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Transfers and altruistic punishment in Solomon's Game experiments

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Abstract. Our research is a variant of the *third party punishment game* that we call *Solomon's Game*. The main feature of this game is that players can not only punish unfair people but also help those individuals who are the victims of that unfairness. The aim of this experiment is to compare the human tendency to punish unfair behavior to the desire to help victims of that unfairness, in presence of a budget constraint and without the expectation of a long-run pecuniary gain.

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Introduction

In the field of experimental economics the most studied reaction to unfairness is punishment. Experimental studies focused on the behavior of subjects when it is possible to punish whenever a cooperation norm or a redistribution norm is violated have represented an important contribution to theories concerning fairness.[1] In particular, the experimental results differ from the theoretical predictions based on a self-interested *Homo Oeconomicus* in two cases. The first case is represented by the second-party punishment (that is, the subject who is the victim of the unfairness can react and punish the agent responsible for the unfairness) in one-shot situations. In such a case no victim should react since the punishment activity will never imply a future gain. The second case is the third-party punishment (a subject who is not the victim can punish the agent responsible for the unfairness). Again, no external observer, according to the theoretical predictions, should punish. However, what the experimental evidence has suggested is that both second-party punishment in one-shot games (Güth et al., 1982; Roth, 1995; Camerer and Thaler, 1995; Ledyard, 1995; Bosman and van Winden, 1999; Fehr and Gächter, 2000; Fehr, 2001; Camerer and Fehr, 2003; Falk, Fehr and Fischbacher, 2005) and third-party punishment, called also altruistic punishment[2] (Fehr and Gächter , 2002; Camerer and Fehr, 2003; Fehr and Fischbacher 2004a, 2004b), exist.[3]

Punishment is consistent with social preferences models and Gintis' notion of strong reciprocity too.[4] According to inequity-aversion theories, the cost of punishment is a sacrifice chosen by fair-minded people who want more equitable final outcomes. Intention-based models justify punishment as a reaction to someone's unfair intentions. According to Gintis (2000), a *strong reciprocator* experiences negative emotions (desire of revenge, desire of fighting against injustice, anger) when she faces unfair situations or social norms violations, and she is willing to sacrifice resources to punish unfairness and violation of norms, even when this does not provide any current or future material reward.[5]

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[1]The Prisoner's Dilemma and the Public Good Game belong to the first category, while the Ultimatum Game, the Third Party Punishment Game and the Power to Take Game belong to the second type. For a survey see Fehr (2001), Camerer and Fehr (2003).

[2] This definition is due to the fact that this activity implies only a cost for the Observer and no gain (Fehr and Gächter , 2002).

[3] Fehr and Fischbacher (2004a) and Carpenter and Matthews (2005) compare second party punishment to third party punishment. They find out that the former reports a stronger reaction to unfairness than the latter.

[4] See chapter 1 for a description in details.

[5] A case that underlines the importance of the role played by culture in people's behavior is the situation where subjects make a decision in a scenario they never faced before. Even if people are able to distinguish between a one-shot and a repeated game, the former is a new situation for them. The idea is that when people face a novel situation, their tendency is to associate it to a well-known daily experience. Consequently, they behave as if they were in the familiar situation, that is, in a repeated game scenario (Henrich et al., 2001). This means that their social and cultural background influences their tendency to punish, and their behavior is a sort of "mirror" of their 'structures of social interaction and modes of livelihood' (p.5).

In this experiment I consider that an external observer, who is witness to an unfair situation and who can intervene, can resist unfairness not only by punishing the oppressor, but also by helping the victim.

A large literature assumes that altruism is the explanation of the tendency to help people (i.e. Becker, 1974; Charness and Rabin, 2002[6]). In models based on altruism, the altruist's utility increases as others' well-being increases. However, studies on volunteering and donations point out that it is relevant to distinguish between altruistic behavior and altruistic motivations.[7] The possibility that different motivations may be hidden behind an altruistic action has been taken into account both theoretically (Menchik and Weisbrod, 1987; Andreoni 1989, 1990; Frey, 1997) and empirically (Freeman, 1997; Van de Ven, 2000, Schokkaert, 2003).

On the other hand, the activity of helping the victim is less studied in the experimental literature, which prefers to deal with: 1) testing the existence of altruistic behavior (i.e.Andreoni and Miller, 2002); 2) testing altruism against trust or inequity aversion (i.e. Bolton et al., 1998; Cox, Sadiraj K and Sadiraj V., 2002); 3) finding an incentive scheme that maximises the revenue coming from donations (i.e. Meier and Frey, 2004; Small and Loewenstein, 2003). To my knowledge, in experimental works helping has never been compared to punishment.[8]

The aim of this experiment is to compare the human tendency to punish unfair behavior to the desire to help victims of that unfairness, in presence of a budget constraint and without the expectation of a long-run pecuniary gain. Our experiment frame is a variant on the *third party punishment game* proposed by Fehr and Fischbacher (2004a).

The paper is organized as follows. In section 2 we present the experimental design and in section 3 the expected results, while section 4 is devoted to the actual results and their interpretation. A comparison of our results with the existing models concerning fairness and altruism is in section 5. Conclusions are presented in 6. Appendix A contains tables and graphs. Appendix B reports the instructions of the experiment.

