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Who Shows Solidarity with the Irresponsible?

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Abstract

Who Shows Solidarity with the Irresponsible?*

In the Solidarity game lucky winners of a lottery can transfer part of their income to unlucky losers. Will losers get smaller transfers if they can be assumed to be responsible for their zero income because they have chosen riskier lotteries? Or will risk-lovers and risk-averters favor those who made the same risk-choice, leading to larger transfers within rather than between the risk-groups? While there is support for both motives in the literature, in an experiment we find that the effect of holding people responsible for their actions is overcome by behavior guided by in-group favoritism based on different levels of risk-taking. This behavior is successfully described by a variant of the social utility function suggested by Cappelen et al. (2013).

Im Solidaritätsspiel können die glücklichen Gewinner einer Lotterie einen Teil ihres Gewinns den unglücklichen Verlierern überlassen. Erhalten die Verlierer eine geringere Kompensation, wenn sie dafür verantwortlich gemacht werden können, dass sie leer ausgingen, weil sie sich für eine riskantere Lotterie entschieden hatten? Oder bevorzugen risikofreudige und risikoscheue Spieler diejenigen, die sich für das jeweils gleiche Risikoniveau entschieden hatten? Während es in der Literatur Argumente für beide Motive gibt, zeigt sich im Experiment, dass Verlierer mehr Solidarität erfahren, wenn sie die gleiche Risikoentscheidung getroffen haben wie der Gewinner und dass damit das Motiv Spieler für ihre Entscheidung verantwortlich zu machen in den Hintergrund treten kann. Dieses Verhalten kann erfolgreich durch eine Variante der social utility function, wie sie von Cappelen et al. (2013) vorgeschlagen wurde, erklärt werden.

Keywords: Risky Behaviour, Solidarity, Responsibility, In-Group Favoritism

JEL classification: D3, D8

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1 Introduction

> "Solidarity means a willingness to help people in need who are similar to oneself but victims of outside influences such as unforeseen illness, natural catastrophes, etc." (Selten & Ockenfels 1998, p. 518)

Widespread solidarity is a form of *insurance* without explicit contracts. All types of insurance, however, suffer from the problems of moral hazard and adverse selection. Therefore, whenever possible, insurance differentiates between customers from different risk classes and rules out payment in cases of gross negligence. Higher risk groups receive less coverage or have to pay higher fees. It is then a natural question to ask whether voluntary solidarity also differentiates between risk groups and/or people who consciously decide to take higher or lower risks. Indeed, when assuming that a relevant part of the population cares, in contrast to insurance companies, not only about monetary payoffs, we may very well expect that there is a difference between solidarity and insurance.

One the one hand, it can be imagined that those who are ready to take high risks may be held partly *responsible* if they fail – and therefore receive smaller solidarity transfers – just as would be the case with insurance contracts. This view is confirmed in an experiment by Cappelen, Sørensen & Tungodden (2010) who show that "there was (...) broad support for the view that individuals should be held responsible for their choice (...)."(Cappelen, Sørensen & Tungodden 2010, p. 440). Note that this responsibility argument requires discrimination of beneficiaries but no differentiation based on characteristics of the benefactors.

On the other hand, it is possible that behavior depends on characteristics of the benefactor as well. It could, for example, be the case that benefactors who also have taken risks (and succeeded) may be more sympathetic to fellow risk-takers. It is easier for them to put themselves in their shoes than in those of "scaredy-cats", and vice versa. Another potential reason for differentiation is the existence of a behavioral norm or fairness standard which requires treating people who took the same action differently from people who took different actions (see e.g. Cappelen et al. 2013). A third potential reason for differently behaving benefactors is the formation of group-identity feelings with the consequence of in-group favoritism which is supported by a vast amount of literature that started with Tajfel (1970). The consequences of these last three lines of reasoning for observed behavior are very similar and it is therefore hard to distinguish between them[1]. As our experiment is not aimed at differentiating between these motives, we will not take a stand on which one offers the more plausible explanation.

Holding people responsible for their decisions (as suggested by the first argument) and favoritism of individuals with the same risk-choice suggest different types of solidarity behavior between people who decide to take a higher risk and those who do not. According to the responsibility argument, people in need would receive less help if they chose the more risky option. For individuals who favor others who made the same choice, however, lucky risk takers show more support for needy risk takers than towards needy risk averters and vice versa. It is the aim of this paper to experimentally evaluated whether favoritism of people with similar choice of risk can overcome the motive to hold people responsible for their decision.

In the next section, closely related literature is presented that gives support to the different potential underlying motives. The experiment is described in Section 3 and in Section 4, following Cappelen et al. (2013), a theory of redistribution is suggested. This order is preferable because hypotheses can be formulated with respect to the specific experimental conditions. In Section 5 the experimental results are presented and a variant of the Cappelen et al. (2013) social utility function is estimated. Section 6 concludes.

[1]In fact, they might be intertwined in the sense that in-group favoritism based on shared identity works partly because it is easier to put oneself in the shoes of others to which one feels closer connected.

2 Literature

The question, what people should be held responsible for, has been answered in various ways. These normative answers consist (among others) of the two extremes "libertarianism" and "strict egalitarianism", i.e. the notion that individuals should be held responsible for all factors that lead to some distribution of resources or that they should not be held responsible at all. In between, there is a wide variety of other concepts according to which individuals should be held responsible for some factors that determine distribution of income but not for others. In a dictator game with preceding production phase, Cappelen, Sørensen & Tungodden (2010) investigate empirically what factors individuals are held responsible for. Although their participants can be classified according to various normative concepts, about 80 percent of the subjects support the view that individuals should be held responsible for factors that are within their control (the choice of working time in their experiment) whereas more than 70 percent of their experimental subjects reject the view that people should be held responsible for factors that are beyond their control (the price per unit produced as chosen by the experimenter).

However, it was not analyzed whether fairness views were conditional on characteristics of the benefactor. This question received attention in a different study (Cappelen et al. 2013) where experimental subjects first had a binary choice of either a risk-less income or a lottery ticket. Then the ex-post aggregate income of two randomly matched subjects could be redistributed by one of them or by a spectator without own interests. Cappelen et al. (2013) find that the redistribution behavior of their subjects can be explained by subjects having one of three types of social utility functions which are based on either one of two unconditional fairness norms or on a conditional fairness norm. The latter implies discrimination of in-group and out-group subjects where the risk-takers form one group and the risk-averters the other and was estimated to be present with about 30 percent of the subjects. We will come back to their model in Section 4.

