Solidarity, Responsibility and Group Identity

Jano Costard
Friedel Bolle

European University Viadrina Frankfurt (Oder)
Department of Business Administration and Economics
Discussion Paper No. 309
December 2011

ISSN 1860 0921

EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER)

Solidarity, Responsibility and Group Identity[1]

Jano Costard and Friedel Bolle

Discussion Paper 309, December 2011

Abstract: In the Solidarity Game (Selten and Ockenfels, 1998) 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 (partly) responsible for their zero income because they have chosen riskier lotteries (Trhal and Radermacher, 2009)? Or will risk-lovers and risk-averters develop group identity feelings, leading to larger transfers within, rather than between, the groups (Chen and Li, 2009, for charitable transfers between and within otherwise defined groups)? In an experiment we find behavior to be guided by in-group favoritism. Responsibility for self-inflicted neediness does not seem to play an important role. In-group/out-group behavior is successfully described by a variant of a social utility function suggested by Cappelen et al. (2010).

Key-Words: Risky Behavior, Group Identity, Solidarity
JEL codes: D3, D8

Europa-Universität Viadrina Frankfurt (Oder)
Lehrstuhl Volkswirtschaftslehre (Mikroökonomie)
Postfach 1786
D - 15207 Frankfurt (Oder), Germany
Email: bolle@euv-frankfurt-o.de

[1] We would like to thank Hannah Liepmann, Annemarie Conrath, Alexandra Jung, Agnieszka Gryska and in particular Claudia Vogel for helping to conduct the experiment. Yves Breitmoser provided rather helpful advice with respect to statistical questions. Remaining shortcomings are, of course, ours.

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 and Ockenfels 1998, p. 18; our emphasis).

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 a natural question whether voluntary solidarity also differentiates between risk groups and/or people who consciously decide to take higher or lower risks. Those who are ready to take high risks may be held partly *responsible* if they fail - and therefore receive smaller solidarity transfers. On the other hand, benefactors who also have taken risks (and succeeded) may be more sympathetic to fellow risk-takers than to "scaredy-cats". The latter argument is supported by a vast amount of literature on the formation of group identity, often with the consequence of in-group favoritism (Tajfel, 1970; Kramer et al., 1993; Akerlof and Kranton, 2000, 2005; Güth et al., 2005; Bernhard et al., 2006; Tan and Bolle, 2007; Charness et al., 2007; Ben-Ner et al., 2009). Further literature is discussed in Chen and Li (2009).

Holding people responsible for their decisions and group identity feelings 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. With group identity feelings, 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 evaluated the empirical relevance of these arguments

In experimental economics, solidarity has been mainly investigated in the framework of the Dictator game and the Solidarity game. In the original Solidarity game of Selten and 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 et al., 2007), the influence of culture (Ockenfels and 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 and 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: “€10 with certainty” or lottery R: “€0 with Prob=0.5, €10 with Prob=0.4, €60 with Prob=0.1.” In RT, only winners of €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 and 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. Contrary to this finding is the observation of Buitrago et al. (2009) that charitable giving in a variant of the Samaritan’s Dilemma game is not affected by the question of whether neediness was self-inflicted or not.

Our paper will analyze giving behavior in a variant of the Solidarity Game which is close to the Rademacher et al. (2009) design. However we will show that solidarity transfers are heavily influenced by in-group favoritism as in Ben-Ner et al. (2009) and Chen and Li (2009). Ben-Ner et al. (2009) find, among other results that giving in a Dictator game is influenced by similarity of political views and belief in god. Chen and Li (2009) define groups by preferences either for Klee or Kandinsky paintings. They 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. In our paper group membership will be defined by the level of risk-taking.

Cappelen et al. (2010) propagate a similar approach though they do not explicitly refer to group identity feelings. In their experiment, subjects first have a binary choice of either a riskless income or a lottery ticket. Then the ex-post aggregate income of two randomly matched subjects can be redistributed by one of them or by a spectator without own interests. Cappelen et al. (2010) find that the redistribution behaviour 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. We will come back to this model in Section 3.

Why is there discrimination at all? According to Eaton et al. (2011), the origin of group formation and in-group favoritism is the hunter-gatherer society in which mankind for 99% 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 the next section the experiment is described and in Section 3, following Cappelen et al. (2010), a theory of redistribution is suggested. This order is preferable because hypotheses can be formulated with respect to the specific experimental conditions. In Section 4 the experimental results are discussed, and Section 5 concludes.

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

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 €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. The participants were told that all payments would be carried out according

[2] The English translation of both forms can be found under http://econ.euv-frankfurt-o.de/jc/Instruktionen.pdf
[3] Within about five minutes, six experimenters with boxes distributed the new decision forms.

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:

(T1) How much would you give to a single A-loser? [4]

(T2) How much would you give to a single B-loser?

(T3) How much would you give to each of two A-losers?

(T4) How much would you give to each of two B-losers?

(T5) 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.

3. Solidarity theory

In the one winner/two losers case we generalize the two-person social utility function of Cappelen et al. (2010) in the following way:[5]

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

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 (€10 or €20). γ is a general and β_i is an individual positive parameter. $F^{k(j)}$ is an individual fairness standard for j's income which can take one of three forms. For a share λ^{EP} of the population the ex post standard "equality of income", i.e. $F^{EP} = X/3$, is assumed to be fair; for a share λ^{EA} it is the ex ante standard "equality of opportunity". As everybody has the same options he or she should keep his income, which means for losers $F^{EA} = 0$. For a share $\lambda^{CE} = 1 - \lambda^{EP} - \lambda^{EA}$ a conditional fairness standard

---

[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.

[5] The only important difference is the second loss term.

applies: F^{EP} is fair if i and j both have chosen the same lottery ticket and F^{EA} is fair otherwise. This social utility function yields the following forecast.

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

and correspondingly for loser h. $F^{k(j)}/X = 0 \; or \; 1/3$ implies that, ceteris paribus, A- and B-winners should transfer the same share of their prize, but they differentiate between in-group and out-group transfers. Out-group transfers under the standards F^{EA} and F^{CE} are always zero.

If there is one loser j and a second winner h then, from i's point of view,

(3) $$V_i = \gamma y_i - \beta_i (E_i y_j - F^{k(j)})^2 / 2E_i X - \beta_i (E_i y_h - F^{k(h)})^2 / 2E_i X$$

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

(4) $$E_i X = i's \; lottery \;\; prize + 20 * (1 + \alpha_i)/(3 + \alpha_i),$$

with α_i = i's expected share of A-players[6]. i's maximization of (3) yields

(5) $$\frac{t_i}{E_i X} = \max\{0, \frac{F^{k(j)}}{E_i X} - \frac{E_i t_h}{E_i X} - \gamma / \beta_i\}.$$

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

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

(6) $average(Et_h / E_i X)$ = 0.0997 for A-winners and 0.0992 for B-winners.

