect all the smaller envelopes again, and the process will be repeated until everyone has the correct envelope.

Before leaving the room, everyone will be asked to fill out a short questionnaire. At the top of the questionnaire, you will be asked for the card identification number. Please do not forget to include this information. Once you have finished the questionnaire, you will be asked to put it in the box placed at the back of the room.

Please raise your hand if you have any questions regarding how the experiment will proceed.

B. Double blind treatment

This is an experiment in the economics of decision-making. The Ministry of University and the University of Siena have provided funds to conduct this research. The instructions you are about to read are self-explanatory. Two of us have been chosen as monitors and will check that the instructions have been followed as they appear here. However, they will not answer any questions during this experiment. If you have any doubts, you should read back through these instructions. Now that the experiment has begun, we ask that you do not talk at all. If you follow these instructions closely and make the appropriate decisions, you will earn an amount of money that will be given to you in cash at the end of the experiment.

In this experiment, each of you will be paired with a different person. You will not be told who this person is either during or after the experiment, nor will they be told who the others are. The only information you will have is the gender of the person with whom you are paired.

Each person will be given 5 euros and will have the opportunity to send in an envelope, some, all or none of the 5 euros to the person whom she/he is paired. The amount sent will be tripled. For example, if you send an envelope that contains 2 euros, the envelope will contain 6 euros when it reaches the paired person. If you send an envelope that contains 4 euros, the envelope will contain 12 euros when it reaches the paired person. The paired person will then decide how much money to send back to you and how much money to keep.

Each person will play both roles in the experiment. Each of you will be paired with two people. In one pair, you will be the person who decides how much of the 5-euros to send to another person, who receives the amount sent tripled by the monitors. In the other pair, you will be the person who receives the amount sent by another person and tripled by the experimenter, and you will decide whether to send back some, all or none of the amount received to the sender. So each of you will make two decisions. However, the important thing to bear in mind is that you are not paired with the same person as sender and responder. Rather, you are paired with two different people.

The remainder of these instructions will explain exactly how the experiment will be run. It is structured so that no one, including the experimenters and the monitors, will know the personal decisions taken by the subjects. Since your decision is absolutely private, we ask you not to tell anyone about your decision during, or after, the experiment.

The experiment will be conducted as follows: a number of large unmarked envelopes have been placed in a box. Each of these envelopes contains 5 euros, a card marked with an identification number that you are asked to remember, and a smaller envelope marked with a circle, which will be coloured pink or blue. Then monitors will call one person at a time to go to the isolated box placed in the front of the room. Each person will take an unmarked envelope from the box and will return to his or her isolated desk.

Once a person has an envelope, he or she will privately open the unmarked envelope and write on the identification card the letter *F* if he is a female or the letter *M* if he is a male. Please do not forget to include this information. Then each person will place as many euros in the smaller circled envelope as they want, keeping the rest. Examples: (1) put 2 euros in the smaller envelope and keep 3 euros; (2) put 4 euros in the smaller envelope and keep 1 euro. These are examples only; the actual decision is up to each person. It is important to bear in mind that the person who receives the amount you sent will be a female if the smaller envelope is marked with a pink circle and a male if the smaller envelope is marked with a blue circle. This process will continue until everyone has made his or her decision.

Once a person has made a decision, he or she will put the smaller envelope and the identification card in the larger envelope. Then the monitors will call one person at a time to go to the isolated box. Each person will put the larger envelope into the box. Note that each returned envelope will look exactly the same, and neither monitors nor anyone else will be able to attribute individual choices to individual subjects.

After all the envelopes have been put in the return box, the monitors will then privately, one at a time, take the smaller envelopes out of the larger envelopes, record on a sheet of paper the letter and the number written on the identification card and the amount of money inside the smaller envelope. The monitors will then triple the amount of money in the smaller envelope, place the smaller envelope back into the larger envelope, and write an identification number on the larger envelope. At this point, the monitors will transfer the envelopes to the return box.

