

**SELF CENTERED AND OTHER REGARDING  
FAIRNESS IN THE SOLIDARITY GAME**

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# Self Centered and Other Regarding Fairness in the Solidarity Game

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## Abstract

This paper revisits and extends the experiment on the solidarity game by Selten and Ockenfels (1998). We replicate the basic design of the solidarity game and extend it in order to test the robustness of the 'fixed total sacrifice' effect and the applied strategy method. Our results only partially confirm the validity of the fixed total sacrifice effect. In a treatment with constant group-endowment rather than constant winner-endowment the predominance of the 'fixed total sacrifice' behavior is replaced by 'fixed relative gift' behavior. We additionally introduce a measure of personality characteristics and compare its specific components with pro-social gift behavior in our experiments. We don't find correlations between actual gift behavior and measures of empathy-driven pro-social behavior used in social science.

*Keywords:* experimental economics, game theory, fixed total sacrifice, solidarity

*JEL classification:* C91, D3

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# 1 Introduction

Solidarity behavior has been studied in experimental economics introducing a particular type of game based on conditional gifts (Selten and Ockenfels, 1998; Ockenfels and Weimann, 1999). In this experiment three participants play a one-shot game in which each of them has a two-thirds probability of winning a fixed amount of money, and one third probability of ending up with nothing. Before knowing the result of the random draw, each participant must indicate the amount of money (gift) she would like to hand over in case she is going to be a winner, i.e. she has to specify the gift that she would dispense in the case of one loser and in the case of two losers in the group. The total gift can be any amount between zero and the total amount she might win. This procedure corresponds to the 'strategy method' introduced by Selten (1967). 'Solidarity' in this context means voluntary gift giving by lucky winners to needy losers in a group. The interaction is characterized by an unfavorable situation that could potentially affect everybody but eventually will affect only one part of the population (the needy person(s)).<sup>1</sup>

The results of Selten and Ockenfels (1998) show two major features. First, the majority of subjects send positive gifts and second, the predominance of a behavior called by the authors 'fixed total sacrifice'. Subjects of their experiments seem to use a two stage reasoning in which they first determine the amount they want to keep for themselves and then distribute the remaining amount (if any) among the needy person(s). This means that the total amount of gift is independent from the number of recipients, i.e., is the same for one or two recipients.

Ockenfels and Weimann (1999) replicate the Selten-Ockenfels solidarity game in Magdeburg (East Germany) with exactly the same procedure as it was used in Bonn (West Germany). They find the fixed total sacrifice effect as well. Additionally they observe that eastern subjects give significantly less than western subjects, which is driven by a higher proportion of egoistical behavior (sending zero to both, to one loser and to two losers).

In this paper, we test the robustness of the two major features of the original solidarity game: positive gifts and the fixed total sacrifice. Selten and Ockenfels (1998) argue, that it is the reciprocal element of the strategy method which makes the solidarity game different from simple dictator games, but that it is still different from pure reciprocity, because gifts cannot be reciprocated over time.

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<sup>1</sup>In the presence of risk aversion, conditional gifts can be seen as a mutually benefitting insurance arrangement.

In a similar vein, Stahl and Haruvy (2002) argue that the use of the strategy method in the sense of making the decision without knowing whether one is a winner or a loser may distort incentives in favor of egalitarian behavior, and thus increases gift giving. Deciding how much to give before knowing the result of the random draw may induce empathy, forcing the subject to "put herself in the shoes" of the loser. In this sense we talk about implicit reciprocity, as the positive effect of giving considering that we might be in the recipient's situation.

Our first Hypothesis follows Selten and Ockenfels (1998) stating that:

**Hypothesis 1** *The strategy method induces a context in which solidarity based on implicit reciprocity might be generated, and increases gift giving.*

In order to test this hypothesis, we introduce a treatment of a partial play method (PPM), where people decide *after* learning that they are a winner, but still don't know if they will be matched with 0, 1 or 2 other winners (losers, respectively) in the group. This is analogous to a dictator game with prior random entitlement. The act of giving is free from any reasoning based on reciprocity. If our hypothesis is true and implicit reciprocity generated by the strategy method plays a role, we should observe a higher level of gift-giving in the original solidarity game than in our PPM treatment.

The second feature observed in the solidarity game is the 'fixed total sacrifice' effect. Selten and Ockenfels (1998) indicate that this type of behavior is inconsistent with the maximization of an altruistic utility function that includes payoffs of other individuals. In this sense, the fixed total sacrifice is an 'anomaly of the anomalies', because it is related to the 'anomalies' of giving to unrelated others (Camerer and Thaler, 1995) on the one hand, but cannot be captured by a model of altruistic behavior. Rather it has to be classified as purely 'self-centered-fairness' behavior, because the winner keeps his own income constant, and distributes the rest.

The observation of the 'fixed total sacrifice' behavior might be due to the fact, that in case of two winners (one loser) and in case of one winner (two losers) the total group gain varies, i.e., it is equal to 20 DM in the first case and 10 DM in the second case. The subjects might have found an 'internal justification' for giving the same amount to one loser as to two losers considering that in the second case the total group endowment is reduced by the half. In order to test this possible effect we introduce a treatment with a constant group endowment (CGE) for each random move outcome with at least one winner, i.e. for the case of 1, 2 or 3 winners. At the same time, we keep the ex-ante expected winner and group endowment (nearly) constant to the baseline treatment.

This leads us to our second hypothesis.

**Hypothesis 2** *In a treatment with a constant group endowment (CGE) we observe 'fixed total gift' behavior rather than the 'fixed total sacrifice' effect.*

'Fixed total gift' behavior in treatment CGE can be called 'fixed *relative* sacrifice' behavior, as well.

To sum up, the main goal of our study is to test (1) the robustness of gift giving with regard to the strategy method involved when participants have to decide about their donations before knowing whether they are a winner or not and (2) the robustness of the fixed total sacrifice effect with regard to the individual endowment of winners and the group endowment. Moreover, the role of expectations and their relationship with behavior is considered.

Additionally, in order to check whether the extend of gift giving and the types of solidarity behavior classified by Selten and Ockenfels (1998) correspond to measures used in social science, we introduce a structured questionnaire on personality characteristics of pro-social behavior corresponding to the Interpersonal Reactivity Index, IRI (Davis, 1980; Davis, 1983, see the next section for a more detailed description). The IRI is of common use in socio-psychological studies on pro-social behavior, i.e. behavior that is intended to benefit other people (Carlo, Allan and Buhman, 1999).

The results of our experiments only partially confirm the predominance of the fixed total sacrifice effect in the solidarity game. The replication of Selten and Ockenfels (1998)'s experiment, and the introduction of the partial play method reproduce the original results, indicating that the strategy method plays no role for gift giving in the solidarity game. In contrast, in the treatment with constant group endowment we find that subjects give the same relative gift to one loser or to each one of the two losers. In other words: the predominant behavior switches from a self-centered type in the replication treatment to a other-regarding type in a treatment with constant group endowment. We do not find any correlation between the IRI and the actual gifts. Our extensions of the original solidarity game yield a better understanding of gift behavior and the source of 'fixed total sacrifice' behavior.

## 2 Experimental Design

Our design consists of three treatments. The first is a replication of the original solidarity game of Selten and Ockenfels (1998, further S-O) with some variations in the experimental procedures. It serves as a baseline for the other two treatments.

In S-O and in our first treatment (SO-R, 'S-O Replication'), subjects participate in a 3-person game. Each subject has the same probability (2/3) of winning 10 DM in S-O and 10 Euro in our first treatment, respectively. Participants decide before the random draws without knowing if they are a winner or not and how the group is matched. Each participant is asked to fill in a decision form in which she must specify the amount of money she is willing to hand over to (a) loser(s) in her group in case she will win. Participants are asked to state two amounts, one for the case of one loser in the group and the other for the case of two losers. In the latter the amount specified goes to each one of the two losers, i.e. the winner pays twice this amount. There is no possibility to differentiate the gift among the two losers. Indeed, they had nothing to specify for the case of no or three losers in the group.