Another mechanism which would lead to outcomes being conditional on characteristics of the benefactor is the formation of group-identity, a mechanism first studied in the experiments by Tajfel (1970). In these experiments, he shows that even for groups defined by rather meaningless categories there is significant in-group/out-group discrimination. Tajfel (1970) thereby spurred a huge literature in the social sciences on social identity (a good overview is given in Chen & Li (2009)). Within economics, the role of identity was introduced by Akerlof & Kranton (2000) which incorporated identity into an economic model (see also Akerlof & Kranton 2002, Akerlof & Kranton 2005). Following their seminal work , identity received increased attention in the experimental economics literature and has been studied in the lab as well as in the field. In the lab, Chen & Li (2009) show that there is more altruism and less envy as well as more positive reciprocity and less negative reciprocity between members of the same group than between members of different groups and Charness, Rigotti & Rustichini (2007) find that the effect of group-membership depends positively on salience of the group. Outside the lab, Bernhard, Fehr & Fischbacher (2006) found in-group favoritism with regard to norm enforcement in a natural field experiment in Papua New Guinea. What is more, in-group/out-group differentiation can not only robustly be observed in experiments, it can also be derived from various social categories as Ben-Ner et al. (2009) show. Their experimental subjects not only give more in dictator games if the receiver has similar religious or political views, favors the same sports team or looks alike, they are also more eager to share an office with people similar in those categories or to commute with them. Notably, only one category did not cause in-group/out-group differentiation and this was gender.

An interesting question is why there is discrimination at all? Here, different evolutionary arguments can be made. According to Eaton, Eswaran & Oxoby (2011), the origin of group formation and in-group favoritism is the hunter-gatherer society in which mankind for 99 percent of its existence has lived. In a group where food is at least partly shared, risk averse individuals utility maximization requires supporting other risk averse individuals who help to create a steady stream of food. On the other hand, if someone is risk-prone he also would like his group to be risk-prone. In addition, Costard et al. (2013) show in an evolutionary setting that a strategy purely differentiating between in-group and out-group typically outperforms other more elaborate strategies that build on reputation and indirect reciprocity.

Solidarity, as studied in experimental economics, has mainly been investigated in the framework of the Dictator game and the Solidarity game. In the original Solidarity game of Selten & Ockenfels (1998), the three members of a group are each endowed with DM 10 with 2/3 probability and with DM 0 with 1/3 probability. In the cases where there are winners (who got DM 10) and losers (who got nothing), the winner(s) can give an arbitrary amount of their endowment to the loser(s). Further experiments investigate the impact of the strategy method (Büchner, Coricelli & Greiner 2007), the influence of culture (Ockenfels & Weimann 1999), or are concerned with the identification of different types of behavior (Bolle et al. 2012). We may regard the Dictator game as a two-person solidarity game although it is rarely discussed under this aspect. It seems that in the dictator game roles (rich and poor) are "given" while in the Solidarity game the random mechanism which determines incomes (winners and losers) is emphasized. In addition, for some purposes the three-player design has advantages. If the only winner of a group determines his transfer to two *different* losers then we can directly see whether and how they are treated differently.

An experiment closely related to ours is Trhal & Radermacher (2009), where the original Solidarity game (Solidarity Treatment ST) was conducted as well as another experiment, called Risk Treatment RT. In RT each of the three participants of a solidarity group had to choose between lottery C: "EUR 10 with certainty" or lottery R: "EUR 0 with Prob=0.5, EUR 10 with Prob=0.4, EUR 60 with Prob=0.1". In RT, only winners of EUR 10 were allowed to compensate losers. All subjects played both treatments, half of them in the order (ST, RT) and half of them in the opposite order, each time in a newly formed group. Trhal & Radermacher (2009) find that subjects in RT who voluntarily took risks and failed, receive less compensation than subjects in ST who could not avoid risks.

Our paper will analyze giving behavior in a variant of the Solidarity game which is close to the Trhal & Radermacher (2009) design. However we will show that solidarity transfers are heavily influenced by in-group favoritism with group-membership defined by the level of risk-taking.

3 The Experiment

The experiment took place at the European-University Viadrina in Frankfurt (Oder), Germany, in 2009. 237 students from the faculties Economics and Business, Law, and Cultural Sciences participated in the experiment. They were invited via email and distributed into two sessions. Each session lasted about one hour. The subjects were placed in a large lecture hall as in written exams, i.e. with so much space between them that the six experimenters could prevent communication. All participants received a show-up fee of EUR 3. The experiment started by giving the participants an instruction form and a first decision form[2]. The instruction form explained that an initial income would be created by one of two random processes (lottery tickets) between which they could choose.

- *Random process A*: With probability 2/3 you "win" EUR 10, with probability 1/3 you receive EUR 0.
- *Random process B*: With probability 1/3 you "win" EUR 20, with probability 2/3 you receive EUR 0.

They were further told that they would be matched with two other (anonymous) people in the room to form a group of three. If their group consisted only of "winners" or "losers" (who receive EUR 0) then the game would end. If it consisted of winners and losers, the winner(s) could transfer arbitrary parts of their prize to the loser(s). After receiving this general information the subjects chose A or B (knowing that there would be a phase with voluntary transfers). They also reported their expectation about the frequencies of A- and B-choices. Then they had to draw an A- or B-envelope (according to their decision) from a box[3]. By opening the envelope they found a new decision form.

[2]The English translation of both forms can be received from the authors upon request.
[3]Within about five minutes, six experimenters with boxes distributed the new decision forms.

First they were informed that they were winners or losers. We deviated from a complete strategy method because the winners had to decide among five further conditions (see below). An additional fundamental conditionality ("if you are a winner") might have restricted the perceived relevance of decisions too much. Because of the same reason we restricted the number of conditions to five. In the following, those who have chosen A and lost (received EUR 0) are called A-losers, the others A-winners. B-losers and B-winners are defined respectively. The winners decided on their transfers for the different possible loser structures and reported their expectations about the other winner's transfers in the one-loser case. Losers decided on transfers "they would have made if they had been winners". The losers' hypothetical decisions served mainly to keep them busy and not to disturb the winners and are not subject of the following analysis. The participants were told that all payments would be carried out according to the random matching of participants. They could collect their money later from a person not involved in the experiment (after reporting their subject number and their self-chosen pseudonym).

