

WCPCG-2010

The influence of cooperative environment and gender on economic decisions in a third party punishment game

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Received date here; revised date here; accepted date here

Abstract

The influence of social context on men's and women's cooperative behaviour was investigated in a third party punishment game. The results of the analyses showed that, in general, people significantly deviated from rational norms since their decisions were not fit to maximization of their economic benefits. Female participants' behaviour was more cooperative in terms of first offer rates than male participants when they were dictators. On the other hand, male participants were more willing to pay money to punish unfair allocations and to reward fair offers when they played the role of third party. Taken together these results imply that explaining the behaviour of people in economic exchange situations require going beyond classical definitions of rationality based on profit maximization and embracing social considerations to account for the influence of the situation and for gender differences.

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Keywords: Cooperation, gender differences, third party punishment game.

1. Introduction

Although classical definitions of rationality emphasize that humans are rational agents who maximize their benefits, recent studies show that people sometimes systematically deviate from these assumptions, especially when social interaction is taken into account (Colman, 2003; Fehr & Fischbacher, 2004; Fehr & Schmidt, 1999; Shafir et al., 1993). For example, in the Ultimatum game, people routinely reject offers less than 20% of the total amount, although no such behaviour should be observed if they were income maximizers (Camerer & Thaler, 1995). Fehr and Fischbacher (2003) argued that the psychological mechanism that rewards the cooperative behaviour and punishes the selfish behaviour of others, in spite of its cost to self, is a sense of fairness. This behaviour is seen even in one-shot, anonymous encounters (Fehr & Gächter, 2002).

Fehr and Fischbacher (2004) examined the altruistic punishment behaviour in situations where social norms are violated. They used a third-party punishment game to assess punishment behaviour. In a standard Dictator game there are two players, one is the dictator and the other is the recipient. The dictator is given some amount of money and is asked to share this money with the recipient. Differently from the Ultimatum game, the recipient has no right

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to reject the offered money even if she thinks that it is not fair. In the third party punishment game, a third player is added with a punishment option. If the third party is selfish then he would not punish the dictator for his unfair behaviour since punishment is also costly for him. However, it was observed that 60% of third parties punished dictators who transferred less than half of their endowment. The results indicate that people are sensitive to violations of cooperation norms and they are ready to punish people who behave unfairly in a cooperative situation.

Some studies show that gender also has an influence on cooperative behaviour. Seguino (1996) and Ortman and Tichy (1999) showed that women contribute more and cooperate more than men in a Public Goods game and a Prisoner's Dilemma game, respectively. However, Eckel and Grossman (2001) conducted an experiment to investigate the effect of gender in the Ultimatum game and found that the behaviour of women and men differed from situation to situation. The results indicate that, similar to Solnick's (2001) findings, there was no significant gender difference on the offers. Eckel and Grossman (2008) argue that the findings of the gender studies are not consistent.

In the present study, a third party punishment game was used to investigate the altruistic punishment and altruistic rewarding behavior of men and women. It was expected that women's scores would be higher than men's in terms of the amount of first offers, and that men's scores would be higher in terms of the amount spent for punishment.

2. Method

3.1. Participants and materials

Volunteer participants were recruited from Doğuş University located in Istanbul. 32 female and 32 male students whose ages ranged from 20 to 30 years participated in the experiment. All subjects were informed that if they participate in the experiment, they may earn some amount of money. In addition, students whose major was Psychology were given extra credits for a specific course.

In the experiment, third party punishment game was used in order to investigate gender difference in the rate of first offer by the dictator, and the rate of altruistic punishment and altruistic rewarding behaviour of the third party. For each role of the game two different software programs were prepared and used in the experiment. The experiment was applied in separate rooms for each participant and every participant was seated against a computer.

3.2. Procedure

First of all, all volunteers were asked whether they have an idea about the Ultimatum Game and its derivatives. The volunteers who knew something about the game were apologized and were not allowed to participate in the experiment.

There were three players in the experiment. Two of them were real participants and the third one was a confederate who behaved as if he/she was involved in the experiment. Real participants played once both the role of the dictator (player A) and the third party (player C) and they were assigned to the roles randomly. But an equal number of males and females played the two roles. In order to create a social interaction situation, they were told that they would play with other participants whom they see around in the experimental rooms. Since player B was a passive player in the game, the confederate was always player B.