In our second treatment (PPM, 'Partial Play Method') we introduce a partial-play method of the SO-R design. The subjects know, before deciding, whether they are winners or losers, and only the winners decide how much they are willing to hand over to one or two possible losers in the group. Results of this treatment would give us information about the effect of deciding before knowing one's role in a solidarity game, i.e. for the effect of the strategy method. This treatment serves also as a bridge between the solidarity game and the dictator game with random entitlement.

Our third experimental treatment (CGE, 'Constant Group Endowment') controls for group endowment effects. We keep the total group endowment constant for each possible scenario of the game. We vary the individual endowment conditional on the cases in which there are three, two, or one winners in a group. In case of three winners each of them gets 6.70 Euros; in case of two winners, each of them gets 10 Euros; and in the case of one winner, she gets 20 Euros. These parameters keep the ex-ante expected group and individual endowments of the SO-R treatment (approximately) constant. Table 1 summarizes the design parameters.

In each of the three treatments we asked subjects to answer a 28 item questionnaire corresponding to the Interpersonal Reactivity Index (Davis, 1980; Davis, 1983, IRI). The subjects had to indicate how a statement describes them on a 5-point scale (A, B, C, D, and E, with A meaning "Does not describe me at all.", and E indicating "Describes very well."). There are items that are scored in an ascending fashion (+, A=0, B=1, C=2, D=3, and E=4) and items that are scored in reverse fashion (-, A=4, B=3, C=2, D=1, and E=0). The questionnaire has four components. Each component is composed of 7 items. The four components are: perspective taking (PT), empathic concern

Treat	Winners	<i>Parameters</i>				Ea. exp.	Sess.	Part.	Mon.	Ind. Ob
		3	2	1	0					
SO-R	Ind. End.	10	10	10	-	6.66	2	15	1	30
	Gr. End.	30	20	10	0	20				
PPM	Ind. End.	10	10	10	-	6.66	2	15	1	20
	Gr. End.	30	20	10	0	20				
CGE	Ind. End.	6.7	10	20	-	6.43	2	15	1	30
	Gr. End.	20.1	20	20	0	19.29				

Table 1: Experimental treatments and parameters. Note: 'Ind. End.' indicates 'Individual Endowment for each winner', 'Gr. End.' indicates 'Group Endowment', 'Ea. exp.' means 'Ex-ante expected', 'Mon.' means 'Monitors', and 'Ind. Ob' translates to 'Independent Observations'.

(EC), personal distress (PD), and fantasy (FS). Examples of the items for each component are: "I try to look at everybody's side of a disagreement before I make a decision" (PT+), "Other people's misfortunes do not usually disturb me a great deal" (EC-), "In an emergency situation I feel apprehensive and ill-at-ease" (PD+), and "After seeing a play or movie, I have felt as though I were one of the characters" (F+). These items refer to perspective taking, empathic concern (reversed-scored), personal distress, and fantasy, respectively. For the complete list of items see the Appendix.

### 3 Experimental Procedures

The experiment was conducted at the experimental laboratory of the Max Planck Institute in Jena, Germany. Participants in this experiment were 96 volunteering undergraduate students from the local Friedrich Schiller University. We ran six sessions with 16 participants (15 subjects plus a monitor) each. Hence there are 30 independent observations for the SO-R and CGE (20 for PPM) treatment (see Table 1). The average age of the 90 active participants (without the monitors) was 23 years, 51 (39) were female (male). The experimental sessions lasted on average one hour; from the time the subjects entered the lab until the time they left it. The average earning was 9.73 Euro including a show-up fee of 2.50 Euro.

As Selten and Ockenfels (1998) we used a double blind procedure, i.e., neither the experimenter nor the other subjects could ever deduce the identity of the correspondent decision maker from a decision (see Instructions in Appendix A). Contrary to Selten and Ockenfels (1998) and Ockenfels and Weimann (1999) we conducted the experiment in the laboratory rather than in the students' restaurant, we used a monitor for the double blind procedure,

and we payed immediately after the experiment rather than announcing a prize (lottery) to motivate subjects to show up to collect their payoff.

The SO-R and the CGE treatments followed the same protocol and had parallel instructions. They differed only with respect to the numbers in the decision form and the expectation form. The PPM treatment differs in a way that will be clarified with the following description of the procedure.

During the experiment, every subject received a code number. These codes were randomly generated sequences of numbers and letters, e.g. 800-C56-Z4B, or 379-V22-W7D, where the last letter in the code corresponded to the session number. The code number was printed on the backside of every form to be filled in and on the payment envelope.

The complete procedure was as follows:

- a. The subjects entered the laboratory and were randomly seated in separated cubicles. When everybody was seated, the instructions were distributed and read aloud always by the same experimenter. Once the instructions were read, subjects' questions were answered privately.
- b. The subjects were asked to draw an envelope from a box. The box contained 16 'big' envelopes. Inside each envelope there was a card with a code number. In one of these envelopes there was a card marked with 'monitor' instead of a code number. The monitor had to guarantee to the other subjects (further the 'active' subjects), that the experiment was conducted according to the rules stated in the instructions. He or she did not participate actively in the game, but was the only contact between the experimenters and the subjects during the proceeding of the experiment. The monitor was informed privately that he or she will get the average payoff at the end of the experiment. We asked her not to reveal this information.
- c. Inside the 'big' envelopes there were three other 'small' envelopes, a blue, a green, and a red one. The 'active' subjects (all the subjects except the monitor) had to open the blue envelope first. In this envelope they found the decision form. On the decision form the subjects were informed about all the possible outcomes of the random draws for the role (winner/loser) and the group matching. In the case of three, two, one winners in a group each winner earned 10,10 and 10 Euro in SO-R and PPM and 6.7,10,20 Euro in CGE, respectively. In the case of no winner in the group everybody got zero. The subjects had to specify the amount of Euros (in Ten-Cent-steps) they were willing to give to the loser in the



case of two winners in the group and to each one of the two losers in the case of one winner. Note, that the subjects could not specify two different amounts in the case of two losers. The amount specified had to be between 0 and the amount won in the one loser case and between 0 and half of the amount won for the case of two losers. After filling in the form they had to put it back into the envelope. Once everybody had filled in the decision form the monitor collected them and put them in a box.

In treatment PPM, at the top of the decision form players were informed whether they were a winner or a loser. The loser's form was empty, they just had to put it back into the envelope. The rest of the winner's form was the same like in SO-R. The proportion of forms was fixed in each PPM session to  $2/3$  (10) winners and  $1/3$  (5) losers.

- d. The active subjects were then asked to open the green envelope. Inside the green envelope they found another form in which they had to specify their expectations about the average amount of gift of all (potential) winners in the case of one loser or two losers. At the time they filled in the decision form they were not informed that they will be asked for their expectations, since knowing that they will have to specify their expectations could have affected their decisions. The expectation forms were the same for all the treatments. The losers in treatment PPM had to fill in this form, as well. The subjects got an extra Euro if one of the amounts specified was exact or differed less than 50 cents or 2 extra Euros if both amounts were exact or differed at most 50 cents from the average amount of gift.
- e. The green envelopes were collected by the monitor, and the active subjects finally opened and filled in the last form, which was in the red envelope. The last form contained the IRI questionnaire and a short questionnaire asking for age, gender, field of studies, and year of study. The items of the IRI questionnaire were presented in a random order among subjects. To prevent biasing, we decided to present the subjects the questionnaire before they learned whether there are a winner or a loser and their monetary income. Indeed, this could not be prevented in the PPM treatment. The monitor then collected the red envelopes.
- f. Once all the red envelopes were collected, in treatment SO-R and CGE the monitor drew one envelope at a time from the box containing the blue envelopes with the decision forms. The active subjects and the experimenter could control the monitor during this phase. The monitor threw a six-sided die once for each blue envelope. If one of the numbers 1, 2, 3,

or 4 appeared, the monitor wrote 'winner' on the envelope. If one of the numbers 5 or 6 appeared, she wrote 'loser' on the envelope. After this procedure the monitor put the blue envelopes back into the box and mixed them. In treatment PPM there was no need for a random draw for the assignment of winner or loser type. The box already contained 10 winner and 5 loser envelopes.