We required the winners to make conditional transfer decisions in five different situations:

1. How much would you give to a single A-loser? [4]
2. How much would you give to a single B-loser?
3. How much would you give to each of two A-losers?
4. How much would you give to each of two B-losers?
5. If there is one A-loser and one B-loser, how much would you give to the A-loser and how much to the B-loser?

In the end they were asked to write a short comment on their decisions. In addition, they reported their gender, faculty, semester and age.

[4] I.e. there are two winners and one loser. In order not to introduce further ramifications of the hypothetical decisions, the type of the other winner is not revealed.

4 Solidarity Theory

In this section, we introduce an extension of the two-person social utility function of Cappelen et al. (2013) to apply it to our experimental setting. In particular, we make it a three-person social utility function to match our three-player experimental set-up. For the case where there is one winner and two losers, it takes the following form

$$V_i = \gamma y_i - \beta_i \frac{(y_j - F^{k(j)})^2}{2X} - \beta_i \frac{(y_h - F^{k(h)})^2}{2X} \quad (1)$$

Here, y_i is the income which winner i reserves for himself and y_j and y_h are the losers' incomes, i.e. i's transfers to them. $X = y_i + y_j + y_h$ is i's prize (EUR 10 or EUR 20). γ is a general and β_i is an individual positive parameter and $F^{k(j)}$ is a reference income for player j. In Cappelen et al. (2013), three different versions of this reference income are considered. First, winner i could have a preference for equalizing income ex post, unconditional of actions taken. She would therefore exhibit an ex post standard "equality of income" which corresponds to a reference income $F^{EP} = X/3$ for both players j and h. Second, winner i might prefer not to equalize income ex post, again unconditional of actions taken. As all players start out in the same situation, this can be called a preference for "equality of opportunity" and implies a reference income of $F^{EA} = 0$ for both players j and h. Third, reference income might depend on actions taken, so being conditional on past actions, in contrast to the previous two cases. Cappelen et al. (2013) analyze the case where the ex post standard "equality of income" is applied to individuals who took the same action as the benefactor and the ex ante standard "equality of opportunity" is applied to individuals who took a different action. Cappelen et al. (2013) prefer to interpret these different reference incomes as "ex ante", "ex post" and "conditional" fairness standards. However, as discussed above, alternative interpretations are possible, especially with regard to the "conditional" fairness standard.

The social utility function yields the following forecast for the transfer of winner i to loser j

$$\frac{y_j}{X} = \max\left(0, \frac{F^{k(j)}}{X} - \frac{\gamma}{\beta_i}\right) \tag{2}$$

and correspondingly for loser h. Based on our three-player setting and the different reference incomes, $F^{k(j)}/X = 0$ or $F^{k(j)}/X = 1/3$. This implies (ceteris paribus) independence of transfers from the question whether the winner is an A-winner or B-winner. Transfers would, however, differ for losers of a certain type if the winner's preferences reveal in-group favoritism.

If there is one loser j and a second winner h, then the utility function becomes

$$V_i = \gamma y_i - \beta_i \frac{(E_i[y_i] - F^{k(j)})^2}{2E_i[X]} - \beta_i \frac{(E_i[y_i] - F^{k(h)})^2}{2E_i[X]} \tag{3}$$

whereas $E_i[y_j] = t_i + E_i[t_h]$ is the loser's expected income after i's transfer t_i and h's expected transfer $E_i[t_h]$. The "ex post" standard is defined as $F^{EP} = E_i[X]/3$ with

$$E_i[X] = i\text{'s lottery prize } + 20\frac{1+\alpha_i}{3+\alpha_i} \tag{4}$$

with α_i being i's expected share of A-players[5]. i's maximization of equation (3) yields

$$\frac{t_i}{E_i[X]} = \max\left(0, \frac{F^{k(j)}}{E_i[X]} - \frac{E_i[t_h]}{E_i[X]} - \frac{\gamma}{\beta_i}\right) \tag{5}$$

While the expected shares of A-players are nearly the same in our experiment (66 percent and 63 percent for A- and B-winners) the expectations $E_i[t_h]$ are rather different. A-winners expect on average transfers of EUR 1.82 and B-winners EUR 2.85. The difference is highly significant ($p < 10^7$ in a two-sided Mann-Whitney U-test). In relation to $E_i[X]$, however, we find

$$\text{average } \frac{E_i[t_h]}{E_i[X]} = 0.0997 \text{ for A-winners and } 0.0992 \text{ for B-winners.} \tag{6}$$

[5]The conditional probability that the only other winner is an A-winner is $(4\alpha_i/9)/(4\alpha_i/9 + (1-\alpha_i)/9) = 4\alpha_i/(1+3\alpha_i)$.

Therefore we expect the same result as in the two-loser case, however in terms of shares of $E_i[X]$: If there are no further differences between A- and B-players then they should transfer the same shares of $E_i[X]$.

Using the elicited expectations of the other winner's transfer in this way implies the hypothesis that, first, subjects develop expectations, and then they decide on transfers based on these expectations. Alternatively, we can assume that the two winners determine the Bayesian equilibrium of the public good game they play. (In the case of interdependent utility functions the income of the loser is a public good or bad for the winners.) We could not use the expectations as in (4) if the winners determine the transfers first (with whatever rationale) and then determine their expectations on the basis of their own transfers. For a discussion of this problem see Selten & Ockenfels (1998).

Based on the theoretical framework, we expect the experimental results to feature the following characteristics. First, in-group transfers as share of the prize won will be independent of the winners' lottery choice. Second, out-group transfers as share of the prize will be independent of the winners' lottery choice. Third, in-group transfers will be higher than out-group transfers[6].

