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Solidarity and Performance Differences

by

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Abstract

To investigate the influence of performance differences on donating behavior in a solidarity game we introduce a real effort task. In each three-person-group subjects are ranked according to their task performance. Since each potential winner is informed about his own rank and the potential losers' ranks, they are able to regard performance differences between various potential losers and between themselves and a potential loser. We run another treatment without a real effort task to check for the influence of performance. We find different kinds of donating behavior which seem to be fundamental characteristics.

Keywords: Solidarity; Performance Differences; Real Effort; Experiment

JEL Classification: C91; D31

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I. Introduction

Solidarity is a behavior which politicians often call for unemployment pay or certain taxes. After the hurricane 'Katrina' aid organizations demanded solidarity with people in the USA, who lost their homes and everything they possessed. These are just two examples for solidarity in every days life. In general, solidarity is defined as an act of providing support for a person in need (Bierhoff and Fetchenhauer (2001)).[1]

Besides investigations in sociology and political science, solidarity has become a research topic in behavioral economics and especially in experimental economics in the last years. A seminal work is an experimental study by Selten and Ockenfels (1998), who introduced the *solidarity game*. The participants of this experiment are randomly divided into three-person-groups and take part in a lottery. Each of the three subjects in a group has a probability of $\frac{2}{3}$ to win DM 10 and a probability of $\frac{1}{3}$ to get nothing.[2] These probabilities are independent, so there can be no winner or one, two or three winners in a group. Before playing the lottery, each participant has to specify the amount of money he would like to transfer to the single loser or to each of the two losers in case of winning respectively (conditional gifts).[3] Because the subjects have to specify their decisions about the transfers to the loser(s) before knowing, if they have won the lottery, the solidarity game is different from the dictator game[4]. Implicit reciprocity plays an important role. If people give positive gifts, they might assume that they will be supported, too, if they are themselves in the situation of a loser. This is different from pure reciprocity since gifts cannot actually be reciprocated.

Selten and Ockenfels (1998) show that the majority of subjects donate positive gifts. It is particularly interesting that a bulk of persons dispenses a fixed amount of money independently from the number of losers. Selten and Ockenfels (1998) call this behavior *fixed total sacrifice*. So each person is first deciding, how much money they want to keep for themselves, and are then distributing the remaining amount of money between the losers, not taking into account the number of losers.

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[1] An important feature of solidarity is that a helping person implicitly assumes that she would have been supported if she herself had been in this situation of distress. This is why the philosopher Jon Elster (1989) refers to solidarity as conditional altruism.
[2] DM 10 would be $ 5.97 today.
[3] This method corresponds to the strategy method (Selten (1967)).
[4] In the dictator game, an allocator can divide a certain amount of money between himself and a receiver. Then both players receive their payoffs according to this allocation.

Another result is that females show more solidarity than males. Furthermore, Selten and Ockenfels (1998) find an education effect: male economic students transfer significantly less than male non-economic students.

In this solidarity game experiment, subjects get an amount of money without having "worked" for it. It is questionable, if donating behavior does not change, if subjects have to work to get an endowment.

In working life, employers select applicants mainly according to their education, training, ability, motivation etc. So effort and performance can influence position, income and status. This is just one reason why these characteristics are regarded as very important in our society. Therefore it may be that prosocial behavior and particularly solidarity are influenced by living in a achievement-oriented society. Investigating performance aspects in an experiment, solidarity can be affected in two different ways: On the one side, the performance of a needy person could affect the behavior of a donator. Because the needy person had to bear effort costs, gifts could be higher than in the original solidarity game. On the other side, the performance of a donator might also have an impact on his gift giving decision. He had to bear effort costs, too, and might therefore transfer less than in the original solidarity game. It is crucial for gift giving which performance effect prevails.

When exerting effort, not only performance itself, but especially the relative performance is relevant for economic settings. For example, the rank allocation in a tournament is just based on the competitors' relative performance. Applied to the solidarity game, performance differences could influence donating decisions. It is possible that a needy person who performed better than another person in need gets a higher transfer. In addition to that, the gift giving behavior of a donator could dependent on his own relative performance in the group. In particular, his donation could be influenced by his performance comparison with regard to the loser's performance. This is exactly what we investigate in our experiment.

Next to Selten and Ockenfels (1998) there are two other experimental studies about the solidarity game, but none included a real effort task: Ockenfels and Weimann (1999) show that subjects from East Germany donate significantly less than West German subjects. The analysis of Büchner et al. (2005) investigates, whether the results found by Selten and Ockenfels (1998) will change, if a person already knows to be a winner of the lottery before specifying the gift giving decisions for the cases of one and two losers. The result of this study is that implicit reciprocity does not influence solidarity. Moreover, Büchner et al. (2005) consider the influence of a constant group endowment over the different outcomes of the lottery (none, one, two or three winners). In contrast to Selten and Ockenfels (1998), they

find that each loser gets a *fixed relative gift*. This means that a winner donates the same relative amount of money to each loser in the case of one single loser compared with the case of two losers. Subsequently, a loser can expect to get the same income in both cases, independently from the number of winners.

Some experimental studies already include relative performance into the dictator and the ultimatum game[5] to compare the behavior with the one in the original games: Ruffle (1998) conducts a dictator game experiment, in which the recipients have to solve a knowledge quiz. Their performance determines the pie size available to be divided in the subsequent dictator game. If a recipient belongs to the best 50%, he is endowed with a high pie ("winning recipient"). Otherwise, he is endowed with a low pie ("losing recipient"). In a control treatment, high and low endowments are randomly divided between the recipients. After the pie size is determined, allocators decide about the distribution between themselves and their recipient. Ruffle (1998) observes that offers to winning recipients in the contest treatment are significantly higher than offers to lucky recipients, who randomly get a high endowment. Offers to losing recipients are slightly smaller than offers to unlucky recipients, who only get a low endowment by chance. Thus, subjects tend to reward good performance and punish bad performance.