- g. The monitor drew again the envelopes from the box. The envelopes were randomly matched in groups of three. The experimenters opened the envelopes that corresponded to each group and calculated the payoffs. Once the payoffs of all participants were calculated, the experimenters opened the green envelopes with the subjects' expectations, and checked if they were correct. In the case one or two of the expected values turned out to be correct or differed less than 0.5 Euro, the subject got one or two extra Euros, respectively.
- h. After the calculation of the payoffs, the experimenters put the money into the payment envelopes which were marked with the code numbers. Then the experimenters left the room and the monitor distributed the payment envelopes to the active subjects. They checked if the amount was exact and left the room after signing a list with all code numbers and the corresponding payoffs. They signed that they had received money in cash under one of the code numbers printed above. In this way their payoff was maintained anonymous.

## 4 Results

### 4.1 Gift Behavior

In the description of the results we denote  $g_1$  as the gift to one loser and  $g_2$  as the gift to each one of two losers;  $e_1$  as subjects' expectation of the average  $g_1$  and  $e_2$  as subjects' expectation of the average  $g_2$ . Table 2 reports the mean absolute monetary values of conditional gifts ( $g_1$  and  $g_2$ ), the mean absolute values of the expectations ( $e_1$  and  $e_2$ ), and the corresponding values from Selten and Ockenfels (1998, S-O) and Ockenfels and Weimann (1999, O-W). The relative frequencies of conditional gift giving are shown in Figure 1 and 2. The individual decision data is reported in Appendix C.

The absolute values of gifts and expectations for each one of our treatments are higher than the ones observed by S-O and much higher than in O-W. Indeed, this may be due to the differences in the winner's endowment, which is 10 Euro

	N	$g_1$	$g_2$	$e_1$	$e_2$
SO-R	30	1.39 (1.30)	0.96 (0.82)	1.87 (1.33)	1.34 (1.01)
PPM Winners	20	1.53 (1.47)	1.05 (0.86)	2.09 (1.51)	1.38 (0.92)
PPM Losers	10			2.75 (1.21)	1.37 (0.76)
CGE	30	1.62 (1.40)	2.84 (2.31)	1.79 (1.04)	2.99 (1.79)
SO (West)	118	1.26	0.80	1.26	0.78
O-W (East)	58/56	0.83	0.52	0.82	0.55

Table 2: Descriptive Statistics: Average gifts and expectations in Euro (S-O and O-W results relying on a pie of 10 DM = 5.11 Euro are calculated with the official exchange rate 1 Euro = 1.95583 DM), standard deviations in brackets. Note:  $g_1$  is the conditional gift to one loser, and  $g_2$  is the conditional gift to each one of two losers;  $e_1$  indicates subjects' expectation of  $g_1$ , and  $e_2$  indicates subjects' expectation of  $g_2$ .

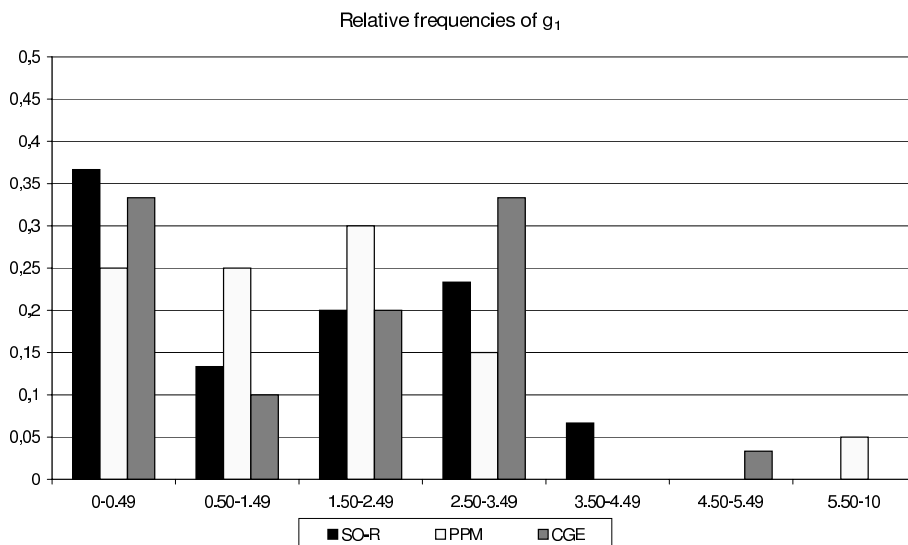


Figure 1: Relative frequencies of gifts to one loser in group ( $g_1$ )

in our treatments SO-R and PPM and 10 DM = 5.11 Euro in S-O and O-W. This sheds a first light on the fact that the subject's decision about the size of gifts is related to the size of their endowment and therefore relative to their wealth.

*Gift to one loser ( $g_1$ )* The mean values of  $g_1$  are 1.39, 1.53, and 1.62 in treatments SO-R, PPM and CGE, respectively. We cannot report any differences between the means and distributions among our three treatments. The Kruskal Wallis Test (chi-square = .417, p-value = .812) as well as pair wise

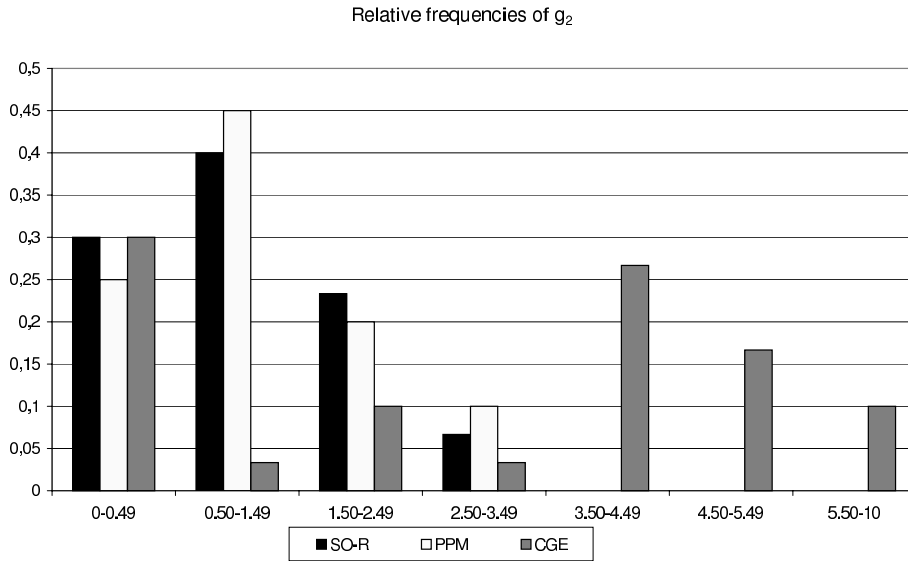


Figure 2: Relative frequencies of gifts to two losers in group ( $g_2$ )

Mann-Whitney-U-tests cannot reject the null hypothesis of the same mean among the three treatments. The two-tailed Kolmogorov-Smirnov goodness-of-fit tests (K-S) comparing pairs of samples cannot reject the hypothesis of the same distribution for the conditional gift of  $g_1$  (p-values equal to .997, .799, and .723, for the treatments SO-R and PPM, SO-R and CGE, and PPM and CGE, respectively). This result indicates the stability of the experimental procedure between the treatments SO-R and CGE, where the experimental procedure and the parameters for the one loser case were the same, but also indicates that the introduction of the partial play method in treatment PPM has no effects on gifts to one loser in the group.

*Gift to two losers ( $g_2$ )* The mean values of  $g_2$  are .96, 1.05, and 2.84, in treatments SO-R, PPM and CGE, respectively. The Kruskal Wallis Test (chi-square = 9.19, p-value = .010) rejects the null hypotheses of the same mean among the three treatments, while pair wise non-parametric Mann-Whitney-U-tests, as reported in Table 3, indicate this to be true only for the comparisons of SO-R vs. CGE and PPM vs. CGE, while it is not true for a comparison of SO-R vs. PPM. The two-tailed K-S test rejects the hypothesis of the same distribution in treatments SO-R and CGE, and CGE and PPM (p-values equal to .000, and .002, respectively), but cannot reject the hypothesis of the same distribution in treatments SO-R and PPM (p-value = 1).