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[6] This refers to the previously mentioned model of *quasi-maximin preferences.*

[7] According to Barker (1993), an altruistic action may be due to three different motivations: instrumentalism, obligation and altruism. Instrumentalism assumes that people decide to help other subjects for pure material (social prestige, Mueller, 1975; Barker, 1993; Roy and Ziemek, 2000; Anheier and Salamon, 2001; allocation of money and personal exploitation of services, Mueller, 1975; Frank, 1988; gain of experience and skills, Mueller, 1975; Barker, 1993; Vaillancourt, 1994; Day and Devlin, 1998; Roy and Ziemek, 2000; Anheier and Salamon, 2001) or psychological self-interest (Bandura, 1977; Barker, 1993). Sociobiological explanations of the presence of altruistic behavior among living beings belong to this category (group selection, Wynne-Edward, 1962; kin-selection, Hamilton, 1964; reciprocal altruism, Trivers, 1971). Obligation is based on the fact that prosocial behavior can be learnt. If a subject's cultural inheritance includes pro-sociality, she will feel morally obliged to behave accordingly. Altruism (for a more detailed survey on this topic, see Ottone, 2002) implies that prosocial behavior may reflect a genuine concern for the situation of someone else. Hoffman (1981), Fishhoff (1982), Deci and Ryan (1985), Batson (1999) believe in the heterogeneity of human forces that induce people to help someone in difficulty, including altruism.

[8]

2. The experiment

From the previous section it may be argued that human beings are inclined to promote fair behavior, punish people who do not respect this principle and help the victims. The real world and the experimental studies (above all the research promoted by Fehr) provide a relevant number of examples.

Up to now the experimental works studied the level of punishment assigned to unfair subjects with respect to the degree of unfairness and with respect to the relationship existing between the unfair subject and the punisher. In particular, they concentrate on the analysis of second party punishment despite the importance of third party punishment as a social norm enforcement device (Gintis, 2000; Fehr, Fischbacher and Gächter, 2002; Fehr and Fischbacher, 2004a). Our research tries to give a contribution in this direction and to give, at the same time, a new input. We analyze the external observers' tendency to punish unfair people and their tendency to help the victims, in presence of a budget constraint. This is why in our game the players can not only punish unfair people but also help those individuals who are the victims of that unfairness.

2.1 Experimental Design

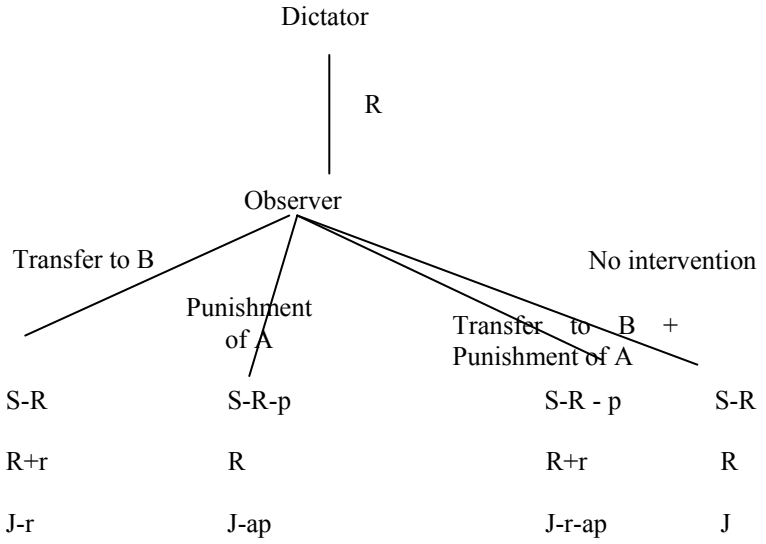
The experiment has been run in the laboratory of experimental economics ALEX at the University of Eastern Piedmont in Alessandria, using the *z-Tree* software (Fischbacher, 1999). Overall, we have run 1 treatment and 2 sessions, with a total of 48 participants (24 participants in each session).

As we said, our tool was a variant on the *Third Party Punishment Game* that we call *Solomon's Game* (*SG*). In particular, each round included two stages. In the first stage couples of players were formed. In each couple the subjects played a *Dictator Game*. Player A was a Dictator and player B was a Receiver. Player A had to decide how to allocate a sum between player B and herself. Player B couldn't react to any decision made by A. In the second stage new subjects (players C) entered the game. Each new player was assigned to one of the couples that had played in the first stage. She was an Observer and had an endowment. Her task was to decide how to use that endowment. She could: 1) transfer money to B if she thought the Receiver had received from A an unfair sum; 2) spend money to sanction[9] A (each euro spent to punish A produced a sanction of 2 euro) if she thought the Dictator had been too unfair; 3) both punish A and transfer money to B; 4) keep the whole sum. The situation is represented in Figure 1.

[9] In real life, costs associated to punishing may include 'the risk of retaliation or at least the potential loss of relationship, the loss of time or money, emotional tensions' (Fehr and Fischbacher, 2004b, p.186).

Figure 1.

Solomon's Game



Where:

S = sum to be allocated

R = sum that A transfers to B

J = C's initial endowment

p = sanction decided by C

r = sum that C transfers to B

a = cost of each single unit of punishment

By backward induction, we obtain that in equilibrium player C would have never punished player A, and player A would have kept the whole sum.

At the beginning of each session each player was randomly assigned a role (A, B or C) and 8 groups of 3 participants were formed. In each group, players A and B played the Dictator Game during the first stage and player C entered the game in the second stage. A and C's initial endowment was the same (10 euro) and the cost of one euro of punishment for player A was 0.5 euro for player C. We did not assigned any show-up fee.

At the beginning of the experiment, participants were informed about the sequential form of the game and about each player's initial endowment. Each player participated in only one session and partnered players' identities were unknown even when the session ended. We implemented the

strategy method[10] at the Observer's stage in order to analyse subjects' behavior in details. In fact, when we ran some 'exploratory' sessions, we realized that we had very few responses of the Observer to certain transfer levels.[11]

Each session of the experiment lasted about 45 minutes and each subjects earned on average 6 euro.

2.2 Expected results

Rational and self-interested Observers would find it profitable neither to punish nor to transfer money to the other players. This directly turns out from the structure of the *Solomon's Game*. Consequently, if people punished only for strategic and self-interested motivations they would not punish in this case. If subjects decide to punish or to transfer it may be due to social and emotional factors, such as the desire for equity, the desire to help other people and the feeling of anger toward those people who are unfair.

