The relation between effort and altruism

An Experimental Analysis

Author	(Wendy) W.M. Mol
Student number	412054
Specialization	Behavioural Economics
Date	July 19, 2018
Supervisor	dr. (Jan) J. P. M. Heufer
Second Supervisor	(Paul) P. van Bruggen MPhil
University	Erasmus University Rotterdam Burgemeester Oudlaan 50 3062 PA Rotterdam

Abstract

Previous research has shown that individuals are not purely selfish. Not only do they care about their own payoff, they also care about the payoff of others. This paper examines the differences in altruistic behavior depending on how much effort individuals exert in earning money. This was tested with a laboratory experiment in the form of a dictator game, in which the subjects were Dutch high school students. The results showed that the subjects donated roughly the same amount regardless of the origin of the endowment. It was found that the percentage of the total endowment donated, decreases as the endowment increases.

Keywords: altruistic behavior, dictator game, effort

Table of content

1. Introduction

In his book Mathematical Psychics, published in 1881, Edgeworth stated: "The first principle of Economics is that every agent is actuated only by self-interest" (Edgeworth F.Y., 1881). Smith also stated that classical economic theory assumes that an individual's utility depends ultimately on his or her own payoff (Smith, 1993). However, insights from behavioral economics have proven otherwise. It has been shown that people behave pro-socially and care about the payoff of another person (Camerer, C.F. (2011)). Pro-social behavior is often tested by means of lab experiments. The question remains how an individual's pro-social behavior in the lab relates to his pro-social behavior outside the laboratory. Levitt and List (2007a, 2007b) mentioned several factors that can lead to differences between prosocial behavior in the lab and in the field. One of these factors are the stakes of the game. The money that is used in lab experiments is often provided by the experimenter, whereas the money in field settings is often earned.

Research has shown that individuals behave differently concerning money that is a windfall compared to money that has been earned. Money that is given by an experimenter is more easily spent than one's own money. The marginal propensity to consume a windfall is higher (Clark, J. (2002)). Therefore, it is likely that an individual's altruistic behavior is different depending on the origin of their money. Is someone who receives money more willing to give part of it away compared to someone who works for their money?

Cherry, Frykblom and Shogren (2002) let people bargain over earned wealth rather than wealth that was granted by the experimenter. They found that individuals who had earned their money were more selfish when compared to individuals who received money as a windfall. The earned amount in the study of Cherry et al., mainly depended on the ability of the subjects.

This paper looks at the difference in altruistic behavior in lab experiments depending on the origin of the endowment. In contrast to the study of Cherry et al., this study will focus on the effect of effort on altruistic behavior. The results have important implications for experimental designs. The results of experiments on prosocial behavior in which a windfall gain is used, may not be generalizable to a natural occurring context in which individuals often have to exert effort in order to earn their money. This is the case if the origin of an endowment has an effect on an individual's prosocial behavior. This paper also investigates the effect of the extent of effort on altruistic behavior. Levitt and List emphasize the importance of the stakes of the game. They stated that it is important to account for differences in stakes across settings. To be able to draw a better conclusion about the generalizability of previous research, this research will look at the effect of effort on altruistic behavior for different stakes.

This research also has important implications for an individual's behavior outside the lab. This research investigates the effect of effort on altruistic behavior for different levels of effort within an individual. The

results could therefore explain the differences in altruistic behavior depending on how hard one has to work for their money. This has implications for preferences in charitably giving and taxation preferences. The central research question of this study is:

"*What is the effect of effort on altruistic behavior?"*

This paper will proceed by outlining a theoretical framework in which the hypotheses will be explained. This section also discusses the dictator game, as that will be used in order to test the hypotheses and answer the research question. A discussion of the data and how this data is obtained will follow. The results will be examined by using nonparametric tests and a linear probability model. The main result of this paper is that altruistic behavior is not significantly different between individuals who exerted effort in order to earn money and individuals who received money as a windfall. Lastly, a discussion section will follow. This section includes concluding remarks as well as implications, limitations and recommendations for further research.

2. Theoretical framework

2.1 Dictator game

2.1.1 Description of the game

A dictator game is used in order to give an answer to the research question. This game is originally developed by Forsythe et al. (1994). It is a one-stage, two-player bargaining game. One player is the dictator and the other player is the receiver. The dictator can divide an amount of money (S) between their self and another individual, the receiver. The payoff for the dictator is equal to the amount of money they receive minus the amount they choose to give away to the receiver ($x_1 = S-x_2$). The receiver does not have the opportunity to reject the division that the dictator makes. The payoff for the receiver is thus equal to x_2.

2.1.2 Standard theory versus findings in research

If it is true that an individual's utility ultimately depends on their own payoff as classical economic theory assumes, then the dictator will make a zero contribution to the receiver ($x_2=0$). However research shows that this is often not the case. Forsythe et al. (1994) conducted a five-dollar and a ten-dollar dictator game. They found that respectively 64% and 79% of the participants gave away an amount greater than zero. Cason and Mui (1997) wrote a paper on the differences between an individual and a team dictator game. In the individual dictator game, the subject decides the allocation of five dollars; in the team dictator game, a team of two subjects decide the allocation of ten dollars. The two subjects in a team agreed on an amount (P) to give away to two other players. Both players in the team received $5 - P$ dollars. The mean individual offer was 23.8% and the mean of the team offer was 25.6%. Andreoni and Vesterlund (2001) found that in their ten-dollar dictator game, the average gift is 2.52 dollars (25.2%) and in the six-dollar dictator game the average gift is 1.54 dollars (25.6%). The typical finding in standard dictator games is that on average 25% of the amount to be shared is given away (Forsythe et al., 1994; Cason & Mui, 1997; Bolton, Katok, & Zwick, 1998) and that 60% of the dictators give away an amount that is greater than zero (Levitt, S. D., & List, J. A. (2007a)). This suggests, in contrast to the prediction of standard economic theory, that an individual's utility does not solely depend on their own payoff, but also depends on the payoff of another person. This can be shown with a utility function. A utility function of an individual includes their own payoff (π_i) and the payoff of another person (π_x). The utility function of an individual can be written as $U_i = f(\pi_i, \pi_x)$

2.1.3 The origin of the endowment

In all of the dictator games described in section 2.1.2, the amount that the dictator could divide was provided by the experimenter. Cherry et al. (2002) were the first ones to let people bargain over earned wealth rather than wealth that was provided by an experimenter. The participants in treatment group were randomly

assigned into two groups; group A or group B. The participants in group A could earn money by correctly answering GMAT questions. If a subject answered at least ten questions correctly, they would earn $40. If the subject answered less than ten questions correctly, they would earn $10. After the earning stage, the subjects were informed about the bargaining stage. During this stage, the subjects in group A were randomly assigned to a person in group B. The person in group A could choose to give some of their earned money to the person in group B. The subjects in group B did not participate in the earning stage prior to the bargaining stage. In the other treatment, the baseline treatment, the subjects did not participate in the earning stage. These subjects received the money that they could divide during the bargaining stage from the experimenter. They found that prosocial behavior was greatly diminished when bargaining involves earned wealth.

Cherry, Kroll & Shogren (2005) explored the impact of the origin of the endowment on contributions to a public good game. There were two treatment, the earned (T1) and the windfall (T2) treatment. The subjects in T1 participated in the earning stage. In which they followed Cherry et al. (2002). The amount earned was determined by the number of correctly answered GMAT questions. In T2 the endowment was a windfall. After the earning stage, the public good contribution took place. Subjects could divide their money between a private account and a public account. The money that was placed in a private account were private earnings. The money placed in a public account was doubled and divided equally among the four group members. They found that the origin of the endowment did not have an effect on the contributions that were put into the public account.

In this paper, the participants could earn money by correctly performing a task. The amount of questions that were answered correctly, mainly depended on the amount of effort that the subject put into the task. This differs from the research of Cherry et al. (2002) and Cherry et al. (2005), where intelligence played a big role. All the subjects in this study take part in the stage in which they could chose to give some of their earned money away to another randomly assigned student. This stage takes place before the earning stage. This in contrast with the procedure of Cherry et al. (2002), where only the subjects of group A participated in the bargaining stage. For a detailed description of the experiment please refer to section 4.4.

2.2 Measuring altruistic behavior and effort

This research investigates whether effort has an influence on an individual's altruistic behavior. As mentioned in section 2.1.2., the utility of an individual depends on their own payoff and the payoff of another person. If it is assumed that an individual's utility function takes the form of $U_i = f(\pi_i, \pi_x)$, altruism suggest that $f(\pi_i(S),\ \pi_x(0)) < f(\pi_i(S - X_2), \pi_x(X_2))$.