The higher endowment of the winner in the case of two losers yields significant differences in gift behavior. However, if we consider the conditional gifts as a proportion of the winner's own endowment,  $g_2$  for CGE is still higher than

Exact Significance, 2-tailed	N	$g_1$	$g_2$	$e_1$	$e_2$
PPM winners vs. SO-R	20 vs. 30	n.s.	n.s.	n.s.	n.s.
SO-R vs. CGE based on absolute values	30 vs. 30	n.s.	0.000	n.s.	0.000
SO-R vs. CGE based on shares of winner's own endowment	30 vs. 30	n.s.	n.s.	n.s.	n.s.

Table 3: Non-parametric statistics: 2-tailed Mann-Whitney-U tests on differences in mean between treatments PPM and SO-R, CGE and SO-R.

for SO-R and PPM (0.142 vs. 0.096 resp. 0.105), but we get no significant difference among the three means and distributions of gifts.<sup>2</sup> Table 4 reports the mean values of gifts and expectations relative to the winner's endowment.

	N	$g_1$	$g_2$	$e_1$	$e_2$
SO-R	30	0.139	0.096	0.187	0.134
PPM Winners	20	0.153	0.105	0.209	0.138
PPM Losers	10			0.275	0.137
CGE	30	0.162	0.142	0.179	0.149
S-O (West)	118	0.246	0.156	0.247	0.153
O-W (East)	58/56	0.162	0.101	0.160	0.108

Table 4: Descriptive Statistics: Average gifts and expectations in share of winner's endowment.

Therefore, the subjects seem to determine their gifts relative to their endowment, which is in line with fairness models (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). Moreover, compared to the results (conditional gifts relative to winner's own endowment) of S-O and O-W, our results from the East German town Jena seem to be close to the values of O-W from Magdeburg, East Germany, but lower than the data of S-O from Bonn, West Germany.

## 4.2 Behavioral Types in Individual Data

Table 5 reports the relative percentage of types of behavior, resulting from a decomposition of conditional gift giving, for our treatments as well as for the original S-O solidarity game. Note, that for our treatment CGE we report both classification types based on absolute gifts and on relative gifts.

<sup>2</sup>Kruskall-Wallis Test, chi-square = 2.69, p-value = .26; pair wise Mann-Whitney-U-tests reported in Table 3; pair wise K-S tests on distributions with p-value equal to .134, and .139, for the treatments SO-R and CGE and CGE and PPM, respectively.

Types	Egoistical	$g_1 > 2g_2$	Fixed total sacrifice		Intermediate	Fixed gift to loser		$g_2 > g_1$
			exact	up to round.		exact	up to round.	
SO-R	0.27	0.03	0.20	0.23	0.07	0.13		0.07
PPM	0.25		0.15	0.20	0.15	0.25		
CGE ab	0.30					0.07		0.63
CGE rel	0.30		0.07		0.23	0.30	0.07	0.03
S-O	0.21		0.36	0.16	0.11	0.16		
O-W	0.47		0.26	0.09	0.05	0.14		

Table 5: Relative frequencies of types of behavior. Entries for treatment 'CGE ab' and 'CGE rel' consider the absolute conditional gift and the conditional gift in proportion of the winners own endowment, respectively.

We use the same definitions as Selten and Ockenfels (1998), but extend them with new characteristics of behavior we have observed. Thus, we define eight types of behavior:

- *Egoistical*: Subjects in this category chose  $g_1 = g_2 = 0$ .
- $g_1 > 2g_2$ : One subject's behavior of  $g_1 > 2g_2$  could not be classified as *fixed total sacrifice up to rounding* as described below. Thus we had to create this category.
- *Exact fixed total sacrifice*: Gift behavior with the pattern  $g_1 = 2g_2 > 0$ , i.e. the same amount was given to one loser as to two losers together, was classified in this category.
- *Fixed total sacrifice up to rounding*: As Selten and Ockenfels (1998), we consider rounding of amounts up to a multiple of the prominence level of 1.00. Cases in this category fulfill  $g_1 > 2g_2 > 0$  or  $2g_2 > g_1 > 0$ . However, rounding the gift in this case can only be considered in treatments SO-R and PPM, because in treatment CGE (relative) fixed total sacrifice would lead to specifying exactly the same absolute amount for one loser as for each of two losers.
- *Intermediate*: Behavior, which could not be classified in other categories, but where  $2g_2 > g_1 > g_2 > 0$  holds true, was considered as intermediate.
- *Exact fixed gift to losers*: When people chose  $g_1 = g_2$ , i.e. gave the same amount to each loser regardless of whether there are one or two winners in the group, they were categorized here.
- *Fixed gift up to rounding*: In our treatment CGE a (relative) fixed gift means that  $g_1 = \frac{1}{2}g_2$ . Thus, by analogy to the fixed total sacrifice behavior

we consider rounding to the prominence level of 1.00. However, only 2 subjects fall under this category.

- $g_2 > g_1 = 0$ : In three cases, we observed this behavior (two times  $g_2 = 1$  in SO-R, one time  $g_2 = 2.5$  in CGE). This behavior may be explained by taking over responsibility when being the only winner in the group while letting the other winner pay in the case of two winners in the group.

Figure 3 shows the distribution of types, where the fixed total sacrifice and the fixed gift behavior are summarized with the corresponding behavior up to rounding, respectively. In Appendix C we classify each subject according to its type of behavior described above.

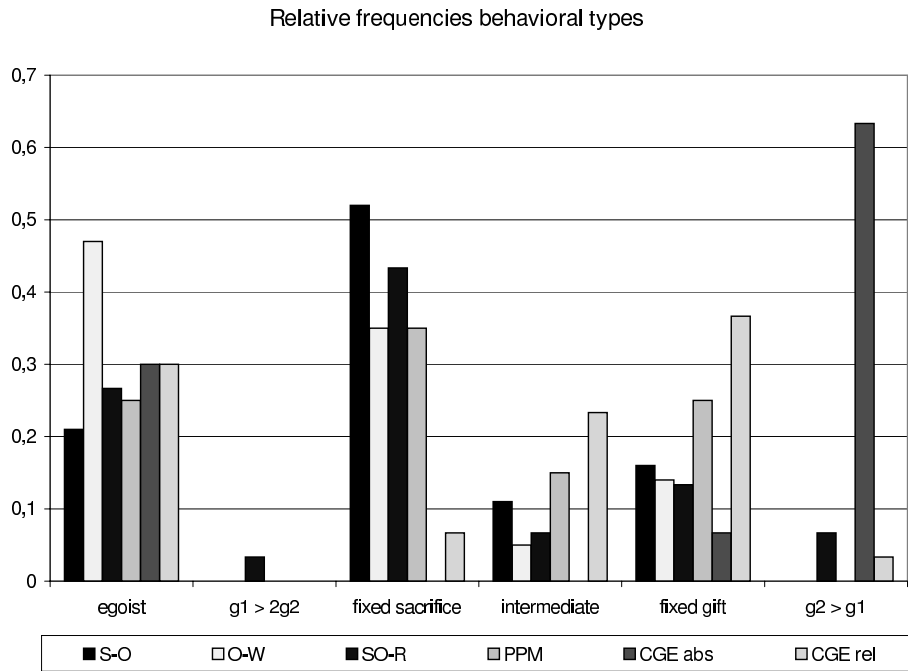


Figure 3: Relative frequencies of types of conditional gift, based on absolute and relative gifts. Note that for S-O, O-W, SO-R and PPM the categorization is indeed the same on the base of absolute and relative gifts, while this is not true for treatment CGE.

