



MSc in Business Economics with Analytics

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Business Economics and Strategic Business Decisions

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Abstract

When people are posed a question, they frequently alter their response to what is socially acceptable rather than what is in their best interests or with complete honesty. But how does this affect their decision-making when they're given a hypothetical strategy to choose from? This question will be attempted to be answered, but particularly when it comes to *Dictator's game* strategies. More specifically we will compare how the theory generated in the Dictator's game can diverge from reality and what causes may be accountable for this deviation. To make this comparison, we'll run an experiment and compare the findings to what game theory projected. The present study took place in Greece and a total of 60 people of various ages participated in an anonymous online research, where a questionnaire was given to them.

Introduction

The traditional assumption that fairness is irrelevant to economic analysis is questioned. Even profit-maximizing firms will have an incentive to act in a manner that is perceived as fair if the individuals with whom they deal are willing to resist unfair transactions and punish unfair firms at some cost to them. The dictator game is a popular experimental instrument in social psychology and economics, a derivative of the ultimatum game. The term "game" is a misnomer because it captures a decision by a single player: to send money to another or not. Thus, the dictator has the most power and holds the preferred position in this "game." Although the "dictator" has the most power and presents a take it or leave it offer, the game has mixed results based on different behavioral attributes. The results where most "dictators" choose to send money evidence the role of fairness and norms in economic behavior, and undermine the assumption of narrow self-interest when given the opportunity to maximize one's own profits.

The dictator game is a derivative of the ultimatum game, in which one player (the proposer) provides a one-time offer to the other (the responder). The responder can choose to either accept or reject the proposer's bid, but rejecting the bid would result in both players receiving a payoff of 0. In the dictator game, the first player, "the dictator", determines how to split an endowment (such as a cash prize) between themselves and the second player (the recipient). The dictator's action space is complete and therefore is at their own will to determine the endowment, which ranges from giving nothing to giving all the endowment. The recipient has no influence over the outcome of the game, which means the recipient plays a passive role. While the ultimatum game is informative, it can be considered too simple of a model when discussing most real-world negotiation situations. Real-world games tend to involve offers and counteroffers while the ultimatum game is simply player one placing forward a division of an amount that player 2 has to accept or reject. Based on this limited scope, it is expected that the second player will accept any offer they are given which is not necessarily seen in real world examples.

The initial game was developed by Daniel Kahneman in the 1980s and involved three parties, with one active and two passive participants. However, it was only in 1994 that a paper by Forsythe et al. simplified this to the contemporary form of this game with one decision-maker (the dictator) and one passive participant (the recipient). One would expect players to behave rationally and maximize their own payoffs, as shown by the homo economicus principle; however, it has been shown that human populations are more "benevolent than homo economicus" and therefore rarely do the majority give nothing to the recipient. In the original dictator game, the dictator and the recipient were randomly selected and completely unknown. However it was found that the result was different depending on the social distance between the two parties. The level of "social distance" that a dictator and the recipient has changes the ratio of endowment that the dictator is willing to give. If the dictator in the game has anonymity with the recipient, resulting in a high level of social distance, they are most likely to give less endowment. Whereas players with a low level of social distance, whether they are very familiar with each other or shallowly acquainted, are more likely to give a higher proportion of the endowment to the recipient. When players are within

an organization, they most likely have a low level of social distance. Within organizations, altruism and prosocial behavior are heavily relied on in dictator games for optimal organizational output. Prosocial behavior encourages the “intention of promoting the welfare of the individual, group, or organization toward which it is directed” (Brief and Motowildo, 1986, p 711).

The initial purpose of this study is to find differences in people's responses when their personal characteristics, such as gender or age, are taken into account. The second objective is to determine whether the subject's approach varies depending on what is deemed socially acceptable, as well as whether his action differs based on whether his acts are made public or not.