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 and Ockenfels (1998).

Under the ex ante fairness standard, transfers should be zero.

We define $\tau_{i \to j}$ = average transfer as share of $E_i X$ from winner type i to the (only) loser of type j. We expect in the two winners/one loser case average transfers with the following relations:

Hypotheses 1. $\tau_{A \to A} = \tau_{B \to B}$ (in-group transfers)

2. $\tau_{A \to B} = \tau_{B \to A}$ (out-group transfers)

3. (a) $\tau_{A \to B} \leq \tau_{A \to A}$

(b) $\tau_{B \to A} \leq \tau_{B \to B}$ (in-group vs. out-group transfers)

All transfers of those subjects with the standard F^{EA} (=0) as well out-group transfers of subjects with the fairness standard F^{CE} are zero. In addition, also subjects with a fairness standard F^{EP} may transfer nothing if they are not inequality averse enough or if they expect a too large[7] transfer by the other winner. Let us assume that their

[7] (4) implies the crowding-out of solidarity transfers (which are strategic substitutes), other social utility functions can imply crowding-in (see Bolle et al., 2012).

shares are δ_A and δ_B. Then, in the two winner/one loser case, the share of zero transfers is $\lambda^{EA} + \delta_A(\lambda^{CE} + \lambda^{EP})$ for in-group transfers from A-winners to A-losers and $\lambda^{EA} + \delta_B(\lambda^{CE} + \lambda^{EP})$ from B-winners to B-losers. The share of zero out-group transfers from A-winners to B-losers is $\lambda^{EA} + \lambda^{CE} + \delta_A \lambda^{EP}$, and the share of zero out-group transfers from B-winners to A-losers is $\lambda^{EA} + \lambda^{CE} + \delta_B \lambda^{EP}$. Because of (6) we expect $\delta_B = \delta_A$. With the definition $\varphi_{i \to j}$ = frequency of zero transfers from winner type i to the (only) loser of type j we expect

Hypotheses	4. $\varphi_{A \to A} = \varphi_{B \to B}$	(in-group transfers)
	5. $\varphi_{A \to B} = \varphi_{B \to A}$	(out-group transfers)
	6.(a) $\varphi_{A \to A} \leq \varphi_{A \to B}$	(in-group vs.
	(b) $\varphi_{B \to B} \leq \varphi_{B \to A}$	out-group transfers)

In the one winner/two losers case we define $\tau_{i \to jh}$ = transfer (as share of i's prize) of winner type i to a loser of type j, when the other loser is of type h. $\varphi_{i \to jh}$ is defined correspondingly.

Hypotheses	7. (a) $\tau_{A \to AA} = \tau_{B \to BB}$	(b) $\tau_{A \to AB} = \tau_{B \to BA}$	(in-group transfers)
	8. (a) $\tau_{A \to BB} = \tau_{B \to AA}$	(b) $\tau_{A \to BA} = \tau_{B \to AB}$	(out-group transfers)
	9. (a) $\tau_{A \to AA} \geq \tau_{A \to BB}$	(b) $\tau_{B \to BB} \geq \tau_{B \to AA}$	(in-group vs.
	(c) $\tau_{A \to AB} \geq \tau_{A \to BA}$	(b) $\tau_{B \to BA} \geq \tau_{B \to AB}$	out-group transfers)
	10. (a) $\varphi_{A \to AA} = \varphi_{B \to BB}$	(b) $\varphi_{A \to AB} = \varphi_{B \to BA}$	(in-group transfers)
	11. (a) $\varphi_{A \to BB} = \varphi_{B \to AA}$	(b) $\varphi_{A \to BA} = \varphi_{B \to AB}$	(out-group transfers)
	12. (a) $\varphi_{A \to AA} \leq \varphi_{A \to BB}$	(b) $\varphi_{B \to BB} \leq \varphi_{B \to AA}$	(in-group vs.
	(c) $\varphi_{A \to AB} \leq \varphi_{A \to BA}$	(d) $\varphi_{B \to BA} \leq \varphi_{B \to AA}$	out-group transfers)

4. Results

230 of the 237 participants delivered completely filled questionnaires. Among these there were 60% female students. The faculties were represented with 60% economics and business students, 15% law students and 26% cultural science

students. It is remarkable that only 47% of our subjects chose the less risky A and 53% the more risky B lottery. On the first glance this seems to be an astonishingly high number of risk seekers. In Cappelen et al. (2010), 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-known certainty effect. (See, for example, Cohen and Jaffray, 1988.) Another reason for so many risk seekers might be that they are somewhat insured by the expected solidarity transfers. In a follow-up investigation by Lübbe and Bolle (2011), however, it is shown that moral hazard does not play a significant role for the choice of B. It is also interesting to note that the average expectations of the frequencies of B-choices are 35% 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%) did not collect their money. The average transfers of A-winners to A-losers, €1.27 in the one-loser case and €1.13 in the two-loser case are close to those in treatment ST of Trhal and Radermacher (2009).

4.1 Aggregate Results

The average relative amounts which losers receive are presented in Table 1. 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% and 12.7% of the winner's prize. Out-group transfers are between 7.0% and 8.8% of the winner's prize. Hypotheses 3 and 9 are strongly supported (only for the comparison of $\tau_{B\rightarrow B}$ and $\tau_{B\rightarrow A}$ measured as shares of E_iX the level of significance is lower). Also Hypotheses 1, 2, 7 and 8 are supported as no significant differences (p<0.05) between the comparable transfers are found.

	Transfer types	Transfers (stand. dev.) in % of prize	E_iX	N
Two winners and one loser	$\boldsymbol{\tau_{A\to A}}$	**12.7* (11.3)**	**6.7* (5.9)**	73
	$\tau_{A\to B}$	7.2 (9.3)	3.8 (4.9)	
	$\boldsymbol{\tau_{B\to B}}$	**11.3* (11.8)**	**8.3$^+$ (8.6)**	35
	$\tau_{B\to A}$	8.8 (11.4)	6.4 (8.3)	
One winner and two losers	$\boldsymbol{\tau_{A\to AA}}$	**11.3* (9.1)**		73
	$\tau_{A\to BB}$	6.8 (7.9)		
	$\boldsymbol{\tau_{A\to AB}}$	**12.4* (9.9)**		
	$\tau_{A\to BA}$	7.0 (8.1)		
	$\boldsymbol{\tau_{B\to BB}}$	**9.6* (10.8)**		35
	$\tau_{B\to AA}$	7.1 (7.7)		
	$\boldsymbol{\tau_{B\to BA}}$	**10.8* (12.0)**		
	$\tau_{B\to AB}$	7.0 (8.1)		

Table 1: Relative transfers from winners to losers (in-group transfers in bold type). In-group/out-group differences: *($^+$) Significantly larger than the value in next line according to a Wilcoxon matched pairs signed rank test with $p < 0.01$ ($p=0.06$).