5 Results

230 of the 237 participants delivered completely filled questionnaires. Among these there were 60 percent female students. The faculties were represented with 60 percent economics and business students, 15 percent law students and 26 percent cultural science students. It is remarkable that only 47 percent of our subjects chose the less risky A and 53 percent the more risky B lottery. On the first glance this seems to be an astonishingly high number of risk seekers. In Cappelen et al. (2013), for example, 90 percent of the subjects preferred a riskless income to a risky lottery with the same expectation value. Note, however, that this difference is at least partly caused by the well-

[6]In the case of two winners, these statements apply to the share of the expected prize won by both winners.

known certainty effect (see e.g. Cohen & Jaffray 1988). Another reason for so many risk seekers might be that they are somewhat insured by the expected solidarity transfers[7]. It is also interesting to note that the average expectations of the frequencies of B-choices are 35 percent which is less ($p = 0.07$ in a chi square test) than the real choices of B but which is still large if one expects most people to be risk averse.

Men and economists chose slightly, but not significantly more often (about 10 percentage points), the riskier B-lottery. In the end, we had 73 A-winners and 35 B-winners, which are the basis of the following analysis. Only 5 of these 108 decision makers (4 percent) did not collect their money. The average transfers of A-winners to A-losers, EUR 1.27 in the one-loser case and EUR 1.13 in the two-loser case, are close to those in treatment ST of Trhal & Radermacher (2009).

5.1 Aggregate Results

The average relative amounts which losers receive are presented in Table 1 and Table 2. In the one winner/two losers case the expected group income $E_i[X]$ is equal to the prize which the only winner receives. The simple result is strong discrimination: In-group transfers are between 10.8 percent and 12.7 percent of the winner's prize. Out-group transfers are between 7.0 percent and 8.8 percent of the winner's prize. The hypothesis of in-group/out-group differentiation is therefore strongly supported (only for the comparison of in-group and out-group transfers for B-players in the case of two winners measured as shares of $E_i[X]$ the level of significance is lower). Also the other hypotheses, namely that in-group transfers and out-group transfers do not differ between A-winners and B-winners, is supported as no statistical differences ($p < 0.05$) can be found. These finding continue to hold when controlling for individual attributes such as gender, field of study or age of the experimental subjects in an OLS-regression. For details, we refer to Appendix A.2.

[7]In a follow-up investigation by Lübbe & Bolle (2011), however, it is shown that moral hazard does not play a significant role for the choice of B.

Table 1: Relative transfers from winners to losers in the two winners case.

Type	Transfers to receiver of type				N
	A		B		
	in % of prize	in % of $E_i[X]$	in % of prize	in % of $E_i[X]$	
A-player	12.7* (11.3)	6.7* (5.9)	7.2 (9.3)	3.8 (4.9)	73
B-player	8.8 (11.4)	6.4 (8.3)	11.3* (11.8)	8.3+ (8.6)	35

*(+) indicate that transfer is significantly larger than corresponding transfer to losers of the other type (Wilcoxon matched pairs rank test with $p < 0.01$ ($p = 0.06$)). Standard deviations in brackets.

Table 2: Relative transfers from winners to losers in the one winner case.

Type	Transfers to receivers of type				N
	Losers of same type		Losers of mixed types		
	A	B	A	B	
A-player	11.3* (9.1)	6.8 (7.9)	12.4* (9.9)	7.0 (8.1)	73
B-player	7.1 (7.7)	9.6* (10.8)	7.0 (8.1)	10.8* (12.0)	35

* indicate that transfer is significantly larger than corresponding transfer to losers of the other type (Wilcoxon matched pairs rank test with $p < 0.01$). Standard deviations in brackets.

5.2 Structural Modeling

Finally, we want to investigate the model of Section 4 and the question of whether A- and B-players have different preferences beyond their risk attitudes with a random utility approach (McFadden 1973, McKelvey & Palfrey 1995). We concentrate on the one winner/two losers case because we want to avoid the discussion mentioned in Section 4 about the nature of the expectation formation in the two winners/one loser case.

We add a random term ϵ_i to the utility function (1), i.e.

$$V_i^k(y_j, y_k) = \gamma(X - y_y - y_h) - \beta_i \frac{(y_j - F^{k(j)})^2}{2X} - \beta_i \frac{(y_h - F^{k(h)})^2}{2X} + \epsilon_i \quad (7)$$

and assume that ϵ_i is i.i.d. extreme value. The individual choice probabilities then have a logit form. Following Cappelen et al. (2013) we assume $\log \beta_i$ to be normally distributed with $\log \beta_i \sim \mathcal{N}(\mu, \sigma)$[8].

The winners' transfers could not be more than half of their prize and only 8 of the 432 transfers were not a multiple of 50 Eurocent. Thus we choose finite sets of possible transfers (in Euro) to one loser, namely $T = T_A = \{0, 0.5, 1.0, \ldots, 5.0\}$ for A-winners and $T = T_B = \{0, 0.5, 1.0, \ldots, 10.0\}$ for B-winners. The eight deviating values are set equal to the closest element of the finite sets.

i's decision under the three conditions $y_j = y_h = \tau_{i\to AA}, y_j = y_h = \tau_{i\to BB}$, and $y_j = \tau_{i\to AB}, y_h = \tau_{i\to BA}$ lead to utilities $V^k(AA)$, $V^k(BB)$ and $V^k(AB)$, whereas $\tau_{i\to jh}$ is the transfer of winner i to losers j and h. The expected likelihood of these three decisions is

$$L_i^k = L_i^k(\tau_{i\to AA}, \tau_{i\to BB}, \tau_{i\to AB}, \tau_{i\to BA}, \gamma, \mu, \sigma) = \int_0^\infty \frac{\exp(V_i^k(AA))\exp(V_i^k(BB))\exp(V_i^k(AB))}{\sum_{x\in T}\exp(V_i^k(y,y))\sum_{x\in T}\exp(V_i^k(y,y))\sum_{(y,z)\in T*T}\exp(V_i^k(y,z))} dF(\mu,\sigma) \quad (8)$$

where F is the lognormal distribution. We assume the standard $k = EA$ to be present in the population with a share of λ^{EA} , standard EP with λ^{EP}

[8] γ can be assumed as the precision parameter of the logit equilibrium and β_i/γ as the parameter of the normalized utility function.