The experiment

The experiment took place in Greece, and 150 people were requested to take part in an economic experiment that lasted 5-10 minutes and was administered in the form of anonymous questionnaires. The questionnaires were distributed via social media, and all participants were notified that they were participating in a study for the course Business Economics and Strategic Business Decisions. The questionnaire was divided into two sections. The first section dealt with the subject's attributes, such as gender, age, and studies. This segment was designed to gather information about the participants that might be related to the second part of the questionnaire. The second part was a simulated dictator game experiment with four hypothetical treatments, in which participants were given the role of dictator and asked to reply to four alternative scenarios regarding which approach they would apply. The main concept behind these four scenarios was for participants to envision themselves as employees of a corporation that, in the framework of a charity, provides them 100€ and instructs them to donate a portion of it to a charity.

According to the dictator's game structure, the employee who will donate the money served as the proposer, while the charity played the role of responder. The four treatments are as follows:

1. Assume you work for a company and you will receive a 150 € Easter gift from the company. As part of a charitable initiative, the corporation decides to give all employees an extra 100€ if they donate at least 10€ to an anonymous charity. In this situation, how much would you be willing to give?
2. Assume that the same circumstances apply, i.e., the Easter gift is 150 €, and you will be given an additional 100 € on the condition that at least 10 € of it is donated to a charity, but this time a list of employees, amounts, and names will be made and announced across the firm. In this situation, how much would you be willing to give?
3. Assume the same conditions apply, i.e., the Easter gift is 150 €, and you will be given an additional 100 € on the condition that at least 10 € of it be donated to a charity, with the exception that you now know that the charity to which this money will be donated is an organization that supports and helps children with cancer. The amount to be given is also anonymous this time. In this situation, how much would you be willing to give?
4. Assume that the same conditions apply, i.e., the Easter gift is 150 €, and you will be given an additional 100 € on the condition that at least 10 € of it be donated to a charity, and you know that the charity to which this money will be donated is an organization that supports and helps children with cancer, but with the exception that a list of employees will be made, with the amounts and names of those who will be given and announced throughout the company. In this situation, how much would you be willing to give?

All four questions had the same possible responses.

- a) 10€
- b) 20-40€
- c) 40-60€
- d) 60-80€
- e) 100€

The experiment's questions are specific for three reasons. The first purpose is to see if the participants' responses match the game's Nash equilibrium. According to the *Nash equilibrium* the proposer always gives the minimum non-negative quantity to the receiver and keeps the rest of the money for himself. The Nash equilibrium in this case is if the respondents give the 10 €.

The second reason for asking these questions is to see if the questioners will be influenced by whether the donation is made anonymously and what is socially acceptable. This will be demonstrated through the differentiation of questions 1–2 and 3–4.

The last question that was attempted to be answered through the questionnaire was whether knowing additional information about the receiver influences the proposer's answer.

The Analysis

The total number of participants in the experiment is 150 people. Tables 1, 2 and 3 show the participants characteristics, more specifically the number of responses to each choice on gender, age, and education.

<i>Answers</i>	<i>Gender</i>
Female	82
Male	65
Other	3

As can be seen, women made up the bulk of the participants, with 17 times the number of men. Three people selected the "other" option.

Table 1. Gender

<i>Answers</i>	<i>Age</i>
18-29	72
30-39	25
40-50	28
50+	25

Table2 shows that the ages of the respondents were primarily 18-29, since this age group counted for about half of the responses, with 72 people choosing this option. The rest are evenly split, with 25 people choosing the answer 25 people choosing the answer 30-39 and 50 and 28 chose 40-50

Table2. Age

<i>Answers</i>	<i>Education</i>
Primary education	1
Secondary education	27
Higher education	122

Table 3. Education

Table 3 shows that higher education is the response of choice for the vast majority of participants, with 127 persons selecting it. Only one person chose primary schooling, while 27 others chose secondary education.

The next question was not about the participants' personal attributes, but rather about their charitable background. To the question: "Have you donated to a charity in the past?" 91 said "Yes, but only rarely," 50 said "no, never," and only 9 said "Yes, very frequently." Finally, table 4 shows the number of responses for each choice, for every treatment.

