DIFFERENCES IN SOCIAL PREFERENCES TOWARDS FRIENDS AND STRANGERS

ERASMUS UNIVERSITY ROTTERDAM
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Bachelor Thesis [Economie & Bedrijfseconomie]

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"How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortunes of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it."
—Adam Smith (1759)

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Abstract

The aim of this study is to investigate how social preferences towards friends differ from social preferences towards strangers. It does so by using quantitative data obtained by means of questionnaires conducted at a secondary school. The questionnaires consist of modified dictator games with varying relative prices and modified dictator games in which the subjects implicitly give money a certain valuation by choosing a certain allocation. The results indicate that when charitableness is cheap, people seem to be kinder, and when it is expensive, they seem to be unkinder. Furthermore, charitableness towards friends does not differ from charitableness towards strangers. This holds for all relative prices. Concerning enviousness, people seem to display envy towards both friends and strangers. Moreover, envy towards friends does not differ from envy towards strangers.

Keywords: social preferences; charity; envy; friends; strangers.

Acknowledgements

With great pleasure I hereby present my bachelor thesis. I am glad to finish the last three years with this thesis and I enjoyed doing the experiment and writing the thesis. I have learned a lot from it. It also aroused my interest in the field of the behavioural economics; I now consider doing a master in behavioural economics. However, the thesis was a challenge for me, as I never did an experiment myself before and I never wrote a thesis before, let alone in English. Fortunately, I was not on my own in this and I would like to thank the people who were involved.

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1 Introduction

A classical assumption in almost all economic models is that people are purely selfish; they do not care about social goals (Fehr & Schmidt, 1999). However, experimental evidence suggests that people do not only care about their own payoff but also about the payoff of other people. Two thought experiments by Frank (2007) about absolute and relative sizes of a house and absolute and relative vacation times illustrate that people do indeed care about relative consumption, although in some domains this is more evident than in others. Furthermore, Kahneman, Knetsch and Thaler (1986) show that "even profit-maximising 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 transaction and punish unfair firms at some cost to themselves." Rees (1993) illustrates that worker satisfaction is highly influenced by wages of others: utility goes down when wages of others go up. This is in contrast with the neoclassical wage theory, which suggests that a worker's utility is based on only his own wage and his own hours of work.

The abovementioned examples illustrate that people are not purely driven by self-interest, but that their utility function depends, apart from on their own payoff, on the payoff(s) of other people. That is, people have social preferences.

It is supposable that one's social preferences are not the same towards any other person. Kinzler and Spelke (2011) investigated, by means of experiments, whether or not infants show different social preferences for people differing in race. This was not the case for 10-month-old and 2.5-year-old infants. Namely, when 10-month-old white infants were offered identical toys by both a white and a black individual, they accepted toys about equally from both individuals. And when 2.5-year-old white infants were given the opportunity to give a present to either a white individual or a black individual, they gave presents about equally to the two individuals. 5-year-old children, on the other hand, did show different social preferences for people differing in race. To be more specific, they demonstrated own race-based social preferences in the sense that white 5-year-old children would prefer to be friends with white individuals rather than the black individuals. Additionally, these children thought that the white 10-month-old infants would choose to accept toys from the white person rather that the black person. Kinzler and Spelke therefore concluded that social preferences based on race emerged between 2.5 and 5 years of age. In their discussion, Kinzler and Spelke noted that the difference in race-based preferences could have been caused by grouping the world into in-groups and out-groups. This means that group identity could have caused the difference in social preferences found towards people differing in race.

Besides the research that has been done by Kinzler and Spelke, more research has been done on differences in social preferences depending on group identity. For example, Chen and Li (2009) investigated if social preferences towards in-group members are different from social preferences towards out-group members. In order to do so, they have made use of laboratory experiments. In-groups were indicated as "groups we identify with" and out-groups as "ones we do not identify with" (Chen & Li, 2009). They induced group identity by using participant artwork preferences. Chen and Li then let the participants play some games in order to enhance group identity. After this, the effects of group identity on three aspects of social preferences were examined. The first aspect was distribution preferences. It was found that “participants exhibit charity (envy) when their match receives a lower (higher) payoff than themselves. Their charity (envy) towards an ingroup match is significantly greater (less) than that towards an outgroup match.” (Chen & Li, 2009). The second aspect they investigated was reciprocity preferences. They found that “participants are more likely to reward an ingroup member’s good behavior but less likely to punish an ingroup member’s misbehaviour.” (Chen & Li, 2009). The third aspect of social preferences they investigated was social welfare maximization (SWM) behaviour. Chen and Li (2009) found that “participants are significantly more likely to choose SWM actions when matched with an ingroup member.” In short, these findings indicate that the participants were more altruistic towards an in-group match than towards an out-group match.

Group identity also plays a roll regarding friends and strangers. Namely, a person is more likely to identify oneself with a friend than with a stranger. Accordingly, friends can be seen as in-group members and strangers as out-group members. In the light of the experiment of Chen and Li, this suggests that people are more altruistic towards friends than towards strangers.

This study will investigate whether or not this is indeed the case.
Research question:

How do social preferences towards friends differ from social preferences towards strangers?

This paper will be followed by theory about (modified) dictator games that will be used in order to answer the hypotheses. Also the Fehr-Schmidt model will be explained, as that model will later be linked with the results found in this study. Quantitative data obtained by means of questionnaires will be used. The games used in the questionnaires will be explained as well as the procedure that has been followed to take the questionnaires. Thereafter, for part of the data, it will be checked whether it follows a normal distribution or not and depending on the answer, either an independent samples t-test or a Mann-Whitney U test will be used to answer some of the hypotheses. For the other part of the data, differences between averages will be calculated first, after which the data will also be checked for normality. Based on the answer, either the independent samples t-test or the Mann-Whitney U test will be used again in order to answer the last hypothesis. The results found will be linked with the Fehr-Schmidt model. This will be followed by a discussion, in which limitations of this study are mentioned as well as suggestions for future research, and a conclusion will be drawn.

2 Theoretical framework

2.1 Original dictator game

The original dictator game was developed by Forsythe, Horowitz, Savin, & Sefton (1994). In this game, the dictator gets to divide a certain amount of money between themself and another subject, which will be called “the other person” from now on. For every euro that the dictator gives away the other person receives exactly one euro. The game can be illustrated by the formula $\pi_s + \pi_o = m$ in which m indicates the amount of money which is to be divided by the dictator, π_s is the part that the dictator keeps themself and π_o represents the amount that the dictator gives away to the other person (Andreoni & Miller, 2002).

2.2 Modified dictator games

Andreoni and Miller (2002) did an experiment in which they introduced modified versions of the original dictator game. Their experiment consists of two parts.

In the first part of the experiment, they examined whether preferences for altruism are consistent with the axioms of revealed preference. For this purpose, they introduced modified dictator games in which the dictator again receives an amount of money and has to choose how much, if any, is to be given away, just like the original dictator game. However, it is not always the case now that the other person receives exactly one euro if the dictator would give away one euro. Rather, the euros the other person receives for the euros the dictator gives away vary across decisions. That is, the game is played for different relative prices of giving. Besides using different relative prices of giving, Andreoni and Miller used variations in the amount of money the dictator got to divide. The modified dictator games described can be illustrated by the formula $\pi_s + p\pi_o = m$. As can be seen, p is added to the formula compared to the formula of the original dictator game. If p is greater than one, it is expensive to give as that would mean that the other person receives less than one euro if the dictator would give away one euro. Similarly, if p is smaller than one, it is cheap to give and if p is equal to one, it is neither expensive nor cheap to give. Note that the other components of the formula (π_s, π_o, m) remain the same as in the original formula (Andreoni & Miller, 2002).

Andreoni and Miller (2002) let subjects fill in the blanks in decision problems, such as "divide 60 tokens: Hold _ at 1 point each, and Pass _ at 2 points each." The subjects were told that each point was worth $0.10. Andreoni and Miller let each of the decision problems differ in the number of tokens to be divided and the number of points a token is worth to each subject. That is, they let the amount of money to be divided and the relative price of giving vary across decisions. In total there were five different numbers of tokens to be divided and seven different relative prices.

In the second part of the experiment, Andreoni and Miller (2002) tested the supposition that preferences might be non-monotonic as well as whether there is some rational jealousy. With rational jealousy, people are acting jealous in some consistent way that takes the context of the situation into account. In order to test this, Andreoni and Miller (2002) let subjects decide how many cents each token would be worth (from 0 to 10 cents each) when the subjects were assigned allocations of tokens. They let subjects fill in five decision problems, such as "Divide 140 tokens: Hold 10 at 1 point each, and Pass 130 at 1 point each. How many cents should each point be worth? (circle one) 0 1 2 3 4 5 6 7 8 9 10." This decision problem has assignments of hold and pass quantities of (10,130). For the other four decision problems the assignments were (20,110), (50,50), (110,20), and (130,10). Thus for five decision problems, subjects had to choose between 10 different allocations of money. Furthermore, all tokens were worth one point each in every decision.

2.3 Standard theory versus social preferences

Standard theory predicts zero offers to the other person and a maximum valuation of money in all five decision problems. The dictator's utility could then be displayed by: $U_s = f(\pi_s)$, meaning that the utility of the dictator is a function that does not depend on the other person's payoff. Rather, it only depends on ones own payoff.

However, experiments typically demonstrate deviations from pure selfishness in both positive and negative directions. An example of a deviation from pure selfishness in positive direction is the typical finding in standard dictator games that dictators give an average of about 25% (Andreoni & Miller, 2002; Andreoni & Vesterlund, 2001; Forsythe et al., 1994). That suggests that people in fact do care about payoff of others (positively or negatively); that people have social preferences. To take this into account, the payoff to the other person has to be included in the utility function of the dictator: $U_s = f(\pi_s , \pi_o)$. The formula shows that utility is a function that depends on both ones own and on the other person's payoff.

2.4 Fehr-Schmidt model

If people give away money in (modified) dictator games like the game Andreoni and Miller (2002) used in the first part of their experiment, it appears that they dislike receiving more than others. That is, it seems that they display advantageous inequality aversion. Furthermore, the games Andreoni and Miller (2002) used in the second part of their experiment could indicate if people display inequality aversion. Namely, if a dictator choses to value money less than maximal so that one does not maximize one's own payoff as well as the payoff of the other person but chooses for a less unequal distribution of money, then the dictator also does not like inequality. As this part of the experiment consists of games in which the dictator receives more than the other person as well as games in which the dictator receives less, advantageous inequality aversion as well as disadvantageous inequality aversion could be indicated in this part of the experiment.

A model that captures this feature is the Fehr-Schmidt (FS) model, a model that assumes inequality aversion. When there are only two players involved, the model can be displayed as follows:

$U_s(x_s , x_o) = x_s - \alpha_s \max\{x_o - x_s,0\} - \beta_s \max\{x_s - x_o,0)$ where α_s and β_s represent the subject's aversion towards disadvantageous inequality and aversion towards advantageous inequality respectively. The model assumes $\beta_s \leq \alpha_s$ and $0 \leq \beta_s < 1$. The first assumption means that having less than others is worse than having more than others.

2.5 Measures for social preferences

In this study, it will be investigated whether social preferences towards friends differ from social preferences towards strangers. As mentioned before, Chen and Li (2009) used three aspects of social preferences to measure social preferences: distribution preferences, reciprocity preferences and SWM behaviour. The measure for social preferences in this study will be one of these three aspects, namely: distribution preferences. Since distribution preferences consist of both charity and envy according to Chen and Li, both of these elements will be taken into account.
Someone is assumed to be charitable if one gives away money when getting an amount of money to be divided between oneself and another person. Someone is assumed to be envious if one chooses on average allocations of money that give them less in absolute terms when moving to less advantageous distributions.

2.6 Hypotheses

2.6.1 Charity

Chen and Li (2009) found that charity towards an in-group match is significantly greater than towards an out-group match. As friends can be seen as in-group members and strangers as out-group members, this might also hold for friends and strangers.

Hypothesis 1:
Charity towards friends is greater than charity towards strangers

Hypothesis 1 will be accepted if it is found that people give more money to friends than to strangers if they get the opportunity to share money.

Andreoni & Vesterlund (2001) tried to answer the question “which is the fair sex?” by means of a modified dictator game with varying incomes and prices, which was originally conducted by Andreoni and Miller (2002) as mentioned in Section 2.2. Andreoni and Versterlund (2001) found that men are more altruistic when altruism is cheap and women are more altruistic when it is expensive. Does charity towards friends and strangers also depend on prices?

Hypothesis 2:
Whether charitableness towards friends or towards strangers is greater- depends on prices

Hypothesis 2 will be accepted if the amounts given away to friends differ from those to strangers depending on prices.

2.6.2 Envy

Andreoni and Miller (2002) found that 23% of their subjects have preferences that, while convex, are not monotonic. This means that some people are jealous and are willing to give up some of their own payoff in order to reduce the payoff of another. Chen and Li (2009) found that envy towards an in-group match is significantly less than that towards an out-group match. As friends can be seen as in-group members and strangers as out-group members, this might also hold for friends and strangers.

Hypothesis 3:
Envy is stronger towards strangers than towards friends

Hypothesis 3 will be accepted if the effect of choosing allocations of money that give people less in absolute terms when moving to less advantageous distributions is significantly greater towards friends than towards strangers.

3 Data & methodology

The research method applied in this study is empirical research, using quantitative data obtained by means of questionnaires made the experimenter. The questionnaires were conducted at the secondary school “Dalton Lyceum Barendrecht” in two fourth grade classes and two fifth grade classes, all pre-university secondary education classes. Since the students at this school are Dutch students, the instructions were given in Dutch. Please refer to Appendix A for the English translation of the questionnaire and Appendix B for original Dutch questionnaire. The questionnaires in the Appendices are the questionnaires given to only one of the two treatment groups, the strangers group. However, the games are the same in both treatment groups. The difference lies in that subjects got different instructions based on the treatment group the subjects got. This will be explained later.

3.1 The games in this study

The questionnaire contains two parts. Part one of the questionnaire consists of three games in which subjects were given the opportunity to share money between themselves and another person. These games are similar to the games Andreoni and Miller (2002) used in the first part of their experiment, which are already explained in Section 2.2. In this section it is also explained that these modified dictator games can be illustrated by the formula $\pi_s + p\pi_o = m$.
In this study, the study that investigates the differences between social preferences towards friends and strangers, the dictator got to divide 10 euros in all three games. That is, $m = 10$ in all three games. Furthermore, the relative prices of giving were 1, 2 and 0.5 in games 1, 2 and 3 respectively. That is, p takes the values 1, 2 and 0.5. Consequently, in game 1 it was neither expensive nor cheap to give, in game 2 it was expensive and in game 3 it was cheap.

Part two of the questionniare consists of five games in which subjects were given the opportunity to reduce the difference between their own payoff and someone else’s payoff and at the same time reducing the amount of money for their own. These games are similar to the games Andreoni and Miller (2002) used in the second part of their experiment, which are already explained in Section 2.2.

In this study, the study that investigates the differences between social preferences towards friends and strangers, the same five decision problems (as the decision problems of Andreoni and Miller) were presented to the subjects: assigments of (13,1), (11,2), (5,5), (2,11) and (1,13) where the amounts are in euros. In the first two games the subject received an amount greater than the other person, in the third game the subject received exactly the same as the other person and in the last two games the subject received less than the other person. Thus, games 1 and 2 are advantageous games for the subject, game 3 is a neutral game and games 4 and 5 are disadvantageous games for the subject. Furthermore, subjects had to choose between five different allocations of money per game. By choosing a certain allocation, subjects implicitly gave money a certain valuation. If the subject chose for the allocation that gives both the subject and the other person the maximum amount possible, then the subject “chose” to value 1 euro exactly 1. The four other allocations give less to both the subject and the other person. If the subject chose for the allocation that yields the second largest amounts to both themself and the other person, they valued 1 euro for 0.75. Chosing for the middle allocation means valuing 1 euro for 0.50, chosing the allocation giving even less than that to both the subject and the other person means valuing 1 euro for 0.25 and chosing the allocation that gives the least to both, (0;0), means valuing 1 euro for 0.

3.1.1 Differences with the games of Andreoni and Miller

The games used in this study differ notably in several aspects from the games of Andreoni and Miller (2002). Between the three games in part one of the questionnaire in this study and the games in part one of the experiment of Andreoni and Miller, there are four notably differences. First, instead of tokens euros were used. Second, the dictator got to divide the same amount of money in all games instead of five different amounts. Third, only three relative prices were used instead of seven. Fourth, whereas dictators could choose any division in the game of Andreoni and Miller, there were restricted options as only five divisions per game could be chosen in this study.

Between the five games in part two of the questionnaire in this study and the games in part two of the experiment of Andreoni and Miller, there are two notably differences. First, instead of tokens euros were used. Second, whereas Andreoni and Miller let the subjects choose between 10 different allocations of money per decision problem, this game let subjects choose between only five different allocations of money per decision problem.

The reasons for the abovementioned simplifications of the modified dictator games of Andreoni and Miller are practical contraints, in particular the restriction on time.

There are still other differences between the games of Andreoni and Miller (2002) and the games in this study. The decision problems got presented in a different way to the subjects than Andreoni and Miller did. While Andreoni and Miller presented the decision problems in words, in this study the decision problems were presented visually to the subjects (and also in words in part one). The reason for this is that the subjects in fourth grade and fifth grade classes probably understand it better visually. Furthermore, Andreoni and Miller told the subjects “the experimenter would choose one of the decision problems at random and carry it out with another randomly chosen subject as the recipient.” In this way, if a subject gets chosen, this subject will get the tokens they chose for themselves, if any, and the tokens the other person chose for this subject, if any, for the game that has been picked out. In this way, giving anything away when the relative price of giving is greater than one is quite pointless.

To illustrate why giving for a relative price greater than one is quite pointless, suppose that two players, called player 1 and player 2, both have the option to either keep everything or to give something for a relative price greater than one and that both players will play an equilibrium strategy. The assumption is being made that people either do not care about others (in which case they will always keep everything) or do not care more about others than about themselves. Both players have to take into account the strategy of the other player. If player 2 would keep everything, player 1’s best response is to keep everything as well. If player 2 would give something, it is not so clear what player 1 would do. Keeping everything would then lead to a somewhat unequal final allocation. Whether or not player 1 gives something depends on his advantageous inequality aversion; and given that it is inefficient to give for a relative price greater than one, player 1’s advantageous inequality aversion has to be strong in order to give something. Assuming that player 1’s advantageous inequality aversion does not outweigh the inefficiency of giving, player 1’s best response is again to keep everything, in which case keeping everything is a dominant strategy for player 1. As player 2 gets to make the same considerations given the strategy of player 1, keeping everything is a dominant strategy for player 2 as well. This results in there being one Nash Equilibrium: both players keep everything. If the assumption that player 1’s advantageous inequality aversion does not outweigh the inefficiency of giving is not met, but if the other way around is true, player 1’s best response is to give something if player 2 gives something. Player 2 again gets to make the same considerations given the strategy of player 1. In that case, there will be two Nash Equilibria: one being that both players keep everything and the other that both players give something. The question then is which equilibrium will be selected. As the equilibrium that both players keep everything is payoff dominant, this equilibrium will probably be selected. Consequently, both players will probably choose to keep everything, even they could not coordinate their choices.

For this reason, there was only one decision maker in the games in this study: the study that investigates the differences in social preferences towards friends and strangers. This resulted into there being only one dictator and one receiver per couple (instead of two of both) and the aforementioned potential problem was thus eliminated.

3.2 Explanations

3.2.1 Incentives

In order to give the subjects an incentive to choose what they really prefer and not just choose something to be done with it quickly, all choices they made had a chance to be paid out with real

money.
Per class, one game got chosen randomly. This is the game that was going to be paid out with money. Furthermore, this game was paid out to only one match (so to two persons in each class). Who these two persons were, was also chosen randomly.
One of the two was the decision maker, which was also determined randomly. If a participant was the decision maker, this participant received the amount of money that they kept, and the other one received the amount that the decision maker gave away. If a participant was not the decision maker, this participant received the amount the decision maker gave away, and the decision maker got the money they kept.

3.2.2 Strangers treatment and friends treatment

The main goal of this study is to investigate differences in social preferences towards friends and strangers. This means that social preferences towards both friends and strangers need to be measured separately. In the four secondary school classes that participated in the survey the students got to choose where to seat themselves (in groups of two). Therefore, a student probably considers a student sitting next to them more of a friend and less of a stranger than a randomly drawn student in the classroom who is not the student sitting next to them. Consequently, in this study students sitting next to each other are called friends and students not sitting next to each other are called strangers. Note that strangers in this study are only relative strangers: students not sitting next to each other are strangers relative to students sitting next to each other.

In order to be able to measure social preferences towards strangers, a "strangers treatment" was conducted. Students that got this treatment were being told the following: "You will be matched with a student in this classroom who is not the student sitting next to you." Similarly, in order to be able to measure social preferences towards friends, a "friends treatment" was conducted. Students that got this treatment were being told: "You will be matched with a student in this classroom that is with 50% chance the student sitting next to you and with 50% chance a student who is not sitting next to you." Because of these differences in matching between both treatments, the expected social distance between the two students who got matched is greater in the strangers treatment than in the friends treatment. Of the two students that were the ones paid out at the end, one student would get to know what the other person chose if the other person would be the decision maker and if the student would figure this out (which one does if one receives an amount of money one did not choose to keep for oneself). As both students have a chance to become the decision maker, they both have a chance that the other person would get to know their choices; this could influence their choices. In the strangers treatment, this is no problem as students do not know who they get matched with. Students may figure out what the other person chose, but they do not know who the other person is. In the friends treatment, however, it would be a problem if students got matched with the student sitting next to them with 100% chance. Namely, students may figure out the choice of the other person and they would know that the other person is the student sitting next to them. This problem is limited by matching students with 50% chance with the student sitting next to them and 50% with a student who is not sitting next to them: students may still figure out the choice of the other person, but they cannot be sure anymore that the other person is the student next to them. Furthermore, as in both treatments one pair got paid out, this also required that they do not learn who else got paid. Section 3.2.5 explains how that was ensured.