Altruism is measured as the percentage of the endowment (S) that is given away (X_2). Thus the result of the formula: $\frac{x_2}{S} \times 100\%$. The subjects have to perform a task in order to earn the money that can be divided. The task consist of 30 questions. Please refer to section 4.2 for a detailed description of the task. The amount of correctly answered questions is a measure of effort. It is assumed that the number of correctly answered questions increases as effort increases. This assumption is plausible because a task is chosen in which effort is the main factor required to perform well. As described in section 4.3, the subjects make the allocation choice before they exert effort. It is assumed that the subjects in this study predict that they will answer more questions correctly if they exert more effort.

2.3 Hypotheses

There has been a debate surrounding the influence of the origin of wealth on individual behavior. Friedman was the first one that mentioned that behavior could differ depending on the resources of wealth with his 'permanent income hypothesis' (Friedman, M. (1957)). Cherry et al. (2002) found that dictators who bargain over earned wealth were more selfish than dictators who bargain over unearned wealth. The dictators who took part in the earning stage made significantly lower offers than the dictators in the baseline treatment, who did not earn their wealth. Previous research has also shown that money that is granted by the experimenter is more easily spent than one's own money. Also, that individuals behave more munificently with another individual's money. The reasoning is that individuals who receive a 'windfall' have a higher marginal propensity to consume it. This is known as the "house money effect" (Clark, J. (2002)). Individuals who have to earn their money are less willing to spend their money for consumption purposes and probably also less willing to spend it in favor of another individual. Based on previous research, it is expected that altruistic behavior is lower when one has to exert effort in order to earn an endowment.

H1: When someone's endowment is earned, he/she makes a lower contribution compared to the case in which the endowment was a windfall

Previous laboratory studies have shown that varying the endowment of a dictator game does not have an influence on the donations of the dictator. Andreoni, J. and Vesterlund, L. (2001) examined a modified dictator game in which they varied the prices. They let the subjects play different allocation problems. In some of these games, the relative price of the own-payoff and other-payoff was different. Two of the problems were not modified. The hold value was equal to the pass value in these games. In one of these games the token endowment was equal to 60 and in the other game the token endowment was equal to 80. The mean payoff to the other party was respectively 15.4 tokens and 25.2 tokens. This means that in the first game an average contribution of 25.66% was made and in the second game an average contribution of

25.20%. Forsythe et al. (1994) tested the hypothesis that "The distribution of the proportion of the pie offered in the $5 and $10 dictator game are identical." This hypothesis was not rejected, there was no statistical difference in the amount donated between the dictators who received $5 and the dictators who received $10. The subjects in the study of List & Cherry (2008) could earn money by taking a quiz. The subjects who correctly answered at least 10 questions, received $100. The subjects who answered less than 10 questions correctly, received $20. The subjects were allocated over two groups. Half of the subjects (group A) participated in the earning stage and the other half (group B) did not. After the earning stage, the allocation stage took place. The subjects in group A could decide how to split the earnings between themselves and another subject of group B. They found evidence that the subjects who earned $20 transferred proportionally more than the subjects who earned $100. However, the differences across the data of the different earnings were not statistically significant. Due to the earning stage, the subjects in this experiment were not randomized into the stakes treatments. Carpenter, Verhoogen and Burks (2005) contributed to existing literature with a randomized experiment that substantially raises the stakes in a dictator game. They found that increasing the stakes from $10 to $100 did not have a statistically significant effect on the behavior of the dictators in the game.

The study in this paper will use a within subject design for the different endowment levels. Data on the distributions of different stakes will be collected. Based on findings in previous literature, it is expected that the average contribution in percentages of the token endowment of the 'windfall group,' will not differ significantly for different token endowments.

H2a: If the endowment is a windfall, the contribution does not differ for different endowment levels.

There are different principles that determine how goods should be distributed. These are the principles of equity, equality and need. One of these principles, the principle of equity, says that goods should be distributed to individuals in proportion to their input. Individuals should be rewarded for their effort and productivity (Armstrong, C. (2012)). Based on this theory, it is expected that individuals will perceive a distribution as fair only if the ones who produce more, also receive more money. This will be the case if effort is an important factor which determines production. Differences in talent or luck should not play a big role. If one's effort increases, they will produce more and the probability that their production is above the average production increases. It is expected that an individual whose production is above average, has a feeling that they deserve a reward that is higher than the expected average reward. Therefore as effort increases, individuals are less willing to give a part of their earned money away. If one exerts more effort, their endowment will be higher. It is expected that the average contribution, as a percentage of the endowment, decreases as the endowment increases.

H2b: If the endowment is earned, the contribution decreases as effort increases

Taken all the hypotheses together, it is expected that the difference in the contribution between individuals who receive money as a windfall and individuals who work for their money, increases as the token endowment increases. Figure 1 below shows the expectations graphically.

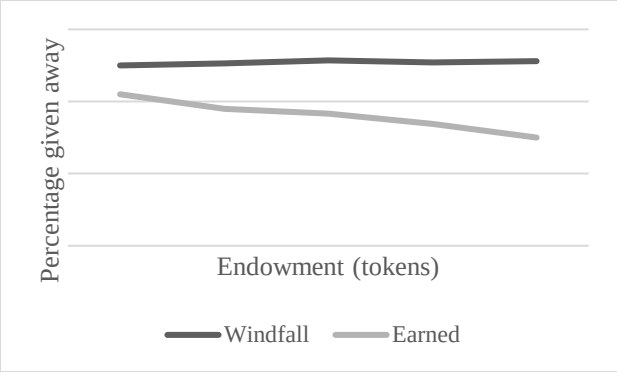

Figure 1. Expected contributions

3. Data

3.1 Power analysis

In planning research, determining the optimal sample size of a study is crucial. An undersized study can miss the capability to produce useful results. Four elements are involved when calculating the optimal sample size (Lenth, R. V. (2001)). The first element is the significance level of the test (α). In this study, the conventional level of significance is taken. This significance level is equal to 0.05. The second element is the power (β). This is conventionally set at 0.80. The third element is effect size (d). The effect size is determined with four factors. The mean of group one, the mean of group two, the standard deviation of group one and the standard deviation of group two. The effect size is calculated as the difference of the mean divided by the standard deviation. As described in section 2.1.2, the average donation in traditional dictator games is equal to 25%. The mean of group one is therefore set to 25 tokens. The mean of group two is expected to be lower. Based on the expectations, the mean of group two is set to 16 tokens (around 35% less than in the standard dictator game). The standard deviation is estimated by observed standard deviations in previous research with dictator games. The standard deviations of the dictator game in Forsythe et al (1994), Bolton et al (1998) and Hoffman et al (1994) range from $1.29 to $1.79, with the average standard deviation being $1.54. The expected standard deviation is set to 15.4 tokens. This is approximately equal to $1.54. There is no indication to expect a different standard deviation for group two compared to group one. Therefore, this is also set to 15.4. These four elements determined the effect size of 0.584 ($= \frac{25-16}{15.4}$). The last element is the allocation ratio. This is the ratio of the amount of subjects needed in both treatments ($= \frac{N2}{N1}$). The optimal ratio depends on the variances of the two treatments and the expected costs. The expected costs for the first treatment are equal to the expected costs of the second treatment and it is expected that the variances of the treatments do not differ. Therefore the allocation rate equals one. The four elements were inserted in the software program 'GPower'. The results showed that there are 100 subjects needed in total. The optimal sample size for both the treatment and the control group is equal to 50.

3.2 Sample of the experiment

In order to investigate what the effect of effort is on one's prosocial behavior, a laboratory experiment is used. This is done at 'Stanislas College Westplantsoen', a high school in Delft, the Netherlands. The students in this sample are all 'vwo' students. This is the highest education level after primary school. Within this education level, subjects can choose between four different degrees; Culture and Society, Economy and Society, Science and Health and Science and Engineering. Each class consists of

approximately 20 students. The optimal sample size in this experiment is equal to 50. Therefore, the control group and the treatment group each consist of three different classes. In both the control and the treatment group, there is one class in which subjects have a science-math based degree. This can be the degree Science and Health or Science and Engineering. The other two classes in each sample consist of students with different degrees. The amount of students with a specific degree is roughly the same between the control and the treatment group. This to make sure that the characteristics of the subjects between the two groups does not differ greatly. Furthermore since all the subjects in this study are fourth year 'vwo' students, they all share the same age. Cristoph Engel (2011) found in his Meta-study of dictator games that age has a strong effect on average donations. It is therefore important that the average age of the subjects in the treatment group is equal to the average age of the subjects in the control group.