<i>Answers</i>	<i>Treatment 1</i>	<i>Treatment 2</i>	<i>Treatment 3</i>	<i>Treatment 4</i>
10 €	32	21	13	10
20-40€	58	57	45	46
40-60€	51	55	41	37
60-80€	4	10	14	18
100 €	5	7	37	39

Table 4. Treatments

In figures 1, 2, 3 and 4 we observe the bar plots of the four treatments. The alternatives 20-40 € and 40-60 € are relatively high in the first and second bar plots, and immediately after that comes the option 10 €, whilst the other two options are quite low, notably in treatment 1. On the contrary, we can see in bar plots 3 and 4 that while the prices of 20-40 € and 40-60 € remain high, the prices of 60-80 € and 100 € skyrockete, specially the value 100, as well as a steep drop in prices to 10 €.

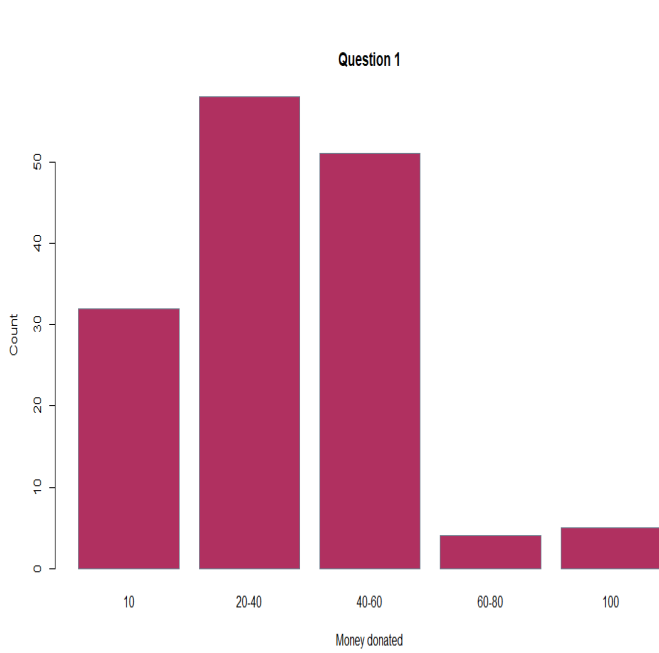


Figure 1. Bar plot Treatment 1

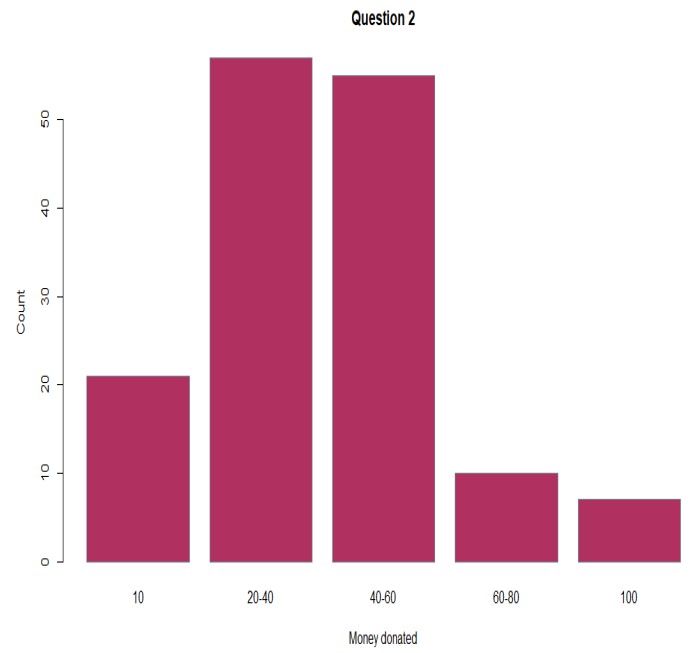


Figure 2. Bar plot Treatment 2

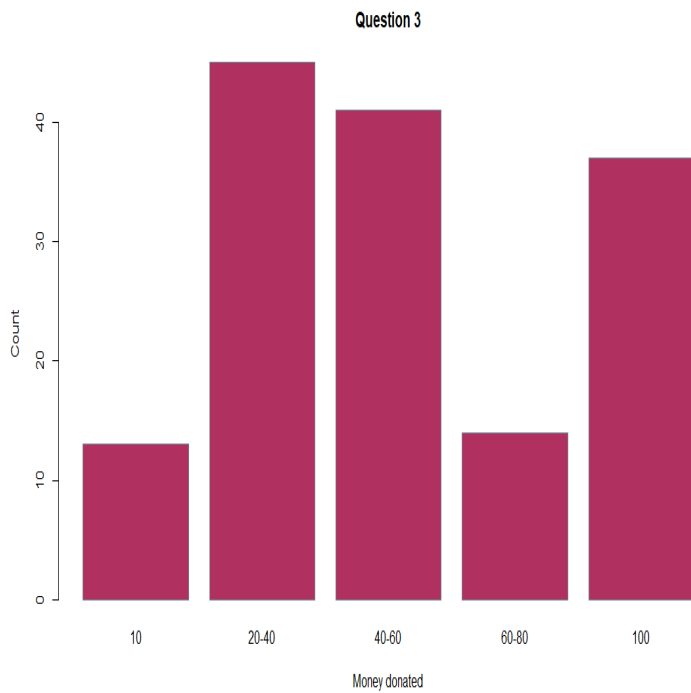


Figure 3. Bar plot Treatment 3

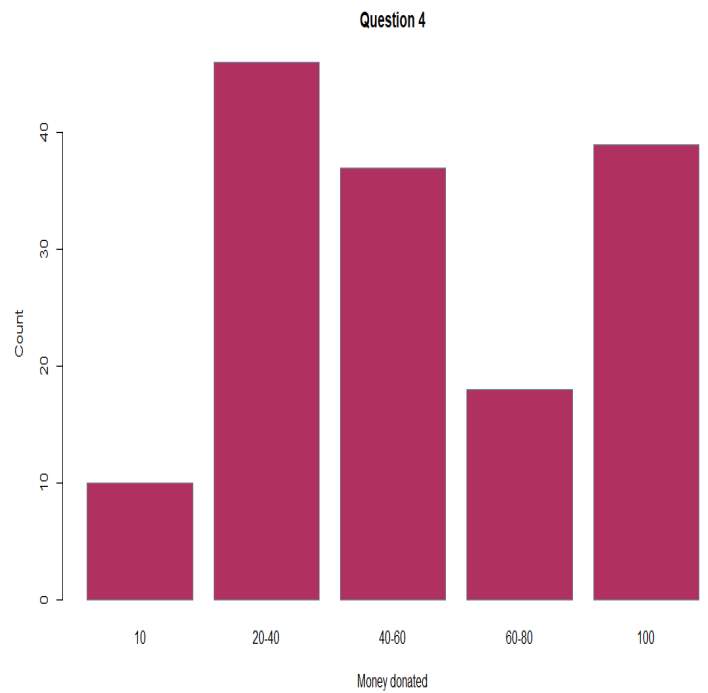


Figure 4. Bar plot Treatment 4

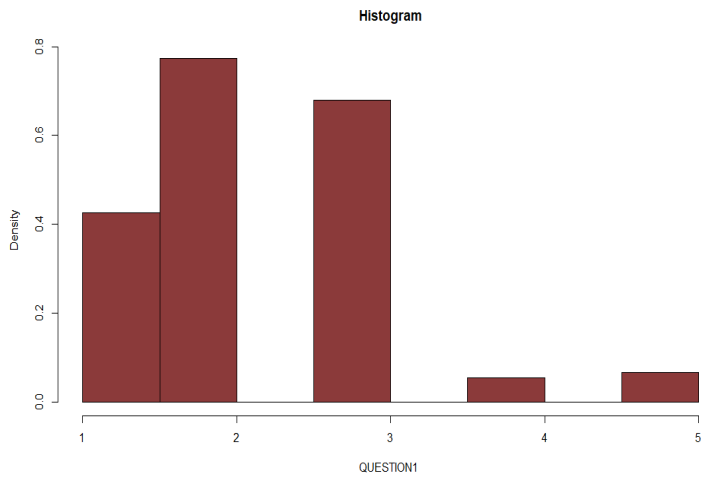