3.2.3 Students sitting on their own

In both the friends treatment and the strangers treatment, if a student were to sit on their own, one got a different questionnaire from the rest of the participants. The difference lies in whom this student was matched with. In the strangers treatment, the student sitting on their own was being told: "You will be matched with a student in this classroom." As it does not matter whether or not someone is sitting next to someone in the strangers treatment, the results of the student sitting alone can still be used. If more than one student were to sit on their own they were simply placed next to each other, getting the normal questionnaire, and the results of all students can still be used as, again, who is sitting next to someone should not influence their decisions in the strangers group. A friend of the experimenter helped conducting the questionnaires. Also, she filled in a questionnaire at home so that a student sitting on their own in the friends treatment could be told: "You will be matched with a person in this classroom that is with 50% chance my friend, who has already filled in a questionnaire, and with 50% a student." In this way, the person sitting on their own in the friends treatment could still participate. However, the results of this subject cannot be used as the friend of the experimenter is not a friend to the subject. If more than one student were to sit on their own they got placed next to each other and got the normal questionnaire. However, the results cannot be used. This is for the reason that they did not choose to sit next to each other so they cannot be considered being friends.

3.2.4 Assignment of the treatments

As mentioned before, the questionnaires were conducted at four pre-university secondary education classes. Two of these classes are fourth grade classes and the other two classes are fifth grade classes. For each year, one of the two classes got the friends treatment and the other got the strangers treatment. The two fourth grade classes consist of 23 and 29 students and the two fifth grade classes of 22 and 27 students. It needed to be determined which class of each year got the strangers treatment and which class of each year got the friends treatment. On the one hand, the larger the classes are, the greater the expected social distance between students not sitting next to each other. This argues in favour of giving the strangers treatment to the larger classes. On the other hand, it might be safer in terms of not ending up with not enough data in the friends treatment to give the larger classes the friends treatment. This holds for the reason that more data will be lost in the friends treatment than in the strangers treatment if there are students that do not sit next to another student (as their results cannot be used in the friends treatment and can be used in the strangers treatment). Giving the larger classes the friends treatment would reduce the risk of ending up with not enough data in the friends treatment. Thus, there was a trade-off.

Before deciding whether the argument in favour of giving the stranger treatment to the larger classes or giving the friends treatment to the larger classes was considered to be more important, the teacher of the classes was asked if it is usual that several people sit on their own. Since he confirmed this, it was decided that the larger classes of each year would get the friends treatment and the smaller classes of each year would get the strangers treatment. Accordingly, the fourth grade class consisting of 29 students and the fifth grade class consisting of 27 students were given the friends treatment. The fourth grade class consisting of 23 students and the fifth grade class consisting of 22 students were given the strangers treatment.

3.2.5 Anonymity and verification

The subjects were asked to indicate their email addresses and were told that they will only be used to contact them in case they won. The participants who won were sent an email in the evening with the message that they won money and the question if they could give their bank account number. Once they gave their bank account number, the money was transferred to their bank account.
In this way, students did not know who they were matched with, meaning that they could not link a potentially observed choice to a particular student. That is, the questionnaire design had been made in a way so that there was anonymity between subjects.

However, since the experimenter got to know which choices belong to which student, there was no anonymity between the subjects and the experimenter. Letting someone else do the entire drawing and matching process could have solved this. However, the experimenter would not be able to supervise the way of conduct. Furthermore, as described in Section 3.3, three out of four test subjects indicated that it would not influence their decisions if they would know the experimenter. Consequently, being assured of a correct drawing and matching process was considered to be more important than anonymity between the subjects and the experimenter.

The participants were told that the teacher would verify that the protocol described in the questionnaires would be followed, but that the teacher does not get you know their choices. If there would be no verification of the teacher (or if they would not know there was), they could think that no money would be paid in the end since no one gets to know it anyways. As that could influence their choices, the teacher verified the protocol described (and they were told this). Thus, the teacher verified in each class that the game, two subjects and the decision maker were chosen randomly. This happened without the teacher getting to know the details so that he did not know what students were chosen. Also, anonymised screenshots of the money transfers were sent to the teacher so that he also verified the money transfers. In this way, there was verification without the teacher getting to know the choices of the students. Consequently, there was a balance between verification and anonymity between the subjects and the teacher.

3.3 Procedure

Feedback was collected from five people similar to the subjects and the procedure and questionnaires were optimised based on the feedback. Please refer to Appendix C for details.

As mentioned before, a questionnaire was filled in by a friend of the experimenter beforehand for the friends treatments, since a person sitting on their own has 50% chance to be matched with the friend of the experimenter in the friends treatment.

In order to be able to start the drawing and matching process in the hallway quickly, everything had been prepared in the hallway already before conducting the questionnaires. This is, a hat, a die, tickets with the numbers 1 to 8, tickets with the numbers 1 to 15 and tickets with the numbers 1 to 30.

In all four classes the students were explained the following before they got the questionnaires:
"I am Lonneke, I study Economics and Business economics at the Erasmus University in Rotterdam and I am in my third year now. This is a friend of mine: Lisa/Merel. To graduate, I have to write a long written essay, called a thesis. For my thesis I need certain data and I would like to gather the data by means of questionnaires. This is where your help would be more than welcome.
The questionnaires consist of little games in which you are asked how you would divide money between yourself and another person. One such game and one match, consisting of two persons in this classroom, will be chosen randomly. These two persons will be actually paid out the amount one of the two persons decided in this game. This payment is related to my school, so it has nothing to do with Dalton. It is anonymous, provided that you do not tell each other if you won any money. It is very important that during the questionnaire you do not communicate with anyone else. So please be quiet and do not use your mobile phone. If you do not follow these rules, unfortunately, you are not allowed to finish the questionnaire, which means that your chance of winning money disappears. Is anyone not willing to participate?"

Then, the questionnaires were handed out to the students. The questionnaires for the strangers groups and for the friends groups were given to the classes that got the strangers treatment and the friends treatment respectively. If a student was sitting on their own, the adjusted questionnaire was given to that person. If more students were sitting on their own, they were placed next to each other and got the normal questionnaires.
Also every student was given a ticket with a number on it. The students were sitting in groups of two. In every class, the student that was sitting in the back on the left was given the number one and the student next to student number one was given the number two. Moving one row forward, the student on the left was given the number three and the student on the right of student number three was given the number four. This was done for all rows in this column. For the next column, starting in the back again, the same procedure was followed: the left student got the lower number and the right student the higher number. This was done for all columns. If a person was sitting on their own, they were also given a number.

While the students filled in the questionnaires the experimenter wrote down in a scheme the way the students were seated. Also, the groups were numbered in this scheme. If a student was sitting alone or if students were placed next to each other in the friends treatment group, it was indicated on this scheme as these results cannot be used. By filling in this scheme, it was easier to determine which students belong to the group numbers that were chosen when a strangers match gets chosen randomly. Please refer to appendix D for the scheme.

Two treatments took place on the same day and the other two treatments took place on two different days. On the day that the two treatments took place, the drawing and matching process started in the second treatment after that the experimenter filled in the abovementioned scheme and while the subjects filled in the questionnaires. For the other two treatments, the drawing and matching process was also after that the experimenter filled in the abovementioned scheme and still during that the subjects filled in the questionnaires. It does not matter that in one class the matching and drawing process took place after the students filled in the questionnaires and in the other classes this was done during the questionnaires. This is for the reason that the timing of the drawing and matching process does not influence the outcomes hereof, so it should also not influence the decisions of the students. When the drawing and matching process took place still during the questionnaires, the friend of the experimenter was still in the classroom to answer potential questions of the students. She was explained the experiment, so she could give correct answers to questions.

In the drawing and matching process, the game, the two winning persons and the decision maker got chosen randomly. Please refer to Appendix E for the exact drawing and matching procedure that was followed for the strangers treatment and Appendix F for the procedure for the friends treatment. The teacher verified that the procedure explained to the students was followed without learning the details.
When everyone finished the questionnaire, the questionnaires were collected. And in the evening the two persons in each class that won were sent an email with the announcement that they won money and the question to send their bank account number. The teacher was not put on CC as that would reduce anonymity between the subjects and the teacher. It was calculated how much each winning person won and it was sent to them once the experimenter received their bank account number. Anonymised screenshots were sent to the teacher so that the teacher could confirm the payment. Furthermore, if a note had been made about people sitting on their own or people being placed next to each other in the friends treatment classes, the results of these students were removed.

3.4 Testing hypotheses

As already explained in Section 3.1, the questionnaire contains two parts. Part one of the questionnaire, consisting of three games, will be used in order to test the hypotheses about charity. Part two of the questionniare, consisting of five games, will be used in order to test the hypothesis about envy.
A significance level of 5% will be used in this study. This means that there is 5% chance to a type I error, which is the rejection of a null-hypothesis that should not be rejected. In other words, the test

states that there is an effect while in fact there is not. Differences found at the 10% level are weakly significant.

As the subjects in this study only had five possibilities per budget to choose from, there are basically five classes (that are ordered). However, the data will be treated as if it is from a continuous distribution. Namely, the subjects had a lot of possibilities to choose from, especially when combining the choices from the first three budgets (125 possibilities). Besides that, the choices that were given to the subjects are focal points, which would be drawn most if they had the possibility to choose any point on the budget. Thus, if the subjects had been free to choose any point on the budget the data would probably not be much different.

3.4.1 Charity

Hypothesis 1:

Charity towards friends is greater than charity towards strangers

For this hypothesis, the total amount given away per subject is of importance, irrespective of the relative prices. Therefore, the amounts given away for all three games will be added up per subject. Then, the means of the total amounts given away will be calculated per treatment. It then needs to be tested whether the total amounts given away are greater in the friends treatment than in the strangers treatment.

To be able to test this, an appropriate test needs to be used. Which test is appropriate depends on the distribution of the total amounts of money students gave away per treatment. For example, the common parametric tests require that the dependent variable be approximately normally distributed for each category of the independent variable (Cramer & Howitt, 2004). Thus, it will first be tested whether the total amounts given away are normally distributed for both the friends treatment and the strangers treatment.

In order to do so, the histogram, the normal Q-Q plot and the Boxplot of the total amounts given away per treatment will be visually inspected. Then, numerical methods: skewness and kurtosis indices, will be calculated. Skewness indicates how asymmetric a frequency distribution is. As a normal distribution is perfectly symmetrical, it has no skewness. Kurtosis catches the features of the tails of a frequency distribution. The normal curve has a kurtosis of zero; if a curve is more elongated or stubbier, kurtosis increases (Cramer & Howitt, 2004). Besides the graphical inspection and the numerical methods, a formal normality test will be performed: the Shapiro-Wilk test (Shapiro & Wilk, 1965). Compared with three alternative normality tests: the Kolmogorov-Smirnov test, Lilliefors test and Anderson-Darling test, the Shapiro-Wilk test is considered the most powerful one (Razali & Wah, 2011).

Whether or not it will be concluded that the total amounts given away are normally distributed for both treatments depends on a combination of the results found for the measures described above. The histogram, normal Q-Q plot and the Boxplot will give an indication of whether there is a normal distribution or not by visually inspecting it. If the histograms look like the typical bell-shaped normal curve, the observed values in the Q-Q plots are close to the expected normal values and the boxplots seems symmetrical, the data seem to be normally distributed. In the Shapiro-Wilk test, the null-hypothesis is that the population is normally distributed. Thus, if a p-value is found lower than 0.05, the null-hypothesis will be rejected. For the numerical method, the z-values for of skewness and kurtosis will be calculated and be compared with the critical z-values: -1.96 and +1.96. The null-hypothesis is again that the population is normally distributed. Thus, if the z-values found are smaller than -1.96 or greater than 1.96, the null-hypothesis will be rejected.

If the conclusion is that the total amounts of money subjects gave away is indeed normally distributed for both the friends treatment and the strangers treatment, a parametric test will be used in order to answer the hypothesis. To be more specific, the independent samples t-test will be used. An independent samples t-test is an appropriate test to measure whether two means of independent distributions differ significantly. It will thus test whether the means of the total amounts given away to friends and to strangers differ significantly form each other. This test requires that the dependent variable is measured on a continuous scale. As the data can be treated as if it is from a continuous distribution, this test is an appropriate test. However, it matters whether the variances of the populations from which the two samples are drawn are equal or not. It is also called “homogeneity of variance” if the population variances are equal. As the data is normally distributed, the parametric Levene’s test will be used to determine whether there is homogeneity of variance or not (Levene, 1960). The null-hypothesis of this test is that there is homogeneity of variance. If a p-value smaller than 0.05 is found, the null-hypothesis will be rejected, implying that there is no homogeneity of variances. If equal variances are found the equal variance t-test will be used. If unequal variances are found on the other hand, the unequal variance t-test will be used, sometimes called the “Welch Satterthwaite test” (Satterthwaite, 1946; Welch, 1938, 1947). The null-hypothesis in both t-tests is that there are no differences in the means of both groups. The test statistic of the t-test is t and that will be compared with the critical values -1.96 and +1.96. If a t-value smaller than -1.96 or greater than 1.96 is found, the null-hypothesis will be rejected, implying that charity towards friends is indeed greater than charity towards strangers (provided that the mean found in the friends treatment is greater than that found in the strangers treatment).

However, if it is concluded that the total amounts of money subjects gave away is not normally distributed for both the friends treatment and the strangers treatment, no parametric test will be used. Instead, a non-parametric test will be used. These tests do not make assumptions about the form of the population distribution, implying that normality is no necessity for these tests (Cramer & Howitt, 2004). The Mann-Whitney U (MW) test is a non-parametric test that can be used to test whether there are systematic differences in the dependent variable between two independent groups (Mann & Whitney, 1947). It does so by ranking the scores of the dependent variable and comparing the observed rank sum with the expected rank sum which is under the null-hypothesis that there are no systematically differences in the dependent variable between the two groups (Cramer & Howitt, 2004). This test only requires ordinal data. As the data is clearly ordered, this test is an appropriate test.

Before performing the test it will be tested whether there is homogeneity of variance. This is for the reason that the MW test assumes homogeneity variance (Mann & Whitney, 1947). As the data are non-normally distributed, the non-parametric Levene's test will be used (Levene, 1960). Again, the null-hypothesis of this test is that there is homogeneity of variance. If a p-value of smaller than 0.05 is found, the null-hypothesis will be rejected, implying that there is no homogeneity of variances. If it turns out that there is indeed homogeneity variance, the MW test will be performed. The test statistic of this test is z; if a z-value greater than 1.96 or smaller than -1.96 is found, the null-hypothesis that there are no systematic differences between both groups will be rejected. This implies that charity towards a friend is indeed greater than charity towards a stranger (provided that the mean found in the friends treatment is greater than that found in the strangers treatment).

Hypothesis 2:
Whether charitableness towards friends or towards strangers is greater- depends on prices

Whether charitableness towards friends or towards strangers is greater does indeed depend on prices if for certain relative prices people give more to friends and for other relative prices they give more to strangers. As games 1, 2 and 3 each have different relative prices, it needs to be determined whether people give more to friends or to strangers per game. First, the means of the amounts given away per game will be calculated per treatment. It then needs to be tested whether the amounts given away per game are greater in one treatment than in the other. In order to be able to do so, it first needs to be tested whether the amounts of money given away per game are normally distributed for both the friends treatment and the strangers treatment.

The procedure of testing the data for normality will be the same as the procedure followed in hypothesis 1. This also holds for testing homogeneity variance. Furthermore, if the data turn out to be normally distributed, the independent samples t-test will be used again; and if the data are not, the MW test will be used again.

Note about testing hypotheses 1 and 2: if it is found that some data sets are normally distributed and others are not, that is, for some data sets the independent samples t-test is the appropriate test and for others the MW test, both tests will be used for each data set. Thus, the MW test will then be added for normally distributed data and the independent samples t-test for non-normally distributed data. However, these tests will only be added for comparison purposes, as the interpretation is problematic given the violations of the assumptions behind the tests.

3.4.2 Envy

Hypothesis 3:
Envy is stronger towards strangers than towards friends

People display envy if their aversion towards having less than others, that is, towards disadvantageous inequality, is strong relative to their aversion towards having more than others, that is, towards advantageous inequality.

Envy is stronger towards strangers than towards friends if the differences between aversion towards advantageous and disadvantageous inequality are greater in the strangers treatment than in the friends treatment, provided that this is due to a strong aversion towards disadvantageous inequality instead of a weak aversion towards advantageous inequality. With a strong aversion towards disadvantageous inequality it is meant that the aversion towards disadvantageous inequality is stronger than that in the friends treatment.

As games 1 and 2 represent games with advantageous inequality and games 4 and 5 games with disadvantageous inequality, an average valuation below 1 over games 1 and 2 is a sign of aversion towards advantageous inequality and an average valuation below 1 over games 4 and 5 is a sign of aversion towards disadvantageous inequality. Thus, envy is stronger towards strangers if the differences between the average valuations over games 1 and 2 and the average valuations over games 4 and 5 are greater in the strangers treatment than in the friends treatment, provided that the average valuations over games 4 and 5 are smaller in the strangers treatment than in the friends treatment.

Consequently, the average valuations over games 1 and 2 as well as the average valuations over games 4 and 5 will be calculated for both treatments. Then, the differences between these average valuations will be calculated for both treatments. It then has to be determined whether these differences differ significantly. In order to be able to do so, the data will first be tested for normality. Based on the outcome, either an independent samples t-test will be performed or a MW test, provided that the assumption of homogeneity of variance is met. Only if it is found that the differences between the average valuations over games 1 and 2 and the average valuations over games 4 and 5 differ significantly between both treatments, it will be tested whether this is due to a strong aversion towards disadvantageous inequality instead of a weak aversion towards advantageous inequality. This will be done by testing whether the average valuations over games 4 and 5 are smaller in the treatment with the greater differences. In order to test this, the data will again first be tested for normality and based on the outcome, either an independent samples t-test will be used or a MW test, provided that the assumption of homogeneity of variance is met.

4 Results

As explained in Section 3.2.4, the fourth grade class consisting of 23 students and the fifth grade class consisting of 22 students were given the strangers treatment. As one student was not present in the former class there are 22 results for this class, and as five students were not present in the latter class there are 17 results for this class. This results in 39 results for the strangers treatment. The fourth grade class consisting of 29 students and the fifth grade class consisting of 27 students were given the friends treatment. In the class consisting of 29 students only 25 students were attendant. Furthermore, three students were sitting on their own so that two of them got placed next to each other. However, the results of all three students cannot be used (as explained in Section 3.2.3). As a consequence, there are results of 22 students in this class. In the class consisting of 27 students only 18 students were present and two students were sitting on their own so were placed next to each other, resulting in 16 results in this class. As a consequence there are 38 results for the friends treatment. Thus, the number of results in the strangers treatment is approximately the same as the number in the friends treatment (39 versus 38).

To be able to investigate differences in social preferences towards friends and strangers, it is important that the subjects in the friends treatment are similar to the subjects in the strangers treatment. Please refer to Appendix G for details that show that this is indeed the case.

4.1 Charity

As mentioned in Section 3.4.1, the amounts given away for all three games are summed up per subject. The histogram in figure 1 gives a visual presentation of the total amounts given away (the friends treatment and the strangers treatment taken together).

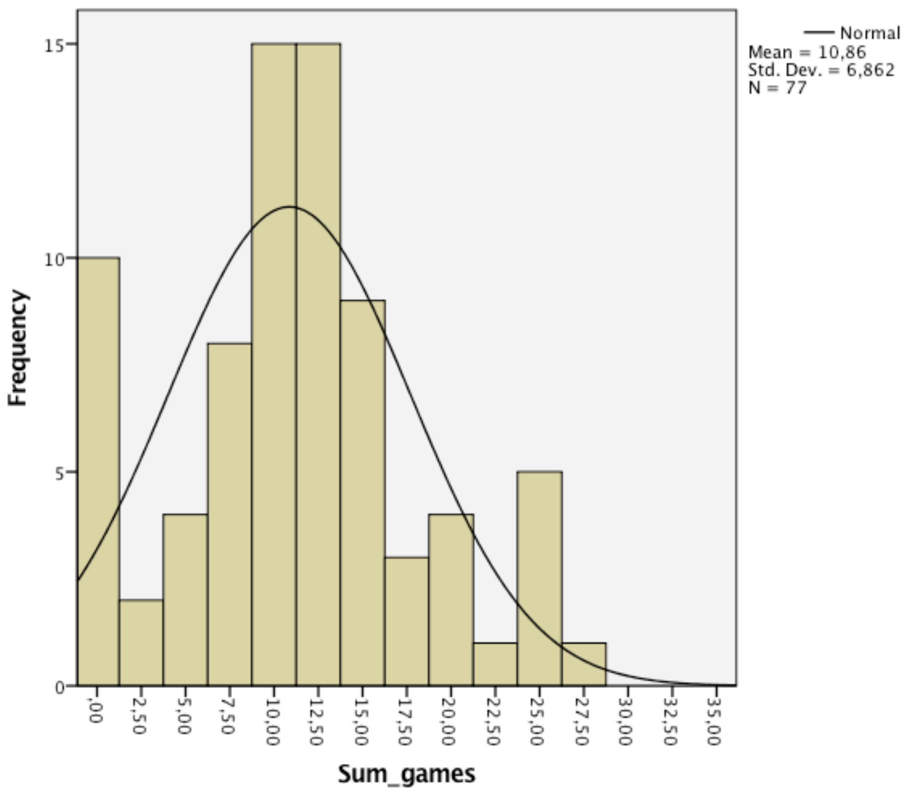


Figure 1: A histogram of the total amounts given away in the friends treatment and strangers treatment taken together

Figure 1 illustrates that 10 people out of 77 (±13%) keep all money to themselves. The rest of the subjects give away at least something in one of the games. On average, people give away 10.86 euros in total over the three games; the maximum amount that could be given away is 35 euros. That is, people give away on average approximately 31% over the three games. Furthermore, in game 1, where the relative price is one, people give away on average approximately 29%. As mentioned in Section 2.3, the typical finding in a standard dictator game is that about 25% is given away. As this percentage is quite similar to the abovementioned percentages found in this experiment, this experiment replicates the common finding quite well.