If we consider absolute gifts, we have to classify 63% of the behavior in treatment CGE as giving more to each of the two losers than to one loser in the group. This is not in line with the evidence from our other sessions and from S-O and O-W, while if one considers the conditional gifts relative to winners' endowment this portion shrinks to 3% (see Figure 3, 'CGE abs' and 'CGE rel'). Thus, again we have evidence that gift giving is relative to the own endowment. In the following we consider results only on a relative basis.

Throughout the experiment we observe 27% of egoistic behavior. This proportion is analogous to the result of Selten and Ockenfels (1998), who reported 21% of egoistic behavior, and significantly less than the result in Ockenfels and Weimann (1999), 47%. However, the proportion of egoistic behavior is highest in CGE and lowest in PPM.

Overall, we observe an amount of 43% of fixed total sacrifice behavior in our replication treatment SO-R compared to 52% in the original S-O game. Note, that in the latter the portion of classification in this category due to rounding is about 31%, while it is 53% in our data. If there would be no rounding, most of these data points would belong to intermediate behavior. Despite of this, we can say that in SO-R we have replicated the S-O game also in the observed types of behavior. In the PPM treatment we observe 8% less fixed total sacrifice and more intermediate behavior, but these changes are rather small.

In treatment CGE the distribution of behavior changes completely. Only 7% of our participants exhibit the exact fixed total sacrifice behavior. The proportion of intermediate behavior rises to 23%, and about 37% of the subjects give a fixed gift, i.e. the same amount to one loser as to each of the two losers.

		Expected				CGE rel
		S-O	O-W	SO-R	PPM	
Observed	$\chi^2$					
	S-O	-	-	-	-	-
	O-W	22.928** ( $< 0.0001$ )	-	-	-	-
	SO-R	1.321 (0.747)	3.404 (0.318)	-	-	-
	PPM	2.487 (0.488)	7.553 (0.056)	3.820 (0.280)	-	-
	CGE rel	25.700** ( $< 0.0001$ )	40.317** ( $< 0.0001$ )	31.687** ( $< 0.0001$ )	8.552* (0.036)	-

Table 6: Results from Chi-Square tests for differences in distribution of behavioral type groups 'Egoists', 'Fixed Total Sacrifice', 'Intermediate' and 'Fixed Gift' based on conditional gifts relative to winner's endowment between treatments SO-R, PPM and CGE and the data from S-O and O-W. Significance values in brackets. \* significant on the 5%-level. \*\* significant on the 0.1%-level

Table 6 reports a Chi-Square-Test for differences in distribution of behavioral types on a relative base between our three treatments and the data from S-O and O-W. We excluded the three observations from  $g_1 > 2g_2$  and  $g-2 > g_1$  and formed 4 groups of behavioral types: 'Egoistical behavior', 'Fixed Total Sacrifice' (including rounding), 'Intermediate' and 'Fixed Gift' (including rounding). As it can be seen, we cannot reject the null hypotheses of the same



distribution of behavioral types for our treatments SO-R and PPM compared to S-O and O-W, while the S-O and O-W distributions differ. The observed distribution of behavioral types in our treatment CGE is different from the observed distributions of all other treatments and experiments.

### 4.3 Expectations

Table 2 and 4 summarize subjects' expectations  $e_1$  and  $e_2$  in the three treatments for absolute and relative values, respectively. The values are very close to the observed conditional gifts, but slightly higher. Overall, 18% of the subjects estimated both expected values correctly (in a range of  $\pm 0.5$ ); 25% and 24% of the subjects guessed the value of the  $g_1$  and  $g_2$  correctly (in a range of  $\pm 0.5$ ), respectively. Spearman rank tests ( $\rho = .64$ , for the  $g_1$  and  $e_1$ , one-tailed p-value  $< .01$ ; and  $\rho = .653$ , for the  $g_2$  and  $e_2$  proportional to winner's own endowment, one-tailed p-value  $< .01$ ) show a high and significant correlation among choices and expectations. However, as Table 7 reports, Wilcoxon Matched Pairs Signed Ranks tests show that in treatments SO-R and PPM subjects expect significantly higher gifts from others than they actually contribute themselves.

	N	$e_1$ vs. $g_1$	$e_2$ vs. $g_2$
SO-R	30	0.017**	0.036*
CGE	30	n.s.	n.s.
PPM Winners	20	0.016**	0.017**
PPM Losers	10 vs. 20	0.007**	n.s.

Table 7: Are expectations greater than donations? Results from 1-sided Wilcoxon Matched Pairs Signed Ranks Test of  $e_1$  vs.  $g_1$  and  $e_2$  vs.  $g_2$  for SO-R, CGE and PPM winners and from one-sided Mann-Whitney-U test between  $e_1$  ( $e_2$ ) of PPM losers and  $g_1$  ( $g_2$ ) of PPM winners. \*significant on the 5%-level, one-tailed; \*\*significant on the 2.5%-level, one-tailed; \*\*\*significant on the 1%-level, one-tailed

Figure 4 shows that this result is driven by a high number of low-contribution higher-expectation data points compared to a low number of high-contribution lower-expectation subjects. Egoistic people guess right that the average gift is higher than their own, and altruists are right expecting that most other people will contribute less.

### 4.4 Demographic Characteristics

The results of our experiment show the absence of a gender effect (two-tailed Mann-Whitney U-tests, p-values equal to .86, and .697, for the one loser case and the two losers case, respectively). The proportion of egoistical behavior,

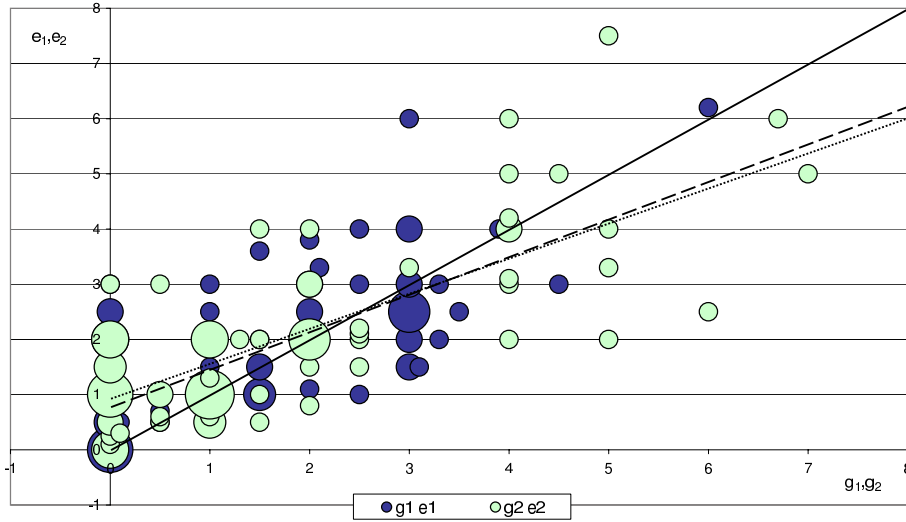


Figure 4: Donations and expectations in the solidarity game. The size of the bubbles represents the number of cases observed for a data point. Furthermore, the 45° line (solid), and the least square regression trend lines for  $g_1, e_1$  (dotted) and  $g_2, e_2$  (short lined) are included.

i.e. zero gifts in both cases, is not significantly different between sexes. This result is different from the finding of Selten and Ockenfels (1998), but is similar to other results in dictator games (Bolton and Katok, 1995a). There is also no correlation between gifts and expectations on the one hand and age or semester of university study on the other hand.

Field of Study	1	2	3	4
Description	Economics and related	Pedagogies and psychology	Other human sciences	Natural Sciences
	Business Administration (25), Economics (3), Business Informatics (2), Business Education (1), Labor Law and Human Resource Management(1)	Educational Sciences (11), Psychology (5), Teacher (3), Social Work (1),	Sociology (5), Media Sciences (2), Law (6), English (3), German (8), Eastern Slavonic Studies (1), Policy (1), Cultural History (1), Philosophy (1), History (2)	Geography (1), Information Science (4), Mathematics (1) Nutrition Science (2)
N	32	20	30	8
N w/o PPM Losers	30 (36%)	18 (22%)	25 (33%)	7 (9%)
$g_1$	0.112	0.176	0.173	0.177
$g_2$	0.082	0.138	0.125	0.171
$e_1$	0.164	0.227	0.195	0.186
$e_2$	0.119	0.144	0.158	0.161

Table 8: Groups of fields of studies and actual decisions and expectations.