Our sample may be made up of people with heterogeneous preferences. This means that the subjects will belong to two groups: some of them may be self-interested and their only aim will be the maximization of their own payoff, while other subjects will be fair-minded or altruist and, consequently, they will be interested in others' payoffs. The former will keep the whole sum, no matter how the Dictators behave. The latter will react to unfairness.

Taking account of the discussion of the previous sections and of the results obtained by Fehr and Fischbacher (2004a), my expected results were:

1) players have heterogeneous preferences;
2) the level of the intervention is proportional to the unfair offer of the Dictator.

[10] When the strategy method is used, players are asked their choice for each possible case. The final payoff is determined on the basis of the situation that actually occurs.

[11] Fehr and Fischbacher (2004) too opted for the strategy method. They knew the possibility that people act in a different way when the strategy method is implemented with respect to a situation where they act after an actual choice is made by the opponents. However, they trust the conclusion by Cason and Mui (1998) and Brandts and Charness (2000) that the strategy method does not induce different behaviors.

3. Results and interpretation of the experimental evidence

In this section we analyse the results we obtained during the experiment. In particular, we focus on the Observers' behavior, on the Dictators' decisions and on players' beliefs. Each subsection is devoted to one of this class of results.

3.1 Third Party Intervention

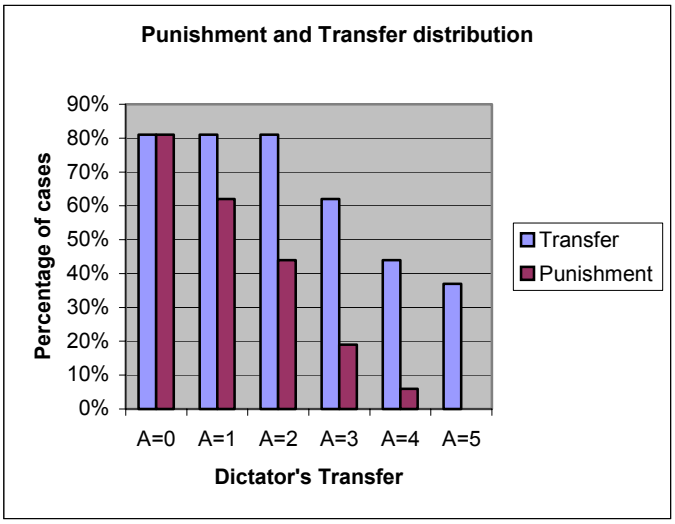
Result 1. The actual behavior of the Observers disconfirms the classical hypothesis that they are only self-interested.

At each transfer level below 5[12] there is a relevant percentage of Observers who decide to punish, while a high percentage of Observers decide to transfer money to the Receiver even when the transfer level is 5 (see Table 1 and Figure 2). Observers' punishment differs significantly from 0 at levels 0-3 (Wilcoxon signed rank test, P > 0,0007), while Observers' transfer differs significantly from 0 at each level (Wilcoxon signed rank test, P = 0,0006).

Table 1 – Punishment and Transfer distribution

	When the Dictator transfers …					
Percentage of …	**0**	**1**	**2**	**3**	**4**	**5**
Punishment	81%	62%	44%	19%	6%	0%
Transfer	81%	81%	81%	62%	44%	37%

Figure 2



[12] Since the initial endowment of the Dictator was 10 euro, we consider each transfer below 5 unfair.

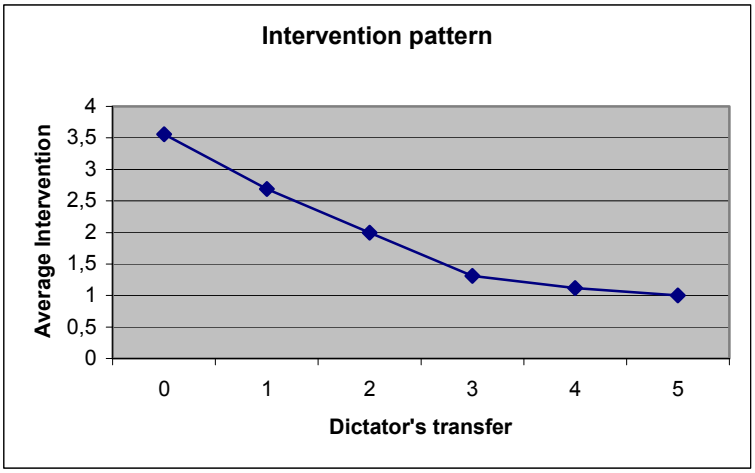
Result 2. The Observers' average expenditure to intervene (punishment + transfer) increases as the Dictators' transfer decreases.

The Observers' reaction is proportional to the degree of unfairness (see Table 2 and Figure 3). This may be explained by the fact that the higher the level of unfairness, more deeply people's sense of justice is touched.

Table 2 – Average Expenditure for Intervention

	When the Dictator transfers …					
	0	**1**	**2**	**3**	**4**	**5**
Average Expenditure	3.56	2.69	2	1.31	1.12	1