In table 1 below, the means and medians of the amounts given away per game as well as for the games taken together are indicated per treatment. This table includes additional information that will be explained at a later stage.

			Friends treatment		Strangers treatment			
Game	Amount to be divided (m)	Relative price (p)	Mean (sd)	Median	Mean (sd)	Median	t	z
1	10	1	2.57 (2.135)	2.50	3.21 (1.983)	2.50	-1.362 (0.177)	-1.329 (0.184)
2	10	2	1.05 (1.181)	0.63	1.38 (1.276)	1.25	-1.161 (0.249)	-1.130 (0.259)
3	10	0.5	6.45 (5.055)	5.00	7.05 (6.039)	5.00	-0.475 (0.636)	-0.149 (0.882)
1, 2 and 3			10.07 (6.393)	10.00	11.63 (7.290)	11.25	-1.003 (0.319)	-0.900 (0.368)

Table 1: Average amounts given away in both treatments for the different relative prices
t indicates the test statistic of the independent samples t-test, z indicates the test statistic of the MW test, the respective p-values are indicated in parentheses in the second line of the cells of these test statistics, the standard deviations are given in parentheses in the second line of the cells of the means.

Hypothesis 1:
Charity towards friends is greater than charity towards strangers

The subjects on average gave away an amount of approximately 10.07 euros to friends and 11.63 euros to strangers. As said before, the maximum amount they could have given away is 35 euros in which case they would keep 0 euros themselves. It seems that people give money away both to friends and to strangers and it seems that more money gets given away to strangers. The question is whether this difference is significant or not.

First, it needs to be determined whether the total amounts of money subjects gave away are normally distributed for both the friends treatment and the strangers treatment. Figures 1 and 2 show histograms of the total amounts given away in the friends treatment and strangers treatment respectively.

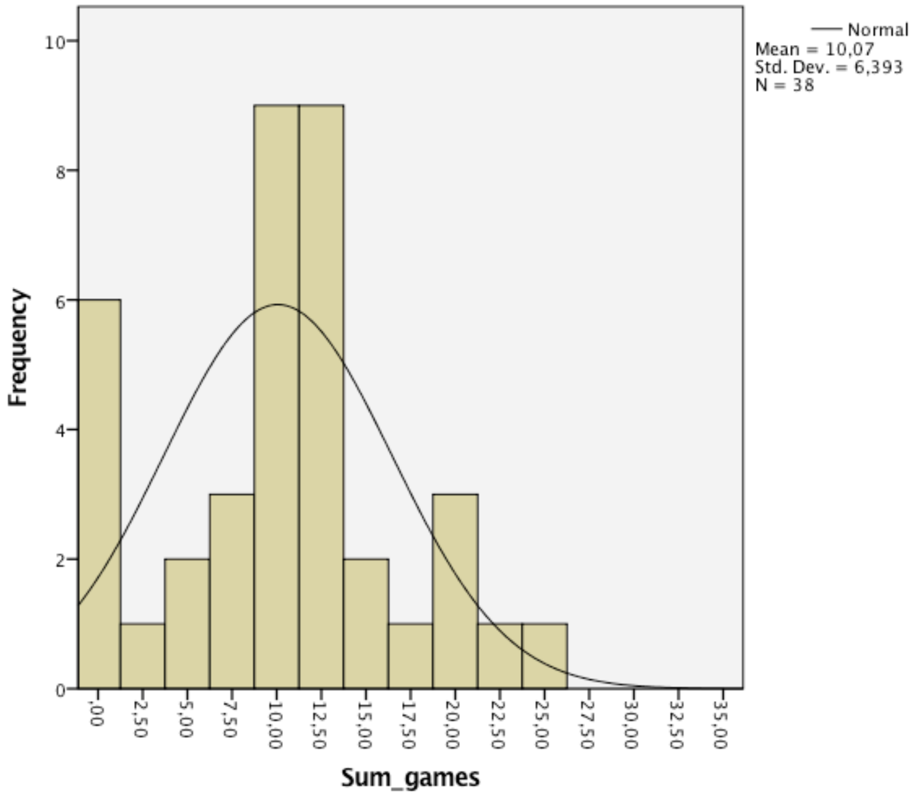


Figure 2: A histogram of the total amounts given away in the friends treatment

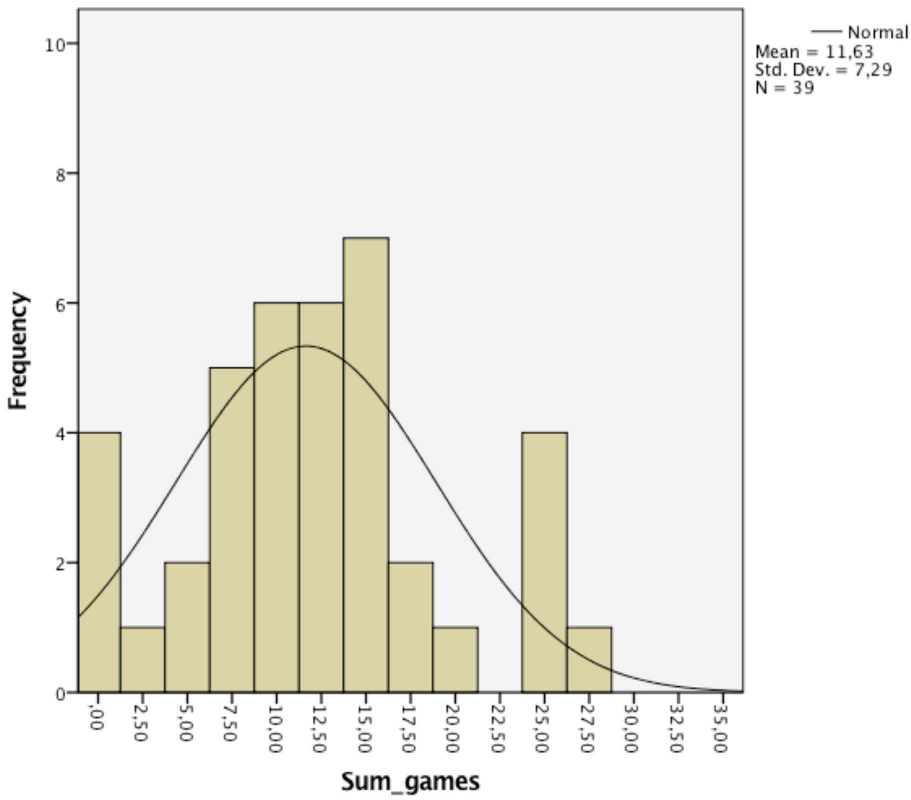


Figure 3: A histogram of the total amounts given away in the strangers treatment

It seems that the histograms follow approximately the bell shaped normal distribution (while in both figures there are outliers at the amount of money given away zero).

Please refer to figures 4, 5 and 6 in Appendix H for the normal Q-Q plots and boxplots of the total amounts given away for both the friends treatment and the strangers treatment. It can be seen that the observed values in the Q-Q plots are not far away from the expected normal values and that the boxplots seem quite symmetrical. Thus, based on a visual inspection, the data seem to be approximately normally distributed.

Furthermore, a skewness of 0.155 (SE=0.383) and a kurtosis of -0.110 (SE=0.750) has been found in the friends treatment, resulting in a skewness z-value and a kurtosis z-value of approximately 0.405 and -0.147 respectively. In the strangers treatment, a skewness of 0.405 (SE=0.378) and a kurtosis of -0.111 (SE=0.741) has been found, resulting in a skewness z-value and a kurtosis z-value of approximately 1.07 and -0.150 respectively. The z-vales are all neither smaller than -1.96 nor greater than 1.96, so the null-hypothesis that the population is normally distributed is not rejected based on this test.

The Shapiro-Wilk test gives p-values of 0.077 and 0.066 for the friends treatment and the strangers treatment respectively. Both these values are greater than the significance level 0.05, so the null-hypothesis that that the population is normally distributed is also not rejected based on this test.

Thus, the graphical inspection, the numerical method and the formal normality test do all not reject that the total amounts given away are normally distributed for both the friends treatment and the strangers treatment. As a consequence, the independent samples t-test will be used.

It first needs to be determined whether there is homogeneity of variance or not, so the parametric (as the data are normally distributed) Levene's test will be performed. A p-value of 0.404 is found, meaning that the null-hypothesis of equal variances is not rejected at the significance level of 0.05. Thus, the equal variance t-test will be performed.

The equal variance t-test gives a t-value of -1.003. As this is in the interval (-1.96,1.96), the null-hypothesis of no differences in the means of the friends treatment and the strangers treatment is not rejected. Thus, the mean of the total amounts subjects gave away to strangers (11.63) is not significantly greater than the mean of the total amounts subjects gave away to friends (10.07). That is, there is no significant difference in the charity towards friends and the charity towards strangers. As a consequence, hypothesis 1, charity towards friends is greater than charity towards strangers, is not accepted. As the MW test will be used for something else later, this test is included here for comparison. The MW test gives a similar conclusion: the null-hypothesis that there are no systematic differences between the amounts of money given to friends and to strangers is not rejected as a z-value of -0.900 is found.

Hypothesis 2:

Whether charitableness towards friends or towards strangers is greater- depends on prices

In table 1 at the beginning of this Section, it can be seen that for the relative price of giving 1, the means of the amounts given away to friends and to strangers are 2.57 and 3.21 respectively. For the relative price of giving 2, the means of the amounts given away to friends and to strangers are 1.05 and 1.38 respectively. And for the relative price of giving 0.5, the mean of the amounts given away to friends is 6.45 and that to strangers is 7.05. This means that for a relative price of 2, people give away on average approximately 24% of the maximum amount they can give away and for a relative price of 0.5, people give away on average approximately 34%. Compared with the experiment of Andreoni and Miller (2002), it is to be expected that the subjects in this experiment would give away a bit more than those of Andreoni and Miller, as the incentives given in this experiment are less strong. However, the finding of Andreoni and Miller still comes close to the finding in this experiment, as Andreoni and Miller found that people give a bit more than 20% of the maximum amount they can give for a relative price of 2 and a bit more than 30% of the maximum amount they can give for a relative price of 0.5.

It thus seems that people give away less money if it is cheap to give and more if it is expensive, both to friends and to strangers. It also seems that for all relative prices, people give more to strangers than to friends. The question is whether the difference in amounts given away to friends and to strangers is significant for each relative price.

It first needs to be determined for each relative price whether the amounts given away are normally distributed for both the friends treatment and the strangers treatment. Histograms of the amounts given away for a relative price of 1 can be found in figures 7 and 8 below.

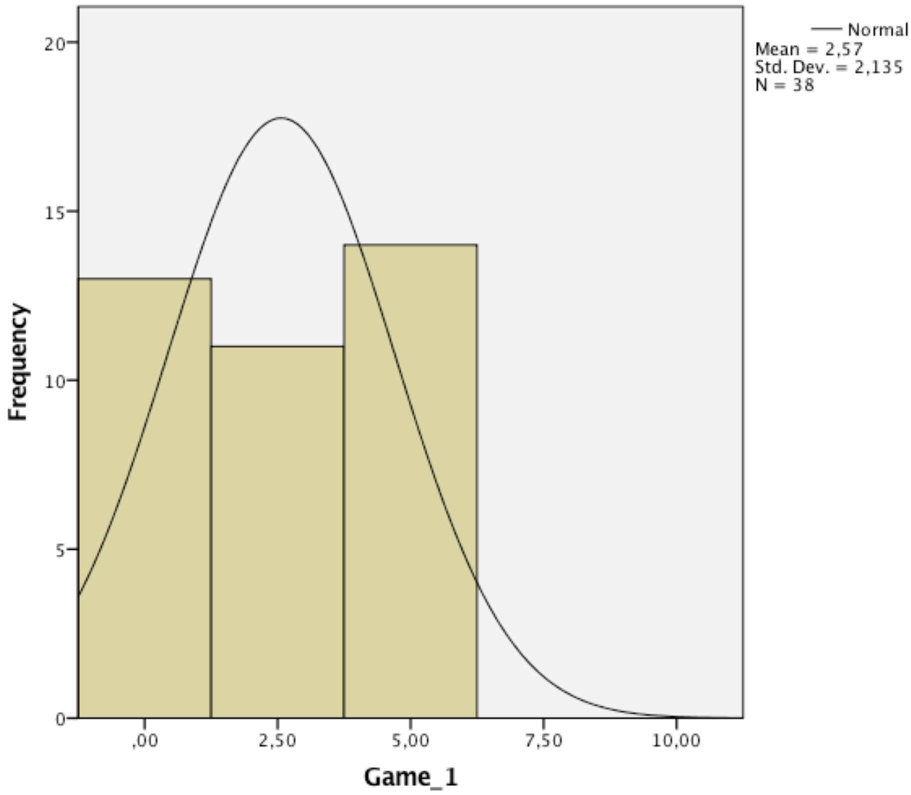


Figure 7: A histogram of the amounts given away in the friends treatment for a relative price of 1

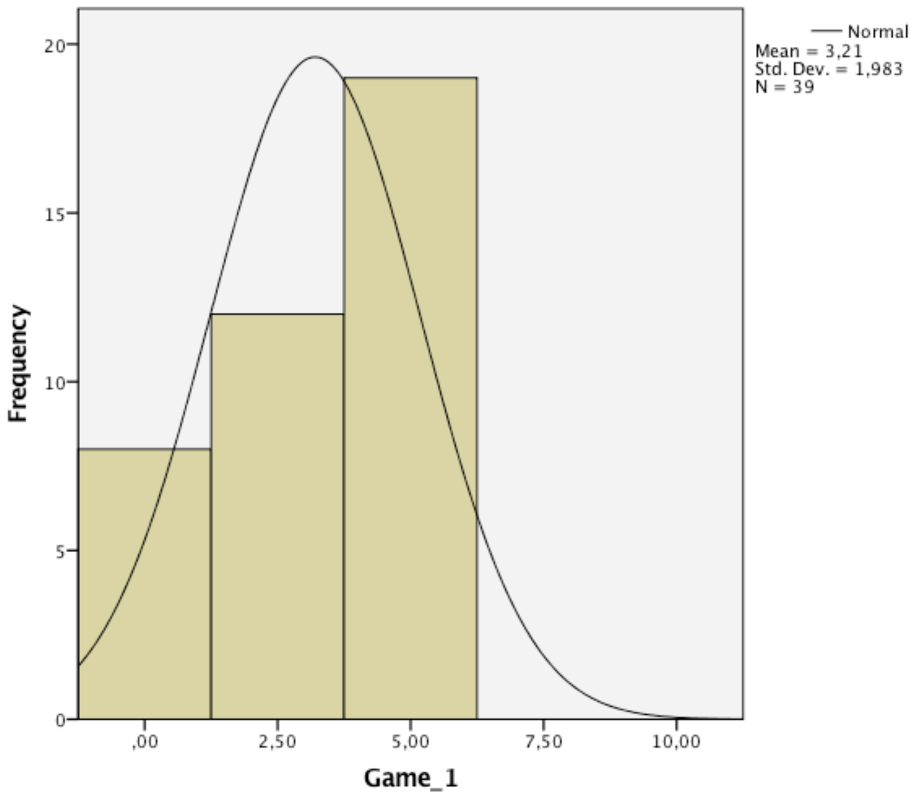


Figure 8: A histogram of the amounts given away in the strangers treatment for a relative price of 1

A visually inspection of the histograms already strongly suggests that these are probable not normal distributions, as the distributions display no typical bell shaped normal curve. Also, the normal Q-Q plots and the boxplots of both treatments differ from normality. Please refer to figures 9, 10 and 11 in Appendix H for the normal Q-Q plots and boxplots of the amounts given away for a relative price of 1 for both the friends treatment and the strangers treatment. The friends treatment has skewness of -0.052 (SE=0.383) and a kurtosis of -1.644 (SE=0.750), giving a skewness z-value and a kurtosis z-value of approximately -0.136 and -2.219. As only the kurtosis z-value does not lie in the interval (-1.96,1.96), the null-hypothesis that the population is normally distributed is rejected based on kurtosis but not on skewness for the friends treatment. The strangers treatment has skewness of -0.562 (SE=0.378) and a kurtosis of -1.169 (SE=0.741), giving a skewness z-value and a kurtosis z-value of approximately -1.487 and -1.578. As both z-vales are within the interval (-1.96,1.96), the null-hypothesis that the population is normally distributed is not rejected based on both kurtosis and skewness for the strangers treatment.

However, the Shapiro-Wilk test gives p-values 0.000 for both treatments, meaning that the null-hypothesis of a normally distributed population is rejected.

Even though a normally distributed population should not be rejected based on skewness in the friends treatment and on both skewness and kurtosis in the strangers treatment, it is concluded that the amounts of money given away for a relative price of giving of 1 are not normally distributed for both treatments. This is for the reason that the visual inspection of the distribution and the formal normality test showed that the amounts given away for a relative price of 1 are in fact not normally distributed for both the friends treatment and the strangers treatment.

It also needs to be determined whether the amounts given away for a relative price of 2 are normally distributed for both treatments. Figures 12 and 13 give a visual presentation of the amounts given away for a relative price is 2.

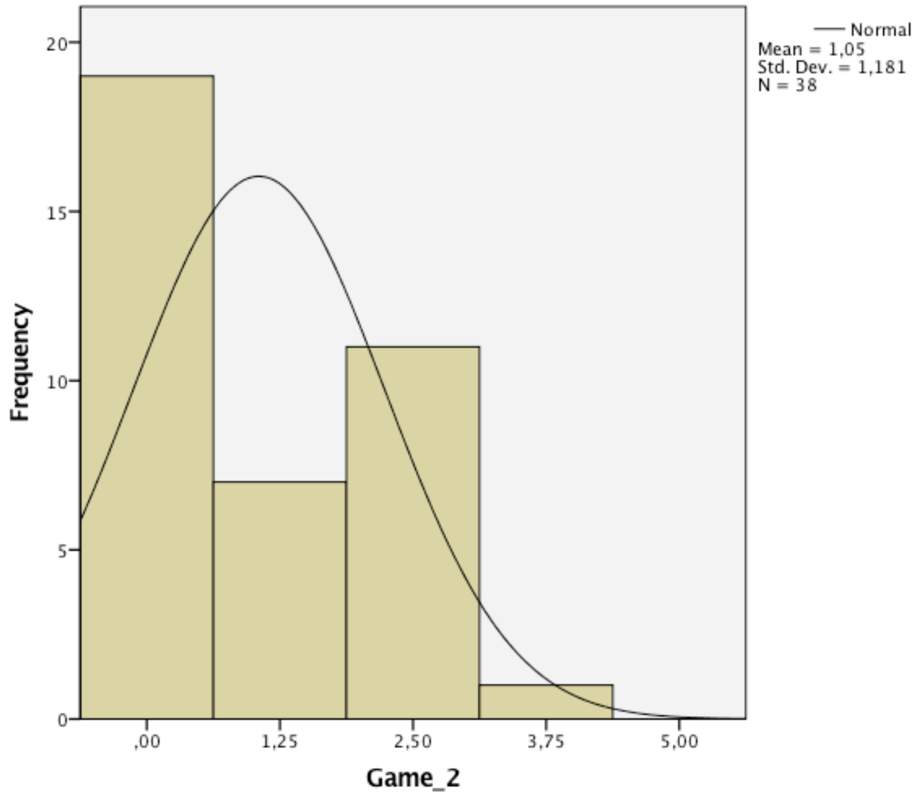


Figure 12: A histogram of the amounts given away in the friends treatment for a relative price of 2

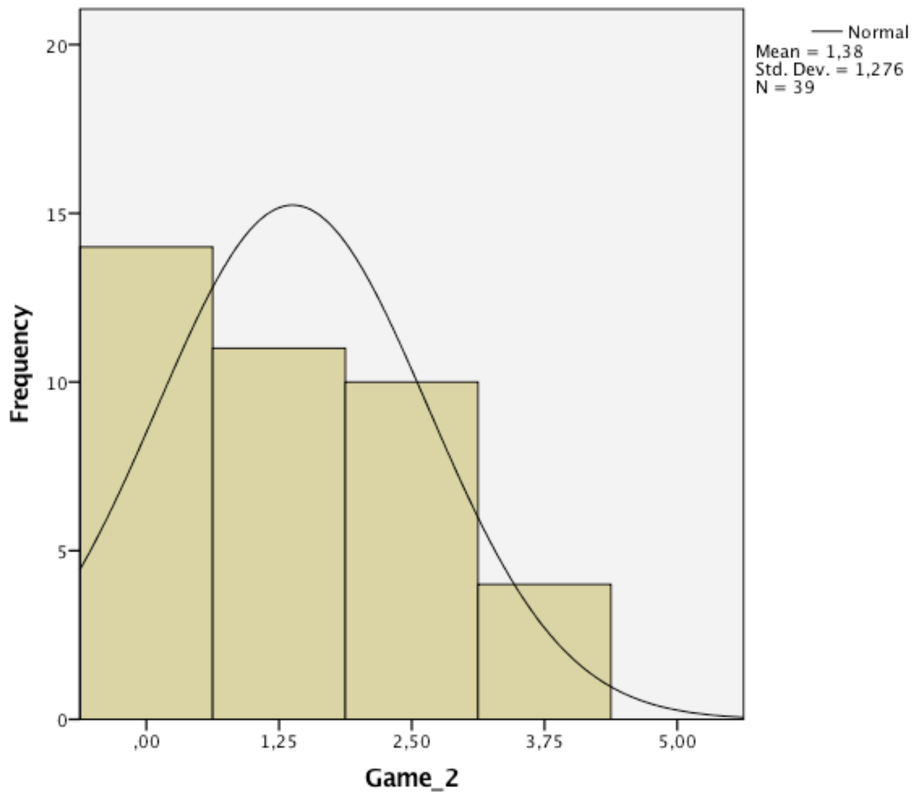


Figure 13: A histogram of the amounts given away in the strangers treatment for a relative price of 2

Again, the typical bell shape of a normal curve is hard to see in the histograms. However, the observed values are not very far away from the expected normal values in the normal Q-Q plots for both treatments. The boxplots, on the other hand, are not symmetrical. Please refer to figures 14, 15 and 16 in Appendix H for these figures. Skewness of the friends treatment is 0.534 (SE=0.383) and kurtosis of the friends treatment is -1.227 (SE=0.750), resulting in a skewness z-value and a kurtosis z-value of 1.394 and -1.636 respectively. In the strangers treatment, the skewness is 0.412 (SE=0.378) and the kurtosis is -1.008 (SE=0.741), giving skewness and kurtosis z-values of 1.090 and -1.360 respectively. As the z-values values are all in the interval (-1.96,1.96), the null-hypothesis that the population is normally distributed is not rejected based on both kurtosis and skewness for both treatments. The Shapiro-Wilk test gives p-values 0.000 for both treatments, meaning that the null-hypothesis of a normally distributed population is rejected.
Even though it is ambiguous, it is concluded that the amounts of money given away for a relative price of giving of 2 are not normally distributed for both treatments.