In Hoffman et al. (1996) the performance of subjects in a quiz determines their position in an ultimatum game. The best 50% of the participants get the position of the proposer, while the others become the responders. Compared with the original ultimatum game, offers decrease significantly. In the dictator game this result holds as well (Hoffman et al. (1994)).

These findings are in line with other bargaining experiments like the one by Hoffman and Spitzer (1985). These authors show that having earned a high entitlement makes people feel deserving their better position and therefore behave more egoistically.

Thus experimental studies underline the influence of relative performance on subjects' behavior in distribution games. Especially the results of the dictator game stress that fairness considerations are influenced by performance. It is not clear right from the beginning what will happen, if relative performance is incorporated into the solidarity game. Will the donating behavior change, if every subject has to perform a real effort task?

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[5] In the ultimatum game, the proposer first gets a certain amount of money, which he can allocate between himself and the responder. Then the responder has the opportunity to accept or reject the proposal. If he rejects, both players receive nothing. If he accepts, each player is paid his fraction. Experimental results of the ultimatum game show that offers tend to converge to an equal split between proposer and responder. In the dictator game, people behave less generous, but even here you can find some allocations around an equal split (Forsythe et al. (1994)).

The remainder of the paper proceeds as follows. Section II describes the design and the procedures of the experiment. Section III states our hypotheses for the different treatments, while section IV presents and briefly discusses the results of our experiment. The final section V concludes.

II. Experimental Design and Procedures

To study the impact of performance differences on gift giving in the solidarity game, we conducted a pen and paper experiment at the University of Bonn Experimental Economics Laboratory. We run two treatments with two sessions, each on two consecutive days in November 2005. There were 24 subjects per session. We made sure that no subject participated twice and that we had no unilateral subject pool. Our sample consisted of 50 females and 46 males. In order to investigate whether there is an education effect, we had a balanced proportion of economic and non-economic students: 50 economists (25 of them were females) and 46 non-economists (25 of them were females). A session lasted approximately one hour. The average earning was € 8.80.[6] To guarantee anonymity, the subjects had to draw code names. They acted and got their payments with this drawn identity. Moreover, these code names determined which person belonged to which group. Each group consisted of three persons.[7] The subjects neither knew their group members nor the group they belonged to.

To ensure credibility of anonymous gift giving decisions, we used a double blind procedure. The subjects were paid by a neutral person, who did neither know the content of the experiment nor the instructions[8]. The payments were computed by two other persons, who knew the instructions but could not attribute decisions of the subjects to special participants. In addition to that, subjects enveloped decision and other data forms, which were collected with a box. We formulated the instructions as neutral as possible, to prevent an influence of framing. For example, we avoided expressions like "gift" or "donation" and used the word *transfer* instead. After reading the instructions, the subjects had to answer clarifying questions to control their understanding of the instructions.

To investigate the influence of real effort and performance differences on solidarity, we run two different treatments. In the first one, the real effort treatment (RET), subjects first had to

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[6] € 1 was about $ 1.1685.
[7] So we had 8 groups per session and 16 groups per treatment.
[8] The instructions can be requested from the authors.

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bead little plastic pearls on a string. This task lasted ten minutes. We chose this kind of task because we expected a high variance in outcomes. As we wanted to rank the subjects according to their performance, the outcome of the subjects in a group should not be the same. Moreover, the most subjects should not enjoy undertaking the task. This is important because gift giving behavior could be higher, if the subjects liked the real effort task. We wanted them to really feel effort costs instead. Additionally, subjects should not need extraordinary abilities. So every subject should basically be able to undertake the task. After performing the task in the RET, subjects in each group were ranked according to their task performance. We used a rank-order tournament for several reasons: firstly, subjects should be intensively motivated to exert effort. Secondly, the conditions for various achievements should be obvious right from the beginning and easily comprehensible for the subjects. Thirdly, we wanted to implement a competitive situation to test, if subjects show solidarity even in such a achievement-oriented environment. Finally, our main research question is whether performance differences influence solidarity: we wanted to create an environment which enables the subjects to compare their relative performance with the other group members.

In our rank-order tournament the one who beaded the most pearls became *rank 1*, the one who performed second best became *rank 2*, and the worst one became *rank 3*. For the case of a tie, we would have diced the higher rank.[9] We let the subjects know that they would have been informed about drawing the higher rank randomly in case of a tie. So if there had not been a notice at their decision chit, they would have known that there had not been a tie in their group. The rank of the subjects determined the provisional income and the probability to lose a subsequent lottery. The relation between provisional task income and rank was the following one: *rank 1* got € 9, *rank 2* got € 5, and *rank 3* got € 1. These amounts would be paid only, if the subjects did not lose the subsequent lottery. If they lost the lottery, their task income would be reduced to zero. If they won, they would get € 7 additionally to their task income. To picture the aspect of provoking a situation of distress, the probabilities of losing the lottery were the higher the worse the rank: *rank 1* lost with a probability of $\frac{1}{6}$, *rank 2* with $\frac{2}{6}$, and *rank 3* with a probability of $\frac{3}{6}$.[10] The lottery assigned two winners and one loser in each group.[11]

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[9] However, this case never occurred.