Table 2 presents frequencies of zero transfers under two definitions of zero, namely “exactly 0” and “< 10% of prize”. As the resulting differences are not “too large” we can expect to arrive at similar conclusions also for other definitions of zero transfers. With one exception (indicated by §) the in-group frequencies of zero transfers of A-winners are not significantly different from the corresponding frequencies of B-winners. This exception contradicts Hypothesis 10 (b), but it is the only contradiction at all. In all cases the in-group frequencies of zero transfers are smaller than the corresponding out-group frequencies. Only the transfers of A-winners, however, are *significantly* different. While, for A-winners, the differences according to the definition “exactly 0” are 51-33=18, 41-23=18, and 40-22=18, the corresponding differences for B-winners are 46-37=9, 43-37=6, and 40-37=3. So it may be that, among A-players, the conditional fairness norm is more frequent or “stricter” than among B-players. On the other hand, we have seen in Table 1 that B-players differentiate enough (i.e.

necessarily in the case of non-zero transfers where there should not be differences) to make average contributions significantly different. This is an indication that A-players and B-players might indeed be different. We will investigate this question in the subsection 4.3.

	Transfer types	Share of zero transfers in % Exactly 0 (<10%)	**N**
two winners and one loser	**$\varphi_{A\to A}$**	**33* (38*)**	73
	$\varphi_{A\to B}$	51 (58)	
	$\varphi_{B\to B}$	**37 (51)**	35
	$\varphi_{B\to A}$	46 (60)	
One winner and two losers	**$\varphi_{A\to AA}$**	**23* (37**)**	73
	$\varphi_{A\to BB}$	41 (60)	
	$\varphi_{A\to AB}$	**22* (29**)**	
	$\varphi_{A\to BA}$	40 (59)	
	$\varphi_{B\to BB}$	**37 (51)**	35
	$\varphi_{B\to AA}$	43 (58)	
	$\varphi_{B\to BA}$	**37 (51§)**	
	$\varphi_{B\to AB}$	40 (63)	

Table 2: Share of zero transfers (in-group transfers in bold type) measured as "exactly 0" or in brackets as "smaller than 10% of endowment". In-group/out-group differences: * (**) significantly smaller than the corresponding value in next line (Fisher exact probability test, $p < 0.05$ (0.01)). In-group/in-group difference:
§ significantly larger (Fisher test, $p < 0.05$) than $\varphi_{A\to AB}$ (29%).

4.2 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 economists, $\mathbf{1}_{AB}$ =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 3 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 €0.55 larger and the transfers by economic students on average €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.

	Const.	1_{w}	1_{Econ}	1_{AB}	1_{BA}	1_{BB}	Adj. R^2
Two winners /one 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
One winner /two 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
One winner /two 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

Table 3: Regression analysis of absolute transfers from a winner to the only loser/to one of the two losers. N=216. In brackets p-values of a two-sided t-test[8].

4.3 Structural modeling

At last we want to investigate the model of Section 3 and the question of whether A- and B-players have different preferences beyond their risk attitudes with a random utility approach (McKelvey and Palfrey R., 1995). We concentrate on the one winner/two losers case because we want to avoid the discussion mentioned in Section 3 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.

[8] The significance of dummy variable coefficients has been checked by additional incremental F-tests.

(8) $V_i^k(y_j, y_h) = \gamma(X - y_j - y_h) - \beta_i(y_j - F^{k(j)})^2/2X - \beta_i(y_h - F^{k(h)})^2/2X + \varepsilon_i$

and assume that ε_i is i.i.d. extreme value. The individual choice probabilities then have a logit form. Following Cappelen et al. (2010) we assume $\log\beta_i$ to be normally distributed with $\log\beta_i \sim N(\mu, \sigma)$.

y_j is equal to $\tau_{i\to jh}$ and y_h is equal to $\tau_{i\to hj}$ because i's transfers are the only income of j and h. 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 decisions 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 $V_i^k(AA)$, $V_i^k(\mathrm{BB})$, $V_i^k(\mathrm{AB})$. The expected likelihood of these three decisions is[9]

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

where F is the lognormal distribution. We assume the fairness standard k=EA to be present in the population with a share of λ^{EA}, standard EP with λ^{EP} and standard CE with $\lambda^{CE} = 1 - \lambda^{EA} - \lambda^{EP}$. Then the average likelihood of the three decisions is

(10) $$L_i = \lambda^{EA} L_i^{EA} + \lambda^{EP} L_i^{EP} + (1 - \lambda^{EA} - \lambda^{EP}) L_i^{CE}.$$

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

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 (Table 4). 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= $4*10^{-5}$). The differences between A- and B-players are mainly the different shares with which the fairness standards are distributed. While A-players have more often (9.3 and 14 percentage points more) fairness standards EP and CE, the fairness 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 μ-log(γ) and σ. The distributions of β_i/γ have the same μ-log(γ) 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.

	γ	μ	$\mu-\log(\gamma)$	σ	λ^{EA}	λ^{EP}	λ^{CE}	-log(L)
A-players	3.13 (0.26)	2.73 (0.09)	1.68	0.19 (0.04)	0.22 (0.05)	0.60 (0.06)	0.18	429.3
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	2.26 (0.18)	2.43 (0.08)	1.42	0.34 (0.05)	0.26 (0.06)	0.60 (0.05)	0.14	434.8 + 281.6

Table 4: Parameter estimation for (9) and (10) with the utility function (8)

We are not completely satisfied with this result, however. The small share of players with a conditional (CE) fairness standard cannot explain the in-group/out-group discrimination identified by non-parametric tests. 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”.[10] 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 (8).

The estimated parameters are reported in Table 5. The separate estimation for A- and B-players again significantly improves the log-likelihood score with respect to all criteria ($p=5*10^{-5}$ in the likelihood ratio test). The same is true when we compare the scores of A-players (B-players) with and without the variable fairness standards. In the likelihood ratio test we get $p= 5*10^{-7}$ ($p=10^{-10}$). Also the theoretical and empirical frequencies of transfers are in good accordance (see Appendix) though 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.