Figure 5. Histogram Treatment 1

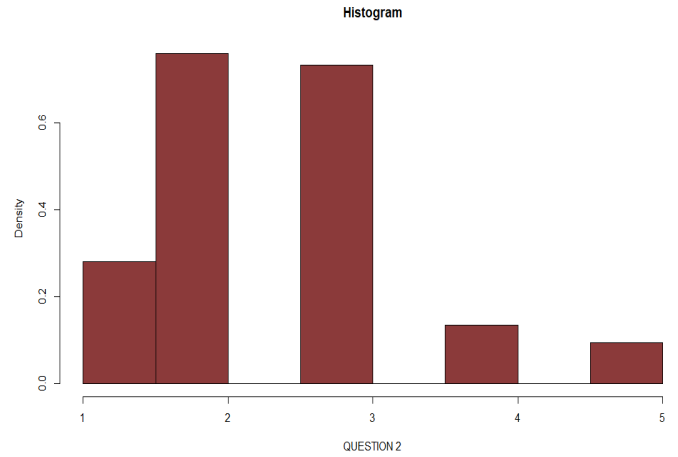


Figure 6. Histogram Treatment 2

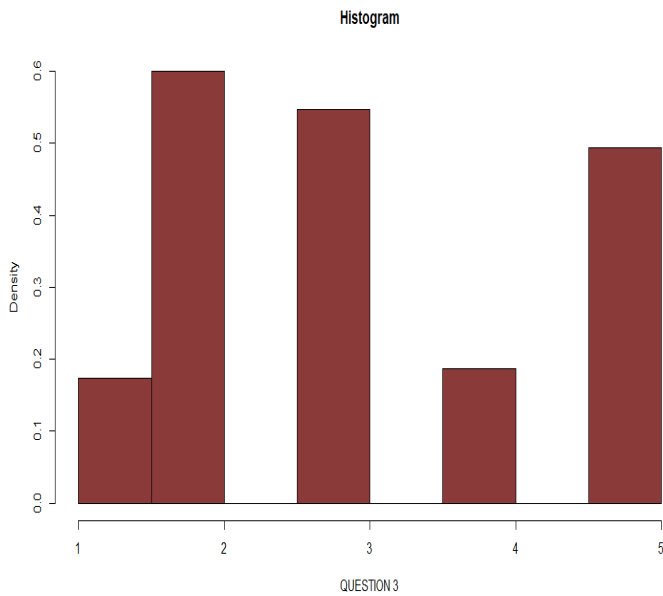


Figure 7. Histogram Treatment 3

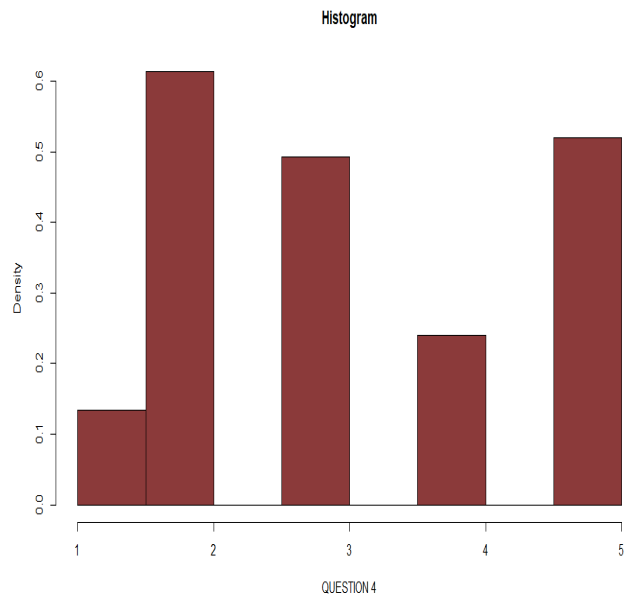


Figure 8. Histogram Treatment 4

Figures 5, 6, 7, and 8 show the same thing as before, which is logical. Prices range from 20-40 € to 40-60 € in the first two histograms, then 10 € in the third, the prices rise rapidly again 60-80 € and 100 € in the last two histograms, while the price declines 10 €.