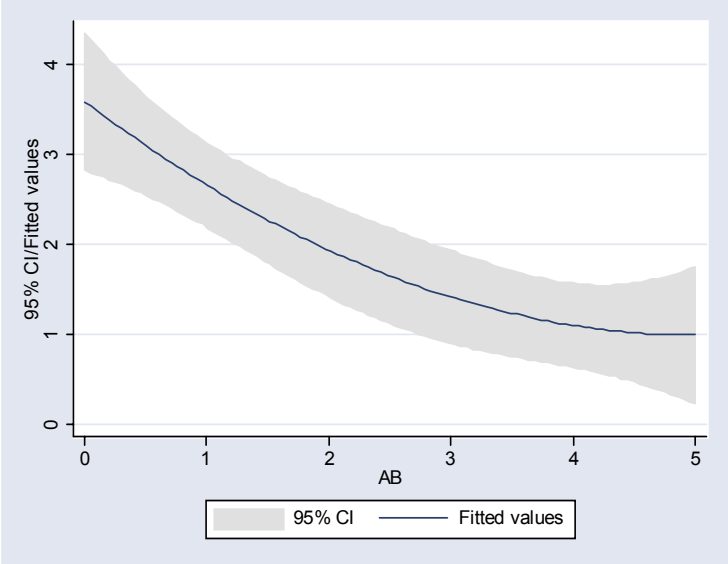
Figure 3



OLS regression[13] of intervention on the variables *Dictator's Transfer* and *Dictator's Transfer*2 (the squared value of the Dictator's transfer) shows that, as the Dictator's transfer increases, the level of intervention decreases even if less than proportionally (slope coefficient of –1.03 for the variable *Dictator's Transfer* and 0.1 for *Dictator's Transfer*2, P = 0.000 and 0.001 respectively). Figure 4 illustrates the predicted value of Intervention with confidence bands around.

[13] Significance tests are based on robust standard errors to take account of dependence of each individual's choices and independence across individuals' choices (cluster option).

Figure 4



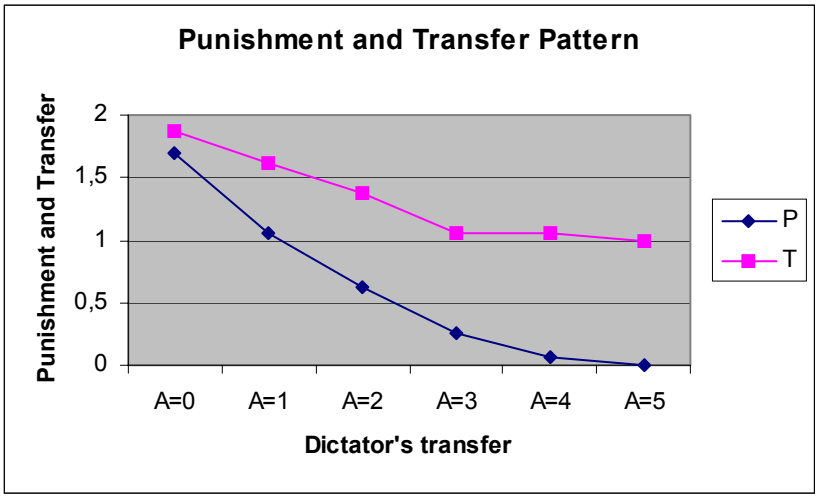
Result 3. Both the Observers' average punishment and average transfer increase as the Dictators' transfer decreases.

The increasing level of punishment (see table 3 and Figure 5) when unfairness increases is in line with the results of other experiments (see for instance Fehr and Fischbacher, 2004a, Bernhard, 2001). The same pattern is followed by the transfer (see table 3 and Figure 5). This may support that helping the victim is another kind of reaction to unfairness.

Table 3 – Average Punishment and Average Transfer

	When the Dictator transfers …					
	0	**1**	**2**	**3**	**4**	**5**
Average Punishment	1.69	1.06	0.62	0.25	0.06	0
Average Transfer	1.87	1.62	1.37	1.06	1.06	1

Figure 5



OLS regression of punishment on the variables *Dictator's Transfer* and *Dictator's Transfer*2 (the squared value of the Dictator's transfer) confirms the relation between the level of punishment and the degree of unfairness. As the Dictator's transfer increases, the level of punishment decreases even if less than proportionally (slope coefficient of –0.68 for the variable *Dictator's Transfer* and 0.068 for *Dictator's Transfer*2, P = 0.000 and 0.001 respectively).

We obtain a similar result when regressing the Observer's transfer on the variables *Dictator's Transfer* and *Dictator's Transfer*2. The former has a significant (P = 0.079) and negative (-0.36) slope coefficient, while the latter has a positive (0.035) but not significant (P = 0.123) coefficient. Figure 6 and Figure 7 illustrate the predicted value of Punishment and transfer with confidence bands around.

Figure 6

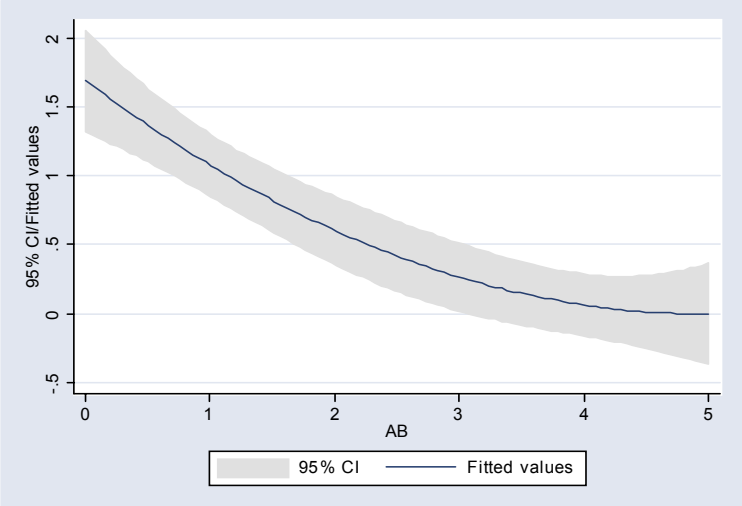
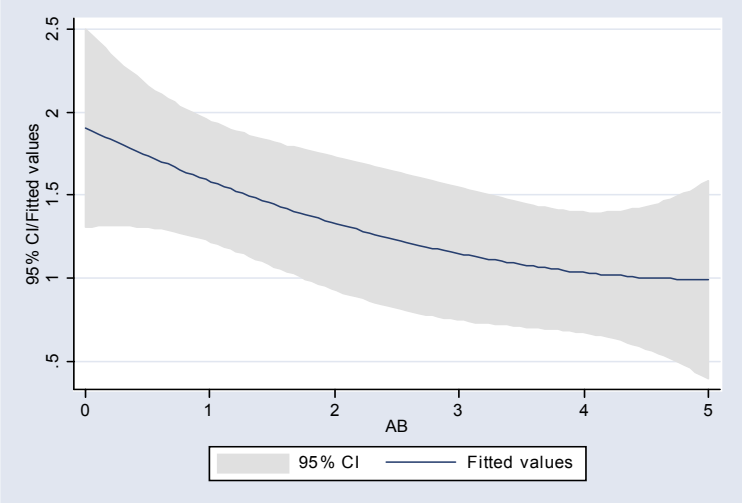


Figure 7



Result 4. Observers' transfer tends to be higher than punishment.