3.3 Self-selection bias

For two classes (named V4B and V4C) it was not possible to conduct the questionnaire during teaching hours due to logistical reasons. These two classes had a choice to participate in the experiment during the break time. The subjects in these classes were not randomly chosen, therefore the problem of self-selection bias may arise. This causes a problem when the distribution of characteristics of the subjects in these two classes do not accurately describe the true population distribution of characteristics (Heckman, J. J. (1990)). It is possible that students who are willing to give up their break to help in an experiment are more generous than students who are not willing to give up their break. To test if there were significant differences in behavior among the subjects who took part in the experiment during teaching hours and the students who took part in the experiment during break hours, the results of the experiment will be examined with and without the classes V4B and V4C. Appendix E provides an additional analysis concerning a potential self-selection bias.

4. Methodology

4.1 The dictator game in the questionnaire

Both groups play a dictator game. They earn or receive an amount of tokens (S) that they can divide between themselves and a random other person who is also playing the game. They do not know who this other person is. The payoff for the dictator is equal to the token endowment minus the amount of tokens they choose to give to the receiver ($S-x_2$). Subjects are asked to divide different amount of tokens. The receiver cannot reject the amount and thus their payoff is equal to x_2.

4.2 The task

The task that the subjects have to perform in order to earn tokens consists of decoding letters into numbers. It is based on the paper of Fisher et al. (2002). This task is chosen because it is unlikely that a subject has done this before. This way, neither of the subjects would feel discouraged as a result of a disadvantage. It is a very simple task, such that performance depends on the amount of effort one puts in the task. One's intelligence does not play a big role, nor does luck. This in contrast to the paper of Cherry et al., where the subjects had to answer GMAT questions in order to earn money.

The task consists of completing 30 questions. In each question, the subject is asked to decode a six letter word. This is done with a decoding scheme. There are four different decoding schemes. This is to make sure that the subjects perform the task on their own. Please refer to table 5a to 5d in appendix B for the different decoding schemes. Each letter corresponds to a number. Subjects are asked to write down the string of numbers that match the six letter word. The matches between the numbers and letters are made randomly for each scheme.

4.3 Treatments

As described in section 2.2, the amount of correctly answered questions is used as a measure of effort. In order to measure the effect of effort, the sample was divided into two groups. The subjects are divided in such a way that the treatment and the control groups are equal in terms of the number of student with the same degree. The first group, the control group, did not have to exert any effort in order to get their tokens. The subjects in this group receive the amount that they could divide as a windfall. A variant of the 'strategy method' (Selten, 1967) is applied in this experiment. The subjects in the 'windfall group' play five different games. The amount of tokens that can be divided differs in each game. In the first game they receive 20 tokens to divide, in the second game 40 tokens, in the third game 60 tokens, in the fourth game 80 tokens and in the last game 100. The second group is the treatment group. The subjects in this group have to earn their tokens. They have to perform the task described in section 4.2 in order to earn their tokens. For each questions they answer correct, they will receive a point. The total amount of points earned, will determine

the amount of tokens they will receive. Table 1 shows the amount of points needed in order to receive different numbers of tokens.

Table 1. Scheme of scores

Points (total amount of questions right)	Tokens
1 – 5	20
5 – 10	40
10 – 15	60
15 – 20	80
20 or more	100

Before the subjects knew their score, they were asked how much they were willing to give away for all possible scores with corresponding token endowments. Tan & Forgas (2010) found that mood can have a significant influence on the way one allocates scarce resources between themselves and others. If the subjects are asked how they would divide the tokens beforehand, the task would not have an influence on the mood of the subjects. Therefore it is not necessary that the subjects in the control group perform the task as well. Another advantage is that the subjects do not know how they would score on the task beforehand. If the subjects are asked afterwards to fill out the questions about all the different scenarios, it is possible that some subjects would not take all the questions seriously. If a subject thinks that they have more than 15 points, it is possible that they are not willing to think hard about how to divide 20, 40 and 60 tokens. This problem is prevented if the subjects are asked to divide the tokens before they perform the task.

4.4 The procedure

As described in section 4.3, the subjects are divided over the control and treatment group based on their degree. Before the questionnaire is handed out, instructions are given to the class. Please refer to appendix A for the instructions that were given to the control group and for the instructions that were given to the treatment group. After the instructions, the questionnaire was handed out. Since the students in this sample are Dutch, the questionnaire that was used in this experiment is translated into Dutch. Please refer to Appendix C for the Dutch translation of the questionnaire. The questionnaires of the treatment group were collected after 10 minutes. For the control group it was expected that the subjects were finished within 10 minutes. Therefore the questionnaire would be collected upon completion for this group. After all the classes were finished with the experiment, the winners were chosen randomly. This is done by the experimenter. The participation numbers of all the participants in the control group were fed into a computer program called ‘random.org.’ This program randomly picked three numbers. The students that matched with those numbers were the ‘winners’ of the game. The same program then randomly picked one of the

five games. The game that is selected was be paid out according to the choice of the winner. If a winner chose to give some tokens away to someone else, then the receiver was determined with the 'random.org' program. This student was randomly chosen from all the participants in the games except for the winners. All the winners and the receivers then received an email to ask for their bank account. When the information was collected, the money was transferred to their bank account. The same procedure was done for the treatment group, with the only difference being that the actual score of the winners determined which game was paid out. A screenshot of the transferred money was sent to the teachers afterwards.

4.5 Clarifications

4.5.1 Incentives

Control over preferences is an important aspect that can be achieved in a lab experiment. Control means that most factors that influence behavior are constant and that only one factor changes at a time (Croson & Gachter, 2010). This can be achieved by implementing the five precepts of Smith (Smith, V. L. (1982). One of these precepts is dominance. Dominance means: "The reward structure dominates any subjective costs (or values) associated with participation" (Smith, V.L. (1982)). In order to overcome the subjective costs and to achieve control, an incentive was given to the participants. Prior to the questionnaire, the students were informed that there would be three winners in the game that would win their chosen allocation. The students of class V4B and class V4C that showed up during their break time were also given a small chocolate bar as an extra incentive to participate. As the experiment was done during school hours and the questionnaire would not take more than 10 minutes to complete, it was expected that the subjective costs were overcome by the incentives. Therefore it can be assumed that the subject was willing to think about the problems and state their real preferences.

4.5.2 Anonymity between subjects and between subjects and the teacher

Reyniers & Bhalla (2013) found that peer pressure can have a significant influence on giving behavior. Subjects care about how others think of them. To overcome the effect of peer pressure on prosocial behavior, the experiment was conducted in such a way that the subjects were anonymous for the other subjects and the teacher. The choice of each subject was not revealed to the class. As described in section 4.4, three students in each game were randomly chosen as a winner. Those students were then sent an email asking for their bank account number. This way, the winnings could be transferred without the others subjects or the teacher knowing who won the game and what the preferred allocation of this student was.

4.5.3 Verification

To make sure that the subjects believed that the experimenter had transferred the money, the teacher verified that the money was transferred. A screenshot of the transferred money was sent to the teacher. This screenshot was anonymized.

4.6 Testing hypotheses

From the obtained data, the hypotheses can be tested and an answer to the research question can be given. Recall the first hypothesis:

H1: When someone's endowment is earned, he/she makes a lower contribution compared to the case in which the endowment was a windfall

A test is needed that tests for differences between two groups. There are two tests that determine if two sampled groups come from the same populations; the parametric t-test and the nonparametric Mann-Whitney U test. The difference between these two tests is the assumption about the distribution of the data. The parametric t-test requires the data to be normally distributed, whereas the nonparametric test does not require a specific distribution (McKnight, P. E., & Najab, J. (2010)). To decide which test is more appropriate, the data is tested for normality. This is done with the Shapiro-Wilk test (Shapiro, S. S., & Wilk, M. B. (1965)).

Both the parametric t-test and the Mann-Whitney U test requires the observations to be independent. Since the subjects are clustered in different classes, there might exist cluster effects. Previous work has shown that ignoring clustering effects when they are present can result in invalid conclusions (Rosner, B., & Grove, D. (1999)). The observations from the same cluster are potentially correlated. This correlation must be taken into account in order to obtain a valid test results (Graubard, B. I., & Korn, E. L. (1994)). Nominal levels of confidence will usually be too high and nominal levels of significance will usually be too low if they are not adjusted for cluster effects (Rosner, B., & Grove, D.). To test if the observations within the same cluster are correlated, the intraclass correlation coefficient (ICC) is determined. This coefficient describes how strongly the units within the same group are similar to each other. A large one-way analysis of variance, is used in order to test for the ICC.