Table 3: Parameter estimates

	γ	μ	$\mu - \log\gamma$	σ	λ^{EA}	λ^{EP}	λ^{CE}	$-\log L$
A-players	3.29 (0.17)	2.77 (0.08)	1.68	0.41 (0.07)	0.22 (0.05)	0.62 (0.06)	0.16	425.2
B-players	1.34 (0.20)	1.99 (0.15)	1.70	0.19 (0.11)	0.46 (0.10)	0.51 (0.10)	0.04	274.1
A- and B-players	2.30 (0.04)	2.43 (0.04)	1.42	0.35 (0.03)	0.26 (0.06)	0.61 (0.05)	0.13	434.0 +281.5

Parameter estimation for (8) and (9) with the utility function (7). Standard errors in brackets.

and standard CE with $\lambda^{CE} = 1 - \lambda^{EA} - \lambda^{EP}$. Then the average likelihood of the three decisions is

$$L_i = \lambda^{EA} L_i^{EA} + \lambda^{EP} L_i^{EP} + \left(1 - \lambda^{EA} - \lambda^{EP}\right) L_i^{CE} \tag{9}$$

In order to find out whether A- and B-players are different we estimate the parameters $(\gamma, \mu, \sigma, \lambda^{EA}, \lambda^{EP})$ for A- and B-players separately and jointly (see Table 3). The reduction of the log-likelihood score of 16.0 after adopting separate estimates surpasses the critical limit described by the BIC and the AIC criteria. The improvement is also highly significant in a likelihood ratio test ($p = 4 \cdot 10^{-5}$). The differences between A- and B-players are mainly the different shares with which the standards are distributed. While A-players have more often (9.3 and 14 percentage points more) standards EP and CE, the standard EA is more frequent (23.3 percentage points more) among the B-players. We can interpret γ as the precision parameter of the logit choice probabilities; dividing the utility function by γ delivers a normalized utility function whose only parameter β_i/γ is lognormal distributed with $\mu - \log(\gamma)$ and σ. The distributions of β_i/γ have the same $\mu - \log(\gamma)$ value and the same σ for A- and B-players but the B-players have a smaller γ which indicates a larger *random* variance of behavior.

We are not completely satisfied with this result, however. The small share of players with a conditional (CE) standard cannot explain the in-group/out-

Table 4: Parameter estimates with flexible standards f_{EA} and f_{CE}

	γ	μ	$\mu - \log\gamma$	σ	f_{EA}	f_{CE}	λ^{EA}	λ^{EP}	λ^{CE}	$-\log L$
A-player	3.95 (0.48)	3.07 (0.14)	1.68	0.42 (0.06)	-0.77 (1.85)	0.22 (0.01)	0.21 (0.05)	0.27 (0.08)	0.52	403.6
B-player	0.91 (0.22)	1.52 (0.31)	1.61	0.61 (0.16)	-4.64 (5.51)	0.27 (0.04)	0.33 (0.26)	0.00 (0.39)	0.67	252.1
A- & B-player	2.07 (0.26)	2.40 (0.14)	1.68	0.47 (0.06)	-0.68 (0.37)	0.23 (0.02)	0.24 (0.04)	0.23 (0.08)	0.53	417.3 +265.9

Introducing variable fairness standards $FS^{EA} = f_{EA}$ and $FS^{EA} = f_{CE}$ (out-group standard). Standard errors in brackets.

group discrimination identified by non-parametric tests, i.e. the model is misspecified. We think that the EA fairness standard and the CE out-group standard need not require strictly zero transfers. While the fairness standard EP (equality) seems to be well rooted in society, we are skeptical with respect to a *standard* of giving nothing (though actually many people give nothing), not even in cases of "self-inflicted harm"[9]. Therefore we introduce, instead of zero standards, variable standards $f_{EA}X$ (X =prize) and $f_{CE}X$ (for out-group players) in the utility function (7).

The estimated parameters are reported in Table 4. The separate estimation for A- and B-players again significantly improves the log-likelihood score with respect to all criteria ($p = 2 \cdot 10^{-12}$ in the likelihood ratio test). The same is true when we compare the scores of A-players and B-players with and without the variable fairness standards. In the likelihood ratio test we get $p < 10^{-9}$ in both cases. In addition, the frequencies based on the model with variable fairness standards and on the parameters in Table 4 are in good accordance with the empirical frequencies of transfers (see Appendix A.1). They might be further improved by introducing prominence (integer number transfers). Because of the restricted number of B-winners, however, we did not want to extend the number of parameters.

We find now – in accordance with the non-parametric tests – the majority of players deciding conditionally, i.e. showing in-group/out-group discrimination. They feel an obligation to help also the out-group losers, however with a mild reduction of their standard of transfers to a quarter $(0.22, 0.27)$

[9]Think of the biblical Parable of the Lost Son (Luke 15, 11-32).

of their income instead of a third as in the case of in-group losers. The share of players with an ex post (equality) standard is estimated as 27 percent for A-winners and 0 percent for B-winners, although in the latter case with a large standard deviation. This is understandable because the conditional decision makers and those with an ex post standard are, in particular in the case of B-winners, not very different.

Surprisingly there are negative fairness standards in the group with an ex ante standard which make zero transfers almost certain[10]. The large standard error is due to a very flat maximum with respect to variations of f_{EA}. The log-likelihood value for $f_{EA} = 0$ is, however, 270.3 for B-players which is significantly more than 252.1. Therefore the correct standard error is large but certainly smaller than 3.59. The usage of bootstrapping for an alternative determination of the standard errors is difficult because of the long computation times for the determination of maximum likelihood estimations. Similar arguments apply in the case of A-players ($-\log L = 406.1$ for $f_{EA} = 0$) and for the joint estimation of A and B-players ($-\log L = 427.4 + 276.0$ for $f_{EA} = 0$). Our conclusion is not that there is really such a norm of taking away large sums from losers (if this were possible) but that people with negative f_{EA} are strong unconditional supporters of the idea that everybody who had had his chance should care for himself[11]. Such a standpoint could also be expressed by the norm $f_{EA} = 0$ and a large precision parameter for this group. Adopting this idea we might ask whether also the conditional standard f_{CE} which is not far from the equality standard 1/3 should be substituted by 1/3 (thus we have an EP standard) and whether there are different precision parameters for all three cases. Estimating γ_{EA} and γ_{CE} (in addition to γ) instead of f_{EA} and f_{CE} leads, however, to increased negative log-likelihood scores (424.3 for A, 256.3 for B and $429.7 + 266.8$ for the joint

[10]For A-winners with a fairness standard $f_{EA} = -0.77$ we get prob(transfer $= 0) > 0.99$ in the case of two losers of the same kind as well as in the case of one A- and one B-loser. For B-winners with $f_{EA} = -3.80$ the corresponding probabilities are even larger.