	γ	μ	$\mu-\log(\gamma)$	σ	f_{EA}	f_{CE}	λ^{EA}	λ^{EP}	λ^{CE}	-log(L)
A-pl.	2.54 (0.27)	2.58 (0.12)	1.68	0.38 (0.07)	-0.38 (0.25)	0.22 (0.02)	0.22 (0.05)	0.22 (0.08)	0.56	414.8
B-pl.	0.91 (0.22)	1.52 (0.31)	1.61	0.51 (0.16)	-4.64 (5.51)	0.27 (0.04)	0.33 (0.26)	0.00 (0.39)	0.67	252.1
A- and B- pl.	1.95 (0.20)	2.35 (0.13)	1.68	0.30 (0.06)	-0.66 (0.87)	0.23 (0.01)	0.27 (0.07)	0.25 (7.5)	0.48	421.1 + 263.6

Table 5: Introducing variable fairness standards $FS^{EA}= f_{EA}$ and $FS^{EA}= f_{CE}$ (out-group standard).

We find now - in accordance with the non-parametric tests – the majority of the 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) 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 22% for A-winners and 0% for B-winners, although in the

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

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[11]. Because of the large standard deviation we cannot say much more than that the standard is negative. But we can say that these people are strong unconditional supporters of the idea that everybody who had had his chance should care for himself[12].

5. Conclusion

The main regularity in Tables 1 and 2 is that risk averters (A-players) strongly favor risk averters and risk seekers (B-players) weakly favor risk seekers. In-group favoritism is also found in a regression analysis which controls for the influence of gender and faculty. (Men and economists give less.) The result is further supported by the estimation of social utility functions with more than half of the subjects using a conditional fairness standard implying in-group favoritism. Our explanation of this result is that risk taking behavior is a strong enough trait to evoke group identity feelings, in particular among risk averters. The literature on the formation of group identity shows even weaker attributes to be effective (Tajfel, 1970, and Chen and Li, 2009). Our results are qualitatively in line with Chen and Li (2009). In their experimental investigation with charitable giving but with groups defined by preferences for Klee or Kandinsky paintings, in-group beneficiaries received 47% more than out-group beneficiaries. In our experiment in-group favoritism is between 28% and 79%. Our results are also in line with Cappelen et al. (2010) whose suggested utility function describes – after a slight adaption – also the behavior of our subjects. Note that while Cappelen et al. (2010) investigate redistribution of aggregate income (in real situations by taxes and social insurance schemes) our

[11] For A-winners with a fairness standard f_{EA}=-0.38 we get prob(transfers=0)=0.98 in the case of two losers of the same kind and prob(transfers=0)=0.94 in the case of one A- and one B-loser. For B-winners with f_{EA}=-4.64 the corresponding probabilities are 0.99997 and 0.997.

[12] The elder brother of the Lost Son is strictly opposed to his father's 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.

frame and focus is the voluntary transfer of income from "winners" to "losers" (within the family, among friends, and by private welfare).

We find significant differences between A- and B-winners in our analysis of behavior in the framework of a random utility approach, in particular concerning the precision parameter of the decision probabilities and A- and B-players' frequencies of the fairness standards. The seemingly large difference of the EA out-group standard makes almost no difference in terms of behavior. Both standards imply the almost certain choice of zero transfers. B-players' risk taking is accompanied less often by the EP fairness standard and more often by the "equal opportunity" EA standard and the conditional CE standard, i.e. risk takers reveal (and accept?) more often that losers "do not deserve" transfers and they use more often a conditional fairness norm. Our analysis estimates a conditional fairness standard $f_{CE} \approx 1/4$ for outgroup players which is only a mild reduction of the fairness standard $f_{EP} = 1/3$ for ingroup players. The different fairness standards and the different frequencies of fairness standards in the population are the major differences to Cappelen et al. (2010), which may be explained by the different nature of the redistribution in the two papers: redistribution of aggregate income in Cappelen et. al. (2010) and transfers from one's own income in this paper.

Arguments for the evolutionary stability of in-group favoritism (Eaton et al., 2011) can easily be extended to capture groups defined by risk preferences. That does not mean that there are no alternative explanations. We may assume that A-winners can easier imagine themselves in the shoes of A-losers and that therefore empathy is easier evoked than in the case of B-losers (and vice versa). These are not completely different explanations, however, because ease of empathy can be regarded as a possible (or even the most important) determinant of group identity feelings.

It is only natural that 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, however, expressed this opinion. Behavior seems to be denounced as irresponsible only if it is riskier than one's own. 9 B-players explicitly remark, that B-losers should get more

[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.

transfers because they are more risk-loving (i.e. like themselves). Even 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 move 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). 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 size of this group probably depends on circumstances.

References

Akerlof, G. and Kranton, R. E. (2000), "Economics and Identity", Quarterly Journal of Economics, 115, . 715-753.

Akerlof, G. and Kranton, R. E. (2005), "Identity and the Economics of Organizations", Journal of Economic Perspectives, 19, Winter, pp. 9-32.

Ben-Ner, A., McCall, B.P., Stephane, M. and Wang, H. (2009), "Identity and In-Group/Out-Group Differentiation in Work and Giving Behaviors: Experimental Evidence", Journal of Economic Behavior & Organization 72, 153-170.

Bernhard, H., Fehr, E., and Fischbacher, U. (2006), "Group affiliation and altruistic norm enforcement", American Economic Review 96(2):217–221.

Bolle, F., Breitmoser, Y., Heimel, J., Vogel, C. (2012), "Multiple Motives of Pro-Social Behavior: Evidence from the Solidarity Game", Theory and Decision, DOI 10.1007/s11238-011-9285-0.

Büchner, S., Coricelli, G., Greiner, B. (2007), "Self Centered and Other Regarding Behavior in the Solidarity Game", Journal of Economic Behavior and Organization, Vol. 62, Issue 2, pp. 293-303.

[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 and Bolle (2011), however, differences according to a personality test are found.

Buitrago, G., Güth, W. and Levati, M.V. (2009), "On the Relation between Impulses to Help and Causes of Neediness: An Experimental Study", The Journal of Socio-Economics 38, 80-88.

Cappelen, A.W., Konow, J., Sørensen, E.Ø., Tungodden, B. (2010), “Just Luck: An Experimental Study of Risk Taking and Fairness”, NHH Discussion Paper 4/10.

Charness, G., Rigotti, L. and Rustichini, A. (2007), "Individual Behaviour and Group Membership", American Economic Review 97 (4), 1340-1352.

Chen, Y. and Li, S.X. (2009), "Group Identity and Social Preferences", American Economic Review, Vol. 99 (1), 431-457, 27p.