It remains to be determined whether the amounts given away for a relative price of 0.5 are normally distributed for both treatments. Histograms of the amounts given away for this relative price are shown in figures 17 and 18.

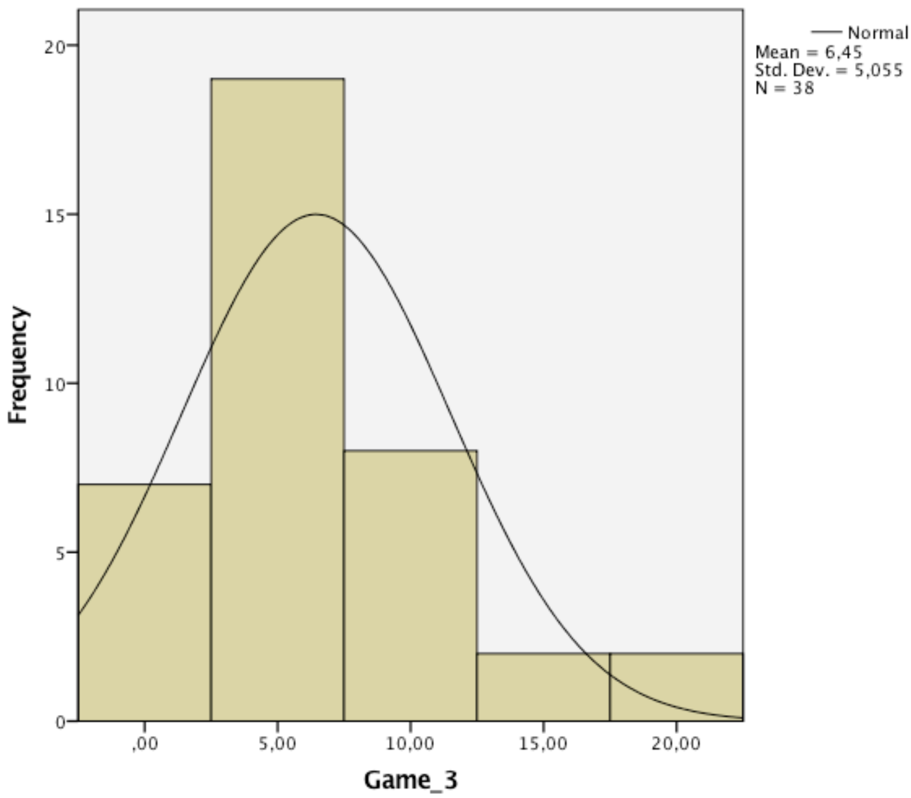


Figure 17: A histogram of the amounts given away in the friends treatment for a relative price of 0.5

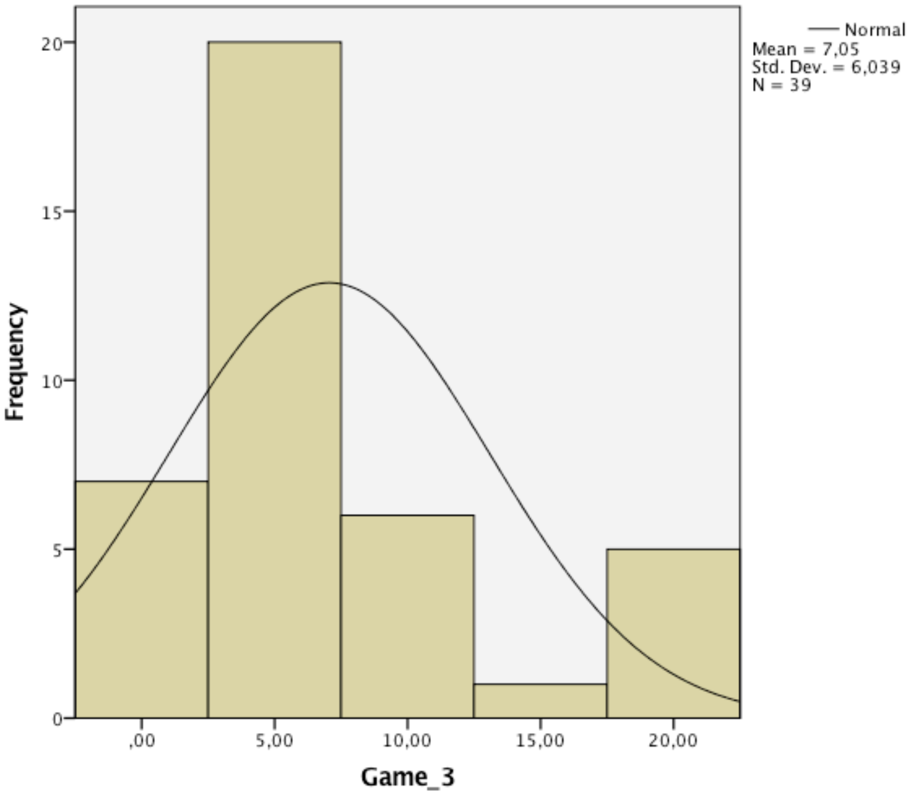


Figure 18: A histogram of the amounts given away in the strangers treatment for a relative price of 0.5

Even though both distributions do not perfectly display the typical bell shape of the normal curve, they are not undistinguishable from it. Also, the observed values in the normal Q-Q plots do not differ very much from the expected normal values in both treatments. However, the boxplots are not symmetric. Please refer to figures 19, 20 and 21 in Appendix H for these figures. Skewness in the friends treatment is 1.028 (SE=0.383) and kurtosis is 1.202 (SE=0.750), resulting in skewness and kurtosis z-values of 2.705 and 1.603. In the strangers treatment, skewness is 1.119 (SE=0.378) and kurtosis is 0.517 (SE=0.741), giving a skewness z-value of 2.960 and a kurtosis z-value of 0.698. As the skewness z-values in both treatments are not in the interval (-1.96,1.96) and the kurtosis z-values are, the null-hypothesis that the population is normally distributed is rejected only based on the skewness z-value for both treatments. The Shapiro-Wilk test gives p-values 0.000 for both treatments, meaning that the null-hypothesis of a normally distributed population is rejected.
Even though it is ambiguous again, it is concluded that the amounts of money given away for a relative price of giving of 0.5 are not normally distributed for both treatments.

Since for all three relative prices it is concluded that there is no normal distribution for both the friends treatment and the strangers treatment, the independent samples t-test cannot be used. Instead, the MW test will be used if the assumption of homogeneity of variance is met.

Thus, it will first be tested whether there is homogeneity of variance. This will be done with the non-parametric (as the data is non-normally distributed) Levene's test. For games 1, 2 and 3, p-values of respectively 0.928, 0.485 and 0.779 have been found. As all p-values are greater than the significance level of 0.05, the null-hypothesis of equal variances is not rejected. As a consequence, the MW test will be performed.

The MW test gives z-values of -1.329, -1.130 and -0.149 for game 1, game 2 and game 3 respectively. As the z-values are in the interval (-1.96,1.96), the null-hypothesis that there are no systematic differences between the amounts of money given to friends and to strangers is not rejected for each game. Thus, people do not give significantly more to strangers than to friends, as seemed for each relative price. That is, there is no significant difference in the charity towards friends and the charity towards strangers for each relative price. As a consequence, hypothesis 2, whether charitableness towards friends or towards strangers is greater- depends on prices, is not accepted. As the appropriate test for hypothesis 1 was the equal variance independent samples t-test, this test will be included here for comparison. The equal variance t-tests gives a similar conclusion: the null-hypothesis of no differences in the means of the friends treatment and the strangers treatment is not rejected for each game, as t-values of -1.362, -1.161 and -0.475 have been found for games 1, 2 and 3 respectively. The results of these tests, as well as the average amounts given away per treatment, can be found in table 1 at the beginning of this Section.

4.2 Envy

Hypothesis 3:

Envy is stronger towards strangers than towards friends

The average valuation of euros for each game is displayed in table 2 for both treatments.

	Game 1	Game 2	Game 3	Game 4	Game 5
Max. self allocation in euros	13	11	5	2	1
Max. other person allocation in euros	1	2	5	11	13
Average valuation of euros in the friends treatment (sd)	0.9539 (0.141)	0.9342 (0.171)	0.9803 (0.090)	0.8158 (0.327)	0.8289 (0.329)
Average valuation of euros in the strangers treatment (sd)	0.8910 (0.213)	0.8974 (0.196)	0.9551 (0.127)	0.8077 (0.311)	0.8205 (0.303)

Table 2: Average valuations of euros in both treatments

The standard deviations are given in parentheses in the second line of the cells of the average valuations.

In the friends treatment, the average valuation over games 1 and 2 is 0.9441 and the average valuation over games 4 and 5 is 0.8224, which is a difference of 0.1217. In the strangers treatment, the average valuation over games 1 and 2 is 0.8942 and the average valuation over games 4 and 5 is 0.8141, a difference of 0.0801. As people in both treatments on average seem to give a lower valuation in games 4 and 5 than in games 1 and 2, it seems that people display envy towards both friends and strangers. Furthermore, as the difference in average valuations seem to be greater in the friends treatment (0.1217) than in the strangers treatment (0.0801) it seems that the difference between aversion towards advantageous and disadvantageous inequality is greater in the friends treatment. The average valuation over games 4 and 5 seem to be almost the same for both treatments. It thus seems that the greater difference between aversion towards advantageous and disadvantageous inequality in the friends treatment is due to a high average valuation over games 1 and 2 instead of a low average valuation over games 4 and 5, that is, due to a weak aversion towards advantageous inequality instead of a strong aversion towards disadvantageous inequality. Consequently, in particular people seem to be less averse towards having more than their friend than towards having more than a stranger.

In order to be able to test whether the differences between the average valuations over games 1 and 2 and the average valuations over games 4 and 5 in the friends treatment are statistically different from those in the strangers treatment, it first needs to be determined whether the data are normally distributed for both treatments.

The Shapiro-Wilk test gives p-values 0.000 for both treatments, meaning that the null-hypothesis of a normally distributed population is rejected. Also, a graphical inspection of the figures 22 to 26 inclusive in Appendix H and the skewness z-values (5.642 in the friends treatment, 4.905 in the strangers treatment) and the kurtosis z-values (5.001 in the friends treatment, 8.615 in the strangers treatment) give the same conclusion. As a consequence, it is concluded that the differences between the average valuations in games 1 and 2 and the average valuations in games 3 and 4 are not normally distributed for both treatments.

Therefore, the MW test will be used if the assumption of homogeneity of variance is met. The non-parametric Levene's test gives a p-value of 0.754, which is greater than 0.05, meaning that the null-hypothesis of equal variances is not rejected. As a consequence, the MW test will be performed. The MW test gives a z-value of -0.166 (and a p-value of 0.868). As the z-value is in the interval (-1.96,1.96), the null-hypothesis that there are no systematic differences between the differences between the average valuations over games 1 and 2 and the average valuations over games 3 and 4 in the friends treatment and strangers treatment is not rejected. Consequently, it is not the case that the differences between aversion towards advantageous and disadvantageous inequality in the friends treatments differs significantly from those in the strangers treatment. That is, there is no significant difference in envy towards friends and strangers. As a consequence, hypothesis 3, envy is stronger towards strangers than towards friends, is not accepted.

5 Link with the Fehr-Schmidt model

In the FS model, α and β represent people's aversion towards disadvantageous inequality and aversion towards advantageous inequality respectively, as explained in Section 2.4. The results found in this study can be used to state something about these parameters.

In the second part of the experiment of this study, valuing money less than maximal for games 1 and 2 is a sign of advantageous inequality aversion, which would indicate that β is greater than zero. Valuing money for less than maximal for games 4 and 5 is a sign of disadvantageous inequality aversion, which would indicate that α is greater than zero. The lower the valuation of money in games 1 and 2, the greater the advantageous inequality aversion, that is, the greater β; the lower the valuation in games 4 and 5, the greater the disadvantageous inequality aversion, that is, the greater α. In this study it is found that for games 1 and 2 as well as for games 4 and 5 people on average seem to value money less than maximal, meaning that people seem to display both advantageous and disadvantageous inequality aversion. Furthermore, the valuation on average seems to be less for games 4 and 5 than for games 1 and 2, meaning that people's disadvantageous inequality aversion seems to be greater than their advantageous inequality aversion. This means that both α and β seem greater than zero and that α seems greater than β. Furthermore, as no differences have been found between the differences between aversion towards advantageous and disadvantageous inequality in the treatments, the differences between α and β in the friends treatment seems to be the same as in the strangers treatment.

In the first part of the experiment of this study, if people would give away no money they would have a payoff of 10 and the other person would have a payoff of zero, resulting in a difference in payoffs of 10. As it was found that people seem to give away money in all three games, making the difference between themselves and the other person smaller, people seem to display some kind of inequality aversion. However, the different price ratios bring in a kind of efficiency concern. If it is neither expensive nor cheap to give away money (relative price of 1) the average payoff to the other person is 2.89 and the average payoff people keep themselves is 7.11, resulting in a difference in payoffs of 4.22. If it is expensive to give (relative price of 2), the average payoff to the other person is 1.22 and the average payoff people keep themselves is 7.56, resulting in a difference in payoffs of 5.34. This shows that the difference in payoffs is greater if it is expensive to make the difference smaller. That is, people are willing to choose a more unequal distribution if it is expensive. It may be that people's inequality aversions get partly overwritten by inefficiency concerns when achieving equality is costly. If it is cheap to give on the other hand (relative price of 0.5), the average payoff to the other person is 6.75 and the average payoff people keep themselves is 6.63, resulting in a difference in payoffs of 0.12. Thus, the difference in payoffs gets smaller if it is cheap to do so (it is now even the case that the payoff people keep themselves is less than the payoff to the other person). Now the inequality aversion and efficiency concern seem to work in the same direction, both making the difference in payoffs for themselves and the other person smaller. Consequently, based on these games it can be stated that α seems to be greater than zero, but that efficiency concerns also play a role. As no differences have been found in the payoffs given away to friends and to strangers, their α's seem to be the same.

6 Discussion

Chen and Li (2009) found that "participants exhibit charity (envy) when their match receives a lower (higher) payoff than themselves. Their charity (envy) towards an ingroup match is significantly greater (less) than that towards an outgroup match." As friends can be seen as in-group members and strangers as out-group members, it was expected that charity would be greater towards friends than towards strangers and that envy would be less towards friends than towards strangers. However, no evidence for differences in charity towards friends and strangers has been found in this study. The same holds for envy: no evidence for differences in envy towards friends and strangers has been found.

The differences between the findings in this study and the findings in the study of Chen and Li could (partly) be caused by different information people have about friends and strangers. Concerning charity for example, if there are a lot of students who know that their friends (who they would be matched with with 50% chance in the friends group) have high incomes, information they do not have about strangers, they might be less charitable to friends than they would be if they did not have this information. Thus, if students would have the same information about friends as they have about strangers, they might be more charitable towards friends than towards strangers.
Another potential explanation of the difference in findings of this study and the study of Chen and Li is that Chen and Li induced group identity whereas friends can be seen as in-group members in a natural way and strangers as out-group members in a natural way. That is, a more every-day setting has been used in this study.

As Andreoni & Vesterlund (2001) found that men and women differ in altruism depending on prices (men are more altruistic when altruism is cheap and women are more altruistic when it is expensive), it was expected that charity towards friends and strangers also depends on prices. However, no evidence has been found for this.

Thus, no significant differences in charity and envy towards friends and strangers have been found in this study. Perhaps there is indeed not a big difference in people's attitude towards friends and strangers. If there are any differences, they are not overwhelming, because otherwise the experiment would have detected them. However, in order to check if the lack of significance persists or if there are actually some differences that still can be found when taking a closer look, the design could be improved. For example, stronger incentives could be used. Another option is to use real strangers instead of relative strangers. Namely, the ideal situation, in order to find evidence for the research hypotheses, would be that each pair in the friends treatment would be friends and each pair in the strangers treatment would be strangers. Each pair in the friends treatment is probably friends because the students chose to sit next to each other and they also had the option to sit on their own. For the strangers treatment, however, not each pair is strangers because relative strangers were used instead of real strangers. However, the design is as such that it causes the expected social distance between the pairs in the strangers group to be greater than in the friends treatment, which is enough for the results to be enlightening. Nonetheless, it could be that more evidence for the research hypotheses will be found if real strangers would be used instead of only relative strangers as that would make the difference in expected social distance between the pairs in the strangers treatment even greater. Another potential improvement in the design is implementing anonymity between the subjects and the experimenter. And if one wants to extrapolate the results of the study to the whole, for example, Dutch population, a representative sample of the Dutch population needs to be taken instead of using students at fourth and fifth grade classes at a secondary school.

The differences in this study that are noticeable when casually looking at the means or medians but are not significant (although some have p-values that are not far away from 0.1) are an indication that more research is required. If conducting a large-scale experiment with strong incentives, real strangers instead of relative strangers and anonymity between the subjects and the experimenter, those potential differences are something to look out for.

Besides only investigating the distributional preferences, it would be interesting to investigate differences in social preferences based on other aspects of social preferences. For example, Chen and Li (2009) measured social preferences by distributional preferences, as well as by reciprocity preferences and SWM behaviour. Concerning SWM, if it is for example the case that people matched with friends rather than with strangers are more likely to choose SWM actions, it would be good for firms, in terms of maximal social welfare, to invest in teambuilding. That is, turning “strangers” into “friends”. Please refer to Appendix I for a suggestion how to investigate reciprocity preferences.
It might also be interesting to investigate whether charity towards friends and strangers depends on different amounts of money to be divided as the amount someone gives away might depend on how much that person gets to divide. Andreoni and Miller (2002) and Andreoni and Versterlund (2001) already used different amounts to be divided in their games, but they did not use it to investigate the difference between charity towards friends and strangers. It would also be interesting to take into account the income of the subject and the subject’s expectation about the income of the person the subject will be matched with. Another suggestion for further research is to investigate how social preferences towards friends and strangers differ if the subjects did not get the money in the experiment, but when it would be out-of-pocket money.

7 Conclusion

Research question:

How do social preferences towards friends differ from social preferences towards strangers?

It has been found that people give away an amount of 10.07 euros on average to a friend if they have the opportunity to share money between themselves and a friend. The average amount given to a stranger is 11.63 euros. It thus seems that people display charity towards both friends and strangers. It also seems that the charity towards strangers is greater than the charity towards friends. The independent samples t-test (as well as the MW test), however, showed that this difference is not significant. Consequently, it is not the case that charity towards friends is significantly greater than towards strangers, but also not the other way around.