Depending on the distribution of the data, a parametric t-test or a Mann-Whitney U test is used. This test tests if there are systematic differences in the amount donated between the two treatments. The test will be repeated five times, for each of the five token endowments.

If the ICC appears to be statistically different from zero, clustering effects should be taken into account. Most work on incorporating cluster effects has focused on parametric tests and not on nonparametric tests like the Mann-Whitney U test. The z-statistic of the Mann-Whitney U test should be interpreted carefully when cluster effects are present. To test if cluster effects have an impact on the confidence intervals and significance levels, multiple logit regressions will be performed. Regressions that are adjusted for correlation of observation within each class and regressions that are not adjusted for this correlation. The p-value of these tests will be compared.

Hypotheses H2a and H2b were stated as follows:

H2a: If the endowment is a 'windfall', the contribution does not differ for different endowment levels.

H2b: If the endowment is earned, the contribution decreases as effort increases

To test hypotheses H2a and H2b, a test is needed that tests if the donation of the five different endowment levels are equal to each other. As described in section 4.3, this experiment makes use of the strategy method. This experiment contains data of six classes of subjects. Each subject answered five questions. Due to the within-design of this experiment, the data is set up as panel data. The participation number of each subject is defined as the group variable. A random regression model or a fixed regression model is used to estimate the effect of different endowment levels on the contribution. In these regressions, the variable 'giving' will be set as the dependent variable. This variable shows the amount that is given away as a percentage of the endowment. The independent variable in these regression is 'tokens'. This shows the token endowment. A random regression model assumes that the individual specific effects are independent of the regressors. To test if this is the case, a Hausman test will be used. This test will estimate the model both by fixed effects and random effects and compare the results. If the estimates are not statistically different, this suggest that there is no correlation between individual specific effects and the regressors. The random effect estimator will be more efficient in that case.

To test the first part of hypothesis two, the regression is ran with the data of the control group. The second part of the hypothesis is tested with the data of the treatment group.

5. Results

5.1 Descriptive statistics

Table 2 shows average contribution rates per treatment and endowment level. The first number represents the absolute amount of tokens that are donated. The number in parenthesis is the relative contribution. This is the amount that is given away as a fraction of the total endowment. It can be seen in the table that the absolute amount donated is higher in the 'windfall' group compared to the 'earned' group for each endowment level. It can also be seen that the relative contribution decreases as endowment level increases for both groups.

The subjects within the control and the treatment group were both divided over three classes. The total number of observations in the control group is 65. Please refer to table 7 in Appendix D for the data of the contributions within the control group. The number of observations, average contribution and standard deviation are shown for each class in the control group. The total number of observations in the treatment group is 65. Please refer to table 8 in Appendix D for a description of the number of observations, average contribution and standard deviation for each class in the treatment group.

Table 2 Average absolute and relative donations

Endowment level	Earned	Windfall
20	6.42 (0.32)	7.72 (0.39)
40	12.20 (0.31)	14.66 (0.37)
60	17.68 (0.29)	19.34 (0.32)
80	22.32 (0.28)	25.06 (0.31)
100	26.92 (0.27)	27.86 (0.28)

The average contribution per token endowment of the control group and the treatment group is graphically showed in figure 2.

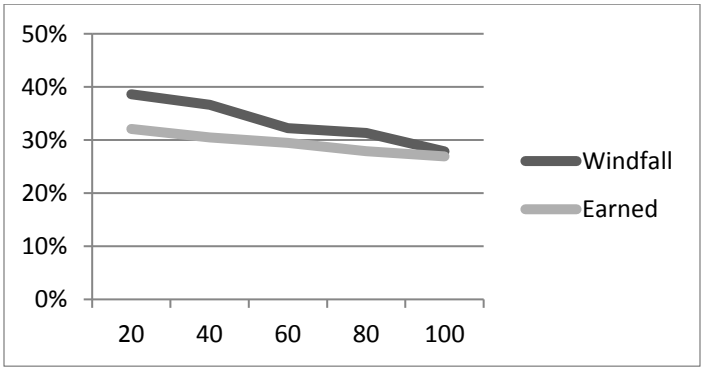

Figure 2. Average contributions per group

5.2 Testing hypotheses

5.2.1 Test for normality

To test if the data is normally distributed, a Shapiro-Wilk test is performed. This test is performed for the data of each game. Table 3 below shows the W-statistic and the p-value for each game. The p-value for each game is lower than 0.05. This means that the null hypothesis which states that the data is normally distributed is rejected. It can therefore not be concluded that the data in this experiment meets the assumption of normality. Since this is one of the main assumption of parametric tests, these tests cannot be used to test the hypotheses.

Table 3 Results of the Shapiro-Wilk test

Game	**W-statistic**	**p-value**
1	0.95	0.00
2	0.94	0.00
3	0.94	0.00
4	0.91	0.00
5	0.91	0.00

5.2.2 Test for cluster effects

The intraclass correlation coefficients are calculated with the large one-way ANOVA. They are shown in table 4. The ICC is equal to zero for the last three games. The ICC is not equal to zero for the first and the second game. The 95% confidence interval of the ICC of game one is equal to (0.00, 0.08) and for game two to (0.00, 0.07). This shows that the ICC of these two games are not significantly different from zero. This means that the donations within each class do not resemble each other. There is no indication that the subjects within each class are more similar to each other with respect to potential confounding factors than subjects that are selected at random. Therefore the subjects within each class are independent and there is no need to control for cluster effects.

Table 4 Intraclass correlation coefficient

Game	**ICC**
1	0.00723
2	0.00548
3	0.00000
4	0.00000
5	0.00000
overall	0.00000

5.2.3 Testing hypotheses

As described in section 4.6, the first hypothesis is tested with a t-test or a Mann-Whitney U test, depending on the distribution of the data and depending on the existence of cluster effects. The hypothesis that stated that the data is normally distributed is rejected. The Mann-Whitney U test will therefore be used to test the first hypothesis. First, the average donation of the five games of the treatment and the control group is compared. The z-statistic is equal to 0.2038. Based on a significant level of 0.05, the null hypothesis is not rejected. There is not enough evidence to conclude that there are systematic differences between the donations done by the 'windfall' group compared to the donations done by the 'earned money' group.

To be able to draw a more specific conclusion about the differences in average donations between the two groups, the differences for each endowment level will be take into account. The test is repeated five times for each game. The z-statistic for each of the five games is shown in column 2 of table 5. All the values are higher than 0.05. Therefore the null hypotheses cannot be rejected for each endowment level at a significance level of 5%. There is no significant systematic differences in the donations between the control and the treatment group for each game.

Table 5. Z-statistics MWU

Test	z statistic	z-statistic without V4B and V4C
Game 1	0.0846	0.2098
Game 2	0.1262	0.2008
Game 3	0.4734	0.4827
Game 4	0.5955	0.6147
Game 5	0.7354	0.8213

The two parts of the second hypothesis will be tested with a random regression model or a fixed regression model depending on the correlation between the individual specific effects and the regressor. This is tested with the Hausman test. The p-value of this test is equal to one. This indicates that there are no significant differences between the results of the random effects model and the fixed effects model. The random effects model is the most efficient model to use.

The first part of hypothesis two is tested with the data of the control group. The coefficient of the independent variable is negative (-.0013417) and has a p-value of 0.000. This indicates that there is a significant negative effect of the token endowment on the amount that is given away. The null hypothesis that the contribution is the same for each endowment level is rejected. It can be concluded that in this sample the contribution decreases as the token endowment increases.

The second part of hypothesis two is tested with the data of the treatment group. The coefficient of the dependent variable is negative (-.0006469) and has a p-value of 0.000. This indicates that the subjects in the treatment group decrease their donations as they increase their effort. The null hypothesis that stated that the contribution is the same for each level of effort is rejected. It can be concluded that in this sample the contribution decreases with effort.

5.3 Testing for self-selection bias

As described in section 3.3, a selection bias might be present in class V4B and in class V4C. These students had the choice to participate in the experiment during their break. This causes a problem when the subjects who voluntary gave up their break are not representative for the whole population. To test if the results differ without these two classes, the Mann-Whitey U test is performed without the classes V4B and V4C. The results are shown in column 3 of table 5. The z-statistic is higher for each game. This suggest that the differences between the donations in the treatment and the control group are larger in the classes that voluntary participated in the experiment. Appendix E and section 6.3 will elaborate on this finding.