At the first step of the experiment, all participants were given a general instruction about the design of the game. Two real participants and a confederate were assigned into separate rooms in order to prevent communication and they were all seated against a computer. They were also told that they were going to play an interactive game with other participants. Actually they were not interacting with each other and played the game against a computer program. Player A and C used software programs designed for this experiment. The program which was prepared for the role of the dictator was designed to respond to the offer of player A in a specific manner. If player A offered less than 20 points to player B, his points were decreased by 9 points, offers between 20 and 30 caused a decrease of 6 points and offers between 30 and 40 caused a decrease of 3 points by the program. When the offer was between 40 and 50 the points of player A did not decrease or increase. In addition, when offers were between 50 and 60, the points of player A was increased by 3 points, offers between 60 and 70 caused an increase of 6 points and offers more than 80 caused an increase of 9 points of player A's points. In the other program, for player C, there were 10

standard allocations (90-10, 80-20, 70-30, 65-35, 60-40, 55-45, 50-50, 50-50, 45- 55, 40-60) which were presented to player C for evaluations. Player C was told that he/she was free to make evaluations, that he/she may either spend his/her points to increase or decrease the amount of points of player A or he/she may stay indifferent against offers.

Participants were not allowed to know who were playing with them but the experimenter provided the information about the gender of the other two participants for each of them. In addition, a situation was created in which the confederate was seen by the other participants before the experiment began.

In the experiment player A, who was assigned to the role of the dictator, was endowed with 100 points. He/she was told that he/she was free to allocate those points depending on his/her preference between himself and player B. All participants were informed that player B has no right to reject the offer of player A. However player C was endowed with 50 points and he was given the right to evaluate the allocation done by player A. They were told that player C will also see how much points were transferred to player B by player A and based on that knowledge player C can evaluate the offer in a positive or negative manner. The words “punishment”, “reward” and “fair” were not used in order not to be manipulative on the decisions of the players. They were also told that depending on his/her personal evaluation player C may spend his/her own points to increase or to decrease the points of A and every 1 point which is spent by player C to decrease or increase the points player A, would add or reduce 3 points from player A’s points. Every participant played the game for 10 trials and after each trial information was provided for player A to know the consequences of his/her allocation in terms of decrease or increase.

Only one participant understood that the game was not interactive and his data were excluded from the data set. At the end of the experiment, the total points of participants were converted into real money. The experiment was around 10 - 15 minutes long for each participant.

3. Results

An independent samples t-test was used to evaluate whether there is a gender difference on the first offers for the first trial. The result of the analysis showed that there was a significant difference between female and male participants in terms of their first offer rates on the first trial. Female participants’ offers ($M = 39.69, SD = 22.14$) were significantly higher than male participants first offers ($M = 27.19, SD = 25.33$), $t(62) = 2.10, p < .05$.

In order to test the effect of gender on the mean of first offer rates, another independent samples t-test was conducted. The result was significant, $t(62) = 3.10, p < .01$. The first offers of female participants ($M = 50.39, SD = 15.03$) were significantly higher than the first offers of male participants ($M = 36.03, SD = 21.42$). The means of first offer rates are presented in the Figure 1.

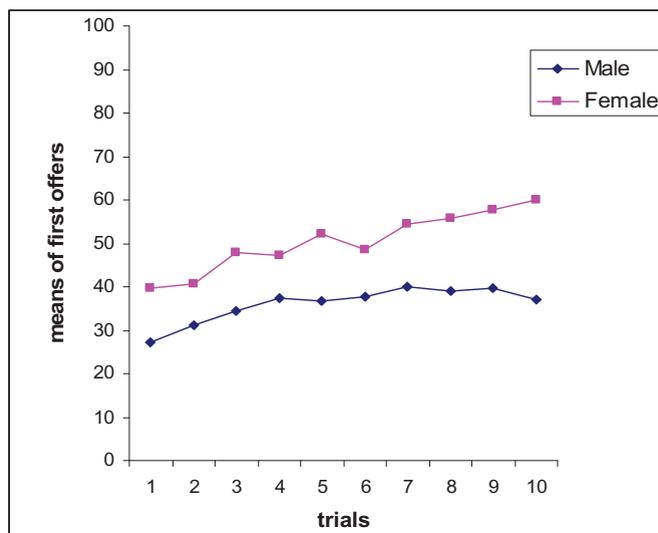


Figure 1. Mean amount of first offers through 10 trials for males and females

To investigate whether there was a gender difference on the points obtained at the end of 10 trials, an independent samples t-test was conducted. The results indicated that female ($M = 49.88$, $SD = 12.11$) participants had significantly lower points than male participants ($M = 61.43$, $SD = 17.21$), $t(62) = 3.10$, $p < .01$. Since female participants gave more points to player B than male participants, at the end of the study they had less money than male participants. It could be said that male participants were more successful in terms of maximizing their profits.