[10] Moreover, we chose these specific probabilities to enhance the subjects' comprehension. We explained to them that the loser of a group was selected by throwing a dice for each group. If the dice showed a one, *rank 1* lost, in case of a two or three, *rank 2* lost, and in case of a four, five or six, *rank 3* lost.

[11] Our focus was not on the comparison of donating behavior in case of one or two losers, so this is a difference to Selten and Ockenfels (1998) where the probabilities of losing were independent of each other.

Before the lottery was played, each subject was informed about their rank in their group.[12] The subjects' donation decisions were detected by applying the strategy method.[13] This is to say that each subject had to announce an amount of money regarding each of the other two ranks in their group. The participants should imagine a situation in which they had already won the lottery and could donate some money to the loser of their group. Because the loser was not selected yet, they had to make two decisions: one donating decision for each possible loser rank. They knew that their transfer decision was only conducted for the rank that really lost. Moreover, only one of the two winners could effectively make a transfer. It was determined by chance, which winner could effectively make the transfer. Only this transfer decision was put into practice. The other transfer decision of the randomly chosen winner for the other winner rank was not transacted. Furthermore, the two transfer decisions of the other winner were not conducted. Naturally, the gift decisions of the loser were not transacted, too. So it was clear to the subjects that their donation decisions were only made to the factual loser of their group in case of winning and being randomly chosen for the transfer decision afterwards. After all subjects had made their decisions and have thrown their enveloped chits in a box, we threw dices for determining the losers of the lotteries and drew lots for whose transfer decision would actually be carried out. Then the box with the decisions and the information about the winner and actual donator of each group were handed out to two other persons not being in the lab. Thus they could ascertain the payments without having an idea which code name was associated with which person. When they finished their payoff calculations, they gave the enveloped payments to another person that was not in the lab, too. This person neither knew the instructions nor the purpose of the experiment. During this procedure the subjects had to solve an IQ-test. When everybody finished, they went to the person with the envelopes and obtained their payoffs.

To investigate what impact the real effort task and performance differences in this task had on solidarity, we run another treatment. This non real effort treatment (NRET) equaled the RET besides the fact that there was no real effort task. Instead of achieving ranks, the subjects were randomly assigned to certain *type categories a*, *b* or *c*. As in the RET the subjects drew code names at the beginning of the experiment, which yielded as a basis for type allocation in the NRET. In this treatment, *type a* equaled *rank 1* in the sense that *type a* got a provisional income of € 9 and additional € 7 in case of winning the lottery. The probability of losing was

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[12] During the evaluation of the task performance the subjects had to answer a questionnaire about personal characteristics, which was originally invented by Brandstätter (1988). The test was not related to aspects of solidarity, fairness, or altruism. So it is guaranteed that this questionnaire did not influence the gift giving decisions.
[13] So we got 8 independent observations from a certain donator rank to a certain recipient rank per session.

$\frac{1}{6}$ as it was for *rank 1* in the RET. Along the line *type b* got a provisional income of € 5 and lost with probability $\frac{2}{6}$. Analogously, *type c* corresponds to *rank 3* and got a provisional income of € 1 and lost with probability $\frac{3}{6}$. Because of procedural reasons the subjects first got to know their types and made their gift giving decisions in the NRET. Afterwards they filled out the questionnaire and the IQ-test.[14]

III. Experimental Hypotheses

First we will construct hypotheses concerning the RET, second regarding the NRET, and finally concerning the comparison between RET and NRET.

The RET:

From the outset it is not clear what impact the performance in the real effort task could have on solidarity in the RET. One can imagine that subjects might evaluate the rank of a potential loser, if they consider a kind of achievement justice. Applied to the case of losing, the better the loser rank the higher the donations should be.[15] This idea could even be strengthened by aspects of attribution theory[16]. The losing probabilities of the subjects are directly affiliated to their ranks. The better the rank, the less is a financial distress provoked by one's own action. If donators regard this aspect, donations should be higher the better the loser rank. This becomes particularly clear by considering the case when *rank 1* loses although he worked hard and his losing probability was relatively small. This situation could be perceived to be very unfair and not as *rank 1*'s own fault. Following this intuition, *rank 1* should get more or higher donations than *rank 2 (rank 3)*, given that *rank 3 (rank 2)* is the donator. This implicitly means that there is a reward effect for good performance and a punishment effect for bad performance within this treatment.[17]

Let d_{ij} denote the donations from *rank i* = 1, 2, 3 to *rank j* = 1, 2, 3 where $i \neq j$. Now one can state Hypothesis A:

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[14] We are confident that the little change in course (questionnaire and IQ-test after the transfer decision) did not influence the treatment comparison of the gift giving decisions because none of these tests included questions which could influence donations.

[15] This consideration is similar to aspects of inequity theory (i.e. Adams (1965)).

[16] Attribution theory focuses on the question when and how persons attribute causes for observed behavior and what effects result from this (see Weiner (1986)).

[17] If we find differences in donating behavior in the RET, we have to control whether these exist also in the NRET. If we do not find the same differences, there is an influence of performance differences on solidarity.

Hypothesis A: Given a certain donator, gifts are the higher the better the rank of the loser:
$$d_{12} > d_{13}, d_{21} > d_{23} \text{ and } d_{31} > d_{32}.$$

An argument which could contradict Hypothesis A is the egalitarian principle that states that every loser should get the same, independent of their assigned rank. So there should be no impact of a loser's performance on donations. Moreover, all losers are in the same situation because they have no income anymore. Also for that reason it might be that potential winners do not consider the rank of a losing person. Would potential winners only pay attention to states and outcomes then one should not see any differences in the gift giving behavior to various ranks.[18] Therefore potential winners would disregard the amount of the lost income[19] and the extent of the losing probability. Then the performance of the loser of the lottery should not influence gift giving behavior.