6. Discussion

6.1 Conclusion

Subjects in the lab donate more to other subjects than standard economic theory predicts. The money that can be divided in most lab experiment done on social preferences, is provided by the experimenter. Previous literature showed that individuals behave differently depending on the origin of money. This research investigate the effect of effort on altruistic behavior. The main research question of this study is "What is the effect of effort on altruistic behavior?"

The results shows that there is no significant difference in donations between the treatment and control group of each endowment level. This shows that it does not matter whether someone exerted effort or received money as a windfall, altruism is the same in the two situations. This is in line with the findings of Cherry et al. (2005). They found that contributions levels in their public good game did not significantly differ depending on the origin of the endowment. However, Cherry et al. (2002) found that there were significant differences in the donations done by dictators who earned their endowment compared to dictators who received their endowment as a windfall. One possible explanation for the finding in this paper has to do with the setup of this experiment. The receivers in the treatment group also took part in the earning stage. Therefore there are two effects that are measured with the first hypothesis. The first part is the effect of exerting effort on the amount that subjects give away. The second part is an effect that occurs within each group. All the students in the treatment group exerted effort but there were only three students randomly assigned as the winner. The subjects knew beforehand that not everyone would get paid out. This might have had an influence on their allocation decision. This can be explained with the same explanation described by Ruffle (1998). He found that effort is an important measure of deservingness when allocators make their decision in a dictator game. It is plausible that the subjects are concerned with how they perceive themselves. Most felt that it is wrong to keep all the money for themselves because of the effort others also exerted. Individuals give up a percentage of their winnings to think of themselves as a fair person.

There is a significant difference in donations as the endowment level increases. This is the case for both the subjects who received money as a windfall as well as for the subjects who earned their money. For the control group this phenomenon can be explained with the tipping theory described by Conlin, O'Donoghue, and Lynn (In Andreoni, & Vesterlund, 2001). They found that individuals normally give around a 15 percent tip when the service was good. This is seen as an appropriate tip. However, when the bill increases it becomes more expensive to meet this social norm. In this research, it becomes more expensive to look altruistic the higher the endowment level. The absolute amount of the contribution increases but the contribution as a percentage of the total endowment decreases. This explanation might also apply to the

treatment group. Besides this explanation, it is likely that the principle of equity, described in section 2.3 plays a role. If the subjects exerted more effort, they earned more money. The probability that a subject performed above the average performance of the group increases. According to the principle of equity, a person with a higher production has a feeling that they deserve a reward that is higher than the expected average reward. Therefore the higher one's effort, the lower the percentage of the amount that is given away.

It has been found that the negative effect of an increasing endowment on the amount donated is stronger for the group that received money as a windfall compared to the group that had to exert effort. The subjects in the treatment group may have a feeling that they have a greater impact on their actual earnings. They may feel bad about giving less than a proportional amount away as they increase their effort level. Whereas the subjects in the control group may consider it as 'luck' if a game with a higher endowment level is chosen to be paid out. Guilt may therefore play a bigger role in the treatment group compared to the control group.

6.2 Implications

There are several important implications of this result. First the implication for experimental designs. The results show that the amount donated does not differ between dictator games in which the experimenter let the subjects work for their endowment and in dictator games in which the subjects are provided with an endowment. This is tested for stakes between 2 and 10 euro. However, the motives of giving can be different for the different treatments. This must be taken into account when drawing conclusions on dictator games.

There are also implications for an individual's behavior outside the lab. The result of this experiment are applicable to situations in which everyone exerted effort but only one individual had a chance to receive a reward. From the results of this experiment, it can be concluded that this individual is willing to share around 29% of the winnings with the other players in the game that did not receive any money. The results also shows that the amount donated, as a proportion of the earnings, decreases as effort increases. An individual is less altruistic if he had to work harder for his money. This has implications for tax preferences. It is assumed that when an individual works hard, his income will be higher. A flat tax rate or a progressive tax rate would not be optimal from the point of view that individuals are less altruistic when they exert more effort. Their utility is higher if the tax rate decreases as their income level increases. Charities can take into account that when an individual has worked hard, they may be willing to donate more in absolute terms but not in relative terms, compared to the case where he did not work as hard. It would be optimal if individuals can easily adjust their monthly or quarterly payments to a charity instead of the standard of paying a fixed amount per period.

6.3 Limitations and suggestions for further research

As explained in section 6.1, the first hypothesis measures two different effects; the effect of exerting effort on the amount that subjects give away and the effect of the knowledge that everyone in the group exerted effort but that there are only a few winners. Further research is needed to determine the size and magnitude of these two effects.

The first effect can be measured with an experiment that is set up as follows: there are two treatments, the baseline treatment (A) and the earnings treatment (B). The subjects in treatment A do not participate in the earning stage and the subjects in treatment B do participate in the earning stage. After the earning stage, the subjects in group A and B receive a choice to give some of their money away to another subject, the receiver. The receivers in this game do not participate in the earning stage and do not receive an endowment. This way, only the effect of effort is measured. Another method to measure solely the effect of effort on the amount donated is as follows; use the same set-up as in this experiment but let the subjects donate to a charity instead of a donation to other subjects in the same treatment group.

The second effect can also be tested with further research. This can be done by letting two groups of subjects (group one and two) earn their endowment. After the earning stage, group one has the chance to give money to a receiver that did not participate in the earning stage and group two has the chance to give money to a receiver that did participate in the earning stage.

The subjects in the treatment group decrease their donations as effort increases. To test whether this effect occurs due to the fact that it becomes more expensive to be altruistic if the endowment level increases or to the principle of equity, further research is needed.

Selection bias seems to play a big role. Appendix E examines the differences in donations for each game between the group that participated during their break time and the group that participated during teaching hours. Especially for the control group there seems to be differences between the donations of those two groups. It is possible that this bias played a role in previous experiments too. Further research to examine the effects of a selection bias of subjects who voluntary participate in experiments is needed.

Due to organizational reasons, it was not possible to run the experiment on the same day for all the six classes. Therefore it is possible that the students talked about the experiment before they participated. This could have had an effect on their preferences. It would have been better to have done the experiment on the same day.

The average giving in this experiment was higher than 25%. The average percentage of non-zero contributions over the five games was equal to 95% for the control group and 91% for the treatment group.

This is higher than what has been found in previous literature. In previous literature it has been found that 60% of the dictators give away an amount that is greater than zero. This could be due to the specific characteristics of the sample in this experiment. All the subjects were around 16 years old and they were all schooled at the highest education level. Further research can focus on the effect of effort on altruistic behavior depending on intrapersonal differences like age and educational level.

Appendices

Appendix A: Instructions and Questionnaires

INSTRUCTIONS CONTROL GROUP

"My name is Wendy and I am studying for a Master's degree in 'Economics and Business: Behavioural Economics' at Erasmus University in Rotterdam. Currently, I am doing my master thesis for which I need information. I would like to conduct a small questionnaire with you, as that would provide me with valuable information. If you don't want to participate, please let me know. It is very important that you do not talk to each other from now on. If you have a question, please raise your hand and I will come to you. In the questionnaire that I am going to give you, you will be asked to share an amount of tokens between yourself and another student that is participating in this game. You play five different games. Each time, the amount of tokens that you receive and can divide is different. In the first game you get 20 tokens that you can divide, in the second game 40, in the third game 60, in the fourth game 80 and in the last game 100. As will be explained in the questionnaire, one person in this class will be randomly assigned as a winner. A computer program called 'random.org' will do this. The decision of this student becomes real for one of the games. The computer will also determine which game this is. As a winner you get the amount of tokens you chose to keep for yourself and that another student will get the amount you chose to give away. This other student will also be randomly assigned. Each token has a value of 10 eurocents. Note that it is important to choose the allocation of tokens you really prefer because there is a chance that your choice becomes real. If you win money in this game, you will be sent an email tonight to ask for your bank account number. You can give your parents' bank account number if you don't have one yourself. Once I receive this information from you, the money will be transferred to your bank account. The teacher will verify that I indeed transferred the money. I will show him/her a screenshot of the transferred amount, but s/he will not get to know who the winner is. You do not have to write your name on the questionnaire. No one will get to know your decision. Please read the instructions very carefully and raise your hand if something is not clear to you in the questionnaire and also once you have finished the questionnaire. I will hand out the questionnaires now."