A two-way ANOVA was conducted to evaluate the effects of players B's gender on 1) first offer rates and 2) decision of the third party in terms of punishment and reward. The result of the analysis showed that gender of players' did not significantly affect 1) the first offer rates, $F < 1$, n.s. and 2) decision of third party in terms of punishment or reward, $F < 1$, n.s. This result is not consistent with the literature because it was claimed that offers made to women are, on average, lower than those made to men (Solnick, 2001).

A one sample t-test was conducted separately for males and females on the total points of participants in order to investigate whether their means were significantly different from 91 (maximum number of points that participants could obtain). The results was significant for female participants; the sample mean of 49.88 ($SD = 12.11$) was significantly different from 91, $t(31) = 19.20$, $p < .001$. The analysis showed that the results were also significant for male participants; the sample mean of 61.43 ($SD = 17.21$) again was significantly lower than 91, $t(31) = 9.72$, $p < .001$. According to the design of the experiment, the optimum offer for the dictator was giving no points to player B in order to maximize own profit. However the results indicate that both genders offered significantly high points to player B, even when they observed that giving no points was more beneficial.

In order to test whether there is a gender difference in terms of total points which was spent by the third party for reward and punishment, another independent samples t-test was conducted. The test was significant, $t(62) = 2.83$, $p < .01$, male participants ($M = 63.42$, $SD = 71.37$) spent significantly more points in total to punish or reward player A than female participants ($M = 25.56$, $SD = 19.32$).

The previous analysis showed that male participants spend much more points than female participants in any case to reward or to punish the dictator. To make a deeper analysis to distinguish spent points for reward and punishment, an independent sample t-test was conducted. The results indicated that male participants ($M = 24.09$, $SD = 43.28$) spent significantly more points for reward than female participants ($M = 8.28$, $SD = 9.82$), $t(62) = 2.02$, $p < .05$. However, the difference between male and female participants in terms of spent points to punish the dictator barely missed significance. Although male participants ($M = 31.63$, $SD = 45.26$) spent more points for punishment than female participants ($M = 17.34$, $SD = 13.31$), the result was not significant, $t(62) = 1.71$, $p = .09$.

Correlation coefficients were computed examine whether there is a relation between the first offer rates of the participant when he/she is the dictator and punishment and rewarding rates when the same participant is the third party. The results indicated that even though first offer rates were not significantly correlated with punishment or rewarding rates, there was a significant correlation between reward and punishment rates for female participants, $r(31) = .37$, $p < .05$.

The results of the paired sample t-test gave also parallel results in terms of punishment and rewarding behaviors. Although the test was not significant in terms of punishment ($M = 31.63$, $SD = 45.26$) and reward ($M = 24.09$, $SD = 43.28$) for male participants, it was highly significant for female participants for punishment ($M = 17.34$, $SD = 13.31$) and reward behavior ($M = 8.28$, $SD = 9.82$), $t(31) = 3.86$, $p < .01$.

4. Discussion

Two points can be made regarding the profit maximization behaviour of the participants and gender differences in the behaviour patterns of the participants. First, although according to economic theories in order to maximize his own profit the third party should not use any points to punish or reward the dictator, the results showed that even though participants were informed that they were free not to spend their points, all of them used some of their points to reward or punish the offers of the dictator at least three times. In addition, male participants were more willing to spend their points to punish or reward the offers made by the dictator. These findings confirm the major findings of Fehr and Fischbacher (2004) and Ottone et al. (2008). Although these studies did not investigate gender differences, they found that, similar to our findings, most of the thirds parties punished unfair dictators.

Secondly, female participants behaved more cooperatively by giving more points to player B than male participants. This finding is consistent with the majority of literature. In a double blind dictator game, Eckel and

Grossman (1998) found that women gave money almost twice as much as men to their partner. In addition, Ortman and Tichy (1999) found that women cooperate significantly higher than men at the beginning of the trials of the Prisoner Dilemma game. Seguino (1996) also found a significant gender difference in terms of the contribution level of individuals in the Public Goods games.

The results of the study have implications for both the effect of social interaction on people's preferences and the rationality debate in the literature. With respect to the classical definition of rationality, almost all people who participated in the experiment are irrational because they spent their money to punish or to reward a stranger, whom they will probably never meet again in such a situation. On the other hand, Chase et al. (1998) argue that the classical definition of rationality is not adequate to evaluate people's responses since it ignores context and content. The mistake of the classical definition of rationality is failing to take into account social norms and some psychological mechanisms such as inequity aversion and sense of fairness. Our results suggest that explaining the behaviour of people in cooperative economic exchange situations requires going beyond classical definitions of rationality based on profit maximization and embracing social (and perhaps evolutionary) considerations to account for the influence of the situation and for gender differences.

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