The monitors will then call one person at a time to go to the isolated box to retrieve the larger envelope with his or her identification number marked on it. You should not open your envelope yet. This process will continue until everyone has retrieved his or her appropriate envelope and returned to his or her seat. When everyone is finished, monitors will ask if everyone has retrieved the correct envelope. If everyone has taken the correct envelope, the experiment will continue. If, however, an envelope has ended up with the wrong person, then the monitors will call one person at a time again and the process will be repeated until everyone has the correct envelope.

Then each of you will privately open the larger envelope and must decide how many euros to leave in the smaller envelope. The person keeps the remaining euros. The smaller envelope should then be placed again in the larger envelope. When everyone has had the opportunity to make his or her decision, the monitors will call again one person at a time. Each person will return the larger envelopes to the box. The monitors will then privately, one at a time, open the larger envelopes

and record how much is in the smaller envelope. After recording how much is in the smaller envelope, the monitors will put the smaller envelope in the larger envelope, and will replace back in the return box.

Then monitors will call one person at a time to go to the box marked 'return envelopes' to retrieve the smaller envelope with the appropriate identification number marked on it. You should not open your envelope yet. This process will continue until everyone has retrieved his or her envelope and returned to his or her seat. When everyone is finished, monitors will ask if everyone has retrieved the correct envelope. If everyone has taken the correct envelope, the experiment is finished. If, however, an envelope has ended up with the wrong person, then the monitors will collect all the smaller envelopes again and the process will be repeated until everyone has the correct envelope.

At this time, you should take all your belongings and leave the building. When everyone in the room has left, the experiment is over, and the monitors will be paid for their participation.

Notes

- 1 Ledyard (1995) and Schram (2000) survey the experimental evidence on subjects deviating from own-payoff-maximizing behaviour.
- 2 See Fehr and Schmidt (2005) for a survey.
- 3 Abbinck *et al.* (2000), Cox (2001) and Cox *et al.* (2002) obtain analogous results by testing the moonlighting game. In this game, the sender can choose whether they want to give the responder part of their endowment or take up to half the endowment from the responder. The amount given by the sender is tripled by the experimenter. The responder then decides whether they want to give or take money from the sender.
- 4 It is only recently that experimental economists have analyzed this problem. In particular, Hoffman *et al.* (1996) argue that the subjects' degree of social distance from the experimenter may affect their behaviour, especially because it gives rise to expectations of reciprocity. See also Bolton and Zwick (1995).
- 5 Ortmann and Tichy (1999) sought to deal with the experimenter bias problem by jointly conducting a test on gender differences in the prisoner's dilemma. However, the physical presence of two experimenters, one male and one female, did not eliminate the possibility that one of the two experimenters would be perceived by the participants as the leading one. For example, the person who reads the instructions aloud is presumably considered to be conducting the experiment.
- 6 We did not inform the responders about their sender's gender in order to differentiate factors influencing reciprocity and trust. If subjects, when they played as responders, did not know the gender of their paired sender, their decision to reciprocate could be considered to depend only on the amount of money received and on the experimenter's perceived purpose.
- 7 The authors acted separately as the experimenters for the two treatments. In each session, there was also an assistant of the same gender as the experimenter.
- 8 Burks *et al.* (2003) made the same assumption in their third treatment, which they termed 'both roles, prior'. Chaudhuri and Gangadharan (2002) also made this assumption to test gender differences (see Table 12.1).
- 9 In a survey on gender differences in the laboratory, Croson and Gneezy argue that

this variance (gender difference) can be explained by a differential sensitivity of men and women to the social conditions in the experiment. Research from

psychology suggests that women are more sensitive to social cues in determining appropriate behavior than are men. (...) Participants of both genders are likely maximizing an underlying utility function, but the function that men use is less sensitive to the conditions of the experiment, information about the other party, and (even) the other party's actions, than the function that women use.

(Croson and Gneezy 2004: 19).

10 If the responder is sent nothing by the paired sender, he or she is excluded from computation as a missing case.

11 The amount of money received from the paired sender and the percentage of money sent back to the paired sender was positively correlated with the Spearman's correlation coefficient of 0.46 (0.576 for women and 0.372 for male), which was significant at the 0.01 level in all cases.

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