HANDOUT CONTROL GROUP

Email: _____

Thank you for participating in this game. In this game you are asked to divide an amount of tokens between yourself and another student that is participating in this game. There are five games. In each game there is a different amount of tokens that you can divide between yourself and another student. In the first game you get 20 tokens that you can divide, in the second game 40, in the third game 60, in the fourth game 80 and in the last game 100. One student in this class will be randomly assigned as the winner. If you are a winner, your choice of one of the games will become real. The computer will determine which game this is. As a winner you will get the amount of tokens you chose to keep for yourself and another randomly chosen student will get the amount you chose to give away. In each game the value of one token is equal to

10 eurocent. Note that it is important to give your real preferences, since it is possible that your choice becomes real.

Game 1
You get 20 tokens to divide between yourself and another student. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 20.

I will keep ___ tokens for myself and I will give ____ tokens away.

Game 2
You get 40 tokens to divide between yourself and another student. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 40.

I will keep ___ tokens for myself and I will give ____ tokens away.

Game 3
You get 60 tokens to divide between yourself and another student. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 60.

I will keep ___ tokens for myself and I will give ____ tokens away.

Game 4
You get 80 tokens to divide between yourself and another student. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 80.

I will keep ___ tokens for myself and I will give ____ tokens away.

Game 5
You get 80 tokens to divide between yourself and another student. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 80.

I will keep ___ tokens for myself and I will give ____ tokens away.

INSTRUCTION TREATMENT GROUP

"My name is Wendy and I am studying for a Master's degree in 'Economics and Business: Behavioural Economics' at Erasmus University in Rotterdam. Currently, I am doing my master thesis for which I need information. I would like to conduct a small questionnaire with you, as that would provide me with valuable information. If you don't want to participate, please let me know. It is very important that you do not talk to each other from now on. If you have a question, please raise your hand and I will come to you. In the questionnaire that I am going to give you, you will be asked to share an amount of tokens between yourself and another student that is participating in this game. You can earn different amount of tokens. The amount

of tokens that you will earn depends on how well you do on a task. I will now explain the task with an example. The task consists of decoding letters into numbers. Each letter corresponds to a number. In this example each letter corresponds to a number based on its position in the alphabet. The corresponding number of A is one, for B is two, for C is three etc. You can see the whole alphabet with is corresponding number on the screen. *Show fig. 1 on a screen in front of the class*. You are asked to decode a six-letter word. For example the word decode. The D corresponds in this case to 4, the E to 5, the C to 3, the O to 15, the D to 4 and the E to 5. So the answer to this question is 4-5-3-15-4-5. Is this clear to everyone? *Repeat the explanation if it is not clear to anyone.*

You will get different versions of decoding schemes. The A doesn't necessarily correspond to '1'. It can also correspond to a '5' or '20'. As I said, the amount of tokens depends on how well you will do on the task. If you get 1 to 5 questions right, you will get 20 tokens to divide. If you get 5 to 10 questions right, you will get 40 tokens to divide. If you get 10 to 15 questions right, you will get 60 tokens to divide. If you get 15 to 20 questions right, you will get 80 tokens to divide. If you have more than 20 questions right, you get 100 tokens to divide. This scheme is also shown at the questionnaire. Before we start with the task I want you to image all the possible cases and write down how many tokens you will keep for yourself and how many tokens you give away to another student. As will be explained in the questionnaire, one person in this class will be randomly assigned as a winner. A computer program called 'random.org' will do this. The relevant decision, based on the number of questions that are right answered, will become real for the winner. As a winner you get the amount of tokens you chose to keep for yourself and that another student will get the amount you chose to give away. This other student will also be randomly assigned. Each token has a value of 10 eurocents. Note that it is important to choose the allocation of tokens you really prefer because there is a change that your choice becomes real. If you win money in this game, you will be sent an email tonight to ask for your back account number. You can give your parents' bank account number if you don't have one yourself. Once I receive this information from you, the money will be transferred to your bank account. The teacher will verify that I indeed transferred the money. I will show him/her a screenshot of the transferred amount, but s/he will not get to know who the winner is. You do not have to write your name on the questionnaire. No one will get to know your decision and no one will get to how well you did on the task. Please read the instructions very carefully and raise your hand if something is not clear. After 10 minutes I will collect the questionnaires. I will hand them out now."

HANDOUT TREATMENT GROUP

Email: _____

Class: _____

Thank you for participating in this game. In this game you are asked to divide an amount of tokens between yourself and another student that is participating in this game. You earn those tokens by performing a simple task. The amount of tokens you get depends on how well you did on the task. One student in this class will be randomly assigned as the winner. If you are a winner, your choice will become real. As a winner you will get the amount of tokens you chose to keep for yourself and another student will get the amount you chose to give away. The value of one token is equal to 10 eurocent. Note that it is important to give your real preferences, since it is possible that your choice becomes real.

The task: your task is to decode letters into numbers. Each letter stands for a specific number. Please write down the numbers that corresponds to the letters. Here is an example:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

QUESTION	**ANSWER**
Please decode the following string:	
D – E – C – O – D – E	4 – 5 – 3 – 15 – 4 – 5

For each question you get right, you will earn 1 point. In the table below you can find the amount of points corresponding with the amount of tokens you earn.

Points (total amount of questions right)	Tokens
1 – 5	20
5 – 10	40
10 – 15	60
15 – 20	80
20 or more	100

Imagine you have 1 - 5 questions right. You earn 20 tokens. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 20.

I will keep ___ tokens for myself and I will give ____ tokens away.

Imagine you have 5 - 10 questions right. You earn 40 tokens. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 40.

I will keep ___ tokens for myself and I will give ____ tokens away.

Imagine you have 10 - 15 questions right. You earn 60 tokens. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 60.

I will keep ___ tokens for myself and I will give ____ tokens away.

Imagine you have 15 - 20 questions right. You earn 80 tokens. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 80.

I will keep ___ tokens for myself and I will give ____ tokens away.

Imagine you have 20 or more questions right. You earn 100 tokens. Please indicate below how you would divide the tokens. Note that the sum of the two must be equal to 100.

I will keep ___ tokens for myself and I will give ____ tokens away.

QUESTION	**ANSWER**
G – Y – M – L – E – S	__ – __ –__ –__ –__ –__
B – E – G – R – I – P	__ – __ –__ –__ –__ –__
D – O – N – D – E – R	__ – __ –__ –__ –__ –__
J – O – K – E – R – S	__ – __ –__ –__ –__ –__
H – A – N – D – E – L	__ – __ –__ –__ –__ –__
U – P – D – A – T – E	__ – __ –__ –__ –__ –__
L – E – S – U – U – R	__ – __ –__ –__ –__ –__
Z – U – I – V – E – L	__ – __ –__ –__ –__ –__

N – U –M – M – E – R	__ – __ –__ –__ –__ –__
B – U – D – G – E –T	__ – __ –__ –__ –__ –__
I – J – S – B – O – X	__ – __ –__ –__ –__ –__
G – A – D – G – E – T	__ – __ –__ –__ –__ –__
B – A – N –K – J – E	__ – __ –__ –__ –__ –__
D – O – K – T –E – R	__ – __ –__ –__ –__ –__
L – Y – C – E – U – M	__ – __ –__ –__ –__ –__
M – A – R – K – E – R	__ – __ –__ –__ –__ –__
R – E – C – T – O –R	__ – __ –__ –__ –__ –__
F – A – C – T – O – R	__ – __ –__ –__ –__ –__
T – E – K – E – N – S	__ – __ –__ –__ –__ –__
K – A – R – T – E – L	__ – __ –__ –__ –__ –__
S – C – H – E – T – S	__ – __ –__ –__ –__ –__
V – A – L – U – T – A	__ – __ –__ –__ –__ –__
E – X – P – O –R – T	__ – __ –__ –__ –__ –__
K – E – N – N – I – S	__ – __ –__ –__ –__ –__
D – U – U – R – S – T	__ – __ –__ –__ –__ –__
C – E – N – T - E – N	__ – __ –__ –__ –__ –__
W – A – A – R – D –E	__ – __ –__ –__ –__ –__
E – F – F - E – C – T	__ – __ –__ –__ –__ –__
C – O – U – P – O – N	__ – __ –__ –__ –__ –__
V – U – L – P – E – N	__ – __ –__ –__ –__ –__

Appendix B: Different decoding schemes

Table 6a Decoding scheme 1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
7	2	23	12	15	19	6	22	25	5	20	3	14	21	1	8	18	13	26	24	4	10	9	16	17	11