[11]The elder brother of the Lost Son is strictly opposed to his fathers forgiving and joyful welcoming of the loser. He might be interpreted as having an EA-standard. His father, on the other hand, indicates that he is discriminative (CE-standard), telling his elder son " everything I have is yours" (Luke 15, 31). The enthusiastic welcome, however, shows that the younger son need not fear really severe discrimination.

estimation of A and B). Thus no uniform definition and interpretation of parameters seems to be possible and we stick to the estimation in Table 4 where we interpret f_{CE} as a different standard of giving and f_{EA} only as a substitute for a high precision parameter[12]. For the application of variable EA standards to the data of Cappelen et al. (2013) see Appendix A.3.

6 Conclusion

The main regularity in Tables 1 and 2 is that risk averters (A-players) strongly favor risk averters and that risk seekers (B-players) weakly favor risk seekers. This pattern is also found in a regression analysis (which can be found in the appendix) which controls for the influence of gender and faculty. The result is further supported by the estimation of social utility functions which reveals that the majority of individuals favor others who have taken same risk-choice over those who took a different action.

We find similarities and significant differences between A- and B-winners in our analysis of behavior in the framework of a random utility approach. A- and B-winners are rather similar with regard to transfers conditional on their type. The players with EP standards are anyway assumed to be identical and the seemingly large difference of f_{EA} for A- and B-players makes almost no difference in terms of behavior. Also players who use a conditional standard are similar: In both groups the standard for in-group players is 1/3 of the prize and for out-group players 1/4. The real difference is the frequency distribution of standards. While A-players consist of 1/5 players with EA standards and 1/4 with EP, there are no B-players with EP standards and 1/3 with EA standards. In addition, with 1/2 of A-players but 2/3 of B-players being estimated as having the conditional standard, there seems to be a correlation between risk preferences and social preferences as our more risk averse subjects are more often characterized as making transfers unconditional of lottery choice and are less often characterized as having

[12]In a mixed approach with a precision parameter γ_{EA} and a fairness standard f_{CE} we get, in the case of B-players, $\gamma_{EA} = 11$ (std.err.= 6.4) and otherwise parameters as in Table 4.

an ex ante standard that implies no transfers to losers whatsoever. Also, the relatively large share of players with an unconditional ex ante (equal opportunity) standard among B-players shows that many people take high risks without expecting solidarity.

The different CE fairness standards and the different frequencies of fairness standards in the population are the major differences to Cappelen et al. (2013), which may be explained by the different nature of the redistribution in the two papers: while Cappelen et al. (2013) investigate redistribution of aggregate income (in real situations by taxes and social insurance schemes) our frame and focus is the voluntary transfer of income from "winners" to "losers" (within the family, among friends, and by private welfare).

Further support for a conditional standard comes from the participants' comments. Naturally, A-winners accuse B-losers of "irresponsible" behavior. In their free comments, 33 of 73 A-players did so[13]. Only one of the 35 B-players expressed this opinion, though. Therefore, behavior seems to be denounced as irresponsible only if it is riskier than one's own. In addition, 9 (out of 35) B-players explicitly remark, that B-losers should get more transfers because they are more risk-loving (i.e. like themselves). This condensed report about the free comments seems to indicate that in-group favoritism/out-group aversion is differently strong between A- and B-players. A-players condemn the decision of B-players more often and more fiercely than vice versa. Thus we may ask whether there are more differences between B-players and A-players than those which we have identified in our paper[14].

We think that it is worthwhile to look for more differences in further studies. In a world beyond our simple model there may be more agreement about the question when risk takers should be called irresponsible (risk loving car drivers) or beneficial for the society (entrepreneurs with innovative products or processes).

[13]They do not always use the term "irresponsible" but they express their opinion that the B-players should not have chosen such high risk.

[14]Neither do A- and B-players differ significantly with respect to their share of women or economists. In the follow-up study by Lübbe & Bolle (2011), however, differences according to a personality test are found.

A Appendix

A.1 Predictions of the model

In the following Figures 1 to 8, transfers predicted by the model and the estimated parameters of Table 4 (black) are compared with empirical transfers (grey). As integer numbers i are more prominent, in the windows frequencies of $i+0.5$ and $i+1$ are aggregated under $i+1$. In the case where sole winners were confronted with one A-loser and one B-loser the transfers x and y are presented as marginal distributions and not as distributions of (x, y) because then 73 (35) data points would have to be distributed on a – at least – 11×11 (21×21) matrix.

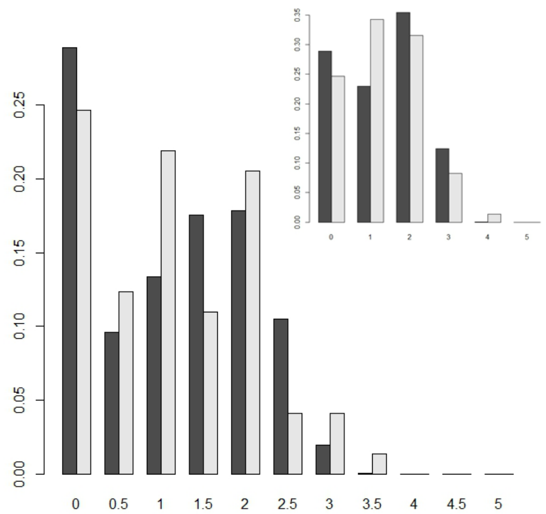

Figure 1: Frequencies of A-winners' transfers to two A-losers. 73 observations.

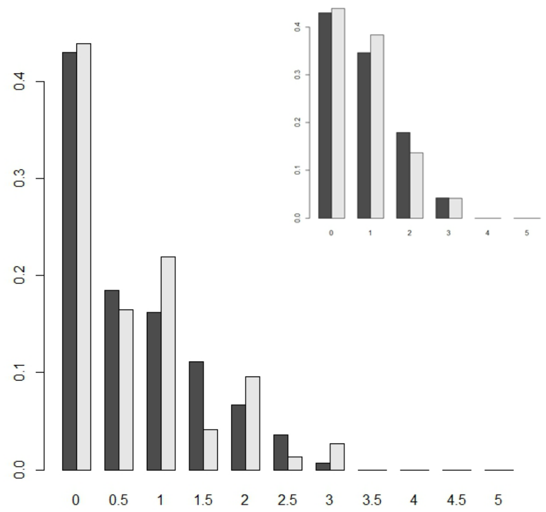

Figure 2: Frequencies of A-winners' transfers to two B-losers.73 observations.