We observe an effect, which one could call 'economist effect'. Table 8 reports means of gifts and expectations for different fields of study. A two-tailed Mann-Whitney-U test for the relative gifts and expectations in all treatments yields that subjects studying economics and related studies come from a different population than subjects from other fields regarding actual gifts  $g_1$  ( $p = 0.047$ ) and  $g_2$  ( $p = 0.012$ ), while the same distribution of expectations  $e_1$  ( $p = 0.220$ ) and  $e_2$  ( $p = 0.227$ ) cannot be rejected. Overall, 40% of the economists are classified as 'egoists', while this is true only for 20% of students from other studies. Contrary to Selten and Ockenfels (1998) we find no interaction effect between field of study, gender and gift giving.

#### 4.5 Personality Characteristics

We do not find a significant correlation among the scores on the Interpersonal Reactivity Index (IRI) and the individual conditional gifts and expectations in the solidarity game (except a positive non-parametric Spearman correlation between PD and  $e_2$  at the 5%-level with  $p = 0.048$ ). Indeed, subjects that hand over a higher amount of their endowment to the loser(s) did not score higher in the IRI. Higher score on the IRI means a higher level of pro-social attitude. Table 9 shows average scores for the four components of the IRI, 'perspective taking', 'fantasy', 'empathic concern', and 'personal distress'. The table shows no significant difference among the three levels of gifts to one loser, 'low' ( $g_1 < 0.5$ ), 'medium' ( $0.5 \leq g_1 < 2.5$ ), and 'high' ( $g_1 \geq 2.5$ ). Table 10 considers the decomposition in types of behavior: egoistic behavior, fixed total sacrifice, fixed gift, and positive gift to two losers and zero gift to one loser. This table does not report any particular pattern of behavior related to any specific feature of the IRI.

	LOW	MED	HIGH
N	26	30	24
IRI	55.81	55.10	55.88
PT	14.15	13.87	14.00
FS	13.19	13.90	14.46
EC	14.88	15.00	14.33
PD	13.58	12.33	13.08

Table 9: Average scores in the perspective taking, fantasy, emphatic concern, and personal distress for low ( $g_1 < 0.5$ ), medium ( $0.5 \leq g_1 < 2.5$ ), and high ( $g_1 \geq 2.5$ ) conditional gift to one loser.

	Egoistical	$g_1 > 2g_2$	Fixed total sacrifice	Intermediate	Fixed gift	$g_2 > g_1 = 0$
N	22	1	23	11	20	3
PT	13.91	13.00	13.00	14.18	14.95	15.67
FS	13.32	15.00	13.57	14.73	14.50	11.67
EC	15.09	16.00	14.91	14.45	14.50	13.67
PD	13.18	13.00	13.61	10.82	12.65	16.33

Table 10: Average scores in the perspective taking (PT), fantasy (FS), emphatic concern (EC), and personal distress (PD) for types of behavior.

## 5 Discussion

We can summarize our findings in six observations:

**Observation 1** *Our results in treatment SO-R replicate the findings of Selten and Ockenfels (1998) and Ockenfels and Weimann (1999).*

We have replicated the results of the original solidarity game even if we have introduced the following variations: laboratory pen and paper experiment, double blind with a monitor, no lottery, and instant payment.

**Observation 2** *Aggregate and individual behavior in the solidarity game is robust against the strategy method.*

We have shown that the observed values of gift giving in the design of Selten and Ockenfels (1998) are not due to the strategy method, i.e., deciding without knowing if one is a winner or not. Thus, we have to reject our Hypothesis 1. Implicit reciprocity generated by the use of the strategy method does not contribute to the explanation of gift giving in this game.

Indeed positive gifts in the solidarity game are consistent with previous findings from dictator experiments. However, the evidence for the impact of the strategy method on behavior is mixed. In this paper we present results which strengthen the opinion of no influence of the strategy method on behavior, similar to Brandts and Charness (2000) and Bolton and Katok (1995b). The strategy method is therefore an appropriate tool to study gift giving behavior.

**Observation 3** *In treatment CGE the predominance of 'fixed total sacrifice' behavior is displaced by 'fixed relative gift' behavior.*

Our experimental analysis confirms that the fixed total sacrifice is the most common behavior in the solidarity game when the winner's endowment remains constant over all the possible scenarios of the game (as in our treatments SO-R and PPM). Selten and Ockenfels (1998) explain the fixed total sacrifice effect

with a two-stage reasoning process: in a first step dictators decide how much to keep for themselves, and in a second step they distribute the remaining amount across potential receivers.

However, in our treatment CGE the predominance of fixed total sacrifice behavior disappears, and is substituted by fixed relative gift behavior. While the difference between both treatments is that the winner's endowment is doubled for the two-loser case in CGE, subjects respond by quadrupling their total gift in the two losers case. Table 11 compares both predominant behaviors in treatments SO-R and CGE.

	'Fixed total sacrifice' in SO-R		'Fixed relative gift' in CGE	
	1 loser	2 loser	1 loser	2 loser
Group endowment	20	10	20	20
Individual endowment	10	10	10	20
Absolute gift to each loser	$x$	$\frac{1}{2}x$	$x$	$2x$
Relative gift to each loser	$x/10$	$\frac{1}{2}x/10$	$x/10$	$x/10$
Absolute total gift	$x$	$x$	$x$	$4x$
Relative total gift	$x/10$	$x/10$	$x/10$	$2x/10$
Absolute expected income of loser	$2x$	$\frac{1}{2}x$	$2x$	$2x$
Relative expected income of loser	$x/10$	$\frac{1}{2}x/10$	$x/10$	$x/10$
Absolute income of winner	$10-x$	$10-x$	$10-x$	$20-4x$
Relative income of winner	$10-x/20$	$10-x/10$	$10-x/20$	$10-2x/10$
Average $x$	2.24	2.74	2.17	2.21

Table 11: Comparisons between the predominant behavior in treatment SO-R, 'fixed total sacrifice', and the predominant behavior in treatment CGE, 'fixed relative gift';  $0 < x \leq 5$ . The average  $x$  is calculated from the subjects showing this behavior including rounding.

The reasoning process proposed by Selten and Ockenfels (1998) is not visible in our data from treatment CGE. We cannot imagine such a cognitive process which could cover both types of behavior exhibited in the two treatments. Essentially, we find a shift from self-centered 'fixed total sacrifice' behavior in treatment SO-R to other-regarding 'fixed relative gift' behavior in treatment CGE. In the first case, winners keep their own (relative) income constant regardless if there are one or two losers in the group. In the second case, winners give gifts in a way that the (expected) income of each loser is constant regardless if there are one or two of them.

**Observation 4** *Expectations of gift behavior are close in mean, but significantly higher than actual decisions in pair wise comparisons.*

Selten and Ockenfels (1998) and Ockenfels and Weimann (1999) report that subjects on average guessed quite well when asked for the average gift of all participants in the solidarity game. They explained this with the 'false consensus' effect, i.e. the general tendency to overestimate one's similarity to others. In our experiment we found the same pattern, and the correlation coefficients reported in Section 4.3 indicate an even stronger false consensus effect. However, contrary to the other experiments we found that subjects expect higher average gifts than they give themselves, which is mainly driven by subjects contributing few or nothing.

**Observation 5** *Economists contribute significantly less than students from other fields of study. We do not observe a gender or age effect.*

The fact that economists behave differently has also been found by other studies, including Selten and Ockenfels (1998) and Ockenfels and Weimann (1999). Marwell and Ames (1981) report that economics graduate students were much more likely to free ride than any other of their groups of subjects. Frank, Gilovich and Regan (1993) conducted a prisoner's dilemma game in which they compared the defection rates of economic majors and non-majors. Their results show that economic majors are more likely to behave self-interested than other students. The defection rates are 60.4% compared to 38.8%.