At each Dictator's transfer level, the average transfer from the Observers is higher than the average punishment (see Table 3 and Figure 5). We conduct the Wilcoxon test to check whether punishment differs significantly from transfer. The result is that this difference is significant at levels 1-5 ($P > 0.01$), but not at level 0 ($P = 0.47$). If we run a Spearman correlation test to analyse a possible correlation between punishment and transfer, we find out that they are significantly correlated at levels 0 and 1 ($P = 0.54$ and $P = 0.51$ respectively), but not at levels from 2 to 5 ($P > 0.13$).

This may imply that, when the Dictator is extremely unfair, the Observer's reaction is bi-directional: a combination of punishment and transfer is used. When unfairness is not extreme, the Observer prefers helping the victim rather than punishing the Dictator.

In October I'll run another treatment where the Observer is not allowed to transfer money to the Receiver. In this way, I'll check whether punishment and transfer are substitutes or complements.

Result 5. People's preferences are heterogeneous.

Our hypothesis that subjects have heterogeneous preferences is supported by the data. If we analyse our sixteen Observers' behavior, we have two selfish players and fourteen fair-minded individuals. According to their different intervention decisions, it is possible to identify (see Table 4 and Figure 8) four different types (and no residual category) that we label:

- *Selfish*: an Observer who never intervenes;
- *Samaritan*: an Observer who only transfers to the Receiver when she intervenes;

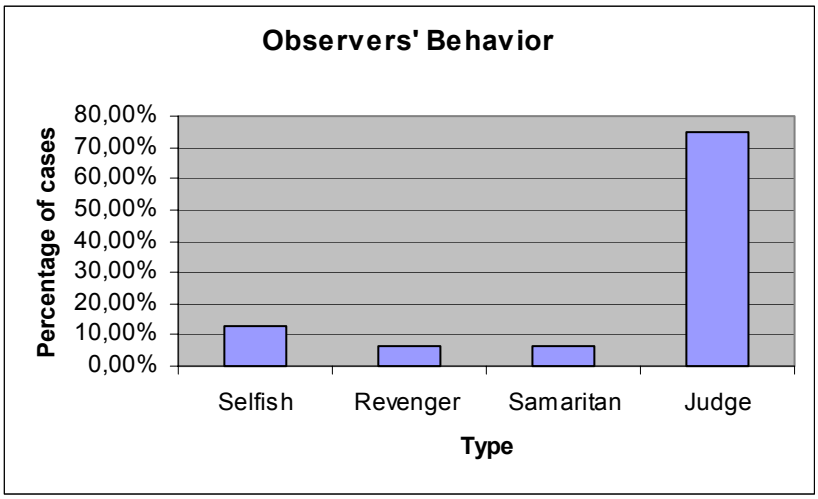
-*Revenger*: an Observer who only punishes when she intervenes;

-*Judge*: a subject who chooses a combination of punishment and transfer when she intervenes.

Table 4. Types

TYPES			
Selfish	**Samaritan**	**Revenger**	**Judge**
12.5% (2 over 16)	6.25% (1 over 16)	6.25% (1 over 16)	75% (12 over 16)

Figure 8



The change we made in the original version of the *Third Party Punishment Game* (by introducing the possibility for C to help B) is useful since it makes it possible both to provide a more detailed classification of human types and to discover that the attitude of human beings to help those who suffer from an injustice is strong. Thirteen Observers over sixteen decide to transfer money to the Receiver. One of them decides only to transfer without judging and punishing an unfair Dictator. This may signify that the desire of revenge and punishment is not the only emotion stimulated by people's sense of justice. People care about the condition of the victims.

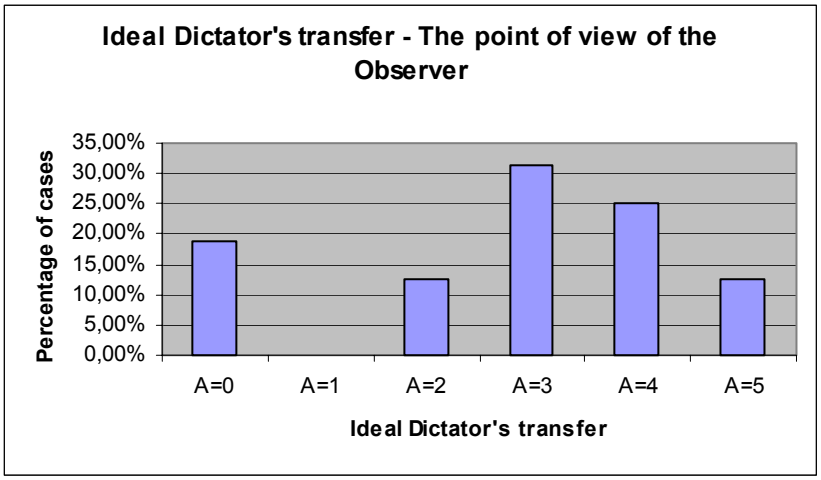
3.2 Subjective unfairness

During the experiment the Observers were asked their ideal transfer from the Dictator to the Receiver (see Table 5 and Figure 9 for the ideal transfer's distribution among the Observers). If we assume that this ideal transfer is a subjective reference point of fairness (instead of the objective fair transfer of 5 euro), each Dictator's transfer lower than the ideal transfer may be considered unfair. In this case, it is possible to analyse the Observer's reaction when her subjective principle of fairness is violated.