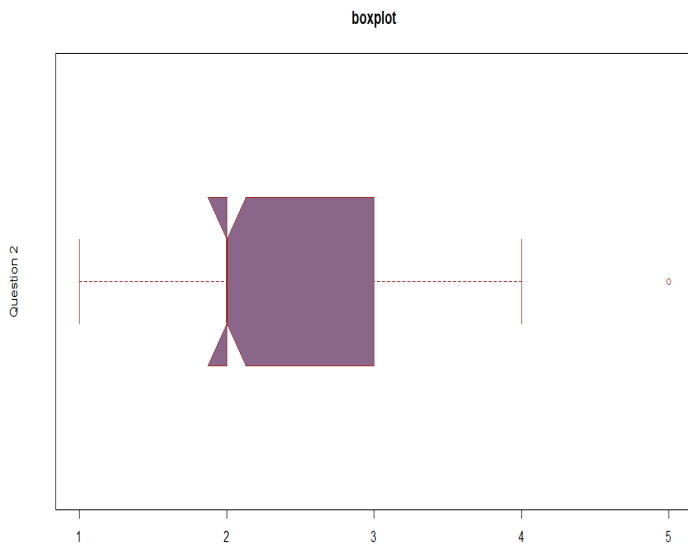


Figure 8.Boxplot Treatment 1

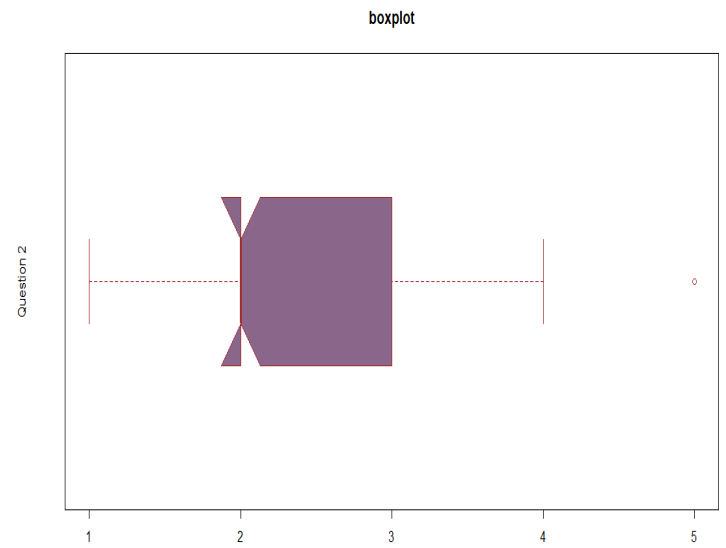


Figure 9.Boxplot Treatment 2

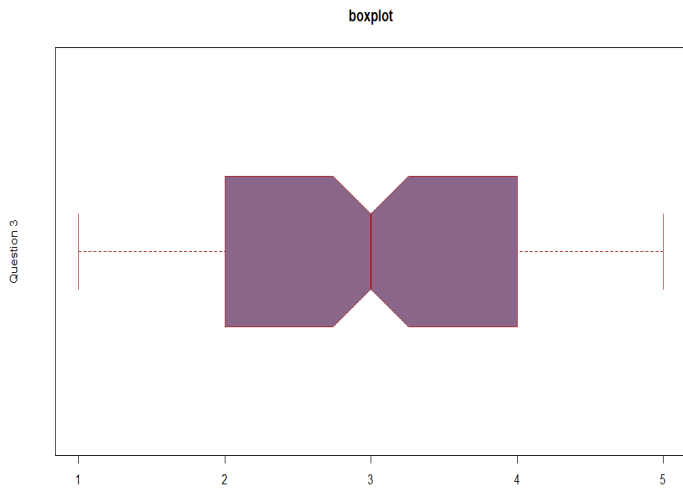


Figure 9.Boxplot Treatment 3

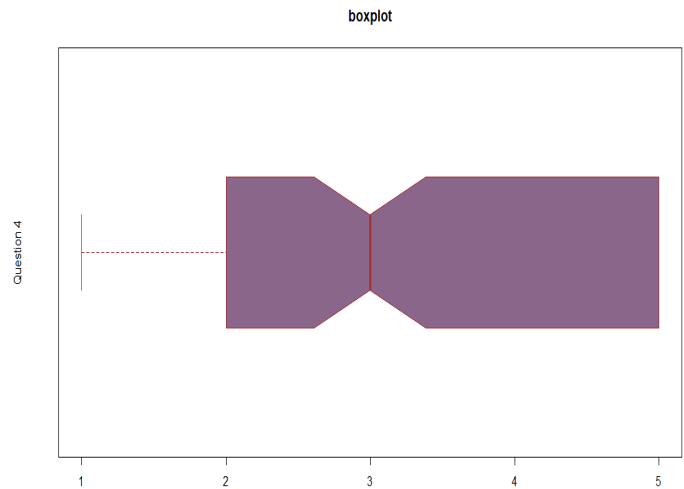


Figure 10.Boxplot Treatment 4

Through the boxplots in figures 7, 8,9,10, we can see which part of the answers each of the five possibilities has picked. The first two boxplots are nearly identical, the results of the questions is in replies b and c, and option 100 stands out as an outlier. In contrast to the other two boxplots, the majority of the responses go to the right, i.e. to higher values.

Figure 11, which depicts the correlation between the variables, is particularly interesting. More particular, we notice a slight association between the individuals' gender and their responses to the four treatments. Then we see an even stronger link between age and the four treatments. There is no special correlation between education and previous donations, however there is a very substantial correlation between treatment responses. More particular, we see that all four treatments are highly correlated, with treatment 3 and 4 having the highest correlation between the variables.