Hypothesis B: There are no differences between donations to various loser ranks, given a certain winner rank.

Since winner ranks have different incomes, one might consider this income effect on donations, too. It is questionable, if subjects with higher incomes donate relatively more. Recent experimental findings which deal with the dictator game (i.e. List/Cherry (2003), Carpenter et al. (2005)) show that higher stakes have no significant influence on the distribution of allocations. In particular, income differences between high and low stakes lay between \$ 80- \$ 90 in those experiments. In our experiment, income differences between the two winners of the lottery are at most € 8. Consequently, one would expect the relative gifts to be the same for each rank.

The NRET:
Because everything is at random in the NRET, we think that most subjects do not make any differences between various losers. Therefore we state the following hypothesis:

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[18] The question, whether people take reference points into consideration and evaluate losses and gains to it as in prospect theory (Kahneman/Tversky (1979)), or if people just evaluate the outcomes of certain states as for example in standard theory, is widely discussed.

[19] With respect to neglecting the lost income of a loser, one can imagine a natural disaster. Imagine people of different income classes and professions that all lost their holdings because of a hurricane. Then it should be plausible to give everybody the same to survive. In such a situation the relative performance of the victims before the disaster should not matter.

Hypothesis C: Donations are the same to all loser types, given a certain winner type.

One aspect that could contradict Hypothesis C is that subjects could have more compassion for a person who is *type c* and lost the lottery. *Type c* already had bad luck to become this type. So if he has bad luck again and loses the lottery, he is really a misadventurer. This could lead to higher donations to *type c* than to the other potential loser, given a certain winner type.

RET and NRET:

To investigate the impact of the real effort task and the performance differences, one should compare the RET with the NRET. It is not clear right from the beginning in which direction these impacts will work. One could think of the task's accomplishment to reduce solidarity in comparison to the NRET. This becomes especially intuitive by noticing the effort costs of a potential winner. If he worked hard, he would evaluate his income differently from the case of a random drawing of his income. He might behave in a more self-interested way because he "earned" his income and thus "deserves" it. This would hint to hypothesize that donations in the RET should be smaller than in the NRET. But one should also regard the fact that potential losers have to exert effort in the RET. This aspect could lead to higher donations to losers in the RET than to losers in the NRET, if it dominates the winners' effect of working. This would contradict the first suggestion.

Regarding aspects of relative performance even more effects can interact. If winners evaluate performance differences, it is intuitive that potential winners could punish bad performers in the RET so that they get less than in a treatment where they were not required to show exertion. In contrast, a potential winner in the RET could show more compassion to *rank 1* than his counterpart in the NRET to *type a* as a loser, because *rank 1* performed best in his group. This could lead to higher donations to *rank 1* than to *type a*.

It is not obvious right from the beginning which of these contradicting effects prevails. Therefore we state the following hypothesis:

Hypothesis D: There are no differences between donations of certain winner ranks to certain loser ranks compared with the donations of the corresponding winner types to the corresponding loser types.

IV. Experimental Results

First we present the results of the RET, followed by the results of the NRET, and the comparison of these treatments.

The RET:

Figure 1 contains the average gifts from a certain rank to the remaining potential loser ranks. The remaining ranks are ordered such that the donation to the better rank occurs first.

Figure 1: Average gifts of donator ranks
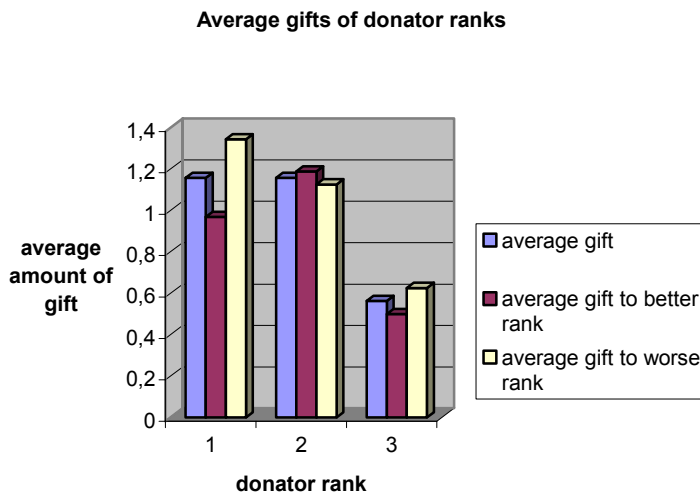
As one can see from Figure 1, the average amount[20] of *rank 1*'s donations is € 1.16 , which is 7.2% of his income after winning the lottery. The average donation of *rank 2* is also € 1.16, which is a share of 9.6% of his final income. *Rank 3*'s average donation is € 0.56, which is 8.3% of his end income. This shows that every rank donates positive amounts in the RET on average. The individual gifts of potential winner ranks to the remaining potential loser ranks are each significantly different from zero.[21]

Firstly, we tested the influence of performance differences of various loser ranks. When analyzing the differences of the two donation decisions[22] of certain potential winner ranks,