Table 5 – Ideal Dictators' Transfer distribution

	Dictator's transfer					
	0	**1**	**2**	**3**	**4**	**5**
Percentage of cases	18.75%	0%	12.50%	31.25%	25%	12.50%

Figure 9



If the ideal transfer is a reference point of fairness, this implies that only 12.5% of the Observers consider the equal share of the pie the fair share. This may be due to the fact that the Observers think that the pie is not 10 euro but 20 euro (the sum of the Dictator's and of the Observer's endowment), since the Observer too may transfer money to the Receiver. If the Observer thinks, for example, that he has to share with the Dictator the duty to give money to the Receiver, the Receiver's fair payoff is 20/3 and the Dictator fair transfer is about 3. At a first sight,

it seems not to be the case, since the Observer's average transfer is only 1.06 when the Dictator's transfer is 3 (see Table 3). Moreover, neither the Dictators seem to expect a conditional transfer from the Observers (see Table 6) and when we test a possible correlation between the Dictator's transfer and his expectation about the Observer's transfer, we find out that they are not significantly correlated (Spearman correlation test, P = 0.78).

Table 6

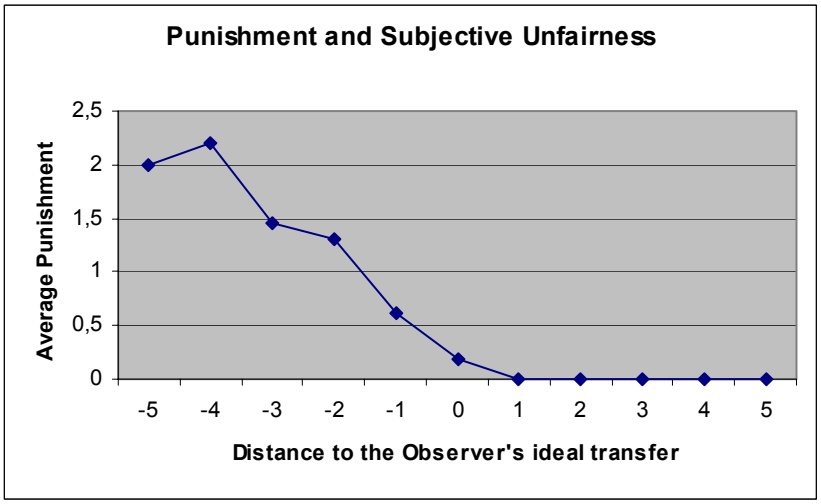
	Expected Observer's Transfer						
Dictator's Transfer	**0**	**1**	**2**	**3**	**4**	**5**	***Total***
0	2 66.7%	0 0%	1 33.3%	0 0%	0 0%	0 0%	3 100 %
1	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 100 %
2	0 0%	2 66.7%	1 33%	0 0%	0 0%	0 0%	3 100 %
3	1 20%	0 0%	2 40%	2 40%	0 0%	0 0%	5 100 %
4	1 33%	1 33%	1 33%	0 0%	0 0%	0 0%	3 100 %
5	1 50%	0 0%	1 50%	0 0%	0 0%	0 0%	2 100 %

However, in October I'll run another treatment where the Observer is not allowed to transfer money to the Receiver. If the ideal transfer is closer to 5 than in this treatment, this may imply that the Observer reference point of fairness is influenced by the possibility to transfer to the Receiver.

Result 6. Both punishment and transfer are sensitive to subjective unfairness.

From Figure 10, it emerges the fact that our Observers punish when the Dictator's transfer is lower but not when it is higher than their ideal transfer.

Figure 10.

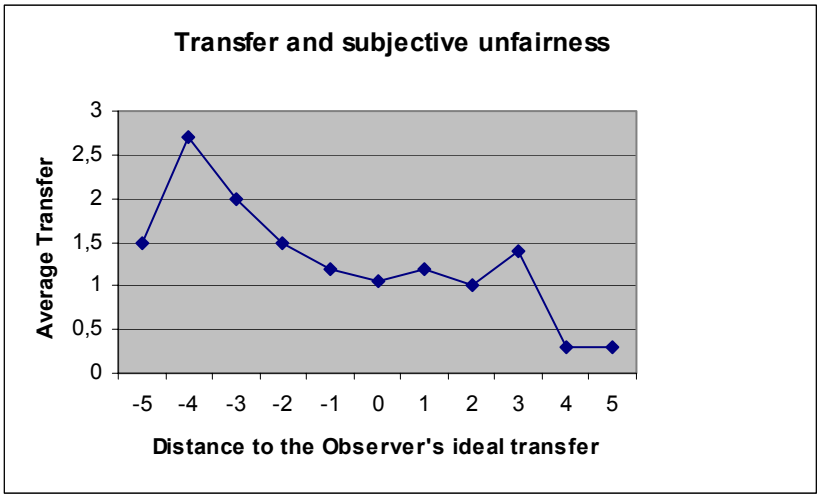


OLS regression of punishment on the variables *Negative Subjective Unfairness*[14], *Positive Subjective Unfairness*[15] and their squared values confirms the relation between the level of punishment and the degree of subjective unfairness (slope coefficient of 0.75 for the variable *Negative Subjective Unfairness,* P = 0.01; while the other variables are not significant). The constant term is not significant. This means that, even if punishment occurs when the ideal transfer corresponds to the real transfer, this is not significant.

In Figure 11 the relation between subjective unfairness and transfer from the Observer to the Receiver is depicted. It is clear that the level of transfer increases as the Dictator's transfer becomes lower and lower than the Observer's ideal transfer. However, some transfers still exist even when the Dictator transfers to the Receiver a sum that is higher than the ideal transfer.