Cohen, M., and Jaffray, J.-Y. (1988), "An Experimental Analysis of Decision Making Under Risk", Journal of Experimental Psychology: Human Perception and Performance 14 (4), 554-560.

Eaton, B.C**.,** Eswaran, M., Oxoby, R. (2011), "'Us' and 'Them': The Origin of Identity, and its Economic Implications", Canadian Journal of Economics 44, 719-748.

Fehr, E., and K. Schmidt. (1999), “A Theory of Fairness, Competition and Cooperation”, Quarterly Journal of Economics, 114(3): 817-68.

Kramer, R.M., Pommerenke, P., Newton, E. (1993), „The social context of negotiation - effects of social identity and interpersonal accountability on negotiator decision making”, Journal of conflict resolution 37 (4), 633-654.

Lei, V., and F. Vesely. (2010), “In-group vs. Out-group Trust: The Impact of Income Inequality”, Southern Economic Journal, 76(4): 1049-1063.

Lübbe, I. and Bolle, F. (2011), “Who helps whom? Risk Taking and Solidarity in a Virtual World”, Discussion Paper 210, Europa-Universität Frankfurt (Oder), December 2011.

McKelvey, R. D. and T. R. Palfrey R. (1995) “Quantal Response Equilibrium for Normal Form Games,” Games and Economic Behavior, 10, 6-38.

Ockenfels, A. and Weimann, A (1999), “Types and patterns: an experimental East-West-German comparison of cooperation and solidarity" in: Journal of Public Economics 71, 275–287.

Selten, R and Ockenfels, A (1998), "An Experimental Solidarity Game", Journal of Economic Behavior and Organization 34, 517-539.

Tajfel, H. (1970), "Experiments in Intergroup Discrimination", Scientific American 223 (5), 96-102.

Trhal, N., Radermacher, R. (2009), "Bad Luck vs. Self-Inflected Neediness – An Experimental Investigation of Gift giving in a Solidarity Game", Journal of Economic Psychology, Vol. 30 (4), 517-526

Appendix: Theoretical and empirical transfers.

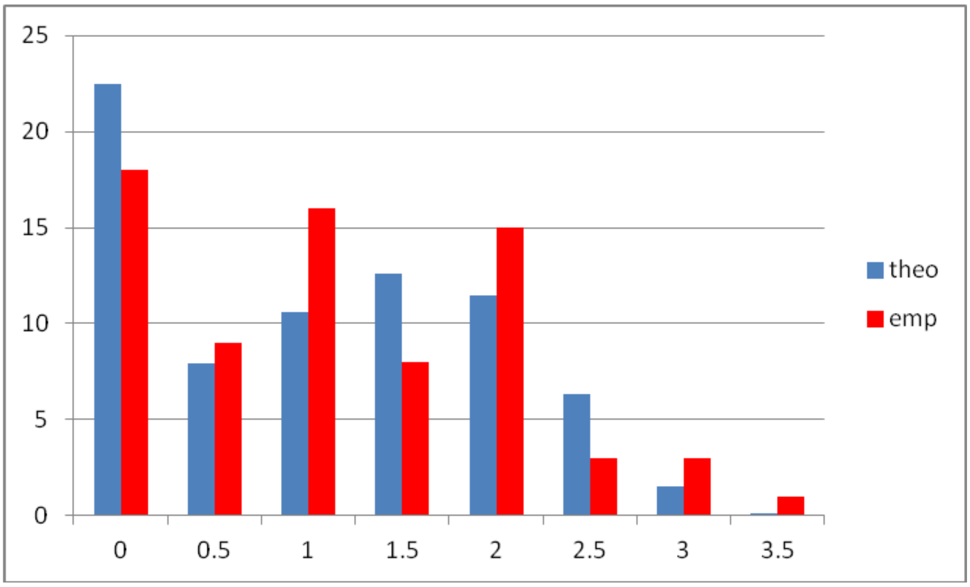

Figure 1: A-winners' transfers to two A-losers. 73 data points.

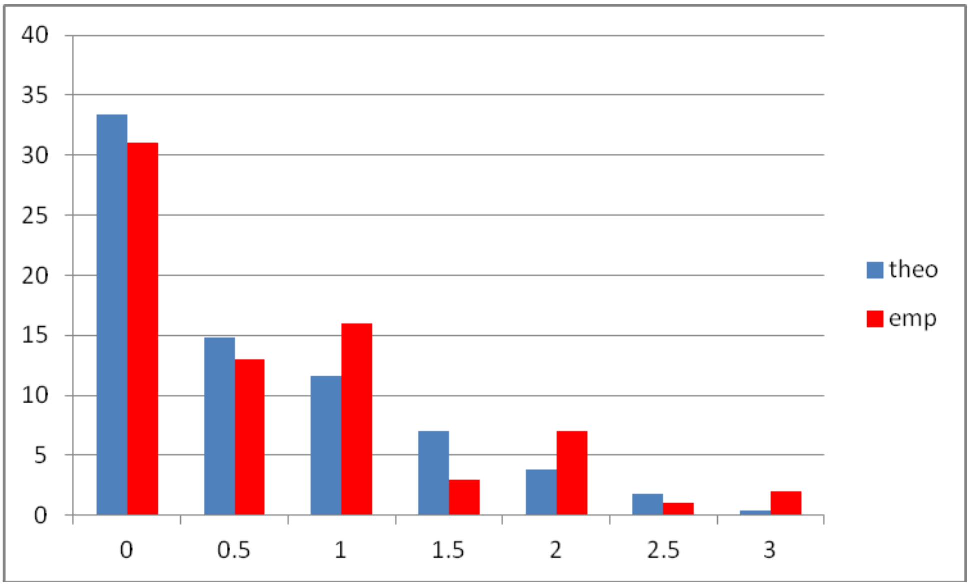

Figure 2: A-winners transfers to two B-losers. 73 data points.