We cannot say where these differences come from. They might be due to the education of the subjects which means that the subjects adopt the basic axioms of their studies. That would denote that there is learning. On the other side, the differences might be due to personal characteristics. Carter and Irons (1991) propose a hypothesis in which they argue that people with certain attitudes self select into economics. In a study they accomplished with freshmen and senior economists and non-economists, they had to reject the learning hypothesis but could confirm the selection hypothesis. Thus, they argue, "Economists are born, not made."

**Observation 6** *There is no correlation between individual characteristics measured by the Interpersonal Reactivity Index and actual gift behavior.*

The lack of correlation might indicate that while the IRI test measures (empathic) solidarity attitudes; the gift giving in the context of the solidarity game can be explained by fairness preferences, but not by empathy driven solidarity. This coincides with our finding that implicit reciprocity induced by the use of the strategy method plays no role for the size of gifts.

## 6 Conclusions

From the results of SO-R and PPM we can conclude that the level and the type of other regarding behavior is analogous to the findings of ?. Under these conditions the modal individual behavior is the fixed total sacrifice. This behavior can be interpreted as self-centered, considering that the winners decide first the amount they want to keep independently from the number of recipients, and then distribute the rest to the needy person(s).

The comparison between SO-R and PPM conditions shows that empathy does not explain gift giving. Indeed, the level of gift giving does not decrease when the strategy method is removed. The independency of our results from empathy driven behavior is confirmed by the comparison between the IRI and actual gift behavior. Indeed, subjects with a higher level of empathic-driven pro-social predisposition do not perform higher gift giving or more egalitarian type of behavior in the solidarity game.

By contrast, the findings from the CGE condition show a dramatic increase of other regarding behavior of the egalitarian type. The winner keeps the amount of gift for each recipient in the one loser and two loser case constant. Therefore when the subject is the only winner in the group she takes her responsibility in keeping the endowment of each one of the two losers at a fair level.

Comparing the three conditions of our experiment we can conclude that the nature of the other regarding behavior depends on donors' endowment; when it is kept constant between the two contingent cases, the donors behave in a self-centered way; whereas, when it increases from the one loser to the two losers case, they behave in a more egalitarian way.

## A Instructions

### Translated from German.

Welcome and thanks for participating in this experiment. Please read these instructions carefully. If you have any question, please raise your hand. We will come to your place and answer your questions. It is prohibited to communicate with the other participants during the experiment. Otherwise, we shall have to exclude you from the experiment and from all payments.

These instructions are identical for all participants. Furthermore, all forms, which have to be filled in during this Experiment, are identical for all participants.

### The experiment

Each participant is a member of a randomly formed three-person-group. Each member of a group might win a certain amount of money that will be specified in the decision form. The probability to win is  $\frac{2}{3}$ . The probability to lose is therefore  $\frac{1}{3}$ . So, obviously, there are four possibilities:

1. the three members of a group win
2. one member wins and the other two lose
3. two members win and the other one loses
4. the three members lose

If you are a winner you will receive the amount specified in the decision form. From this amount you can voluntarily hand something over to the losers in your group. Your payoff is therefore the amount you received minus the amount you gave to the loser(s) in your group.

Your decisions are absolutely anonymous. Due to the following procedure it is guaranteed that neither the other participants nor the experimenters can assign decisions which were made to certain persons.

### Procedure

1. You will be asked to draw an envelope from a box. This box contains as many envelopes as participants in this experiment. Inside each envelope you find a card with a code number that just you know. Please keep this card and show it to no other participant or to one of the experimenters



except to the monitor mentioned under point 8 in this procedure.

One of these cards is marked with the word 'monitor'. This 'monitor' will guarantee that this experiment will be conducted as it is written here.

The monitor himself will not participate in this experiment.

If you are not the monitor, you find three further envelopes (blue, red, green). Please do not open these envelopes before we ask you to do so.

We will tell you when to open each particular envelope.

2. Then everybody except the monitor has to open the blue envelope. In this envelope you will find a decision form, which is marked with your code number on the backside. Please fill in this decision form completely. After you have filled in this form please put it back into the envelope and close the envelope. Once everybody has filled in the decision form, the monitor will collect them all with a box.
3. Then every participant (except the monitor) will open the green envelope when we ask them to do. Inside you will find another form with your code number on the backside. Please fill in this form completely, put it back into the envelope and close the envelope. Once everybody has filled in the form, the monitor will collect the green envelopes.
4. After this we will ask you to open the red envelope. Inside you will find a third and last form. Please fill in this form completely as well and put it back into the envelope. Once everybody has filled in the form, the monitor will collect the red envelopes.
5. The monitor will draw one envelope at a time from the box containing the blue envelopes with the decision forms. She / he will throw a normal six-sided dice once for each decision form. If one of the numbers 1, 2, 3, or 4 appears, the monitor will write 'winner' on the envelope. If one of the numbers 5 or 6 appears he or she will write 'loser' on the envelope. After this all envelopes are put back into the box and are mixed again.
6. The monitor will draw again the blue envelopes from the box. The envelopes will be randomly matched in groups of three. For each group the experimenters will open the envelopes and calculate the payoff. Please notice that the experimenters don't know and won't know the identity of the participants.
7. After the calculation of the payoffs, the experimenters will put the money into envelopes which are marked with the code numbers. After this the experimenters leave the room.

8. The monitor will now come to each of the participants. Please give her/him your code number. The monitor will give you then the corresponding envelope. Please do not yet open the envelope.
9. When all envelopes are distributed the monitor will take the experimenters in again. When we tell you to do so, please open the envelope and check the money.
10. After this you can leave the room. At the door there will be a list with all code numbers and the corresponding payoffs. Please sign there that you received money in cash under one of these code numbers. Due to this procedure your payoff stays anonymous.

## **B Forms**

**Translated from German.**

### **Decision form.**

Your group consists of three participants.

In case of *three winners* in your group each of you receives ten euro.

In case of *two winners* in your group each of the two winners receives ten euro, the loser receives zero euro.

*In case that you are one of the two winners in your group:*

How much of your ten euro would you give to the loser in your group? (each amount between zero and ten euro is possible, in ten cent steps)

Please enter the amount here: .....

In case of *one winner* in your group, the winner receives ten euro, and both losers receive zero euro.

*In case that you are the winner :*

How much of your ten euro would you give to each of the two losers in your group?(each amount between zero and ten euro is possible, in ten cent steps)

Please enter the amount here: .....

In case of *no winner* in your group each of you receives zero euro.

Please put this decision form back into the blue envelope and close it.

**Expectations form.**

In the previous form you could say how much you would give to the loser(s) in your group in case that you are a winner.. How much do you think do the other participants give *on average to each loser in the group?*

in case of *one* loser in the group:.....

in case of *two* losers in the group:.....

Please notice, you get one extra euro if one of the amounts is exact or differs at most 50 cent, or two euro extra if both of the amounts are exact or differ at most 50 cent each.

Please put this form back into the envelope.

**3rd form: Interpersonal Reactivity Index Questionnaire**

1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)
2. I often have tender, concerned feelings for people less fortunate than me. (EC)
3. I sometimes find it difficult to see things from the 'other guy's' point of view. (PT-)
4. Sometimes I don't feel very sorry for other people when they are having problems. (EC-)
5. I really get involved with the feelings of the characters in a novel. (FS)
6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)
7. I am usually objective when I watch a movie or a play, and I don't often get completely caught up in it. (FS-)
8. I try to look at everybody's side of a disagreement before I make a decision. (PT)
9. When I see someone being taken advantage of, I feel kind of protective towards them (EC)
10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)

11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)
12. Being extremely involved in a book or movie is somewhat rare for me. (FS-)
13. When I see someone get hurt, I tend to remain calm. (PD-)
14. Other people's misfortunes do not usually disturb me a great deal. (EC-)
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT-)
16. After seeing a play or a movie, I have felt as though I were one of the characters. (FS)
17. Being in a tense emotional situation scares me. (PD)
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC-)
19. I am usually pretty effective in dealing with emergencies. (PD-)
20. I am often quite touched by things that I see happen. (EC)
21. I believe that there are two sides to every question and I try to look at them both. (PT)
22. I would describe myself as a pretty soft-hearted person. (EC)
23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)
24. I tend to lose control during emergencies. (PD)
25. When I'm upset at someone, I usually try to 'put myself in his shoes' for a while. (PT)
26. When I'm reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)
27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

## C Decision data and types of behavior

Abbreviations: *EGO* - egoistical, *E FTS* - exact fixed total sacrifice, *R FTS* - fixed total sacrifice up to rounding, *IM* - intermediate, *E FG* - Exact fixed gift, *R FG* - Fixed gift up to rounding, *W/L* - winner/loser.