[14] *Negative Subjective Unfairness* is defined as max {0, Ideal Transfer – Real Transfer}
[15] *Positive Subjective Unfairness* is defined as max {0, Real Transfer - Ideal Transfer}

Figure 11.



OLS regression of transfer on the variables *Negative Subjective Unfairness* and *Positive Subjective Unfairness* confirms the relation between the level of transfer and the degree of subjective unfairness (slope coefficient of 0.26 for the variable *Negative Subjective Unfairness,* P = 0.078; while the other variable is not significant). The constant term is significant (coefficient of 1.1, P = 0.007).

3.3 The Dictator's Transfer

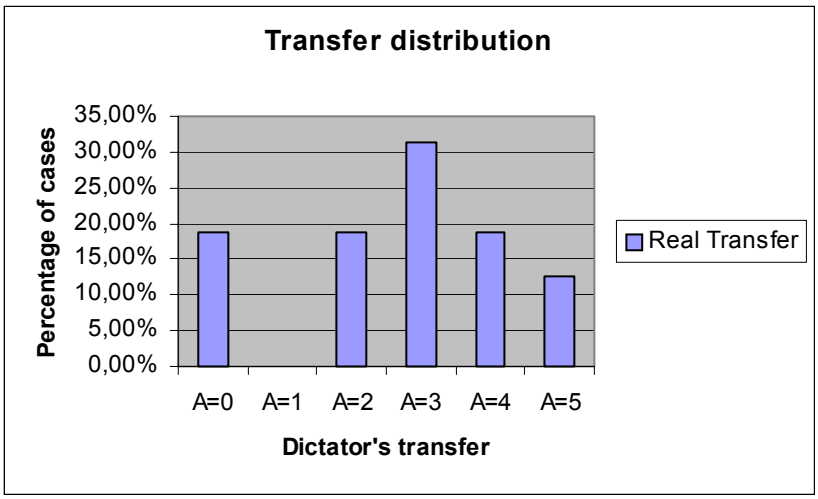
Result 7. The actual behavior of the Dictators disconfirms the classical hypothesis that they will keep the whole sum.

Dictators' transfers differ significantly from 0 (Wilcoxon signed rank test, P = 0,000). About 81% of the Dictators give more than nothing to their assigned Receiver (see Figure 12 and Table 7). The average transfer from the Dictator to the Receiver is 2.69.

Table 7 – Dictators' Transfer distribution

	Dictator's transfer					
	0	**1**	**2**	**3**	**4**	**5**
Percentage of cases	18.75%	0%	18.75%	31.25%	18.75%	12.50%

Figure 12



Two possible motivations may explain this result. It may be possible that some Dictators are fair-minded and they decide to give some money to the Receiver. On the other hand, it may be possible that a self-interested Dictator decides to transfer a sum that is high enough to avoid punishment. If this is the case, the classical theory fails again: punishment is a credible threat.

3.4 Players' Beliefs

Result 8. The beliefs of the Receivers over the average transfer of the Dictators corresponds to the observed transfer from the Dictators. At the same time, there is no difference between the observed Dictators' average transfer and the Observers' ideal average transfer.

We asked the Receiver their expectations about the transfer from the Dictator. The average expected transfer is 2.69. This perfectly corresponds to the observed average transfer (2.69). The Mann-Whitney test confirms this correspondence (P = 0.95).

The Observers' ideal average transfer is 2.81. It is slightly higher than the observed average transfer. However, this difference is not significant (Mann-Whitney test, P = 0.76).

Result 9. There is no significant difference between the Dictators' beliefs about the Observers' punishment and transfer as well as there is no significant difference between the Receivers' beliefs about the Observers' punishment and transfer.

The average punishment expected by the Dictators, 0.12, does not differs significantly from the observed average punishment, 0.81 (Mann-Whitney test, P = 0.135). The same conclusion holds

when we analyse the transfers: the average transfer expected by the Dictators, 1.31, does not differs significantly from the observed average transfer, 1.19 (Mann-Whitney test, P = 0.710).

Even when we analyse the Responders' beliefs about the Observers' behavior, we do not find any significant difference. The expected average punishment is 0.87 while the expected average transfer is 0.93. Expected punishment is slightly higher than the observed punishment while the opposite is true for transfer. However, this values do not differ significantly from the actual values (Mann-Whitney test, P = 0.504 and P = 0.451 respectively).

5. Comparison with social preferences theories

As we mentioned in the introduction, social preferences theories, where subjects take into account not only their own material payoff but also others' payoffs, have been developed. To what extent are these theories suitable to explain the results obtained in our experiment?

Theories of unconditional altruism may explain why third parties decide to transfer money, but they never predict punishment.

Fairness theories face several problems in explaining third party punishment. The model proposed by Bolton and Ockenfels (2000) suggests that people care about their position relative to one another. In our experiment the fair share should be 1/3 of the total endowment, that is, each player should have 20/3. Actually, with an initial endowment of 10, the Observer has ½ of the total endowment. Consequently, she should be willing to decrease her material payoff. However, punishment increases the share of the Observer, because reducing the Dictator's payoff by 2 costs only 1. Suppose that the Observer spends 2 euro to punish the Dictator. The total payoff is now 14 and the Observer's payoff is 8, that is, 2/7 (> ½) of the total. The only possible solution for the Observer is to transfer money to the Receiver until her own payoff corresponds to the fair share. This model may explain the behavior of the *Samaritans*, but not the behavior of the *Judges* or the *Revengers.*

The model by Fehr and Schmidt (1999) can usually predict third party punishment and transfers to worse-off subjects. Fehr and Schmidt assume that subjects are self-centred inequity averse and, consequently, they are willing to spend money to decrease the payoff of people who are better-off and to increase the payoff of people who are worse-off. In our experiment, if the Dictator keeps the whole initial endowment, her payoff is equal to the payoff of the Observer and there would be no reason for the third party to punish someone who is as rich as her. At the same time, it would not be profitable to transfer money to the Receiver because it creates a disadvantageous inequality for the Observer. If the Dictator transfers any sum to the Receiver, her payoff is always lower than the Observer's. The *Revenger's* behavior is not consistent with the model by Fehr and

Schmidt since there is no outcome-oriented reason to punish the worse-off Dictator. On the other hand, the *Samaritan's* behavior may be explained if the Observer transfers to the Receiver an amount smaller or equal to what the Dictator has sent. Fehr and Schmidt predict the *Judge*'s behavior only when the Observer chooses a combination of transfer and punishment that leaves Observer and dictator with the same payoff (this is not the case for half Observers).