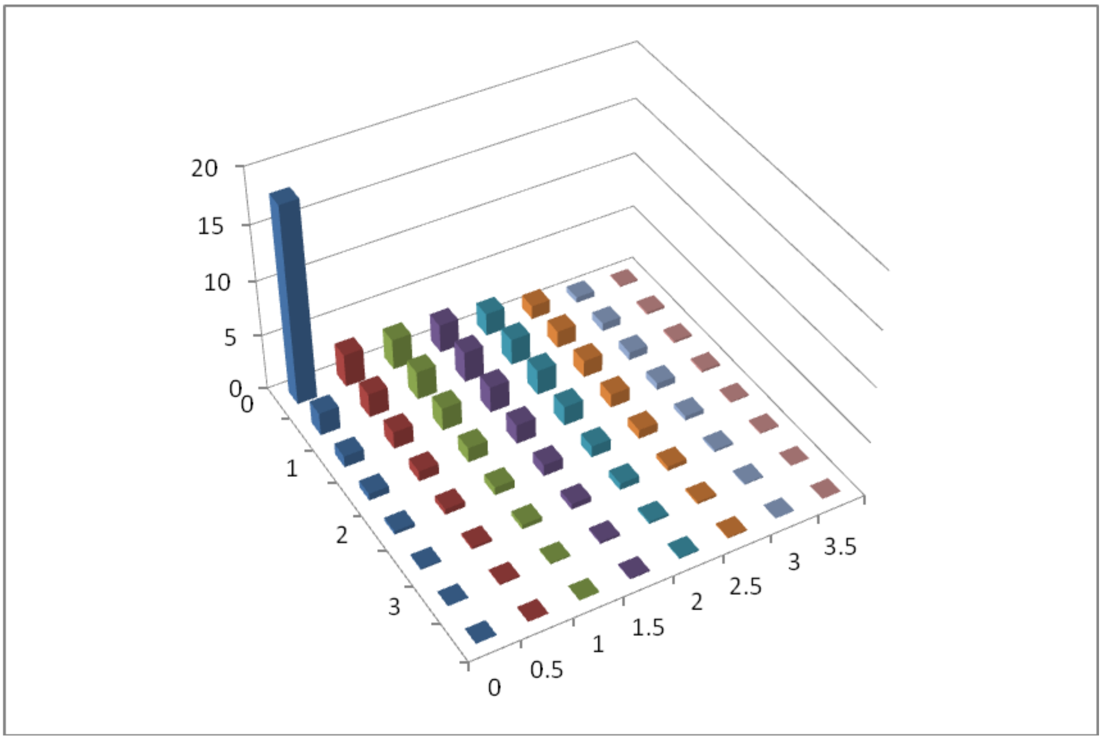

Figure 3: A-winners' theoretical transfers to one A-loser (backward pointing axis) and one B-loser (forward pointing axis). 73 data points.

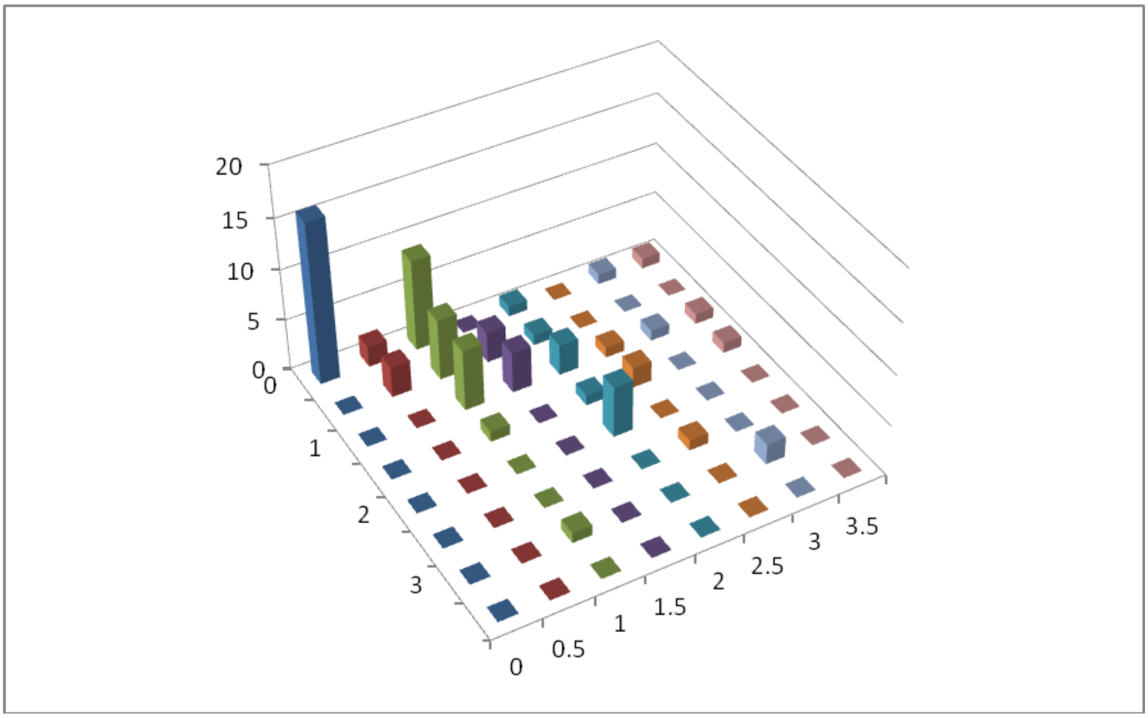

Figure 4: A-winners empirical transfers to one A-loser (backward pointing axis) and one B-loser (forward pointing axis). 73 data points.