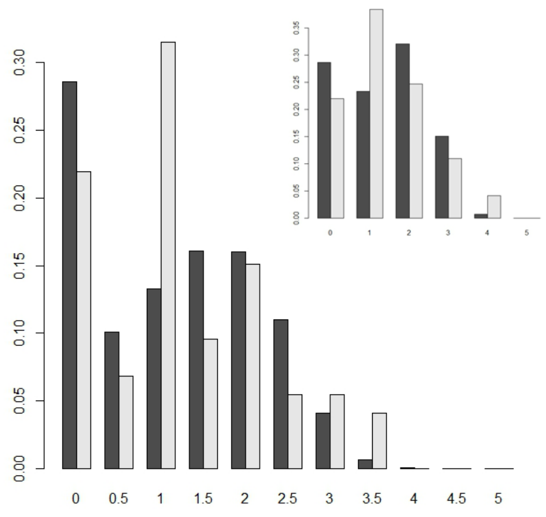

Figure 3: Frequencies of A winners' transfers to an A-loser when confronted with one A-loser and one B-loser. 73 observations.

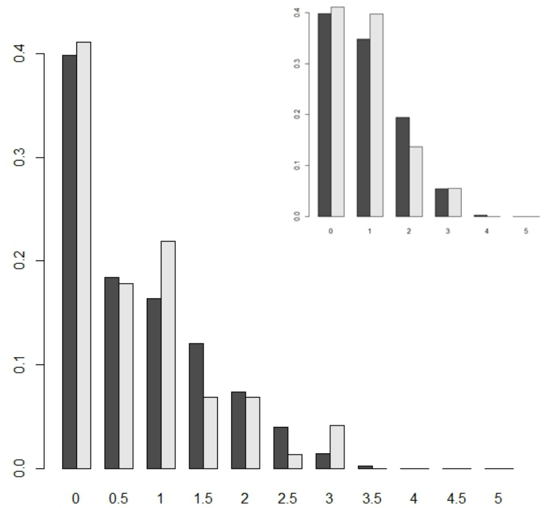

Figure 4: Frequencies of A winners' transfers to a B-loser when confronted with one A-loser and one B-loser. 73 observations.

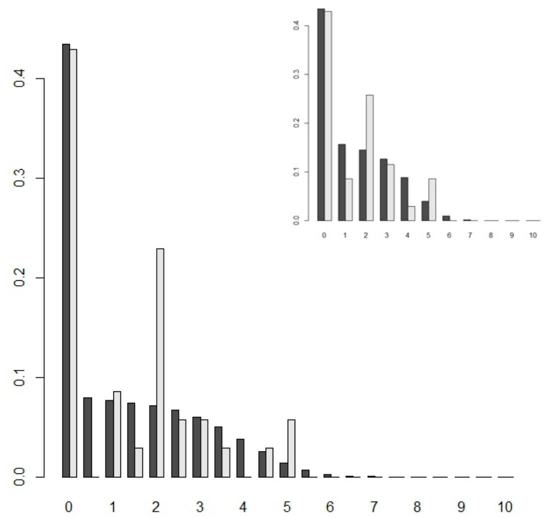

Figure 5: Frequencies of B-winners' transfers to two A-losers. 35 observations

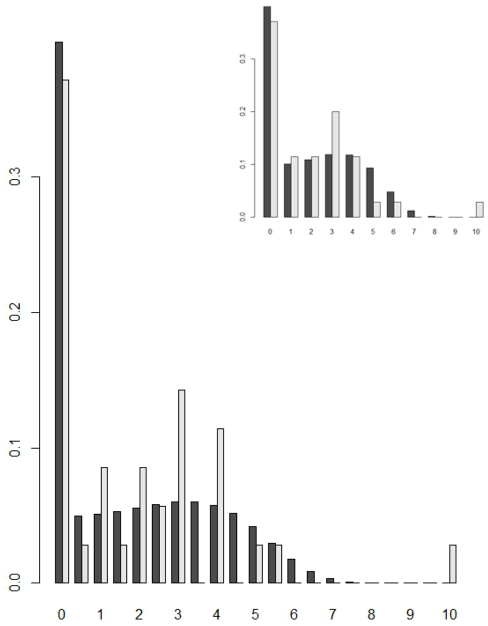

Figure 6: Frequencies of B-winners' transfers to two B-losers. 35 observations

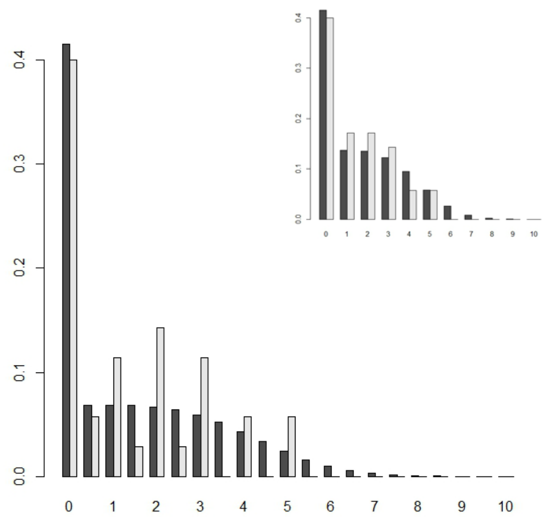

Figure 7: Frequencies of B winners' transfers to an A-loser when confronted with one A-loser and one B-loser. 35 observations

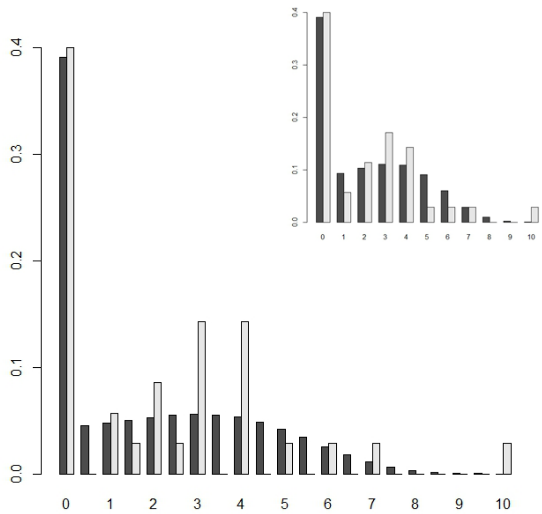

Figure 8: Frequencies of B winners' transfers to a B-loser when confronted with one A-loser and one B-loser. 35 observations