However, it could still be that there are significant differences per game. As the games consist of different relative prices, this means that it could be that people give more/less to friends/strangers when it is cheap/expensive to give. With the relative price of giving of 1, it is neither cheap nor expensive to give. It has been found that people give on average 2.57 to friends and 3.21 to strangers with this price. When it is expensive to give, with the relative price of 2, people give on average 1.05 to friends and 1.38 to strangers, which is on average approximately 24% of the maximum amount they can give away. When it is cheap to give on the other hand, with the relative price of 0.5, the average amount that gets given away to friends is 6.45 and to strangers this amount is 7.05, on average approximately 34% of the maximum amount they can give away. It thus seems that people give away less money if it is expensive to give and more if it is cheap, both to friends and to strangers. It also seems that for all relative prices, people give more to strangers than to friends. However, by performing MW tests (as well as independent samples t-tests), it was shown that this difference is not significant. Hence, whether charitableness towards friends or towards strangers is greater, does not depend on prices. In other words: it is not the case that people are more/less efficient towards either friends or strangers.

It has been found that in the friends treatment, the average valuation over games 1 and 2 is 0.9441 and the average valuation over games 4 and 5 is 0.8224, which is a difference of 0.1217. In the strangers treatment, the average valuation over games 1 and 2 is 0.8942 and the average valuation over games 4 and 5 is 0.8141, a difference of 0.0801. Thus, is seems that people display envy towards both friends and strangers. It also seems that the difference between aversion towards advantageous and disadvantageous inequality is greater in the strangers treatment and that this is due to a weak aversion towards advantageous inequality instead of a strong aversion towards disadvantageous inequality. In particular, people seem to be less averse towards having more than their friend than towards having more than a stranger. However, the MW test showed that the differences between aversion towards advantageous and disadvantageous inequality in the friends treatment does not differ significantly from those in the strangers treatment. Consequently, it is not the case that envy is stronger towards strangers than towards friends, but also not the other way around.

Based on these findings, it can be concluded that charitableness towards friends does not differ from charitableness towards strangers. This holds for all relative prices. Also, envy towards friends does not differ from envy towards strangers. Consequently, it seems that social preferences towards friends do no differ from social preferences towards strangers.

8 Bibliography

Andreoni, J., & Miller, J. (2002). Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism. *Econometrica, 70* (2), 737-753. doi: 10.1111/1468-0262.00302

Andreoni, J., & Vesterlund, L. (2001). Which is the Fair Sex? Gender Differences in Altruism. *The Quarterly Journal of Economics, 116* (1), 293-312. doi: 10.1162/003355301556419

Chen, Y., & Li, S. X. (2009). Group identity and social preferences. *The American Economic Review, 99* (1), 431-57. doi: 10.1257/aer.99.1.431

Cramer, C., & Howitt, D. (2004). *The Sage Dictionary of Statistics.* London, England: SAGE Publications Ltd.

Fehr, E., & Schmidt, K. M. (1999). A Theory of Fairness, Competition and Cooperation. *The Quarterly Journal of Economics*, *114* (3), 817–868. doi: 10.1162/003355399556151

Forsythe, R., Horowitz, J. L., Savin, N. E., & Sefton, M. (1994). Fairness in Simple Bargaining Experiments. *Games and Economic Behavior*, *6* (3), 347–369. doi: 10.1006/game.1994.1021

Frank, R. H. (2007). *Falling Behind: How Rising Inequality Harms the Middle Class.* Berkeley, California: University of California Press

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1986). Fairness and the Assumptions of Economics. *The Journal of Business*, *59* (4), S285-S300. doi: 10.1086/296367

Kinzler, K. D., & Spelke, E. S. (2011). Do infants show social preferences for people differing in race? *Cognition*, *119* (1), 1–9. doi: 10.1016/j.cognition.2010.10.019

Levene, H. (1960). Robust tests for equality of variances. In Contributions to Probability and Statistics: Essays in Honor of Harold Hotelling. *Stanford University Press*, 278-292. doi: 10.1002/bimj.19630050119

Mann, H. B., & Whitney, D. R. (1947). On a Test of Whether one of Two Random Variables is Stochastically Larger than the Other. *The Annals of Mathematical Statistics*, *18* (1), 50–60. doi: 10.1214/aoms/1177730491

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk , Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics, 2* (1), 21–33. doi:10.1515/bile-2015-0008

Rees, A. (1993). The Role of Fairness in Wage Determination. *Journal of Labor Economics*, *11* (1), 243–252. doi: 10.1086/298325

Satterthwaite, F. E. (1946). An Approximate Distribution of Estimates of Variance Components. *Biometrics Bulletin*, *2* (6), 110-114. doi: 10.2307/3002019

Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, *52* (3/4), 591-611. doi: 10.2307/2333709

Smith, A. (1759). *The theory of moral sentiments*. London, England: A. Millar.

Welch, B. L. (1938). The Significance of the Difference Between Two Means when the Population Variances are Unequal. *Biometrika*, *29* (3/4), 350-362. doi: 10.2307/2332010

Welch, B. L. (1947). The Generalization of 'Student's' Problem when Several Different Population Variances are Involved. *Biometrika, 34* (1/2), 28-35. doi: 0.2307/2332510

9 Appendices

Appendix A: English translation of questionnaire for the strangers group

Thank you for participating! It is very important that during the questionnaire, you do not communicate with anyone else. So please be quiet and do not use your mobile phone. If you do not follow these rules, unfortunately, you are not allowed to finish the questionnaire, which means that your chance of winning money disappears. If you have a question, please raise your hand and wait with asking your question until I am there to help. Once you completed the questionnaire, please also raise your hand and wait until I picked up your questionnaire. On your table, there is a ticket with a number on it. Please write down this number in the designated area below. Please also indicate your gender and your e-mail address, which will only be used to contact you in case you won.

Number _______

Gender __m/f__

E-mail address _______

You will be matched with a student in this classroom who is not the student sitting next to you. We will call the student with whom you are matched 'the other person' onwards. You will not get to know who the other person is and the other person will not get to know who you are. It will be impossible for any participant to know this. Also, none of the other participants will learn what you choose. Both hold provided that you do not tell each other if you won any money.

The questionnaire consists of two parts, in total eight games. In all games you are asked to choose an allocation of money that you prefer. The euros that you keep for yourself are always indicated first and the euros you give away are always indicated second. For example, if you would choose the allocation of money '(7.50;2.50)', you would keep €7.50 yourself and would give €2.50 away. The other person gets to make the same decisions.

However, while I want you to make a choice in every game, not all games will be paid out. When everyone has completed the questionnaire, I will choose one game randomly. This is the game that is going to be paid out with money.

Furthermore, this game will be paid out to only one match (so to two persons in this classroom). Who these two persons are, will also be chosen randomly.

One of the two will be the decision maker, which will also be determined randomly. If you are the decision maker, you will receive the amount of money that you have kept, and the other one will receive the amount that you have given away. If you are not the decision maker, you will receive the amount the decision maker has given away, and the decision maker will get the money he/she has kept.

Note that all of your choices have a chance to become real, so choose wisely.

If you won money, you will be sent an e-mail this evening with the message that you won money and the question if you could give your bank account number. Once you gave your bank account number, the money will be transferred to your bank account.

The teacher will verify that I follow this protocol. However, he does not get you know your choices.

Remember that there is a chance that you will be paid out what you choose in a certain game and that no participant will get to know what you choose if you do not tell anyone, so just fill in whatever you really prefer.

We now start with part 1:

Part 1

This part consists of three games. In these games you have the chance to share money with the other person. You get an allocation of €10 in each game. You can choose to keep all the money for yourself, give everything away, or keep a part for yourself and give the rest away. The three games differ in how many euros the other person actually receives if you give away euros. This will be explained in the three following games.

Remember, the first amount indicates the euros you keep and the second amount indicates the euros you give away to the other person.

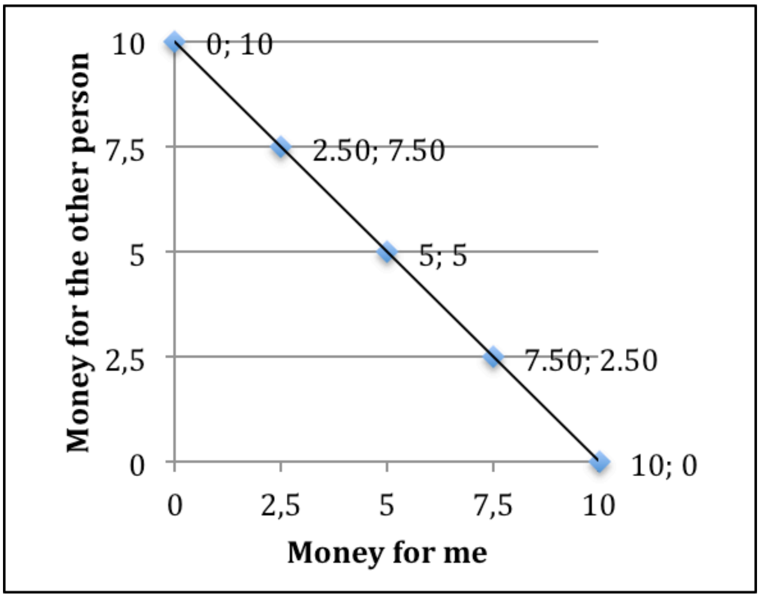
Game 1

You get an allocation of €10. You have three options:

1. Keep €10 for yourself; then the other person gets nothing.
2. Give €10 away to the other person; then you keep nothing for yourself.
3. Keep a part for yourself and give the rest away. For every euro that you give away, the other person gets €1.

The question to you is what allocation of money you like best. You can choose from: (0;10), (2.50;7.50), (5;5), (7.50;2.50) and (10;0).

Please circle the allocation you prefer in the figure below:



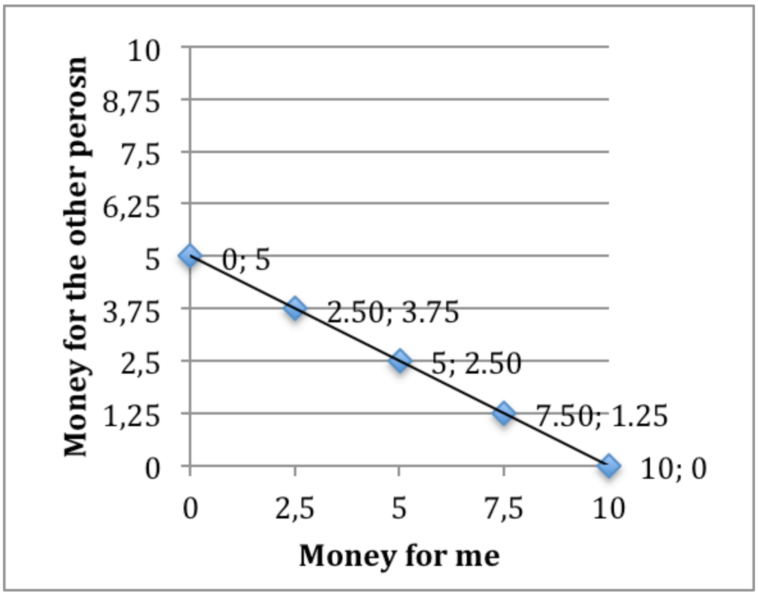
Game 2

Again, you get an allocation of €10. And again, you have three options:

1. Keep €10 for yourself; then the other person gets nothing.
2. Give €10 away to the other person; then you keep nothing for yourself. However, the €10 you give away are not worth €10 to the other person (as was the case in game 1). In this game, the other person only receives €5 if you give away €10.
3. Keep a part for yourself and give the rest away. For every euro that you give away, the other person only gets €0.50 (while in game 1 the other person received €1 for every euro you gave away).

The question to you is what allocation of money you like best. You can choose from: (0;5), (2.50;3.75), (5;2.50), (7.50;1.25) and (10;0).

Please circle the allocation you prefer in the figure below:



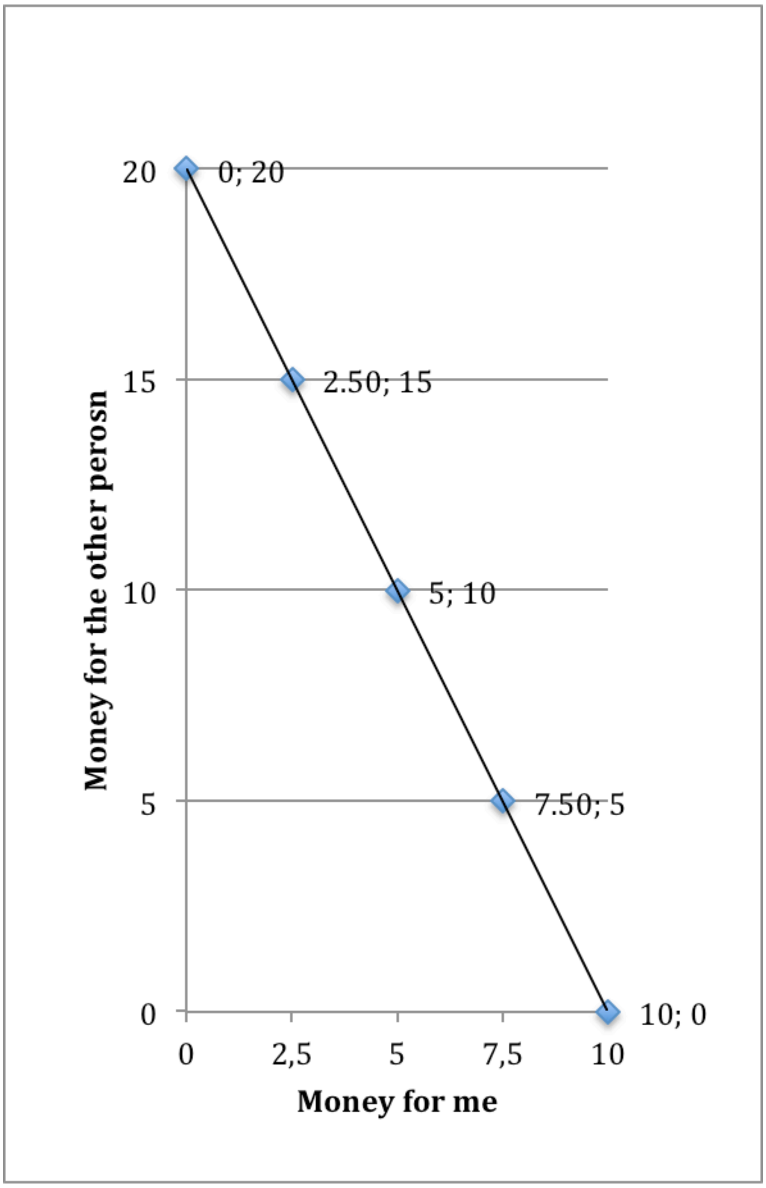
Game 3

Again, you get an allocation of €10. And again, you have three options:

1. Keep €10 for yourself; then the other person gets nothing.
2. Give €10 away to the other person; then you keep nothing for yourself. In this game, for the €10 you give away, the other person receives even €20.
3. Keep a part for yourself and give the rest away. Now, for every euro that you give away, the other person gets even €2.

The question to you is what allocation of money you like best. You can choose from: (0;20), (2.50;15), (5;10), (7.50;5) and (10;0).

Please circle the allocation you prefer in the figure below:



This is the end of part 1. We now continue with part 2:

Part 2

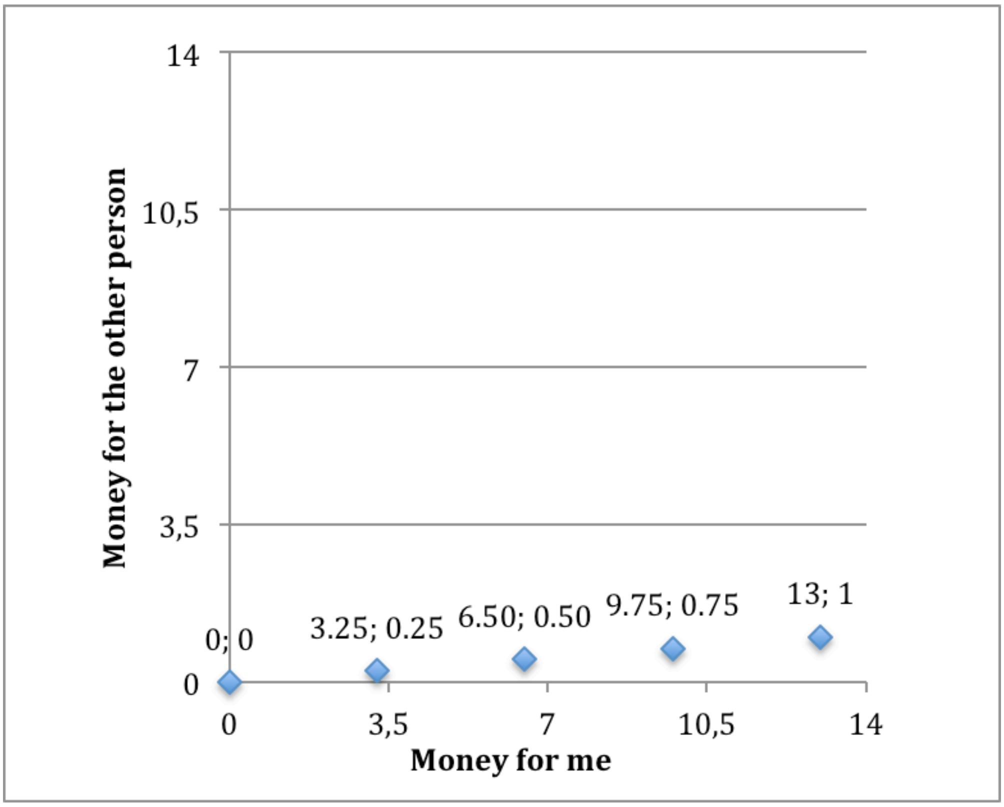
In the following five games, you are asked to choose what allocation of money you prefer. In all five games, the division of euros from which you can choose from right to left in the figures below gives you less euros in absolute terms. It also makes the difference between what you get and what the other person gets smaller, except for in game 3.

Remember, the first amount indicates the euros you keep and the second amount indicates the euros you give away to the other person.

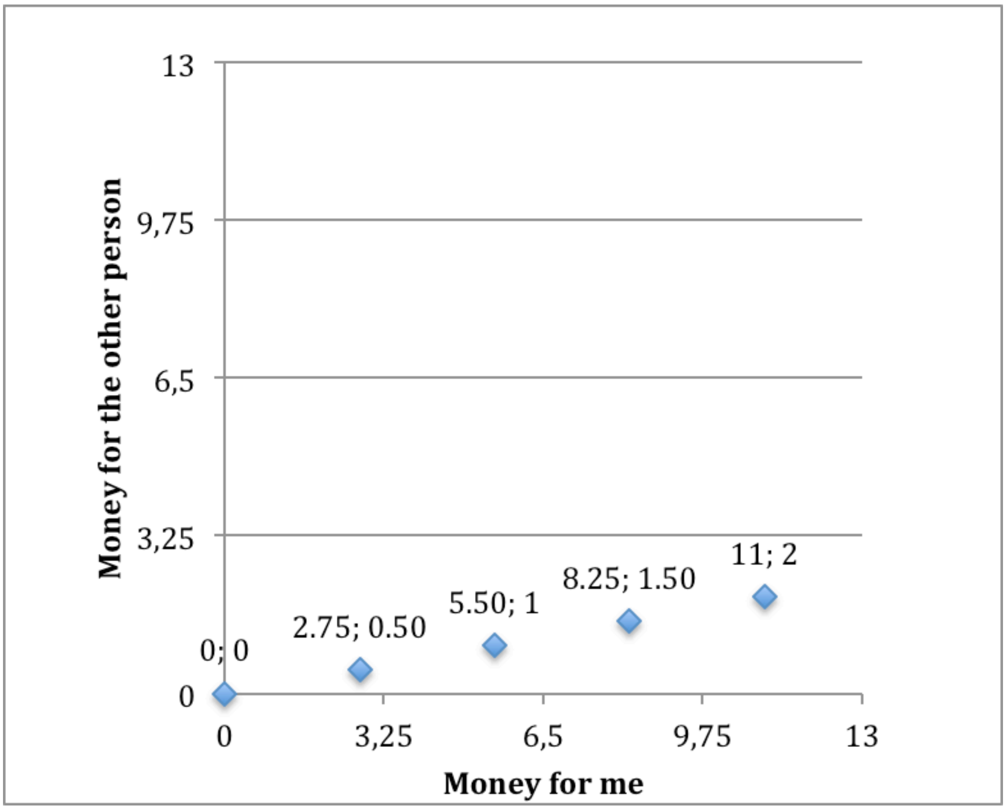
Please circle the allocation you prefer in all five figures below:

In game 1 and game 2, you get more than the other person (unless you choose allocation (0;0)). Moving from right to left in the figures makes the difference smaller. It also makes your payment smaller.