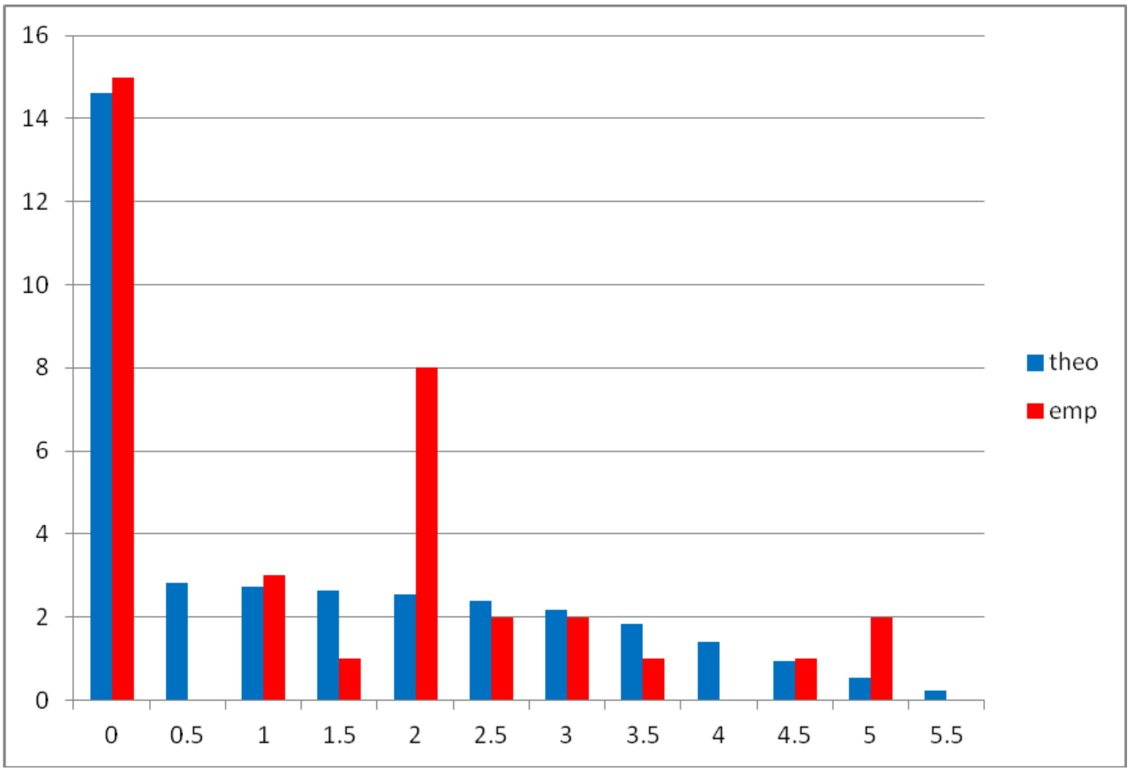

Figure 5: B-winners transfers to two A-losers. 35 data points,

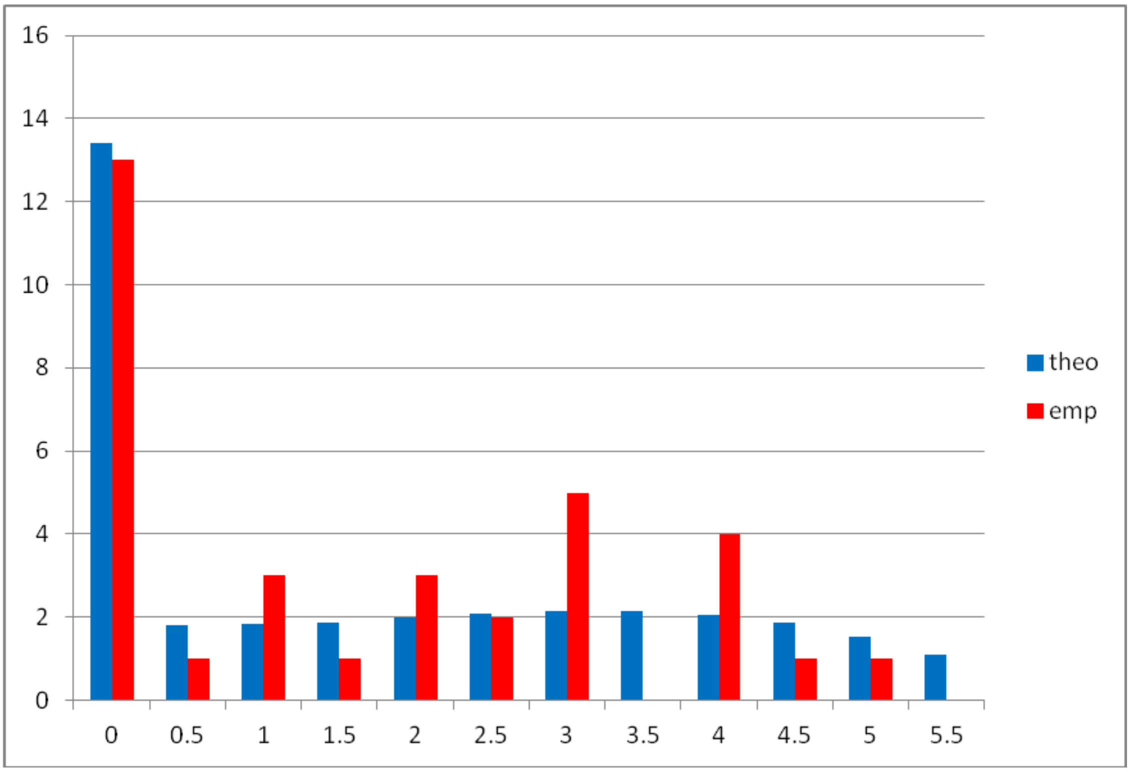

Figure 6: B-winners transfers to two B-losers. 35 data points.

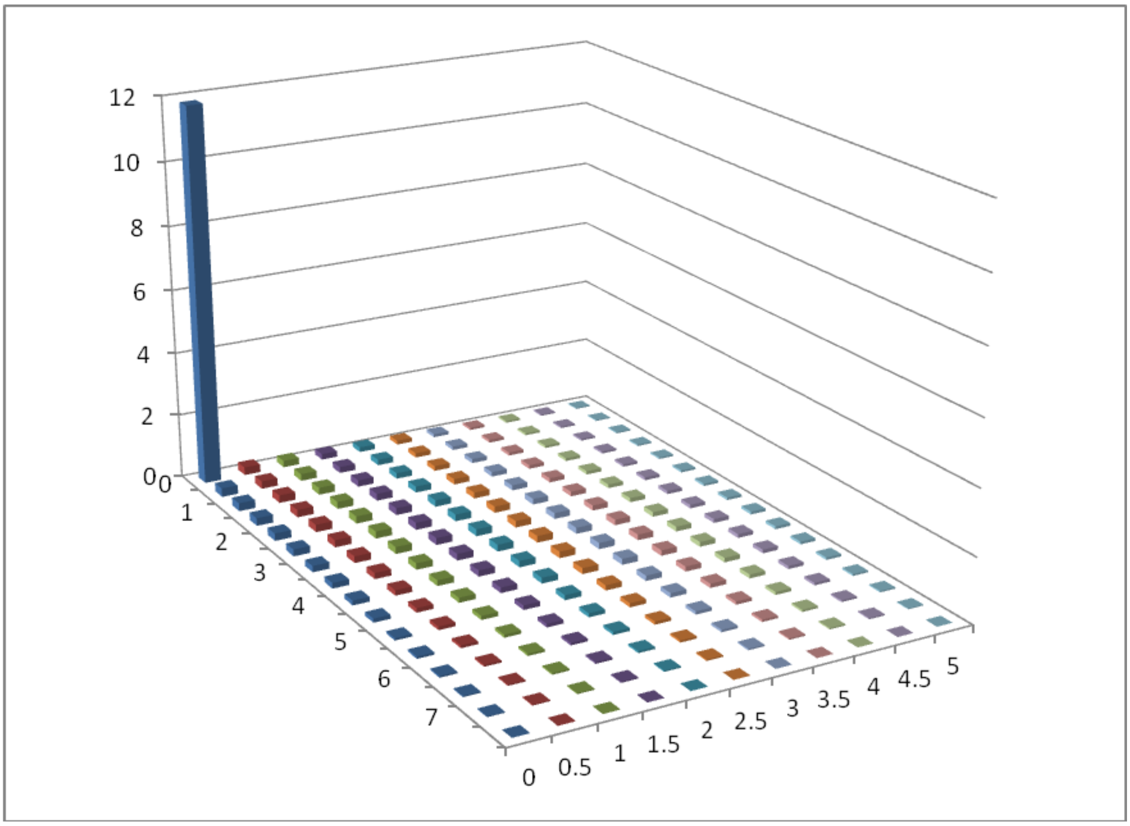

Figure 7: B-winners' theoretical transfers to one A-loser (backward pointing axis) and one B-loser (forward pointing axis). 34 data points.