Table 5: Regression analysis of absolute transfers

	constant	$\mathbf{1_W}$	$\mathbf{1_{Econ}}$	$\mathbf{1_{AB}}$	$\mathbf{1_{BA}}$	$\mathbf{1_{BB}}$	Adj. R^2
2 winners/ 1 loser	1.22 (0.000)	0.55 (0.01)	-0.57 (0.02)	-0.54 (0.03)	0.67 (0.04)	1.17 (0.000)	0.15
1 winner/ 2 losers of same type	1.15 (0.000)	0.39 (0.03)	-0.51 (0.008)	-0.45 (0.03)	0.45 (0.09)	0.96 (0.000)	0.15
1 winner/2 losers of diff. type	1.26 (0.000)	0.34 (0.08)	-0.46 (0.03)	-0.53 (0.02)	0.34 (0.28)	1.06 (0.000)	0.12

Regression analysis of absolute transfers from a winner to the only loser/to one of the two losers. $N = 216$. p-values of a two-sided t-test in brackets .

A.2 Regression analysis

We extend our analysis by controlling for influences of individual attributes in a regression analysis with the dummy variables $\mathbf{1_w} = 1$ for women, $\mathbf{1_{Econ}} = 1$ for economics students, $\mathbf{1_{AB}} = 1$ if the transfer is from an A-winner to a B-loser, and $\mathbf{1_{BA}}$ and $\mathbf{1_{BB}}$ respectively. The first line of Table 5 shows the results for the case where there is one loser. The value of the constant, 1.22, is the average amount which a male, non-economist A-winner transfers to an A-loser. The regressions show that, compared with the male non-economist, females' transfers were on average EUR 0.55 larger and the transfers by economic students on average EUR 0.57 smaller. Also, the coefficient of the dummy $\mathbf{1_{AB}}$ is negative and significant, showing that A-winners transfer less to B-losers than to A-losers. When interpreting the coefficient of $\mathbf{1_{BA}}$ one has to keep in mind that B-winners won double the amount of A-winners, so a coefficient of zero would mean that B-winners transferred on average and in relative terms only half as much to A-losers than A-winners did. Further, the coefficient of $\mathbf{1_{BB}}$ being larger than coefficient of $\mathbf{1_{BA}}$ indicates that B-winners favor B-loser over A-losers. This group effect is stable over all winner/loser cases. Therefore, the regression analysis confirms all the results from Table 1 and Table 2.

A.3 Variable norms in Cappelen et al. (2013)

We were not completely satisfied with the original version of Cappelen et al.'s (2013) proposal about norms. We therefore allowed one of their norms to vary and got thus a better fit and a consistent interpretation of our results. Is such a variation advantageous also in the case of Cappelen et al.'s (2013) results?

In their experiments two subjects i and j decided independently about risk taking or not. They got incomes y_i and y_j according to their decisions and then subject i (or a referee, which is not analyzed here) had to distribute their aggregate income $X = y_i + y_j$ between them. i's decision is assumed to be influenced by one of three norms F^k. $k = EP$ designates the "ex post" norm of an equal split of the aggregate income. $k = EA$ designates the "ex ante" norm which requires both to get the income y_i and y_j which they earned according to their risk taking decision. $k = CE$ designates a conditional norm where for subjects who have decided as oneself (who have also decided to take a risk or have also decided to take no risk) the EP norm applies and otherwise the EA norm. If the norm k applies for i and if he decides to take x_i for himself his utility is

$$V_i^k(x_i) = \gamma x_i - \beta_i \frac{(x_i - F^{k(i)})^2}{2X} + \epsilon_i$$

where γ and β_i are parameters and ϵ_i is a random variable. The β_i are assumed to be log-normally distributed with parameters (ζ, σ). In our first estimation we accepted all these assumptions. The only difference is that we have a three-person game with a corresponding extension of the utility by an additional term and that the utility function is expressed in terms of transfers x_j to j.

The suggestion in our paper is that the "ex ante" standard may not be as strict as Cappelen et al. (2013) require it to be, in particular if our co-player earned $y_j = 0$ (the only case with transfers in our experiment). We therefore set $F^{EA} = f^{EA} x_i$ and $F^{CE} = F^{EP}$ for co-players who decided as i and $f^{CE} x_i$ otherwise. The introduction of the two additional parameters f^{EA} and f^{CE} improved the fit to the experimental data in Cappelen et al. (2013) considerably (see Table 6).

Note that all norms are effective only for large enough β_i. The large parameter γ guarantees complete egoism for a large share subjects who are

Table 6: Fixed and variable norms in Cappelen et al. (2013)

	λ^{EA}	λ^{EP}	ζ	σ	γ	f^{EA}	f^{CE}	$-\log L$
fixed f^{EA} and f^{CE}	0.274 (0.086)	0.411 (0.091)	3.094 (0.503)	4.378 (0.655)	15.577 (0.509)	1	1	1200.6*
variablef^{EA} and f^{CE}	0.629 (0.079)	0.233 (0.072)	3.441 (0.424)	3.192 (0.396)	24.922 (2.019)	0.0665 (0.034)	1.003 (0.017)	1150.8

Note that the estimates in row 1 are taken from Table 4 in Cappelen et al. (2013) for specification 1 and the case of stakeholders.
Remark: * Due to different approximation methods for integration we compute 1201.8.

assigned to any of these norms. This makes the interpretation of the results and comparisons difficult.

We have shown that there is still unexploited information in the residuals of the model of Cappelen et al. (2013) and that a generalization of their utility function is successful in exploiting this information. The question remains whether these amendments are satisfactory or whether additional aspects should enrich the original classification of social norms. In any case Cappelen et al.'s (2013) utility function is a promising alternative to the often used altruism and inequity aversion. Its applicability should be tested in further investigations.

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