Game 1

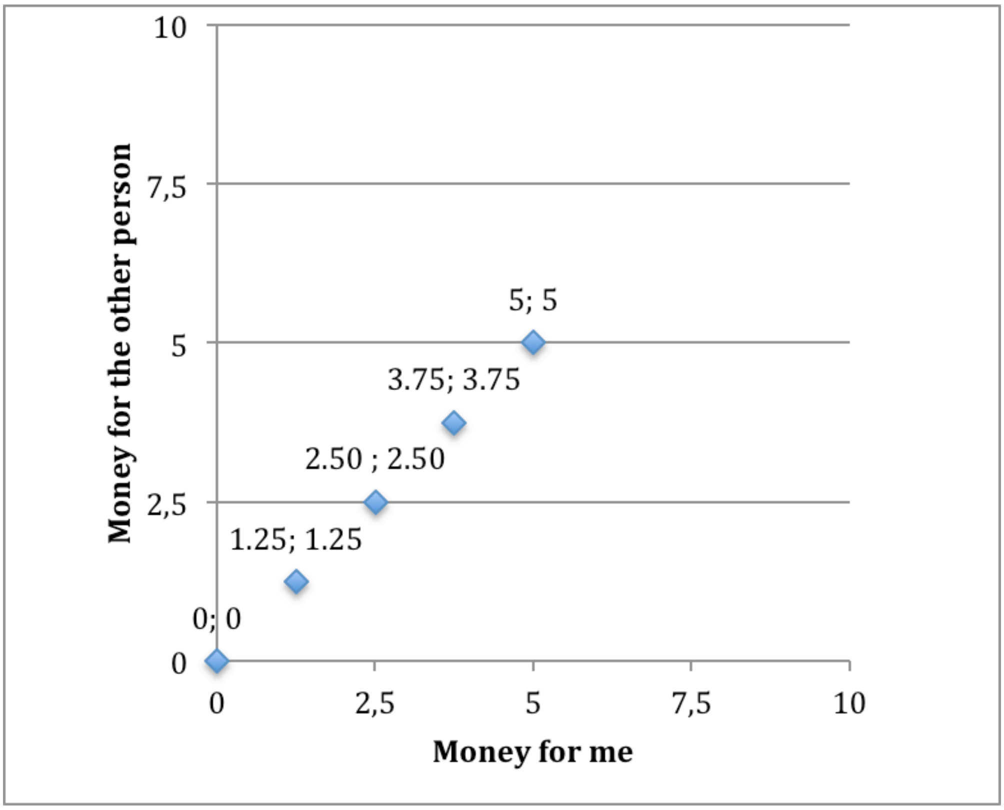


Game 2



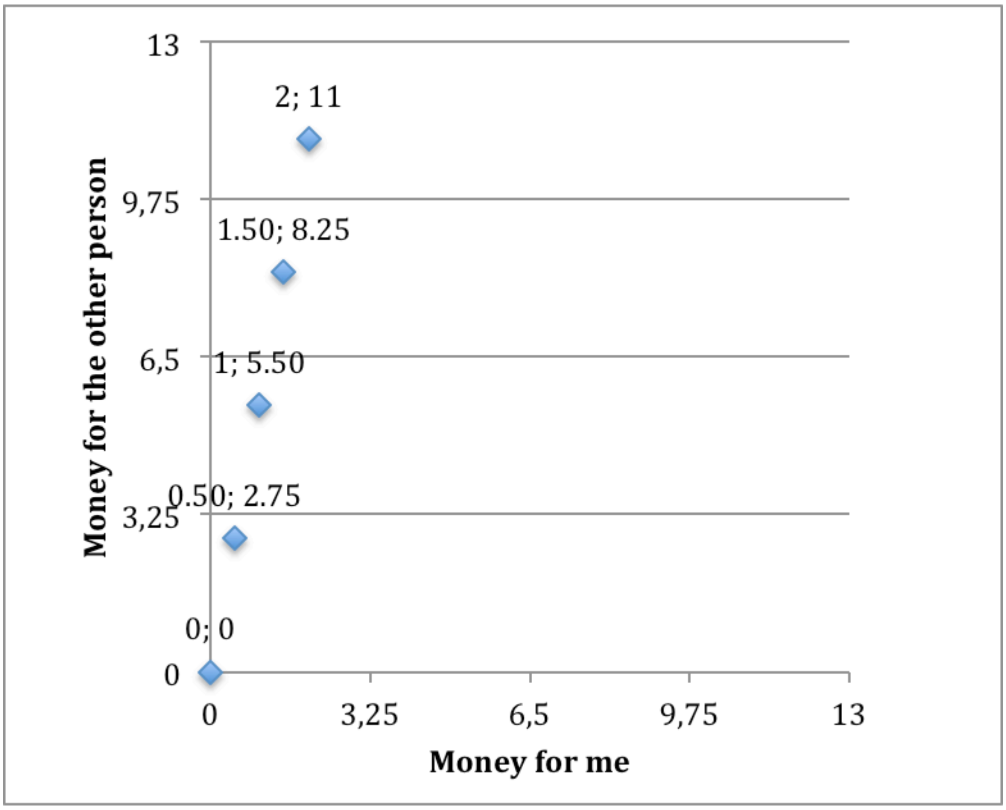
In game 3, you get exactly the same as the other person. So moving from right to left in the figure does not change the difference between your and the other person's payments. It does make your payment smaller.

Game 3

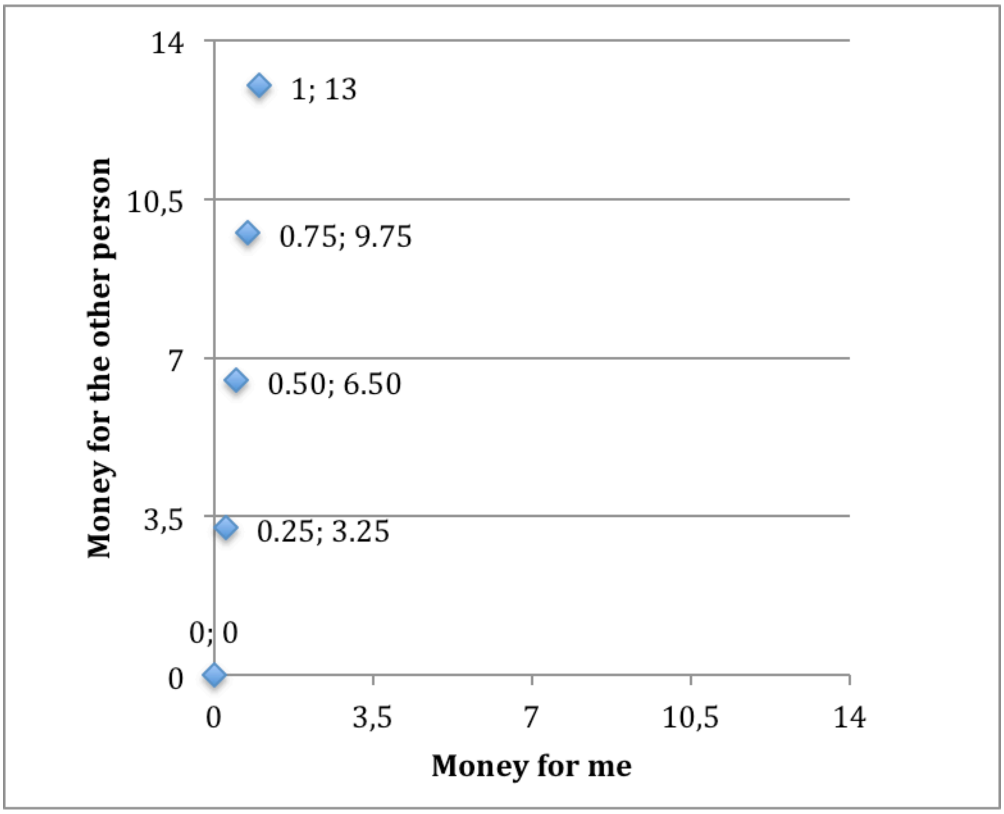


In game 4 and game 5, you get less than the other person (unless you choose allocation (0;0)). Moving from right to left in the figures makes the difference smaller. It also makes your payment smaller.

Game 4



Game 5



See next page

This is the end of the questionnaire. Make sure you filled in your preferred choice in every game. Please raise your hand when you are done and I will pick up the questionnaire. Please be quiet until everyone is done. When everyone is done, the payment process will start.

Appendix B: Original questionnaire for the strangers group

Bedankt voor je bijdrage aan dit experiment! Het is heel belangrijk dat je tijdens de vragenlijst met niemand communiceert. Wees dus alsjeblieft stil en gebruik je mobiel niet. Als je je niet aan deze regels houdt, mag je de vragenlijst helaas niet afmaken en heb je dus geen kans meer om geld te winnen. Als je een vraag hebt, steek dan je hand op en wacht met het stellen van je vraag tot ik bij je ben. Wanneer je de vragenlijst helemaal ingevuld hebt, steek dan ook je hand op en wacht totdat ik de vragenlijst heb opgehaald. Op je tafel ligt een kaartje met een nummer erop. Schrijf dit nummer op de aangewezen plek hieronder. Geef hier ook je geslacht en e-mail adres aan. Je e-mail adres zal alleen gebruikt worden om contact met je op te nemen in geval dat je gewonnen hebt.

Nummer _______

Geslacht __m/v__

E-mail adres _______

Je zal gematched worden met een leerling in deze klas die niet de leerling is die naast je zit. Vanaf nu noemen we de leerling met wie je wordt gematched ‘de andere persoon’. Je komt er niet achter wie de andere persoon is en de andere persoon komt er niet achter wie jij bent. Geen enkele deelnemer zal hierachter komen. Ook zal geen enkele deelnemer erachter komen wat je kiest. Let op, dit beide geldt op voorwaarde dat jullie elkaar niet vertellen of jullie geld hebben gewonnen.

De vragenlijst bestaat uit twee delen, in totaal acht spellen. In alle spellen word je gevraagd een toewijzing van geld te kiezen die jij het beste vindt. De euro’s die je zelf houdt, worden altijd als eerste aangegeven en de euro’s die je weggeeft, worden altijd als tweede aangegeven. Bijvoorbeeld: als je de toewijzing van geld ‘(7,50;2,50)’ zou kiezen, zou je €7,50 zelf houden en €2,50 weggeven. De andere persoon staat voor dezelfde keuzes.

Hoewel ik wil dat je in elk spel een beslissing maakt, zullen niet alle spellen uitbetaald worden. Wanneer iedereen de vragenlijst helemaal heeft ingevuld, zal ik één spel willekeurig uitkiezen. Dit is het spel dat uitbetaald gaat worden met geld. Bovendien zal dit spel alleen uitbetaald worden aan één match (dus aan twee personen in dit klaslokaal). Wie deze twee personen zijn, zal ook willekeurig bepaald worden.

Eén van de twee zal de beslisser zijn, wat ook willekeurig bepaald wordt. Als jij de beslisser bent, zal je de hoeveelheid geld krijgen die je voor jezelf hebt gehouden en de andere persoon de hoeveelheid geld die jij hebt weggegeven. Als jij niet de beslisser bent, zal je de hoeveelheid krijgen die de beslisser weg heeft gegeven en de beslisser zal de hoeveelheid krijgen die hij/ zij voor zichzelf heeft gehouden.

Houd er rekening mee dat al je keuzes een kans hebben werkelijkheid te worden, dus denk goed na over je keuzes.

Als je geld hebt gewonnen, ontvang je vanavond een email met de mededeling dat je geld hebt gewonnen. In deze mail wordt ook om je rekeningnummer gevraagd en zodra je dat hebt gegeven, zal het door jou gewonnen bedrag naar je over worden gemaakt.

De leraar zal erop toezien dat alles volgens de regels verloopt, maar hij komt niet achter jullie keuzes.

Onthoud dat er een kans is dat je uitbetaald wordt wat je kiest in een bepaald spel en dat geen enkele deelnemer erachter komt wat je kiest als je het niemand vertelt, dus vul in wat je daadwerkelijk het beste vindt.

We beginnen nu met deel 1:

Deel 1

Dit onderdeel bestaat uit drie spellen. In deze spellen heb je de kans geld te delen met de andere persoon. Je krijgt een toewijzing van €10 in elk spel. Je kan ervoor kiezen al het geld zelf te houden, alles weg te geven, of zelf een deel te houden en de rest weg te geven. De drie spellen verschillen in hoeveel euro's de andere persoon daadwerkelijk ontvangt als jij euro's weggeeft. Dit zal uitgelegd worden in de drie volgende spellen.
Onthoud dat het eerste bedrag de euro's aangeeft die je zelf houdt en het tweede bedrag de euro's die je weggeeft.

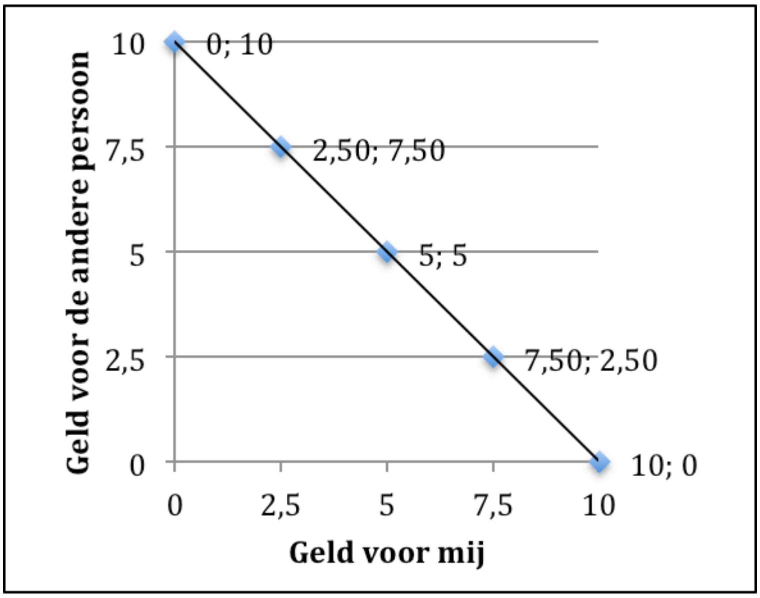
Spel 1

Je krijgt een toewijzing van €10. Je hebt drie opties:

1. Houd €10 zelf; dan krijgt de andere persoon niks
2. Geef €10 weg aan de andere persoon; dan houd jij zelf niks
3. Houd een deel zelf en geef de rest weg. Voor elke euro die jij weggeeft, krijgt de andere persoon €1.

De vraag aan jou is welke toewijzing van geld jij het beste vindt. Je kan kiezen uit:
(0;10), (2,50;7,50), (5;5), (7,50;2,50) and (10;0).

Omcirkel de toewijzing die jij het beste vindt in de figuur hieronder:



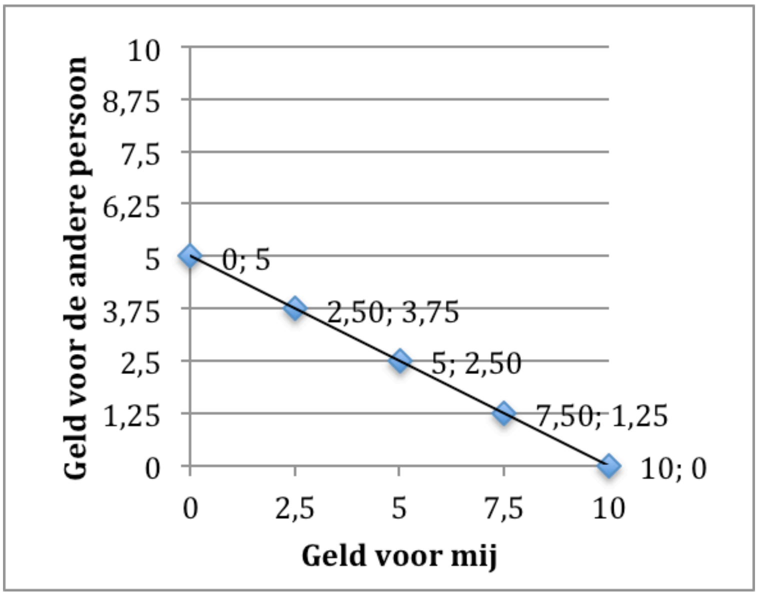
Spel 2

Opnieuw krijg je een toewijzing van €10. En opnieuw heb je drie opties:

1. Houd €10 zelf; dan krijgt de andere persoon niks
2. Geef €10 weg aan de andere persoon; dan houd jij zelf niks.
   Echter, de €10 die jij weggeeft, is niet €10 waard voor de andere persoon (wat wel het geval was in spel 1). In dit spel ontvangt de andere persoon maar €5 als jij €10 weggeeft.
3. Houd een deel zelf en geef de rest weg. Voor elke euro die jij weggeeft, krijgt de andere persoon maar €0,50 (hoewel in spel 1 de andere persoon €1 ontving voor elke euro die je weg gaf).

De vraag aan jou is welke toewijzing van geld jij het beste vindt. Je kan kiezen uit:
(0;5), (2,50;3,75), (5;2,50), (7,50;1,25) and (10;0).

Omcirkel de toewijzing die jij het beste vindt in de figuur hieronder:



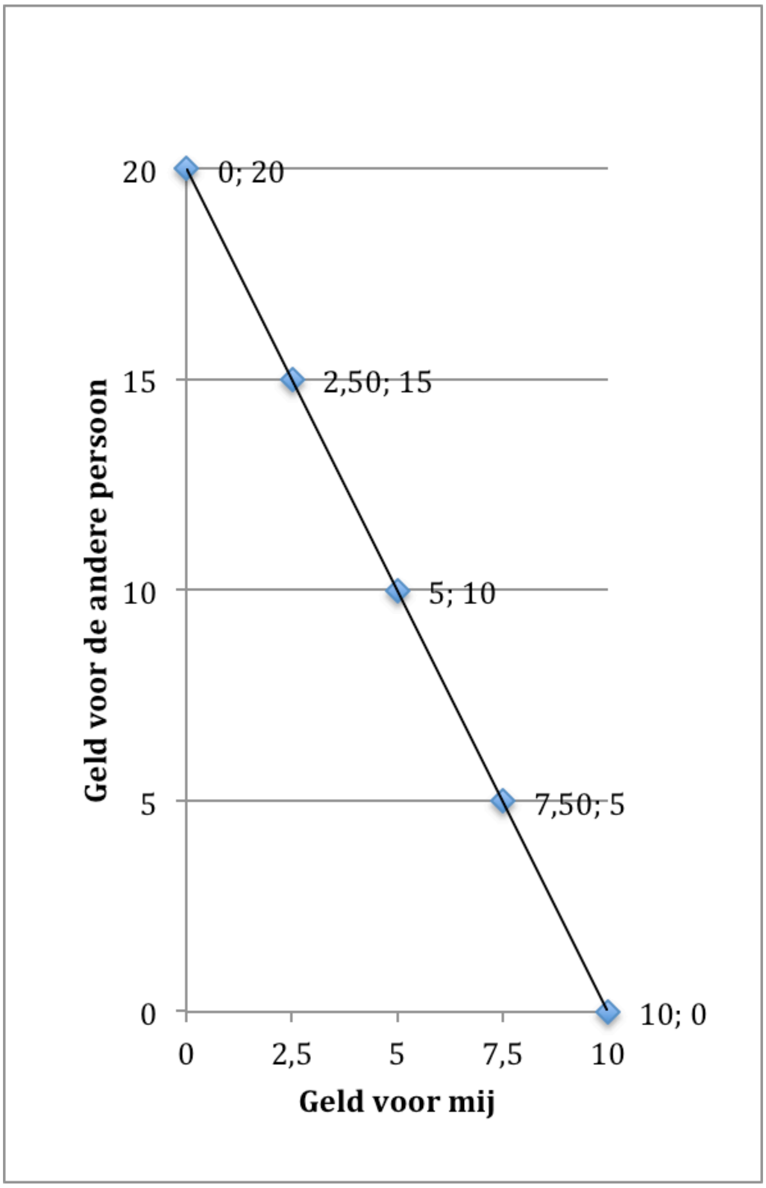
Spel 3

Opnieuw krijg je een toewijzing van €10. En opnieuw heb je drie opties:

1. Houd €10 zelf; dan krijgt de andere persoon niks
2. Geef €10 weg aan de andere persoon; dan houd jij zelf niks. In dit spel ontvangt de andere persoon maar liefst €20 als jij €10 weggeeft.
3. Houd een deel zelf en geef de rest weg. Voor elke euro die jij weggeeft, krijgt de andere persoon maar liefst €2.

De vraag aan jou is welke toewijzing van geld jij het beste vindt. Je kan kiezen uit:
(0;20), (2,50;15), (5;10), (7,50;5) and (10;0).