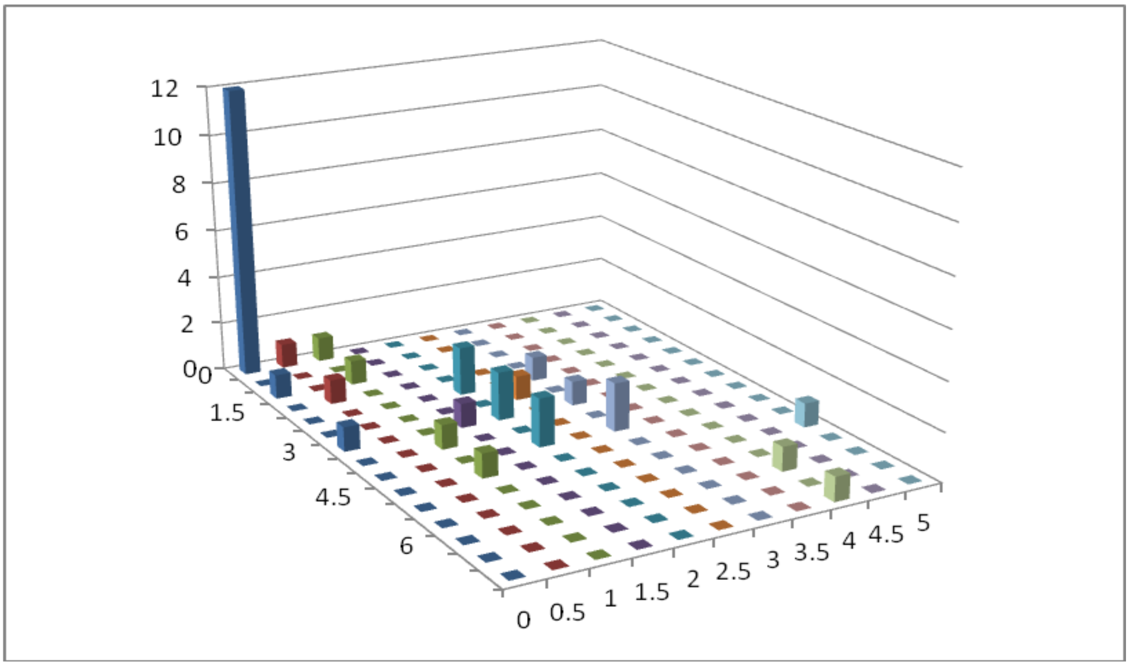

Figure 8: B-winners' empirical transfers to one A-loser (backward pointing axis) and one B-loser (forward pointing axis). 34 data points.

For online publication!

General Instructions
(Translation from German)

For the following experiment, you can influence your initial endowment (in Euro) by choosing between two random processes.

Random process A: With probability 2/3 you “win” Euro 10, with probability 1/3 you receive Euro 0.
Random process B: With probability 1/3 you “win” Euro 20, with probability 2/3 you receive Euro 0.

After choosing the initial endowment, groups of three are built by random choice from the attendees. If a group consists only of winners or only of losers, the game ends. If the group consists of one or two winners, each winner has the possibility give money to the loser(s). You will be informed on the chosen alternative of the “loser”, but won’t get information on the choice of the second winner in case there are two winners.

You receive the money that results from your decision. If you are a loser, you receive, in addition to your initial endowment, the money the winner(s) transfer to you. If you are a winner, you receive your initial endowment minus the transfers to the loser(s).

You can collect your payoff from **……….. to ……………** in room ………. Please **remember your number and pseudonym!**

Number:

Pseudonym: ________________

Which of the alternatives do you choose?

Random process A: With probability 2/3 you “win” Euro 10, with probability 1/3 you receive Euro 0.

Random process B: With probability 1/3 you “win” Euro 20, with probability 2/3 you receive Euro 0.

Please check the alternative with which your initial endowment should be determined:

Random process A	

Random process B	

What do you think, how many of the attendees pick random process A? How many pick random process B?

Random process A is choosen by ____________ % the attendees.

Random process B is choosen by ____________ % the attendees.

Case: Subject has chosen A and won.

Number:

Pseudonym: ________________

You were determined by the random process to be a „winner" and you received an initial endowment of Euro 10.

(a) What will you give if there are two winners in your group and you have no information on the other winner?

Answer A: To a loser, who chose random process A,

I give __________,__________ €.

Answer B: To a loser, who chose random process B,

I give __________,__________ €.

What do you expect the others to transfer ***on average****? (The best estimation will be rewarded with €10, each)*

Answer A: **I expect ____________,____________ € on average** for a loser, who chose random process A.

Answer B: **I expect ____________,____________ € on average** for a loser, who chose random process B.

(b) What will you give if you are the only winner in your group?

Answer A: In case both losers chose random process A,

I give each of them __________,_________ €.

Answer B: In case both losers chose random process B,

I give each of them __________,_________ €.

Answer C: In case one loser chose random process A and the other loser chose random process B,

I give the one who chose random process A __________,________ € and

the one who chose random process B __________,________ €.

(c) Personal data

Sex: □ male □ female

Faculty: □ Economics/Business □ Law □ Cultural Science

Age: __________ Semester (overall): __________

In case your transfers differed between losers who choose A and losers who choose B, please comment on the reason.

Case: Subject has chosen B and won

Number:

Pseudonym: ________________

You were determined by the random process to be a “winner” and you received an initial endowment of Euro 20.

Otherwise: same questions as to A-winners.

Cases: Subject has chosen A or B and lost (data not analyzed)

Number:

Pseudonym: ________________

You were determined by the random process to be a “loser”.

What do you think, how much do you get from the winner(s)?

In case there are two winners, I receive altogether ________ **€**.

In case there is just one winner, I receive ________ **€**.

In the following we would like to know **how you would have decided in case you would have been picked as a winner.**

Otherwise: same questions as for A-winners.