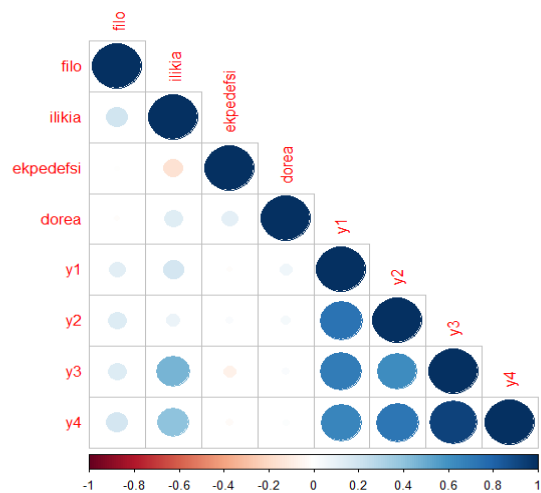


Figure 11. Correlation

Then four multiple linear regression models were created, each with a different dependent variable, Y, for each treatment, and independent variables, all of the other questionnaire responses.

Model 1

Depended Variable Y: Treatment 1

Independent variables: Gender, Age, Education, Previous Donations, Treatments 2, 3 and 4

The only factors that were statistically significant for the dependent variable following the model were treatments 2, 3, and 4, with treatments 2 and 3 being the most statistically significant.

Model 2

Depended Variable Y: Treatment 2

Independent variables: Gender, Age, Education, Previous Donations, Treatments 1,3 and 4

The only factors that were statistically significant for the dependent variable following the model were Age, treatments 1, 3, and 4, with treatments 1 and 4 being the most statistically significant but, in this model.

Model 3

Depended Variable Y: Treatment 3

Independent variables: Gender, Age, Education, Previous Donations, Treatments 1, 2 and 4

The only factors that were statistically significant for the dependent variable following the model were Age, treatments 1, 2, and 4, with treatments 1 and 4 being the most statistically significant but, in this model.