Omcirkel de toewijzing die jij het beste vindt in de figuur hieronder:



Dit is het einde van deel 1. We beginnen nu met deel 2:

Deel 2

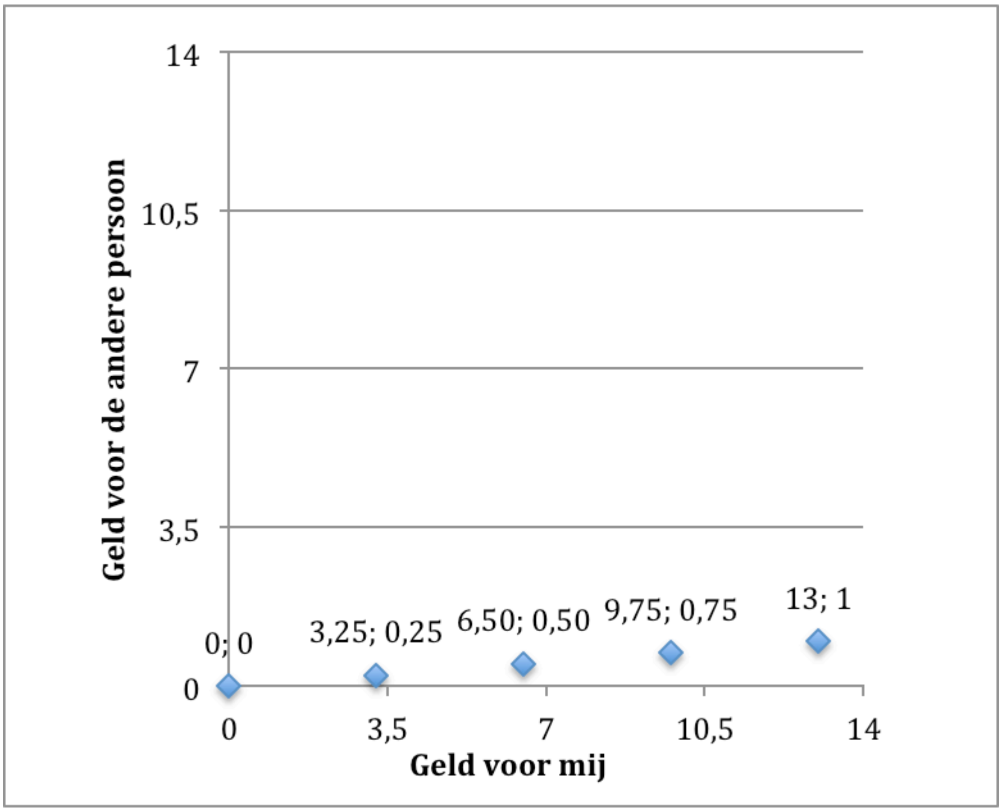
In de volgende vijf spellen word je gevraagd welke toewijzing van geld jij het beste vindt. In alle vijf spellen geldt dat de verdeling van euro's waaruit je kan kiezen van rechts naar links in de figuren hieronder je minder geld geeft in absolute termen. Ook maakt het het verschil kleiner tussen wat jij en de andere persoon krijgt, behalve in spel 3.

Onthoud dat het eerste bedrag de euro's aangeeft die je zelf houdt en het tweede bedrag de euro's die je weggeeft.

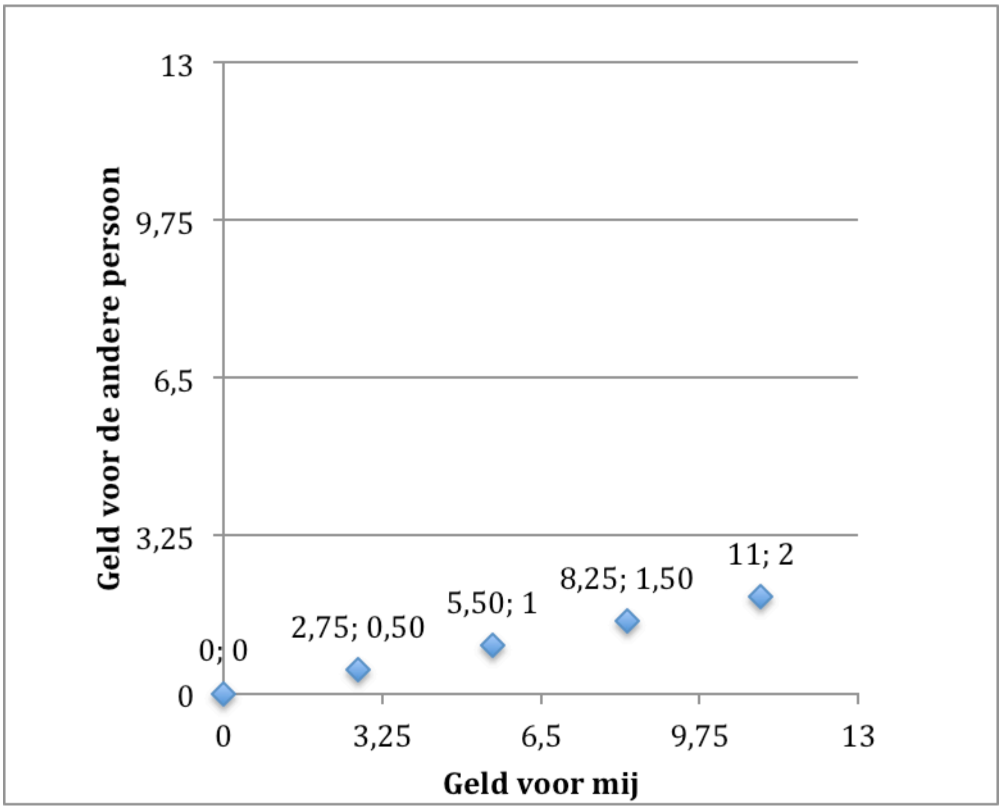
Omcirkel de toewijzing die jij het beste vindt in alle vijf figuren hieronder:

In de spellen 1 en 2 krijg jij meer dan de andere persoon (tenzij je toewijzing (0,0) kiest). Het verschil wordt kleiner naarmate je meer naar links gaat in de figuren. Ook maakt het jouw betaling kleiner.

Spel 1

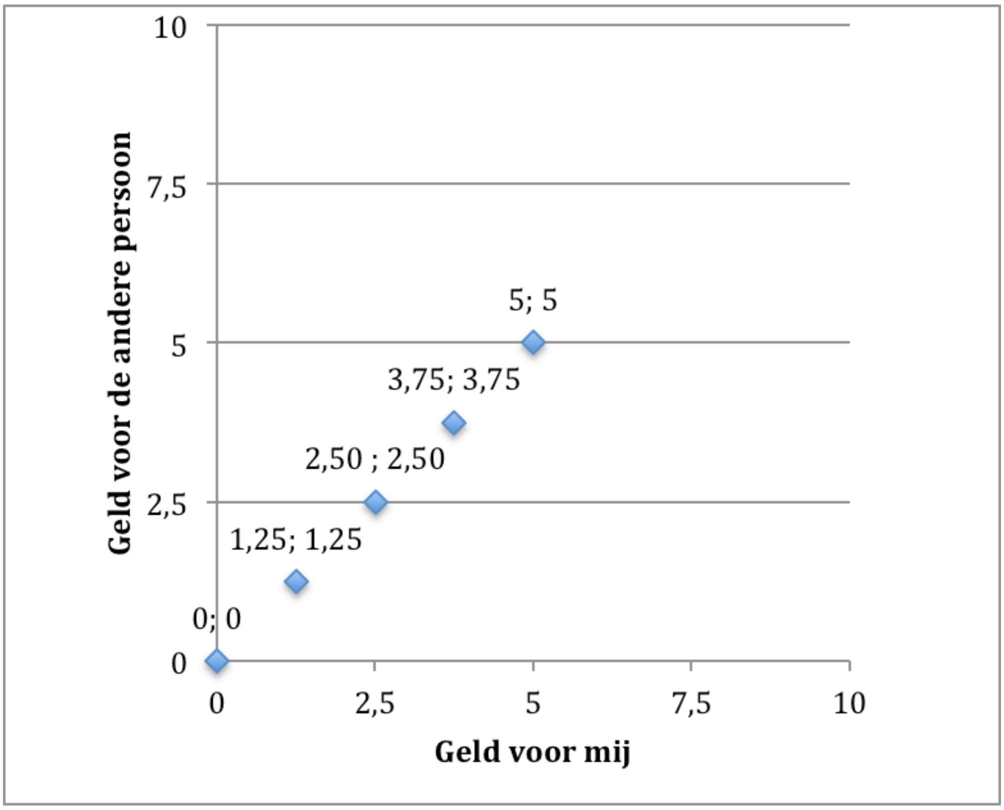


Spel 2



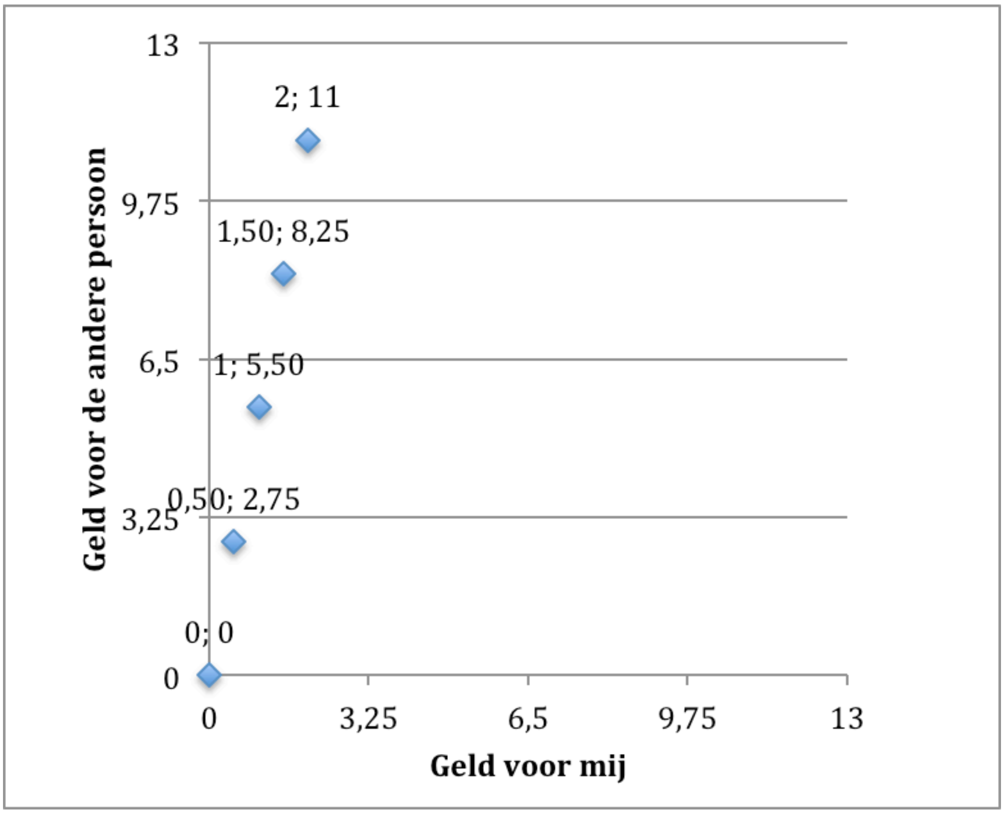
In spel 3 krijg je precies evenveel als de andere persoon. Dus meer naar links gaan in de figuur verandert het verschil tussen de betalingen aan jou en de andere persoon niet. Wel maakt het jouw betaling kleiner.

Spel 3

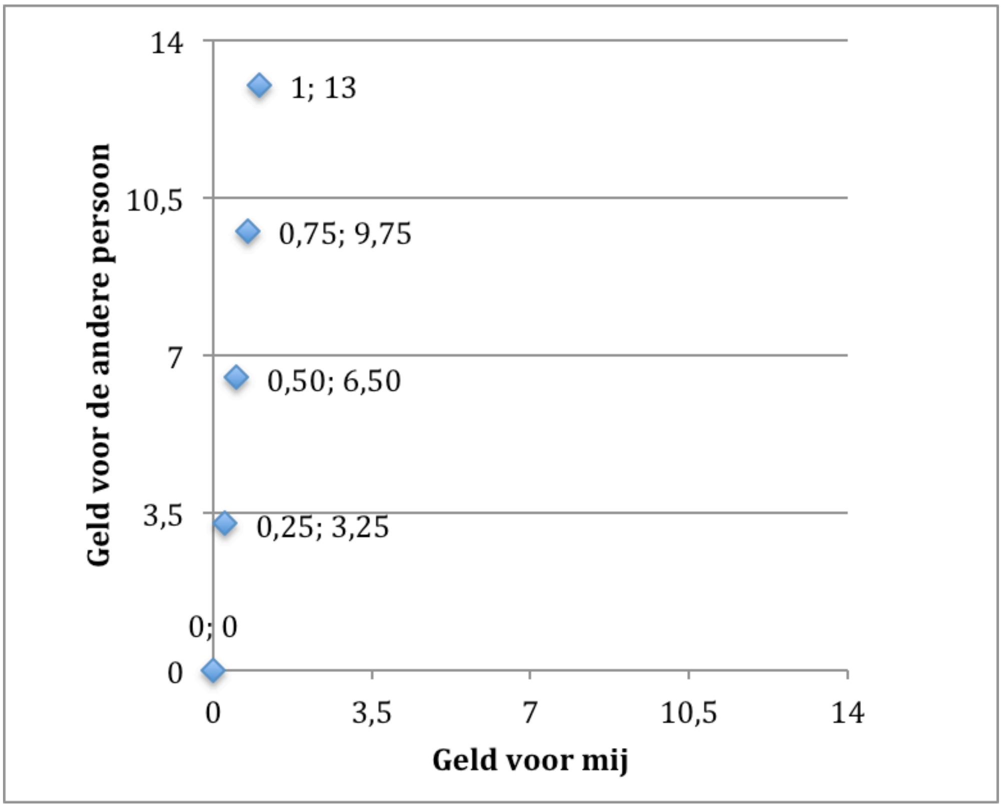


In de spellen 4 en 5 krijg jij minder dan de andere persoon (tenzij je toewijzing (0,0) kiest). Het verschil wordt kleiner naarmate je meer naar links gaat in de figuren. Ook maakt het jouw betaling kleiner.

Spel 4



Spel 5



z.o.z.

Dit is het einde van de vragenlijst. Zorg ervoor dat je hebt gekozen wat jij het beste vindt in elk spel. Als je klaar bent, steek je je hand op en kom ik de vragenlijst ophalen. <u>Wees alsjeblieft stil tot iedereen klaar is</u>. Pas dan zal het uitbetalingsproces beginnen.

Appendix C: Feedback from people similar to the subjects

Before conducting the questionnaires for real, they were tested for comprehensibility by five people similar to the subjects, the test subjects. They are all students doing pre-university education and are in either fourth or fifth grade. Three things had to be adjusted based on the comments of these people. First, it was not mentioned clearly enough that the chance of winning money disappeared if subjects were forced to stop because of not listening to the instruction not to communicate. Second, the figures in the questionnaires were not very clear. And third, someone did not understand what the Dutch word "allocatie" means. This was adjusted in the questionnaires; thereafter everything was clear to them.

Four of the five test subjects were also asked several questions. Two questions were asked in order to decide how the subjects would going to be paid out. The first question was: "suppose that you would all receive an envelope at the end of the questionnaire in order to pay out the two participants that won and only the envelopes of the participants that won contain money. You are told to immediately put away the envelope in your backpack and open it only at home. Would you still open your envelope right away?" Three out of four stated that they would open it in presence of other people or that they would expect people to open it in front of other people. One out of four said she would open it at school already, but not in presence of other students. The second question was: "Would you prefer giving your email address or your bank account?" All four would prefer giving their email address. Two even told some students of that age do not even have a bank account yet or would rather give that of their parents. Based on both these findings it was decided that email addresses were going to be used instead of envelopes or bank accounts in order to pay out the subjects.
Most subjects do not know the experimenter at all; a few only know the experimenter by appearance. In order to find out the importance of anonymity between the subjects and the experimenter, the following question was asked: "If you would not know the experimenter, would it influence your choices if you knew that the experimenter would get to know what you chose? And if you knew the experimenter a little?" Three answered that both would not influences their choices. One answered that both would probably influence her choices unconsciously.

Appendix D: Scheme

The student numbers were written down on the lines and the group numbers were written down after the arrows.

___ ___→ ___ ___→ ___ ___→ ___ ___→

___ ___→ ___ ___→ ___ ___→ ___ ___→

___ ___→ ___ ___→ ___ ___→ ___ →

___ ___→ ___ ___→ ___ ___ →

Appendix E: Drawing and matching process for the strangers treatment

The results of drawing numbers and throwing the die were indicated on the lines

Randomly decide what game gets chosen

Put tickets with the numbers 1 to 8 in the hat and pick one → game__

Randomly decide what match gets chosen

Put tickets with group numbers 1 to __ in a hat and pick two numbers → 2 groups: __&__

To decide which person of the first group will be chosen, roll a die:

If die gives even number → student with even ticket number

If die gives uneven number → student with uneven ticket number

→student:__

To decide which person of the second group will be chosen, roll a die:

If die gives even number → student with even ticket number

If die gives uneven number → student with uneven ticket number

→student:__

Note: if there is a person sitting on his own and this group number gets chosen → don't have to roll the die in this section.

Randomly decide which of the two persons chosen will be the decision maker

Roll a die:

If die gives even number → person with highest number is decision maker

If die gives uneven number → person with lowest number is decision maker

→ student __ is decision maker

Appendix F: Drawing and matching process for friends treatment

The results of drawing numbers and throwing the die were indicated on the lines

Randomly decide what game gets chosen

Put tickets with the numbers 1 to 8 in the hat and pick one → game__

Randomly decide what match gets chosen

Roll a die:

If die gives even number → friends match

If die gives uneven number → stranger match

→ _______match

If friends match + even student number:

-Put tickets with student numbers 1 to __ in a hat and pick one →student__

the other one is the student next to this student

If friends match + uneven student number:

-Put tickets with student numbers 1 to __ in a hat + one number: that of my friend, and pick one →person__

the other one is the person next to this person

If strangers match:

-Put tickets with group numbers 1 to __ in a hat and pick two numbers → 2 groups: __&__

To decide which person of the first group will be chosen, roll a die:

If die gives even number → student with even ticket number

If die gives uneven number → student with uneven ticket number

→student:__

To decide which person of the second group will be chosen, roll a die:

If die gives even number → student with even ticket number

If die gives uneven number → student with uneven ticket number

→student:__

Note: if there is a person sitting on his own and this group number gets chosen → don't have to roll the die in this section.

Randomly decide which of the two persons chosen will be the decision maker

Roll a die:

If die gives even number → person with highest number is decision maker

If die gives uneven number → person with lowest number is decision maker

→ student __ is decision maker

Appendix G: Similarity of students between the treatments

As both treatments consist of a fourth grade pre-university secondary school class and a fifth grade pre-university secondary school class, it could be important that the ratio of students from a fourth grade class to students from a fifth grade class is the same in both treatments. Namely, students from a fourth grade class could differ from students in a fifth grade class in for example age and knowledge. As the friends treatment consists of 22 students from a fourth grade class and 16 students from a fifth grade class, the ratio of students from a forth grade class to students from a fifth grade class is 1.38. The strangers treatment consists of 22 and 17 students from a fourth grade class and fifth grade class respectively, resulting in a ratio of 1.29. Thus, the ratios do not differ much between both treatments. Furthermore, the subjects in the two fourth grade classes are probably similar to each other as well as the subjects in the two fifth grade classes (same education level, approximately same age, et cetera). However, since Andreoni and Vesterlund (2001) found that social preferences differ between men and women, it is chekced specifically whether the ratio of men to women is the same between both treatments. In the strangers treatment, the gender of one subject is unknown, resulting in there being 18 or 19 men and 20 or 21 women. Consequently, the ratio men to women is either 0.86 or 0.95 in the strangers treatment. In the friends treatment, the ratio is 1.24 as this treatment contains 21 men and 17 women. It is considered in this study that these ratios do not differ too much. Consequently, it can be concluded that the subjects in the friends treatment are similar to the subjects in the strangers treatment.