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[20] The average donation from *rank 1* is the average over the average donations to *rank 2* and *rank 3*. The calculations are analogously for *rank 2* and *3* as donators.
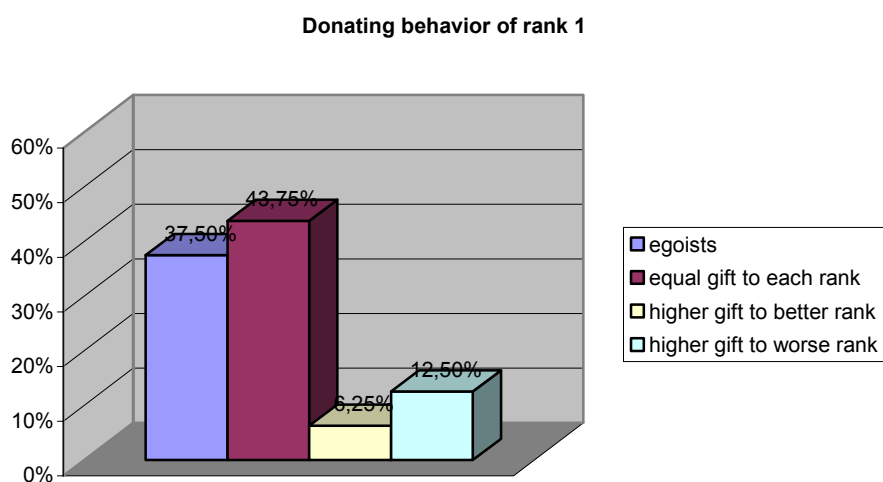
[21] Using a Mann – Whitney U test, the levels of significance for the one-sided tests are smaller than 0.01 and 0.001 concerning the donations from *rank 1* to *rank 2* and *rank 3*, 0.05 and 0.025 concerning the donations from *rank 2* to *rank 1* and *rank 3* and 0.1 and 0.025 concerning the donations from *rank 3* to *rank 1* and *rank 2*.

[22] We conducted the difference by subtracting the donation to the worse rank from the donation to the better rank. Then we tested with a Mann – Whitney U test whether these differences would be significantly different from zero.

one can see that neither of them is significantly different from zero. So on average the rank of a potential loser does not seem to significantly influence gift giving behavior, given a certain donator. For example, *rank 2* does not give higher donations to *rank 1* than to *rank 3* on average. This seems to hint at the fact that potential winners do not evaluate the loser's previous performance differences and do not care for the at least partly provoked losing probability on average. Therefore we can reject Hypothesis A in favor of Hypothesis B.

Only paying attention to the average may be misleading what becomes clear by investigating the behavior of potential donators in detail. One can distinguish between four kinds of behavior: the first one is an egoistical behavior. With this we categorize potential winners who give nothing to anyone. This behavior is predicted by standard economic theory.[23] The second kind of behavior is described by donators who give the same gift amount to both potential loser ranks.[24] Thirdly, there are donators who give more to the better potential loser and less to the worse one. Finally, one can find potential winners who behave the other way round by giving more to the worse potential loser. Figures 2-4 show the percentage occurrences of certain kinds of donating behavior for potential winner ranks.

Figure 2: Donating behavior of rank 1

Donating behavior of rank 1

egoists: 37,50%
equal gift to each rank: 43,75%
higher gift to better rank: 6,25%
higher gift to worse rank: 12,50%

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[23] According to standard economic theory, donations should not be observed. Gift giving decreases donators' incomes without any utility enhancing effect.

[24] We excluded the donators that give zero to both potential loser ranks because this kind of behavior is purely egoistical and should therefore be an own category.

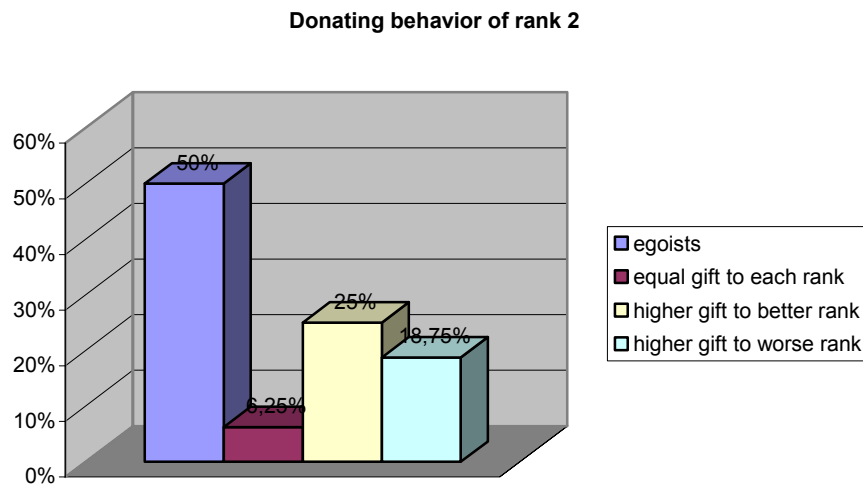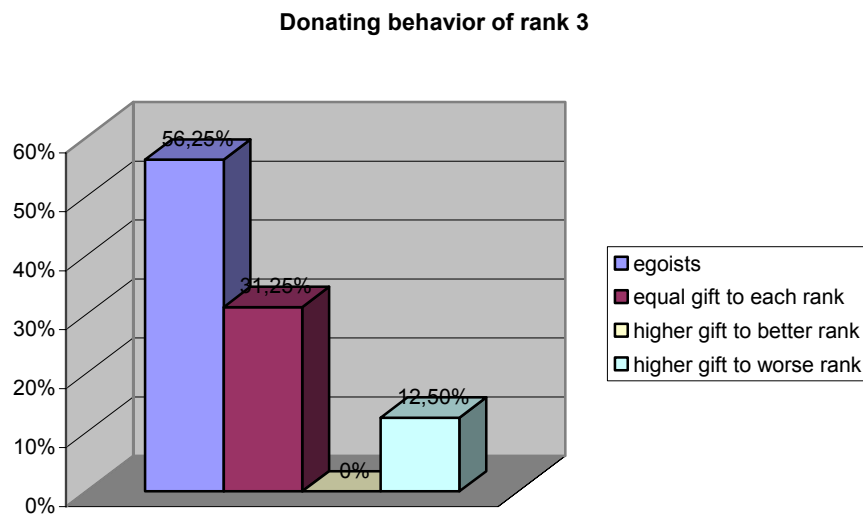Figure 3: Donating behavior of rank 2