Model 3

Depended Variable Y: Treatment 4

Independent variables: Gender, Age, Education, Previous Donations, Treatments 1, 2 and 3

The only factors that were statistically significant for the dependent variable following the model were Age, treatments 1, 2, and 3, with treatments 2 and 3 but also Age being the most statistically significant but, in this model.

Variables	Model 1	Model 2	Model 3	Model 4
Intercept	0.730	0.223	0.240	0.32472
Gender	0.671	0.710	0.136	0.14866
Age	0.398	0.006	0.004	5.75E-11
Education	0.979	0.977	0.419	0.37212
Previous Donations	0.401	0.609	0.624	0.74716
Treatment 1	Y	9.90E-12	1.73E-07	0.00511
Treatment 2	9.90E-12	Y	0.001	5.75E-11
Treatment 3	1.73E-07	0.001	Y	< 2e-16
Treatment 4	0.005	5.75E-11	< 2e-16	Y

Table 5.Model P-Value

Table 5 illustrates the above conclusions. The null hypothesis that the variable is not statistically significant is rejected for variables with a P-value of almost 0.

Conclusions

We'll remind you that this experiment is attempting to answer three questions:

1. Respondents' answers agree with Nash equilibrium?
2. Questioners will be influenced by whether the donation is anonymous and what is socially acceptable?
3. Does learning more about the receiver alter the proposer's response?

Let's begin with the most basic inquiry. The results show that only a small percentage of people agreed with the Nash equilibrium, which was the 10€, with just 21.33% in the first treatment, 14 % in the second treatment, 8.67 in the third treatment, and 6.67 % in the fourth treatment. The percentage of responders who answered 10 € declined as the conditions changed. This was to be expected, as prior experiments have shown that the results of the tests almost always deviate significantly from the Nash equilibrium. The answer to the other two questions we want to answer may provide the solution to why this is happening. What may explain this disparity is that a number of responders provide the response that society deems most appropriate.

We now move on to the second question. We now move on to the second question. Almost all of the prices in the answers grew from the first to the second treatment, the only condition that has changed is that the donation was no longer made anonymously, with the exception of 10€, which decreased by 7.33 %, and the 20-40, which remained nearly constant. The response 40-60 € increased by 2.67 %, 60-80 € increased by 4%, and 100 € increased by 1.33 %. Also, there are distinctions between treatments 3 and 4, with the only difference being anonymity. The price of the answers 60-80 € has increased by 2.67 percent, while the price of the answers 100 € has increased by 1.33 percent. The answer 10 € dropped 2%, the answer 40-60 dropped 2.67 percent, and the answer 20-40 remained nearly unchanged. The conclusions drawn from these findings are that respondents' responses are influenced by what is deemed socially acceptable, since when donations are not anonymous, the replies to big prices go up and the answers to little prices go down. However, the differences do not appear to be significant, implying that the sample we used is marginally influenced.

Finally, let's have a look at the last question that was posed. Treatment 3 and 4 was used to try to solve this question. When you know who the receiver is, what happens next? The most significant changes in the percentages of each answer were shown from treatment 2 to treatment 3. The low costs all declined: the response 10 € decreased by 4.67 %, the answer 20-40 € decreased by 8%, the answer 40-60 € decreased by 9.33 percent, in contrast to the answers 60-80 €, which increased by 2.67 %, and the answer 100 €, which increased by a whopping 20%. It's worth mentioning that there appeared to be a strong link between this change and the age factor. Treatments 3 and 4 received the greatest values from the majority of respondents aged 40-50 and 50+, indicating that they were more conscious of the concern posed by these treatments. One can easily assume from this that knowing more about the receiver can have an impact on the response you give.

In conclusion, the experiment demonstrates that the initial results of an experiment may differ from those predicted by economic theory, and that there are a variety of circumstances that can affect the outcome when you take on the role of Dictator in the game. Finally, it's worth noting that the experiment was conducted on a hypothetical level, and that the results could be drastically different if it were carried out in real life.

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