Appendix H: Histograms, normal Q-Q plots and Boxplots

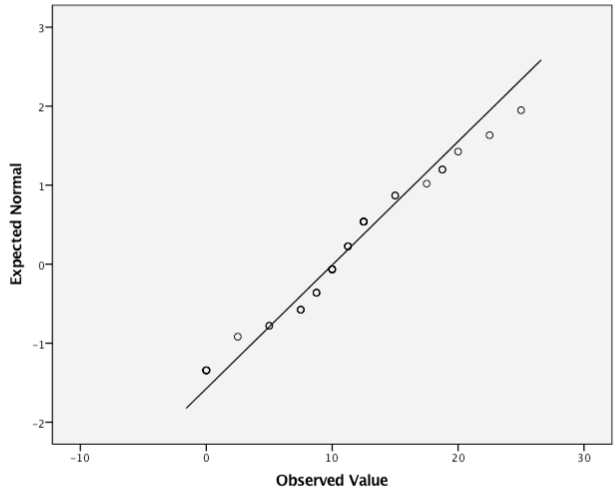


Figure 4: A normal Q-Q plot of the total amounts given away in the friends treatment

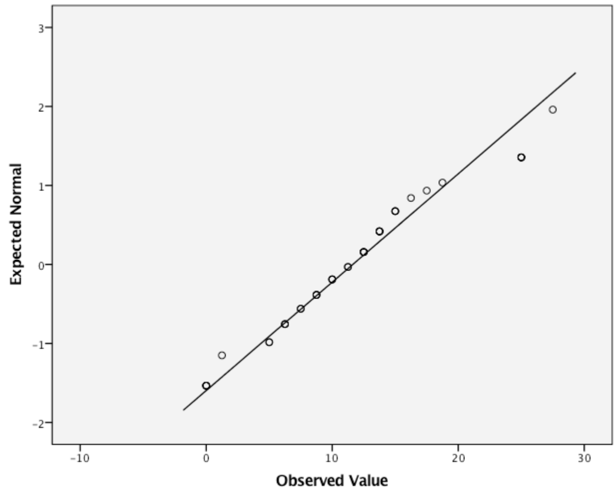


Figure 5: A normal Q-Q plot of the total amounts given away in the strangers treatment

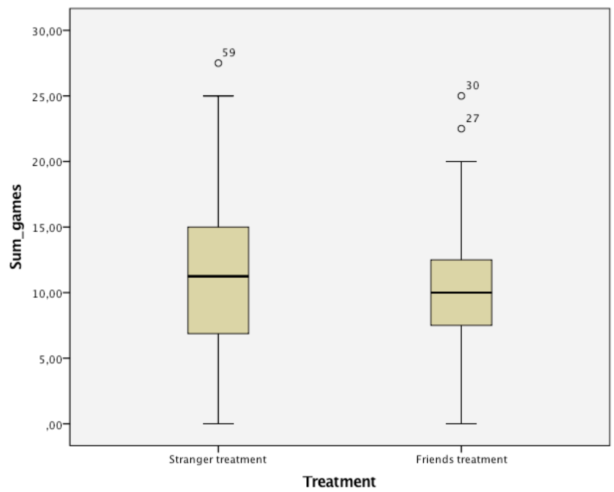


Figure 6: Boxplots of the total amounts given away for both the strangers treatment and the friends treatment

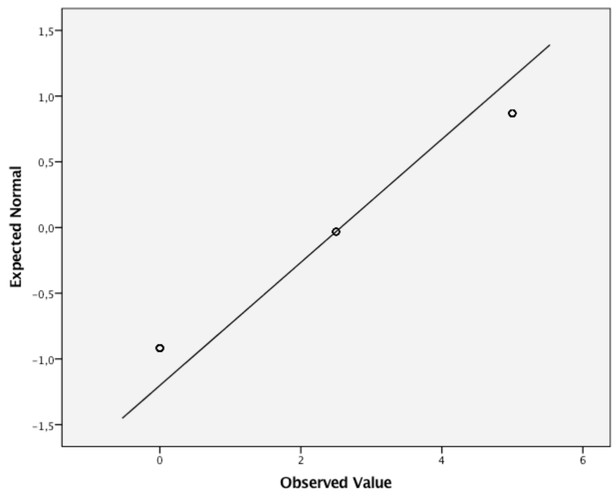


Figure 9: A normal Q-Q plot of the amounts given away in the friends treatment for a relative price of 1

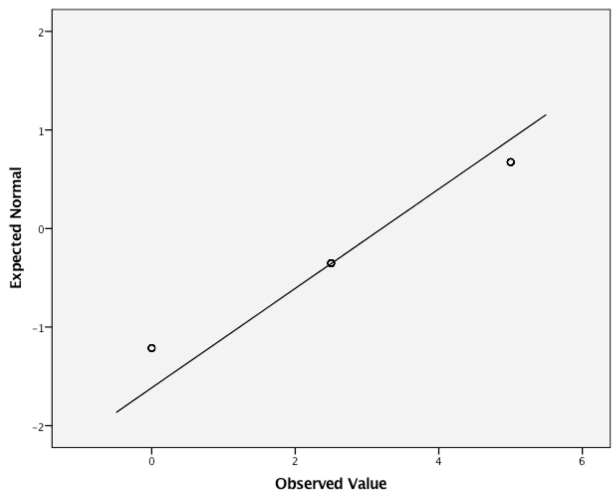


Figure 10: A normal Q-Q plot of the amounts given away in the strangers treatment for a relative price of 1

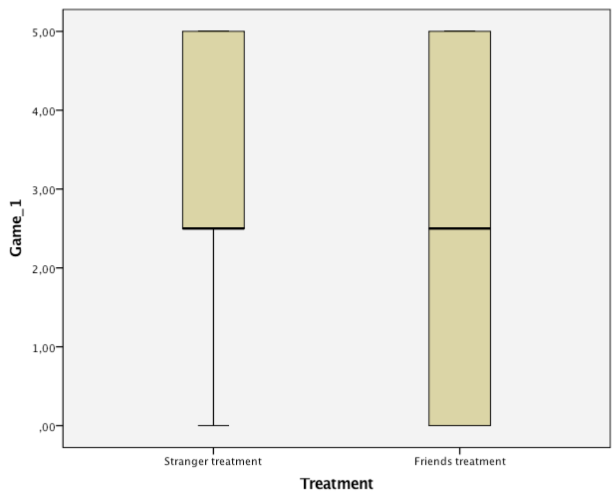


Figure 11: Boxplots of the amounts given away for a relative price of 1 for both the strangers treatment and the friends treatment

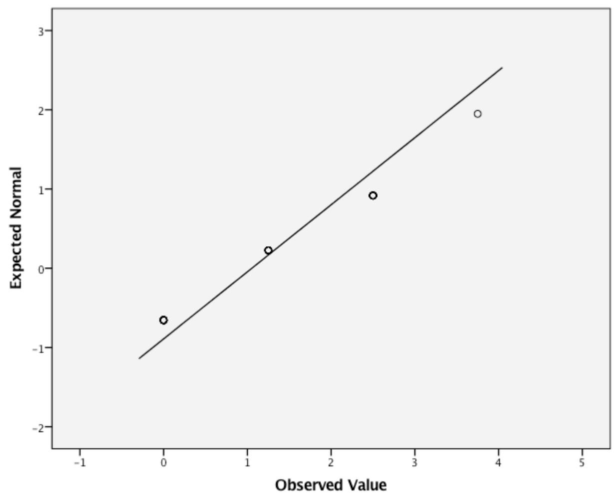


Figure 14: A normal Q-Q plot of the amounts given away in the friends treatment for a relative price of 2

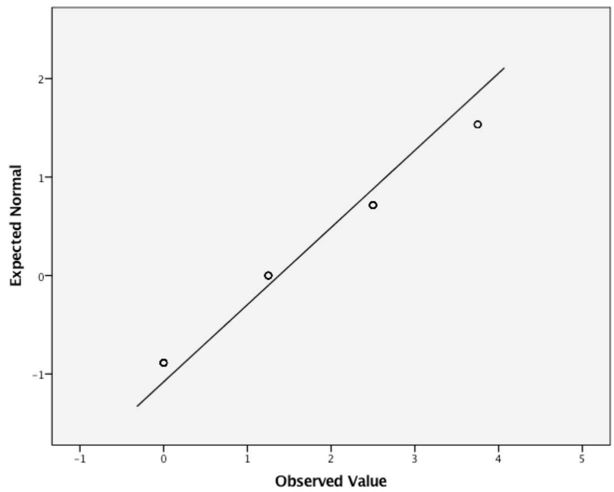


Figure 15: A normal Q-Q plot of the amounts given away in the strangers treatment for a relative price of 2

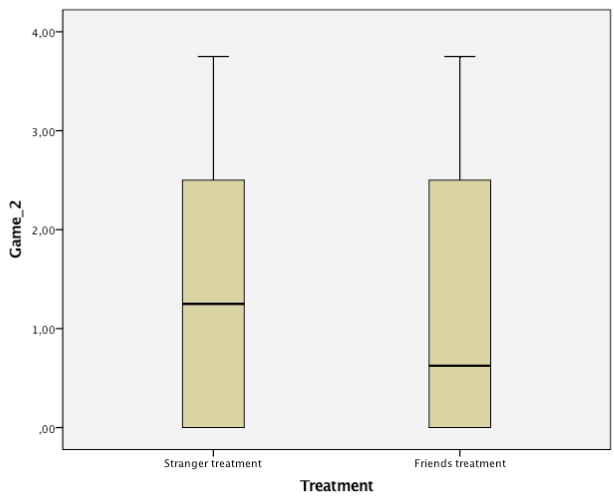


Figure 16: Boxplots of the amounts given away for a relative price of 2 for both the strangers treatment and the friends treatment

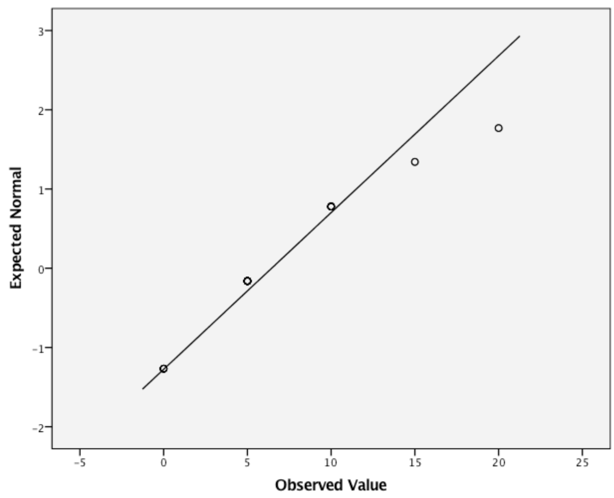


Figure 19: A normal Q-Q plot of the amounts given away in the friends treatment for a relative price of 0.5

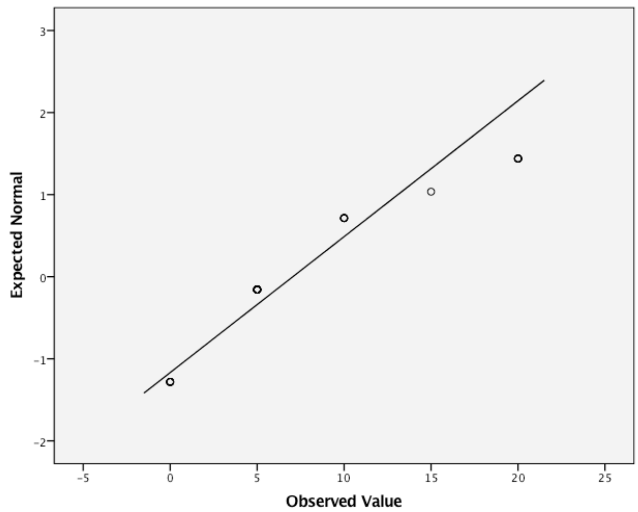


Figure 20: A normal Q-Q plot of the amounts given away in the strangers treatment for a relative price of 0.5

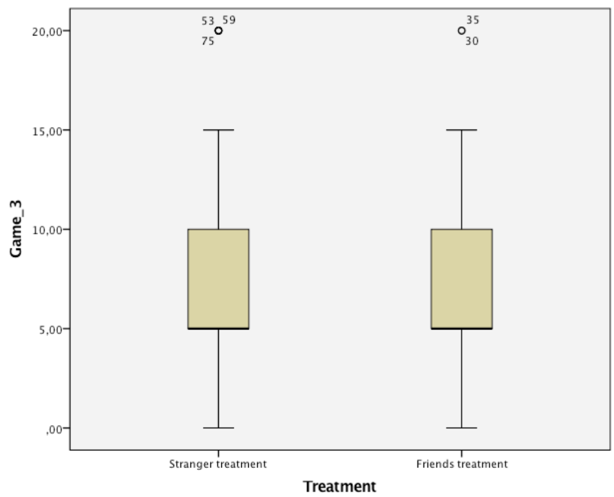


Figure 21: Boxplots of the amounts given away for a relative price of 0.5 for both the strangers treatment and the friends treatment

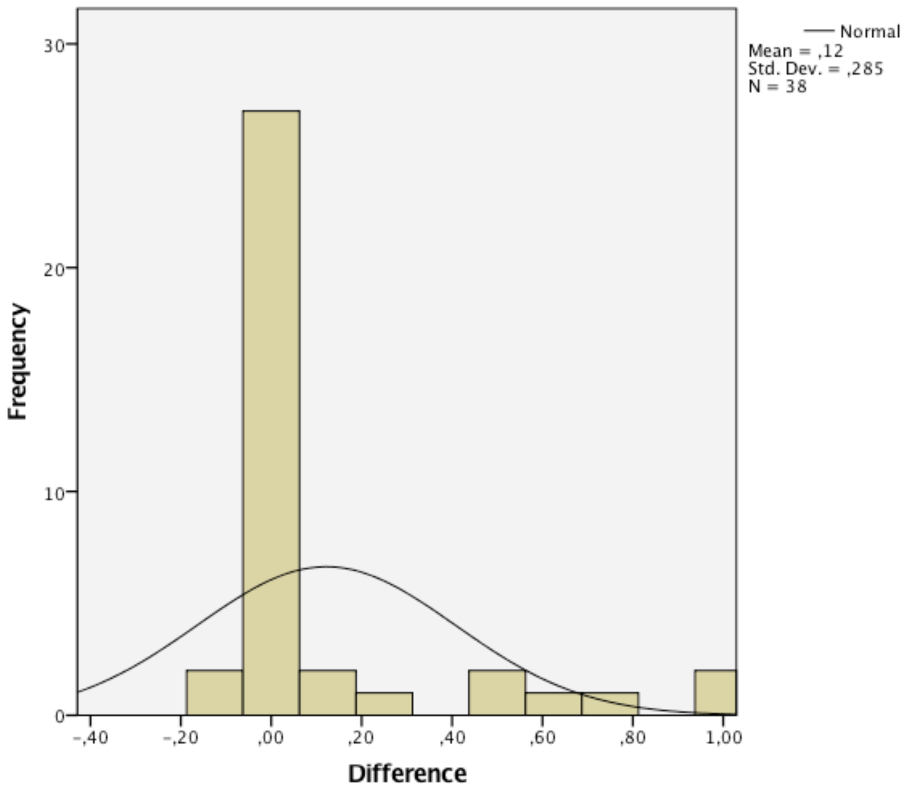


Figure 22: A histogram of the differences in the friends treatment between the average valuations in games 1 and 2 and the average valuations in games 4 and 5

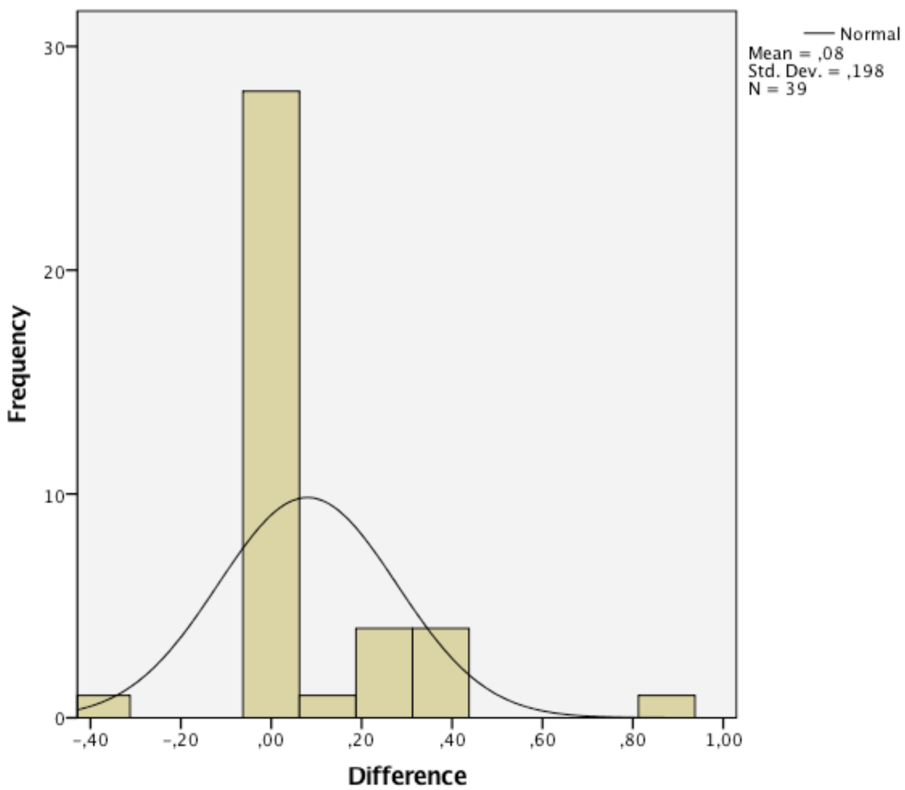


Figure 23: A histogram of the differences in the strangers treatment between the average valuations in games 1 and 2 and the average valuations in games 4 and 5

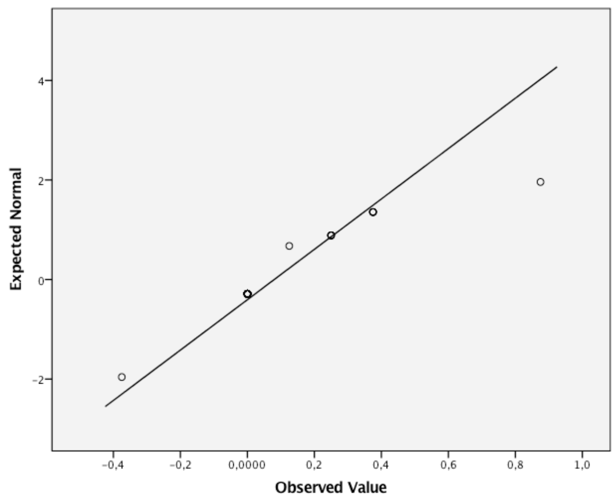


Figure 24: A normal Q-Q plot of the differences in the friends treatment between the average valuations in games 1 and 2 and the average valuations in games 4 and 5

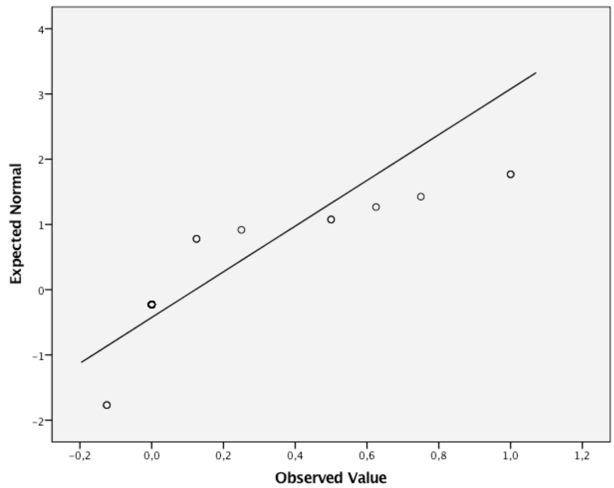


Figure 25: A normal Q-Q plot of the differences in the strangers treatment between the average valuations in games 1 and 2 and the average valuations in games 4 and 5

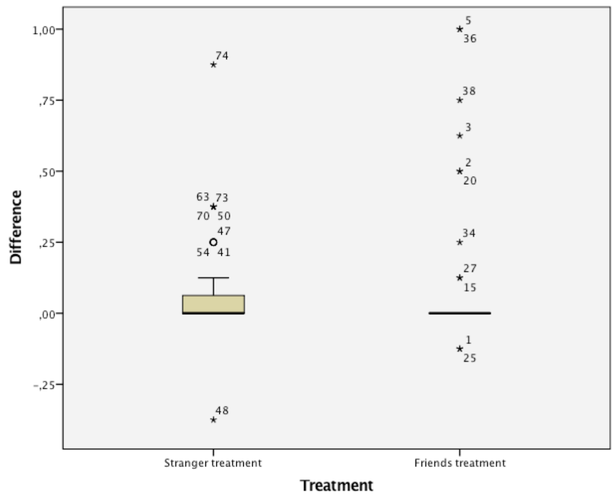


Figure 26: Boxplots of the differences between the average valuations in games 1 and 2 and the average valuations in games 4 and 5 for both the strangers treatment and the friends treatment

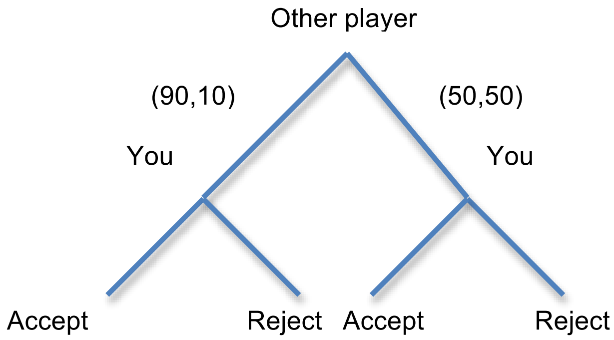
Appendix I: Suggestion how to investigate reciprocity preferences

In order to investigate reciprocity preferences, the following mini ultimatum game, in which the strategy method is applied, could be played.

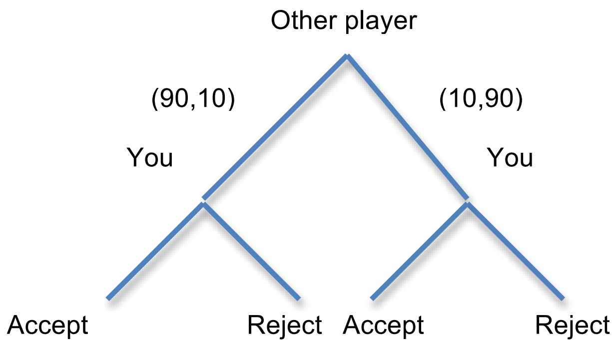
Mini ultimatum game

Three games will be played. The subject knows that the other player can either choose a distribution of (90,10) or an alternative: (50,50) in game 1, (10,90) in game 2 and (100,0) in game 3. The first amount indicates the payoff to the subject and the second amount the payoff to the other player. The question is what the strategy of the subject would be in each game for both potential choices of the other player. The subject has to circle their decision (accept or reject):

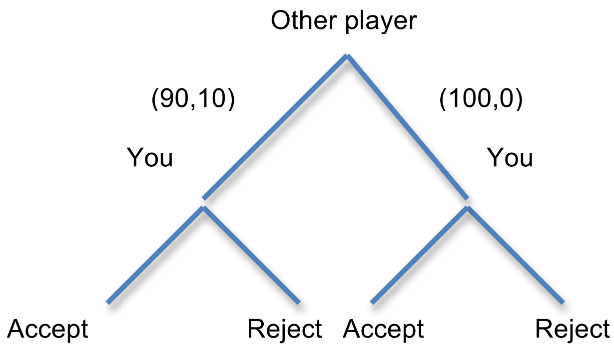
Game 1



Game 2



Game 3



There are reciprocity preferences if the subjects' acceptance rate for (90,10) increase from game 1 to 3, as the behaviour of other player gets kinder from game 1 to 3 if the other person would choose (90,10) while the payoff to the subject stays the same.