Donating behavior of rank 2

Figure 4: Donating behavior of rank 3

Donating behavior of rank 3

As can be seen from Figure 2, the most common behavior of *rank 1* is to give an equal gift to each rank. But there is still a high percentage of persons (37.5%) who donate nothing at all. This is the most common behavior of *rank 2* and *3*. As can be seen from Figures 3 and 4, half of *rank 2* subjects and 56.25 % of the *rank 3* subjects behave purely egoistically. It is more common among *rank 2* subjects to give different gifts to different ranks than to donate an equal positive gift. Some subjects regard loser's performance but their assessment is ambiguous: 25% of *rank 2* subjects give more to *rank 1*, while 18.75% give more to *rank 3*. Donating more to *rank 1* could result from regarding achievement justice, while giving more

to *rank 3* could result from jealousy concerning *rank 1*. This could also account for *rank 3* donators of whom no one gives more to *rank 1*. Comparing the different kinds of behaviors there are more *rank 1* subjects than *rank 2* subjects who give an equal gift. There are also more *rank 3* subjects who behave this way than *rank 2* subjects. Following the intuition behind Hypothesis B, these *rank 1* and *3* subjects do not seem to account for the loser's performance. They show the same solidarity to each loser and support them with the same amount of money. Another possible reason for their behavior could result from the fact that they may only evaluate, if the loser performed either better or worse. Because *rank 1* and *3* subjects are at the extremes of the rank classification, they do not donate more to one of the two potential loser ranks.

Secondly, we tested the influence of winner's performance differences on solidarity. We found that given a certain potential loser rank, the average donation from the winner ranks does not differ significantly. This applies to both, the average absolute and the average relative donations. Therefore the performance difference between a winner and a loser does not seem to matter. For example, to have performed better or worse than the loser, does not influence donating behavior. Moreover, income levels have no significant effect on donations.

We find a gender effect for the gift giving behavior of *rank 1* to *rank 2* in the RET. A Mann-Whitney U test indicates that *rank 1* females transfer more to *rank 2* losers than *rank 1* males.[25] Furthermore, *rank 1* economists donate less to *rank 3* losers than *rank 1* non-economists do.[26] This is in line with the result that egoistical behavior is much more common among economists on *rank 1* than among non-economic subjects on *rank 1*.[27]

The NRET:

The average donations of certain types can be found in Figure 5. The average donation[28] of *type a* is € 1.97, which makes 12.3 % of his income after the lottery. *Type b* donates on average 12.5 % of his end income, what is an amount of € 1.50. The average donation of *type c* is € 0.94 and thus 11.7 % of his final income. This demonstrates that subjects in the NRET also show solidarity to potential losers on average.[29] The donations of certain types to specific potential loser types are each significantly different from zero.[30]

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[25] The significance level is p < 0.05 (one-sided).
[26] Mann – Whitney U test with a significance level of p < 0.041 (one-sided).
[27] The Fisher tests yields a significance level of p = 0.0594.
[28] Again we conducted the average over the average donations to the different potential loser types.
[29] The relative donations are in line with the results of Büchner et al. (2005). The mean relative donation in case of one loser is 13.9%. The results of Selten and Ockenfels (1998) are with 24.6% a bit higher. But when

Figure 5: Average gifts of donator types

Average gifts of donator types
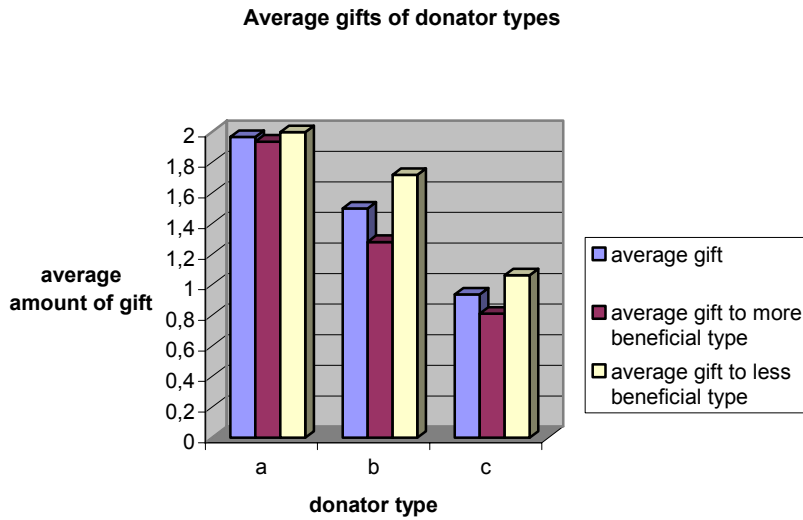
Firstly, we tested, if there were differences between donations to various loser types, given a certain winner type. On average donations were not significantly different from each other. Therefore Hypothesis C cannot be rejected. As hypothesized, donators do not seem to evaluate different loser types in different ways on average. This might be because every position is at random. Income differences and probability allocations arising by chance seem to be too weak to have an obvious influence on average.