The intention-based reciprocity models by Rabin (1993) and Dufwenbeg and Kirchsteiger (2004) can predict neither third-party punishment nor third-party transfer. They are based on the assumption that the Dictator is only punished if she is unkind to the Observer and the Receiver only receives a transfer if she is kind to the Observer. None of our types is explained by these models.

The model by Falk and Fischbacher (2000) and the DASM model by Kohler (2003) have the same predictable power as the model by Fehr and Schmidt.

The hybrid model (social welfare concern + reciprocity) developed by Charness and Rabin (2000) may explain all our types. Punishment is the Observer's reaction to the Dictator's misbehavior, while transfer comes from the quasi-maximin principle, according to which the Observer transfers money to the Receiver to improve the condition of the poorer player.

6. Summary and conclusions

The aim of this experiment is to compare the tendency to punish unfair behavior and the desire to help victims of that unfairness, in presence of a budget constraint and without the possibility for a long-run pecuniary gain. Our research tool is a variant of the *Third Party Punishment Game* that we call *Solomon's Game.* While in the original version of the game the external Observer was only allowed to punish the Dictator, in our new version we introduce the possibility for the Observer to transfer money to the Receiver.

Our expected results are mostly confirmed. In particular:

1) players have heterogeneous preferences. In our experiment it is possible to identify four different 'Types';

2) the level of intervention is proportional to the unfair offer of the Dictator;

3) when we compare our results with the existing social preferences models, we find out that the hybrid model by Charness and Rabin has a good predictable power, while the model by Fehr and Schmidt fails to explain several choices of half players.

In my opinion, several results deserve a further inquiry. First of all, the role of the Observer's transfer. In particular, it should be useful to run a treatment with the original version of the Third Party Punishment Game where the Observer can only punish (this will be done in October). In this

way it would be possible to check whether punishment and transfer are substitutes or complements. Moreover, it would be possible to check whether the possibility to transfer influences what we called subjective unfairness.

Secondly, it would be interesting to make the Dictator earn his initial endowment and analyse if this changes the Observer's notion of fairness and, consequently, his reaction.

The last point is the effect of the intervention cost. We ran some pilots where both punishment and transfer were free for the Observer. The effect was that, for each level of the Dictator's transfer, the Observers intervened (by punishing and transferring) more. The idea is that intervention reflects prosociality. This is a sort of ordinary good, whose demand increases as its price decreases.

Appendix A – Instructions

FIRST SCREEN. Welcome to the experiment and thank you for participating. There are neither difficulties nor tricky questions. You are only required to follow the instructions that will appear on your screen. Your answers will be absolutely anonymous. It will not be possible to the experimenter to match the answers with the person who provided them. Silence during the experiment is required.

SECOND SCREEN. The experiment involves three different participants (referred to as Player A, Player B and Player C) and it is made up by two stages. At the beginning of the first stage, you will be randomly assigned a role (A, B or C). no participant will know the identity of the partnered subjects.

FIRST ROUND. Players A and B have to share 10 euro. In particular, subject A has an initial endowment of 10 euro and has to decide whether to transfer 0, 1, 2, 3, 4 or 5 euro to the Receiver. Subject B has an initial endowment of 0 euro and cannot react to any decision taken by A.

SECOND ROUND. Player C has an initial endowment of 10 euro. Her task is to decide how to use those 10 Euro. She can: 1) transfer money to B if she thinks B has received from A an unfair sum; 2) spend money to sanction A (each euro spent to punish A produces a sanction of 2 euro) if she thinks subject A has been too unfair; 3) both punish A and transfer money to B; 4) keep the whole sum.

To sum up, she is allowed to allocate her 10 euro as she wants as soon as: 1) the sum of the euro that C uses to punish A, that C transfers to B and that C keeps is equal to 10; 2) the sums that C allocates are in whole euro (C cannot transfer eurocent).

Player C is asked to declare how she would transfer to B and spend to punish A if A's transfer is 0, 1, 2, 3, 4 or 5 euro. The final pay-off is computed on the basis of A's actual transfer to B.

THIRD SCREEN. To be sure that you have understood, check if it is clear that:

- if A decides to transfer 2 euro to B and C decides to transfer 1 euro to B, A will gain 8 euro, B 3 euro and C 9.
- If A decides to transfer 2 euro to B and C decides to pay 2 euro to punish A, A will gain 4 euro, B 2 euro and C 8.
- If A decides to transfer 2 euro to B and C decides to transfer 3 euro to B and to pay 1 euro to punish A, A will gain 6 euro, B 5 euro and C 6.
- If A decides to transfer 2 euro to B and C decides to keep the 10 euro, A will gain 8 euro, B 2 euro and C 10.

FOURTH SCREEN. More generally, it should be clear that:

- each euro that C transfers to B increases B's gain by the amount of 1 euro;
- each euro that C spends to punish A decreases A's gain by the amount of 2 euro.

FIFTH SCREEN. Before the experiment can begin, you will be asked some control questions, to check whether you have understood the rules. The experiment will begin as soon as every participant has successfully answered all control questions.

The following screens display the control questions and the real sessions.

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