Treat	Session	Code	W/L	g1	g2	e1	e2	Type abs.	Type rel.	
SO-R	1	666-R29-X9B	W	0	0	1.5	2	EGO	EGO	
		947-P85-D4B	W	2	1	2	1	E FTS	E FTS	
		599-B58-S5B	L	0	0	1	1	EGO	EGO	
		192-T52-P7B	W	1.5	0.5	2	1	$g_1 > 2g_2$	$g_1 > 2g_2$	
		922-U76-P6B	W	1	0.5	1	0.5	E FTS	E FTS	
		803-F46-U8B	L	0	0	2.5	1.5	EGO	EGO	
		939-X60-L1B	W	1	0.5	2.5	3	E FTS	E FTS	
		537-T68-Q6B	W	0	0	0	0	EGO	EGO	
		104-U69-C0B	W	1	1	1	0.6	E FG	E FG	
		690-O30-N8B	W	1.5	1.5	1	0.5	E FG	E FG	
		521-Z25-J0B	L	0	0	0.5	0.25	EGO	EGO	
		527-P70-I7B	W	0.1	0.1	0.5	0.3	E FG	E FG	
		800-C56-Z4B	W	3.5	2.5	2.5	1.5	IM	IM	
		578-A66-Z1B	W	0	1	2.5	1	$g_2 > g_1$	$g_2 > g_1$	
		872-T19-W7B	L	0	1	0	1	$g_2 > g_1$	$g_2 > g_1$	
		2	264-U27-Z3D	W	1.5	1	1	0.5	R FTS	R FTS
			544-M76-W2D	W	2.5	2	3	2	R FTS	R FTS
	229-J97-W7D		W	1.5	1	1.5	1	R FTS	R FTS	
	439-O42-J6D		W	3.9	2.5	4	2.1	IM	IM	
	596-C67-E8D		W	0	0	2	1	EGO	EGO	
	475-A48-B3D		W	0	0	1	1	EGO	EGO	
	842-M37-W2D		W	3.1	2	1.5	0.8	R FTS	R FTS	
	398-J11-C3D		L	3	1.5	2.5	4	E FTS	E FTS	
	162-G63-G1D		W	2	1	2.5	2	E FTS	E FTS	
	985-R51-N0D		W	3	2	6	4	R FTS	R FTS	
	376-J15-S6D		L	0	0	0	0	EGO	EGO	
	371-J32-I9D		W	3	2	3	2	R FTS	R FTS	
	379-V22-W7D		L	3	2	2.5	1.5	R FTS	R FTS	
	412-F97-V0D		W	1	1	1	1	E FG	E FG	
	457-K57-A1D		W	2.5	1.3	4	2	E FTS	E FTS	
	CGE	3	396-H88-E4F	W	0.5	0.5	0.5	1	E FG	E FTS
			827-V98-U3F	L	3.3	6.7	3	6	$g_2 > g_1$	E FG
			751-K67-T2F	W	0	2.5	0	2	$g_2 > g_1$	$g_2 > g_1$
			308-J22-X3F	W	2	4	3.8	4.2	$g_2 > g_1$	E FG
			993-V30-C5F	W	0	0	1	3	EGO	EGO
			416-D67-J9F	L	0	0	1	2	EGO	EGO
			560-Z26-U2F	L	0	0	0.5	0.5	EGO	EGO
			779-O79-R8F	L	2.1	4	3.3	3.1	$g_2 > g_1$	R FG
			324-O56-W5F	L	0	0	1.5	1.5	EGO	EGO
			876-P70-K1F	W	0	0	0	0	EGO	EGO
			717-P41-Z6F	L	2	4	2	2	$g_2 > g_1$	E FG
			793-C25-R9F	W	3	7	1.5	5	$g_2 > g_1$	R FG
801-B82-L5F		W	2.5	5	1	2	$g_2 > g_1$	E FG		
174-O38-X3F		L	0	0	2	2	EGO	EGO		
737-R48-O4F		W	3.3	5	2	3.3	$g_2 > g_1$	IM		
4		117-J25-Y5H	W	3	5	2.5	7.5	$g_2 > g_1$	IM	
		351-Z90-U9H	W	2	4	3	4	$g_2 > g_1$	E FG	
		794-K47-Q5H	L	2	4	2	5	$g_2 > g_1$	E FG	
		907-Z59-Q7H	W	0	0	1.2	2	EGO	EGO	
		279-I52-N3H	L	1	2	1	2	$g_2 > g_1$	E FG	
		413-O49-C1H	W	1	2	2	3	$g_2 > g_1$	E FG	
		984-J71-G0H	L	0	0	0.5	1	EGO	EGO	
		965-O31-Y2H	L	3	4	2	3	$g_2 > g_1$	IM	
		684-S97-R4H	L	3	4	2	4	$g_2 > g_1$	IM	
		207-Z95-J9H	W	1.5	2	1.5	2	$g_2 > g_1$	IM	
		674-G87-V0H	W	3	4	2.5	6	$g_2 > g_1$	IM	
		795-D88-A7H	W	3	5	4	4	$g_2 > g_1$	IM	
	957-V79-P5H	W	0	0	2	1	EGO	EGO		
	213-C34-J3H	W	3	6	1.5	2.5	$g_2 > g_1$	E FG		
	155-E83-O0H	W	4.5	4.5	3	5	E FG	E FTS		
PPM	5	696-O29-K9J	W	1	1	1.5	1	E FG	E FG	
		576-W26-O5J	W	3	2	4	3	R FTS	R FTS	
		538-P89-A4J	L			2	1.5			

Treat	Session	Code	W/L	g1	g2	e1	e2	Type abs.	Type rel.
		199-R10-E3J	W	3	2.5	2.5	2.2	IM	IM
		627-R63-F1J	W	0	0	1	0.5	EGO	EGO
		877-S79-H7J	L			3.5	0.7		
		303-Q58-V8J	W	3	2	3	2	R FTS	R FTS
		200-J58-Z1J	W	0	0	0.25	0.1	EGO	EGO
		673-J84-L9J	W	2	1.5	2	2	IM	IM
		552-J91-C6J	W	2	1	3	2	E FTS	E FTS
		763-K48-Q3J	W	0.5	0.5	0.7	0.6	E FG	E FG
		244-C49-K7J	L			2	1		
		768-M19-J1J	W	0	0	2	1	EGO	EGO
		983-J58-H4J	L			3	2		
		844-H56-X4J	L			3	2		
	6	559-F49-N7L	W	0	0	3	1.5	EGO	EGO
		450-H79-B4L	W	2	1	2.5	1.3	E FTS	E FTS
		132-S80-T5L	W	1	1	3	2	E FG	E FG
		979-W97-D6L	W	1	1	0.5	0.5	E FG	E FG
		421-D99-M0L	W	0	0	0	0	EGO	EGO
		652-Y77-S5L	L			2.5	2.5		
		899-Q62-T9L	W	1.5	1	3.6	2	R FTS	R FTS
		521-J80-T4L	L			1	0		
		612-R72-G6L	L			5	2		
		507-I73-X2L	W	1	1	1	1	E FG	E FG
		916-I48-V5L	W	6	3	6.2	3.3	E FTS	E FTS
		269-Q78-K5L	W	1.5	1	1	0.5	R FTS	R FTS
		834-V15-M8L	W	2	1.5	1.1	1	IM	IM
		661-E94-K6L	L			1.5	1		
		773-O44-V1L	L			4	1		

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