But investigating the data in detail shows that there exist different kinds of behavior for each type in the NRET. Figures 6 – 8 picture the donation behavior of the various types. As in the RET we can find all four different kinds of behavior.

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comparing our results to these experiments, one should pay attention to the fact that both winners can transfer something in case of one loser in these experiments.

[30] Using a one-sided Mann-Whitney U test, the significance levels are 0.001 for the donations from *type a* to *b* and *c*, 0.01and 0.001 for the donations from *type b* to *type a* and *c*, 0.025 and 0.001 for the donations from *type c* to *a* and *b*.
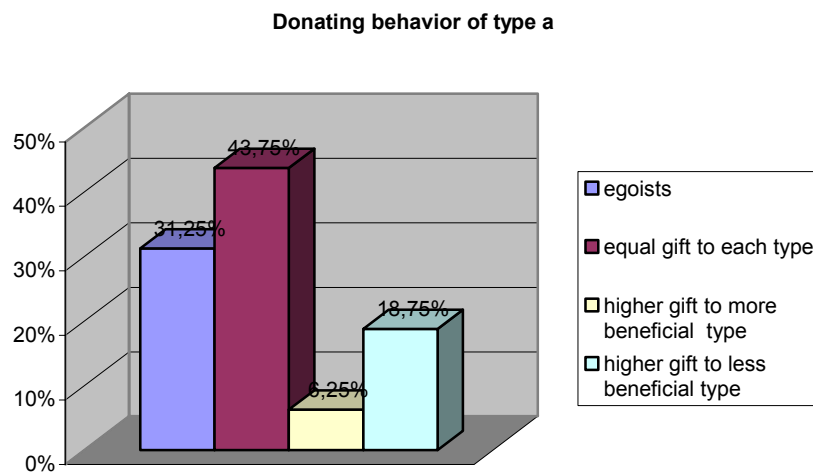
Figure 6: Donating behavior of type a

Donating behavior of type a

Figure 7: Donating behavior of type b

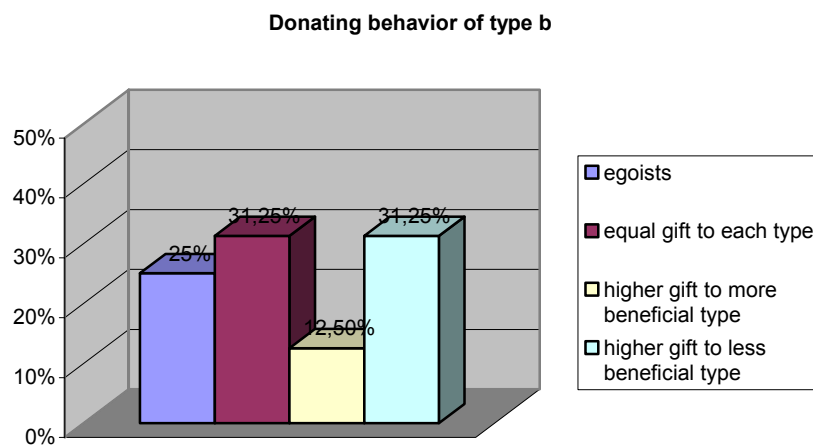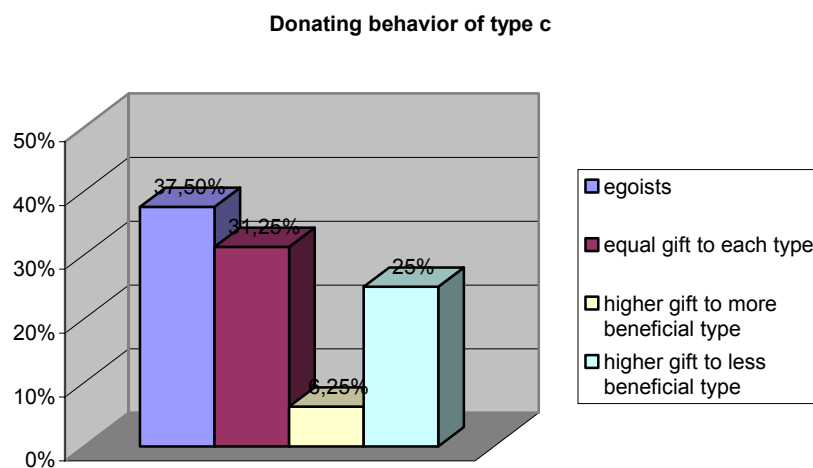**Donating behavior of type b**

Figure 8: Donating behavior of type c

Donating behavior of type c

The most common behavior (43.75%) of *type a* is to make an equal gift to each potential loser type. With 31.25 % there is a high percentage of egoistical behavior, too. Concerning *type b*, giving an equal gift and giving more to *type c* than to *type a* are with 31.25% the most frequent behaviors. The most widespread behavior of *type c* is to behave purely egoistically (37.5%). The most uncommon behavior for each type is, to give more to the more beneficial loser type than to the less beneficial potential loser type.[31] Therefore potential winners care less about subjects who already had good luck with the type allocation. Donators do not seem to show much compassion for someone who first had good luck to get a relative high income and a low losing probability. All types who donate unequal gifts show more solidarity for subjects who already had bad luck to become the less beneficial type.

Secondly, we tested the differences in donating behavior across potential winner types, given a certain loser type. There are no significant differences between these donations on average. This states that subjects with a higher income do not donate a higher share on average. Moreover, subjects' donating behavior does not seem to be influenced by their own "luck" to become a certain type on average.

