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EMPATHY, GUILT-AVERSION AND PATTERNS OF RECIPROCITY

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2011/08

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Titolo: EMPATHY, GUILT-AVERSION AND PATTERNS OF RECIPROCITY

ISBN: 978 88 8467 676 4

Prima Edizione: Giugno 2011

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09123 Cagliari
Tel./Fax 070 291201
www.cuec.it

Empathy, Guilt-Aversion and Patterns of Reciprocity*

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June 2, 2011

Abstract

This paper reports the results of an experiment aimed at investigating the link between empathy, anticipated guilt and pro-social behavior. In particular we test the hypothesis that empathy modulates the anticipatory effect of guilt in bargaining situations and, more specifically, that it correlates with subjects' willingness to give and to repay trust in an investment game. We also control for the effect of individual risk attitude. Our main results show that empathy significantly influences players' *pattern* of restitution in the investment game

*To Silvia Aresu, Monica Cugusi, Davide Eltrudis and Gianluigi Mazziti goes my gratitude for their invaluable research assistance. I would also like to thank three anonymous referees, the editor, Florian Artinger, Martin Dufwenberg, Benedetto Gui, Andrea Isoni, Cristina Murroni and Fabio Tufano who helped to improve the paper in a substantial way, as well as audiences at the 5th Nordic Conference on Behavioral and Experimental Economic (Helsinki), Annual CIPESS workshop (University of Turin) and CRENoS Seminar (University of Cagliari). The usual disclaimer applies. Financial support from the Regione Autonoma della Sardegna (L.R. 7/2007 - Project no. CRP3-223) is gratefully acknowledged.

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and that risk-propensity weakly affects the decision to trust; we also find a significant gender difference in the distribution of empathy.

These results seem to indicate that empathy affects pro-social behavior in a more complex way than previously hypothesized by existing models of social preferences.

JEL classification: D63, C78, C91.
PsycINFO classification: 2360, 3020, 2223.
Keywords: Trust, Reciprocity, Guilt-Aversion, Empathy.

1 Introduction

Recent economic research has indicated that individual behavior in economic interactions can be explained, in many cases, by other-regarding preferences. This evidence has led to the development of models of agents with "extended" utility functions that incorporate both material and psychological elements (see e.g. Fehr and Gachter, 2000, Sobel, 2004, and Fehr and Schmidt, 2006, for recent surveys). Alternative theoretical approaches differ with respect to how those functions are defined. In particular, two main classes of models can be distinguished: models that focus on distributional concerns (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), and models that focus on intention-based motives (Rabin, 1993; Dufwenberg and Kirchsteiger, 2004; Battigalli and Dufwenberg, 2007; Pelligra, 2010). Both classes of models include a psychological element in the extended utility function that can be interpreted as a "guilt factor" (Krajbich et al. 2009; Dufwenberg, 2002). When triggered by inequality or by opportunism, the guilt factor produces a cost whose negative effects agents tend to anticipate and avoid by behaving pro-socially. In this interpretation, thus, individual sensitivity to guilt should affect, ceteris paribus, the likelihood of pro-social behavior. Psychologists from different perspectives suggest that the cognitive and affective basis for feeling guilt is the capacity to feel or anticipate the suffering and distress of others, in other words, to empathize with others (Hoffman, 1982; 2000; Baumeister et al., 1994; Singer and Fehr, 2005; Tommasello et al., 2005).

In this paper we report on an experiment designed to investigate the connection between individuals' ability to empathize and their pro-social behavior, supposedly driven by guilt-aversion, in a simple economic game. More precisely, we test the hypothesis that the Empathy Quotient (EQ henceforth), a widely used and well-validated psychometric measure (Baron-Cohen et al., 2004; Lawrence et al., 2004), is correlated with the subjective sensitivity parameter that appears in models of social preferences, and consequently, with players' tendency to give and to repay trust in an investment-game (IG). On the trustor's side we find that players' EQ does not affect trust (the amount sent in the IG) which is instead weakly correlated with individual risk-propensity. On the trustee's side, the EQ appears to be strongly associated with different *patterns* of restitution ('conditional' vs 'balanced' reciprocity). We also find, in line with the literature on the subject, a significant difference in the empathy distribution across gender. The paper is

organized as follows: the next section briefly discusses the psychological and neuroscientific literature on empathy and anticipated guilt and its associations to the economic models of social preferences. Section 3 describes the experimental design, the hypotheses and the procedures. Sections 4 and 5 present and discuss the results. Section 6 concludes the paper.