Table 6b Decoding scheme 2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
7	4	6	9	18	10	16	2	19	23	14	12	3	21	24	26	20	1	25	11	13	5	8	17	15	22

Table 6c Decoding scheme 3

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
11	16	14	20	6	19	15	24	18	22	12	23	2	1	4	5	8	26	17	10	13	9	21	3	25	7

Table 6d Decoding scheme 4

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
9	21	23	5	25	17	12	24	20	22	16	1	13	7	6	11	2	3	4	15	14	8	26	19	10	18

Appendix C: Dutch Instructions and Questionnaires

INSTRUCTIES CONTROLE GROEP

"Mijn naam is Wendy en ik studeer de Master 'Economics and Business: Behavioural Economics' aan de Erasmus Universiteit in Rotterdam. Op dit moment ben ik bezig met mijn master scriptie en daarvoor heb ik informatie nodig. Ik zou graag een korte vragenlijst met jullie willen afnemen, dat mij waardevolle informatie verstrekt. Als je niet wilt deelnemen, geef het dan alsjeblieft aan. Het is erg belangrijk dat jullie vanaf dit moment niet meer met elkaar praten. Als je een vraag hebt, steek dan je hand op en ik zal naar je toekomen. In de vragenlijst die ik jullie zo ga geven, wordt gevraagd om een aantal tokens te verdelen tussen jezelf en een andere willekeurige student die ook meedoet aan dit spel. Je speelt vijf verschillende spellen. Bij elk spel is het aantal tokens dat je ontvangt en kan verdelen verschillend. In het eerste spel krijg je 20 tokens dat je kan verdelen, in het tweede spel 40, in het derde spel 60, in het vierde spel 80 en in het laatste spel 100. Zoals ook wordt uitgelegd in de vragenlijst zal er een persoon in de klas willekeurig worden gekozen als de winnaar. Een computer programma genaamd 'random.org' zal dit doen. De keuze van deze student zal werkelijkheid worden voor één van de spellen. De computer zal ook beslissen welk spel dit is. Als een winnaar krijg je het aantal tokens waarvoor je hebt gekozen om zelf te houden en een andere student zal het aantal krijgen waarvoor je gekozen hebt om weg te geven. Deze andere student zal ook willekeurig worden gekozen. Elke token heeft een waarde van 10 eurocent. Merk op dat het belangrijk is dat je een verdeling van de tokens kiest wat echt jouw voorkeur heeft omdat er een kans is dat je keuze werkelijkheid wordt. Als je geld wint in het spel, zal je vanavond een email ontvangen met de vraag om je rekeningnummer op te sturen. Als je zelf geen rekeningnummer hebt, kan je die van je ouders sturen. Zodra ik deze informatie ontvangen heb, zal ik het geld overmaken naar je bankrekening. De leraar zal bevestigen dat ik het geld heb overgemaakt. Ik zal hem/haar een screenshot laten zien van het overgemaakte bedrag, maar hij/zij zal niet te weten komen wie de winnaar is. Je hoeft je naam niet op de vragenlijst te schrijven. Niemand zal je beslissing te weten komen. Lees de instructies zorgvuldig en steek je hand op als iets niet duidelijk is in de vragenlijst en ook als je klaar bent met het invullen van de vragenlijst. Ik zal ze nu gaan uitdelen."

HAND-OUT CONTROLE GROEP

Email:_____

Bedankt voor je deelname in dit spel. In dit spel word je gevraagd om een hoeveelheid tokens te verdelen tussen jezelf en een andere student die ook aan dit spel meedoet. Er zijn vijf spellen. In elk spel zal je een verschillend aantal tokens kunnen verdelen tussen jezelf en een andere student. In het eerste spel krijg je 20 tokens dat je kan verdelen, in het tweede spel 40, in het derde spel 60, in het vierde spel 80 en in het laatste spel 100. Eén student in deze klas zal willekeurig worden gekozen als de winnaar. Als jij de winnaar bent, zal je keuze van één van de spellen werkelijkheid worden. De computer zal bepalen welk spel dit is. Als een winnaar krijg je het aantal tokens waarvoor je hebt gekozen om dit zelf te houden en een andere willekeurig gekozen student zal het aantal krijgen waarvoor je hebt gekozen om weg te geven. In elk spel is de waarde van een token gelijk aan 10 eurocent. Merk op dat het belangrijk is om je echte voorkeur op te geven, aangezien het mogelijk is dat je keuze echt wordt uitbetaald.

Spel 1

Je krijgt 20 tokens dat je kunt verdelen tussen jezelf en een andere student. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 20.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Spel 2

Je krijgt 40 tokens dat je kunt verdelen tussen jezelf en een andere student. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 40.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Spel 3

Je krijgt 60 tokens dat je kunt verdelen tussen jezelf en een andere student. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 60.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Spel 4

Je krijgt 80 tokens dat je kunt verdelen tussen jezelf en een andere student. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 80.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Spel 5

Je krijgt 100 tokens dat je kunt verdelen tussen jezelf en een andere student. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 100.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

INSTRUCTIES TREATMENT GROEP

"Mijn naam is Wendy en ik studeer de Master 'Economics and Business: Behavioural Economics' aan de Erasmus Universiteit in Rotterdam. Op dit moment ben ik bezig met mijn master scriptie en daarvoor heb ik informatie nodig. Ik zou graag een korte vragenlijst met jullie willen afnemen, dat mij waardevolle informatie verstrekt. Als je niet wilt deelnemen, geef het dan alsjeblieft aan. Het is erg belangrijk dat jullie vanaf dit moment niet meer met elkaar praten. Als je een vraag hebt, steek dan je hand op en ik zal naar je toekomen. In de vragenlijst die ik jullie zo ga geven, wordt gevraagd om een aantal tokens te verdelen tussen jezelf en een andere willekeurige student die ook meedoet aan dit spel. Je kan verschillende hoeveelheden tokens verdienen. Het aantal tokens dat je verdient hangt af van hoe goed je presteert bij een opgave. Ik zal de opgave nu uitleggen aan de hand van een voorbeeld. De opdracht bestaat uit het decoderen van letters tot getallen. Elk letter correspondeert met een nummer. In dit voorbeeld correspondeert elke letter met een nummer gebaseerd op hen positie in het alfabet. Het corresponderende nummer voor A is 1, voor B is 2, voor C is 3 etc. Het hele alfabet met corresponderende nummers is weergegeven op het boord. *Laat figuur 1 op het boord zien voor de klas.* Je wordt gevraagd om een zes-letter woord te decoderen. Een voorbeeld van een woord is decode. De D correspondeert in dit geval met een 4, de E met een 5, de C met een 3, de O met een 15, de D met 4 en de E met 5. Het antwoord op deze vraag is dan 4-5-3-15-4-5. Begrijpt iedereen het? *Uitleg herhalen als het niet duidelijk is.*

Jullie zullen verschillende versies van decodeer schema's krijgen. De A hoeft dus niet noodzakelijk te corresponderen met een '1'. Het kan ook corresponderen met een '5' of een '20'. Zoals ik al zei, het aantal tokens dat je krijgt hangt af van hoe goed je de taak uitvoert. Als je 1 tot 5 vragen goed hebt, zal je 20 tokens krijgen om te verdelen. Als je 5 tot 10 vragen goed hebt, zal je 40 tokens krijgen om te verdelen. Als je 10 tot 15 vragen goed hebt, zal je 60 tokens krijgen om te verdelen. Als je 15 tot 20 vragen goed hebt, krijg je 80 tokens om te verdelen. Als je meer dan 20 vragen goed hebt, krijg je 100 tokens om te verdelen. Dit schema is ook weergegeven op de vragenlijst. Voordat je begint met de taak, wil ik dat je je alle mogelijke scenario's voorstelt en opschrijft hoeveel tokens je voor jezelf houdt en hoeveel tokens je aan een andere persoon geeft. Zoals ook wordt uitgelegd in de vragenlijst zal er een persoon in de klas willekeurig uitgekozen worden als de winnaar. Een computer programma genaamd 'random.org' zal dit doen. De relevante keuze, gebaseerd op het aantal goed beantwoorde vragen, van deze student zal werkelijkheid worden. Als een winnaar krijg je het aantal tokens waarvoor je hebt gekozen om zelf te houden en een andere student zal het aantal krijgen waarvoor je gekozen hebt om weg te geven. Deze andere student zal ook willekeurig worden gekozen. Elke token heeft een waarde van 10 eurocent. Merk op dat het belangrijk is dat je een verdeling van het de tokens kiest wat echt jouw voorkeur heeft omdat er een kans is dat je keuze werkelijkheid wordt. Als je geld wint in het spel, zal je vanavond een email ontvangen met de vraag om je rekeningnummer op te sturen. Als je zelf geen rekeningnummer hebt, kan je die van je ouders sturen. Zodra ik deze informatie ontvangen heb, zal ik het geld overmaken naar je bankrekening. De leraar zal bevestigen dat ik het geld heb overgemaakt. Ik zal hem/haar een screenshot laten zien van het overgemaakte bedrag, maar hij/zij zal niet te weten komen wie de winnaar is. Je hoeft je naam niet op de vragenlijst te schrijven. Niemand zal je beslissing te weten komen en niemand zal te weten komen hoe je hebt gescoord op de taak. Lees de instructies zorgvuldig en steek je hand op als iets niet duidelijk is. Na 10 minuten zal ik de vragenlijsten ophalen. Ik zal ze nu gaan uitdelen."