Comparison of the RET and the NRET:

To investigate whether the real effort task and performance differences have an influence on solidarity, we compared the two treatments RET and NRET. The question of interest is whether the ranks' donations to a certain potential loser rank compared with the corresponding types' donations to the certain potential loser type are the same. As we find out, one cannot reject Hypothesis D. Performance does not seem to have an effect on gift giving behavior on average. For all comparisons[32] except one[33] there is neither a significant difference between treatments concerning the average absolute donations nor concerning the average relative donations.

Observing almost no treatment differences could result from two reasons: Firstly, potential winners as well as potential losers have to bear effort costs in the RET. If we only regard the

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[31] With a "more (less) beneficial type" we refer to the type with the higher (lower) income and the lower (higher) losing probability.

[32] The comparisons are: average donations of *rank 1* to *2* compared with average donations of *type a* to *b*, average donations of *rank 1* to *3* compared with average donations of *type a* to *c*, average donations of *rank 2* to *1* compared with average donations of *type b* to *a*, average donations of *rank 2* to *3* compared with average donations of *type b* to *c*, average donations of *rank 3* to *1* compared with average donations of *type c* to *a*, average donations of *rank 3* to *2* compared with average donations of *type c* to *b*.

[33] Only the comparison of the positive average donations of *rank 1* to *rank 2* with the positive average donations of *type a* to *type b* shows that donations are significantly higher in the NRET (Mann-Whitney U test, significance level p < 0.05 (one-sided)).

"winner side", it would be plausible that winner ranks donate less than winner types. In contrast, if we only regard the "loser side", the other way round is more reasonable so that loser ranks may get more than loser types because they have worked. Since treatment differences are not observed, these two effects might balance each other on average. Following this idea the fact of exerting effort has an influence on solidarity but it is disguised. Secondly, it might be that an impact of the real effort task contest on solidarity simply does not exist on average. When the real effort task has no influence on solidarity, the distributions of different kinds of donating behavior should be the same for a certain rank and his corresponding type. This would mean that donating behavior would be part of subjects' fundamental characteristics. This is underlined by the comparison of *type a* with *rank 1* and *type c* with *rank 3* where the frequencies of different kinds of behavior are very similar.

But when comparing the distributions of *rank 2*'s behavior with the distribution of *type b*'s behavior, the real effort task seems to influence donations. Since the relative frequencies of different kinds of behavior change remarkably, performance could affect these subjects' decisions.

To test which of these two explanations should be taken for granted we extended our experiment by running a control treatment.[34] This control treatment (CT) combined a modified RET with a modified NRET. The modified RET (NRET) equaled the RET (NRET) besides the following modifications: In the CT, three-person-groups of the RET and the NRET were matched. Each subject had to state five transfer decisions instead of two: two transfer decisions for each potential loser of his own three-person-group and three for the matched group.[35] After the lottery, one winner of each three-person-group could effectively make a transfer to one of the two actual losers of the six-person-group. This design enables us to test whether there are performance effects and how to separate between them.

The results of the CT suggest the second explanation to be the more appropriate one. The data show that donators who did not have to perform a task did not donate in a significantly different way to loser ranks or loser types. So it does not matter whether the loser worked or not. In the same way no significant differences between donator ranks' gifts to loser ranks or loser types can be found. Surprisingly, a potential winner does not only disregard performance differences between potential losers but also neglects whether a loser performed a task at all. Astonishingly, it has also no significant influence on donating behavior whether a potential winner had to bear effort costs or not.

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[34] There were 48 subjects participating in this control treatment.
[35] So for example, *rank 1* states transfer decisions for the potential losers *rank 2*, *rank 3* of his own group and for *type a*, *type b*, and *type c* of his matched group.

V. Concluding Remarks

As the RET and the comparison with the NRET show, solidarity is not influenced by performance differences between needy persons on average.[36] But having a closer look at the data reveals four different kinds of donating behavior. Surprisingly, the distribution of these kinds of behavior is nearly the same for *rank 1* and *type a* and very similar for *rank 3* and *type c*. As is underlined by the results of the CT, these behavior patterns seem to be consequences of fundamental characteristics of the subjects. A high proportion of subjects participating in the CT distinguish between potential losers by donating unequally but their donating decisions seem to be based on various criteria. Strikingly, performance evaluation is not in the main focus. Against the background of living in a performance oriented society it is very surprising that solidarity as prosocial behavior is unaffected by relative performance.

Attribution theory claims that mainly those needy persons are supported who are not responsible for their distress. So according to attribution theory, helping behavior declines when someone provoked his distress.[37] Keeping this at the back of one's mind, it is surprising that potential winner ranks do not consider the rank of the loser although in the RET performance differences determine the losing probabilities of the lottery. Therefore, losing the lottery is at least partly driven by one's own performance. To emphasize a provoked distress, one could run another treatment, in which subjects would get to know exactly how many pearls each group member beaded. As a consequence, one evaluation criterion of the subjects could be the size of performance differences. High differences of *rank 3*'s performance in relation to the other ranks could especially be recognized as his own fault next to the actual losing probabilities.[38]

To investigate further possible criteria for donating decisions, one could run an extension by implementing a higher group size and assigning ranks several times. Would a potential winner rank show more solidarity with a loser of the same rank?

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[36] In these treatments no significant correlation between donating behavior and the five personality dimensions requested in the questionnaire is found. Furthermore, there is not a correlation between the gift giving behavior and the intelligent quotient of a subject.

[37] See Weiner (1986).

[38] To test consequences of an actual fault on donating behavior in a solidarity game, Radermacher and Thral (2006) conducted another experiment, but without incorporating performance.

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