2 Relevant Literature

2.1 Empathy

Game theory is fundamentally based on the assumption that people are capable of predicting the actions of others. This ability, usually referred to as Theory-of Mind, has two distinct components: cognitive (mentalizing) and affective (empathy) (see Singer and Fehr, 2005; Singer, 2009). In our study we focus mainly on the affective component. If we assume that people's actions are, at least partially, emotionally-driven, the ability to anticipate and share emotions and feelings with others, that is, to empathize, represents a crucial factor of this more general process.

Empathy or emotional perspective-taking is generally defined as our ability to understand other people's feelings (Preston and de Waal, 2002; Gallese, 2003). A more specific definition is proposed by de Vignemont and Singer (2006). In their view, empathy can be defined by a set of four conditions: we "empathize" with others when we have (a) an affective state, (b) which is isomorphic to another persons affective state, (c) which was induced by observation or imagination of another persons affective state, and (d) when we know that the other person's affective state is the source of our own affective state. Condition (a) is particularly important as it helps to differentiate empathy from mentalizing, which denotes, instead, our ability to represent others' mental states without emotional involvement.

Following the perception-action model of motor behavior and imitation, Preston and de Waal (2002) develop a theory of empathy that explains how we can understand what someone else feels when he or she experiences simple emotions such as anger, fear, sadness, joy or pain, or even more complex ones such as disappointment, shame or guilt. They suggest that the mere observation or imagination of another person's emotional state automatically triggers a representation of that state in the observer. This theory is supported by recent neuroscientific evidence that shows how the observation or imagina-

tion of another person in a given emotional state activates a representation of a similar state in the observer through an unconscious and effortful process (Singer et al., 2004a). In a fMRI study, Singer and colleagues find that, as hypothesized, the empathic response is automatic and does not require any form of engagement of judgment about others feelings. This study also finds a considerable level of heterogeneity across individuals in their ability to empathize. footnoteIt was already known that higher scores in empathy questionnaires are strongly correlated with differences in pro-social behavior such as volunteering and charitable giving (Davis et al., 1999). In economic experiments, Ben-Ner et al. (2004) and Ben-Ner and Halldorsson (2010) also find that a measure of "agreeableness" affects giving choices in the dictator game and trustworthiness in the trust game. Gunnthorsdottir et al. (2002) find that a Machiavellian scale (which is related with individuals' ability at perspective-taking) predicts reciprocity.

These individual differences measured by questionnaires have been found to be highly correlated with differences in the activation of the bilateral anterior insula and the rostral anterior cingulate cortex, neural circuitry that is normally activated in the processing of the affective component of pain. The same affective pain circuits that are activated when we feel pain are also active when we observe someone else experiencing pain. That suggests that if another person suffers pain: "our brains also make us suffer from this pain." (Singer and Fehr, 2005, p.342). It is also important to note that empathy is not limited to known or significant others but extends also to unknown or imagined persons (Morrison et al., 2004; Jackson et al., 2005).

Several studies on the functioning of the mirror-neuron system and its relation to the simulation theory-of-mind have identified in this neural circuitry the physiological correlates of this "mental mimicry" ability (Rizzolati et al. 2001; Gallese and Goldman, 1999). In strategic interactions, empathy allows us to anticipate others' emotional reactions to our perspective choices. People can anticipate others' emotional reactions as they consider behavioral alternatives and direct their choices in order to avoid negative feelings or to produce positive ones. Thus emotions can exert a strong influence on choice: "by providing critical feedback regarding both anticipated behavior (feedback in the form of anticipatory shame, guilt, or pride) and actual behavior (feedback in the form of consequential shame, guilt, or pride)" (Tangney et al., 2007, p. 347). These considerations are the building blocks of the so-called "negative-state relief model" (Baumann et al., 1981) that posits that people tend to perform actions that are believed to increase positive affect,

while reducing any unpleasant emotional state and distress such as feelings of guilt. In this perspective, guilt and especially "anticipated guilt", is thought to mediate the pro-social effects of empathy (Leith and Baumeister, 1998; Hoffman, 2000).