HANDOUT TREATMENT GROEP

Email: _____

Bedankt voor je deelname in dit spel. In dit spel word je gevraagd om een hoeveelheid tokens te verdelen tussen jezelf en een andere student die ook aan dit spel meedoet. Je kan tokens winnen met het uitvoeren van een simpele taak. Het aantal tokens dat je krijgt hangt af van hoe goed je scoort op de taak. Een student in deze klas zal willekeurig uitgekozen worden als de winnaar. Als jij de winnaar bent, zal je keuze realiteit worden. Als een winnaar krijg je het aantal tokens waarvoor je hebt gekozen om zelf te houden en een andere student zal het aantal krijgen waarvoor je gekozen hebt om weg te geven. De waarde van een token is gelijk aan 10 eurocent. Merk op dat het belangrijk is dat je een verdeling van het de tokens kiest wat echt jouw voorkeur heeft omdat er een kans is dat je keuze werkelijkheid wordt.

De taak: je taak is om letters te decoderen naar nummers. Elke letter staat voor een specifiek nummer. Schrijf het nummers op die corresponderen met de letters. Hier volgt een voorbeeld:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Figuur 1. Voorbeeld decodeer taak

VRAAG	**ANTWOORD**
Decodeer de volgende rij:	
D – E – C – O – D – E	4 – 5 – 3 – 15 – 4 – 5

Voor elke vraag die je goed hebt, krijg je 1 punt. In de tabel hieronder vind je het aantal punten dat correspondeert met het aantal tokens dat je verdient.

Punten (totaal aantal vragen goed)	Tokens
1 – 5	20
5 – 10	40
10 – 15	60
15 – 20	80
20 of meer	100

Stel je voor je hebt 1 – 5 vragen goed. Je verdient 20 token. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 20.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Stel je voor je hebt 5 – 10 vragen goed. Je verdient 40 token. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 40.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Stel je voor je hebt 10 – 15 vragen goed. Je verdient 60 token. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 60.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Stel je voor je hebt 15 – 20 vragen goed. Je verdient 80 token. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 80.

Ik houd _____ tokens voor mijzelf en ik geef _____ tokens weg.

Stel je voor je hebt 20 of meer vragen goed. Je verdient 100 token. Geef alsjeblieft hieronder aan hoe je de tokens zou verdelen. Merk op dat de som van de twee gelijk moet zijn aan 100.

Ik houd_____ tokens voor mijzelf en ik geef _____ tokens weg.

VRAAG	**ANTWOORD**
G – Y – M – L – E – S	__ – __ –__ –__ –__ –__
B – E – G – R – I – P	__ – __ –__ –__ –__ –__
D – O – N – D – E – R	__ – __ –__ –__ –__ –__
J – O – K – E – R – S	__ – __ –__ –__ –__ –__
H – A – N – D – E – L	__ – __ –__ –__ –__ –__
U – P – D – A – T – E	__ – __ –__ –__ –__ –__
L – E – S – U – U – R	__ – __ –__ –__ –__ –__

Z – U – I – V – E – L	__ – __ –__ –__ –__ –__
N – U –M – M – E – R	__ – __ –__ –__ –__ –__
B – U – D – G – E –T	__ – __ –__ –__ –__ –__
I – J – S – B – O – X	__ – __ –__ –__ –__ –__
G – A – D – G – E – T	__ – __ –__ –__ –__ –__
B – A – N –K – J – E	__ – __ –__ –__ –__ –__
D – O – K – T –E – R	__ – __ –__ –__ –__ –__
L – Y – C – E – U – M	__ – __ –__ –__ –__ –__
M – A – R – K – E – R	__ – __ –__ –__ –__ –__
R – E – C – T – O –R	__ – __ –__ –__ –__ –__
F – A – C – T – O – R	__ – __ –__ –__ –__ –__
T – E – K – E – N – S	__ – __ –__ –__ –__ –__
K – A – R – T – E – L	__ – __ –__ –__ –__ –__
S – C – H – E – T – S	__ – __ –__ –__ –__ –__
V – A – L – U – T – A	__ – __ –__ –__ –__ –__
E – X – P – O –R – T	__ – __ –__ –__ –__ –__
K – E – N – N – I – S	__ – __ –__ –__ –__ –__
D – U – U – R – S – T	__ – __ –__ –__ –__ –__
C – E – N – T - E – N	__ – __ –__ –__ –__ –__
W – A – A – R – D –E	__ – __ –__ –__ –__ –__
E – F – F - E – C – T	__ – __ –__ –__ –__ –__
C – O – U – P – O – N	__ – __ –__ –__ –__ –__
V – U – L – P – E – N	__ – __ –__ –__ –__ –__

Appendix D: Descriptive statistics per class

Table 7. Descriptive statistics control group

ClassID	Game1	Game2	Game3	Game4	Game5
V4B					
Obs.	11	11	11	11	11
Mean	0.48	0.47	0.40	0.38	0.36
Std. Dev.	0.265	0.228	0.189	0.179	0.186
V4E					
Obs.	24	24	24	24	24
Mean	0.36	0.34	0.32	0.27	0.25
Std. Dev.	0.222	0.245	0.244	0.246	0.200
V4F					
Obs.	30	30	30	30	30
Mean	0.38	0.35	0.29	0.33	0.27
Std. Dev.	0.217	0.247	0.228	0.279	0.231
Total					
Obs.	65	65	65	65	65
Mean	0.39	0.37	0.32	0.31	0.28
Std. Dev.	0.228	0.244	0.228	0.252	0.213

Table 8. Descriptive statistics treatment group

ClassID	Game1	Game2	Game3	Game4	Game5
V4C					
Obs.	12	12	12	12	12
Mean	0.33	0.33	0.34	0.33	0.32
Std. Dev.	0.131	0.113	0.103	0.103	0.120
V4G					
Obs.	22	22	22	22	22
Mean	0.36	0.33	0.31	0.27	0.27
Std. Dev.	0.310	0.294	0.275	0.255	0.247
V4H					
Obs.	26	26	26	26	26
Mean	0.29	0.27	0.26	0.26	0.24
Std. Dev.	0.186	0.210	0.211	0.222	0.206
Total					
Obs.	60	60	60	60	60
Mean	0.32	0.31	0.29	0.28	0.27
Std. Dev.	0.230	0.230	0.221	0.216	0.208

Appendix E: Additional analysis: selection bias

This section will elaborate further on the possible cluster effects. As described in section 5.2.3, The z-statistic of the Mann-Whitney U test increased for each game without the classes V4B and V4C. This suggests that the differences between the donations in the treatment and the control group are larger in the classes that voluntary participated in the experiment. To test if the donations between the 'during break time' group was different from the donations of the 'during teaching hours' group, a Mann-Witney U test is performed. This test tests if there are significant differences between the donations done by the group that participated in the break and the group that participated during teaching hours for each game. The test is performed ten times, for each of the five games and within the control and the treatment group. The z-statistics of these tests are shown below. There is a significant difference in giving between the two groups for game two at the 5% confidence interval. At the 10% confidence interval, there is a significant difference in the amount that is given away for the last four games of the control group. There are no significant differences in donations done between the subjects that voluntary participated and were in the treatment group and the classes that participated during class hours and were in the treatment group.

Table 9. Z-statistics of the Mann-Whitney U test

Game	Control	Treatment
1	0.1089	0.6648
2	0.0477	0.2459
3	0.0697	0.1377
4	0.0950	0.1175
5	0.0800	0.1029

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