2.2 Anticipated Guilt

As an emotional state arising from the consequences of a certain action, guilt has been extensively studied, however "anticipated guilt" remains a relatively obscure concept. Some evidence is available in the context of health behavior, that shows how people's choice to avoid a risky conduct is related to their assessment of how guilty they would feel if they performed that action (Birkimer et al., 1993). In a different context, O'Keefe (2002) finds evidence along the same line, showing that people tend to avoid actions they anticipate will make them feel guilty. Lindsey (2005) collects further evidence that shows that, when induced to anticipate feelings of guilt, people are more likely to comply with a certain prescription, precisely to avoid the guilt that would result from non-compliance.

This evidence lends support to the "negative-state relief model", and helps clarify its structure which appears to be ultimately based on two basic elements: first, anticipated guilt which is induced by a counterfactual reasoning about the negative consequences that our potential action or inaction may produce to others and it is mediated by empathy. Second, a common tendency to avoid such guilt feelings. Thus empathy leads to anticipatory guilt, and guilt-aversion, in turn, leads to pro-social behavior. in this framework, the ultimate basis for experiencing anticipatory guilt is constituted by the ability to empathize with others, that is, the ability to feel, share and anticipate the potentially negative emotions that our actions may produce in others.

In the context of an economic interaction this ability is useful both from a self-interested point of view and in motivating other-regarding behavior. Empathy enables to predict and to take into account others' emotional responses to our perspective actions. This way, a self-interested agent can be able to best-reply to the expected reaction of the other agents in order to maximize her material payoff. On the other hand, the ability to empathize may also promote other-regarding behavior by inhibiting courses of action that may induce negative emotional states in others and consequent feelings of guilt in the agent.

2.3 Guilt in Social Preferences Models

According to many psychologists, the ability to empathize enables people to predict others' emotional responses and, to some extent, their emotionally-driven choices. This fact is particularly relevant for the game-theoretical modeling of social preferences. In the distributional approach, agents are supposed to have a taste for fairness in the distribution of material payoffs. They are motivated not only by their own material gains, but also by how their payoff compares with that of the other agents. Inequality-aversion models posit that subjects experience a psychological cost if their joint actions determine an outcome associated with unequal payoff distributions. If player i gets more than player j, the difference between the two payoffs, weighted by a subjective sensitivity parameter, represents a psychological cost for i, that reduces her overall utility.

More specifically, Fehr and Schmidt (1999) assume that the utility of a subject depends on the difference between her own payoff and those of the other subjects, so that agents have egalitarian preferences. Bolton and Ockenfels (2000) assume, instead, that the utility function of a subject depends on her own payoff, relative to the average overall payoff, so that agents care about their own relative status. In these models, fairness-related preferences depend only on the final distribution of payoffs.

The intention-based approach, on the other hand, models other-regarding preferences by incorporating the role of players' perceived intentions in the form of "reciprocity" (Rabin, 1993, Dufwenberg and Kirchsteiger, 2004) or "fulfilling expectations" (Battigalli and Dufwenberg, 2007; Pelligra, 2010). Reciprocity theories are built upon the idea of "reciprocating kindness", namely, the willingness to repay a kind action and punish an unkind one, even at some cost. Theories of fulfilling expectations describe the tendency to fulfill others' manifest expectations in order to avoid the feeling of guilt arising from consciously letting others down.

In the guilt-aversion model, if i betrays j's expectations, she experiences a psychological cost which is proportional, given a subjective sensitivity parameter, to i's conjecture about j's disappointment (i's second-order expectations). Thus, a utility maximizing strategy involves, in both models, an attempt to avoid guilt.

Both models incorporate in their utility functions a subjective parameter

aimed at describing individual differences in the sensitivity to guilt feelings. The above discussion about the "negative-state relief model" and the role played by guilt-aversion and empathy in the theoretical models, leads us to Singer and Fehr's claim according to which: "The hypothesis that empathy enhances other-regarding behavior in combination with the existence of individual differences in empathy suggests that people who exhibit more affective concern are more likely to display altruistic behaviors." (2005 p. 343).

The empirical value of this claim is what we intend to test with our experiment. More precisely, we investigate whether empathy is correlated with trust and reciprocity and in which sense we can say that "empathy enhances other-regarding behavior".

3 The Experiment

3.1 Experimental Design and Hypotheses

To assess the effect of empathy on other-regarding behavior we first measure subjects' disposition to empathize using the EQ (Baron-Cohen et al., 2004) a widely used and well-validated psychometric test.[1]

The EQ questionnaire was designed to be short, easy to use, and easy to score. It comprises (in its short-form) 40 questions and three sub-scales focused on the "emotional", "cognitive" and "social" dimensions. Responses are given on a four-point scale ranging from "strongly agree" to "strongly

[1]There are several psychometric instruments used to measure empathy. One of the most widely used in the psychological literature is the Interpersonal Reactivity Index (IRI) (Davis, 1983). The IRI questionnaire is formed by four seven-item subscales focused on "empathic concern", "perspective-taking", "fantasy" and "personal distress". Critics, however, argue that the IRI may measure processes broader than empathy. In particular the "fantasy" and the "personal distress" sub-scales may assess imagination or emotional self-control, and: "although these factors may be correlated with empathy, it is clear that they are not empathy itself" (Baron-Cohen and Wheelwright, 2004, p. 166). We preferred to use the EQ precisely to overcome those drawbacks. Validation studies (Lawrence at al., 2004) found a good association between the EQ and IRI's "empathic concern" and "perspective-taking" subscales, suggesting concurrent validity. The EQ was also shown to have high test re-test reliability over a period of 12 months. Furthermore, comparing self-reported and brain imaging data, Lamm et al. (2007) found a correlation between the EQ and the activation of brain areas (right putamen, the left posterior/middle insula, the anterior medial cingulated cortex and the left cerebellum) traditionally regarded to be central for empathy.

disagree". The total sum of points represents the individual's EQ. We also measure subjects' attitude towards risk with the Holt-Laury algorithm (Holt and Laury, 2002). In this procedure a subject is presented with a series of 15 choices between a lottery that pays either 200 euros or zero with equal probability and an increasing amount (ranging from 50 to 120 euros in the fifteenth choice) paid for sure. The lottery at which the subject switches her choice from the risky alternative to the guaranteed amount is considered an individual index of subject's risk-propensity that can be easily mapped into the traditional Arrow-Pratt measure of relative risk-aversion.[2] We then observe subjects' choices in a one-shot version of the Investment Game (IG) (Berg et al., 1995).

In the IG a proposer has to decide how much, if any, of his initial endowment he should send to the receiver. Any positive amount is tripled by the experimenter and passed to the receiver, who in turn, has to decide how much of the tripled amount to send back to the proposer. The amount sent by the proposer and the restitution by the receivers are usually interpreted as measures of trust and trustworthiness, respectively. In the sub-game perfect Nash equilibrium of the game, both the proposer and the receiver send nothing to the other. However, deviations from equilibrium behavior are commonly observed in experimental studies (see Camerer, 2003 for a general review). These "anomalies" can be explained in terms of both distributional concerns and/or guilt-aversion. As we said, both explanations incorporate the effect of guilt: feelings of guilt for determining an unfair distribution in the inequality aversion-type of explanation and guilt from betraying others' expectations in the guilt-aversion models. Our general hypotheses refer to the correlation between the amount sent and the payback and individuals' EQs. More specifically we want to test whether:

(Hypothesis 1) the amount sent is positively related to the EQ;

(Hypothesis 2) the reciprocal behavior (measured as the correlation between the amount received and the amount returned) is positively affected by the EQ.

[2]If a subject prefers the lottery (200, 0.5 ; 0, 0.5) to the sure amount (x, 1) up to lottery 7 and then she switches to the sure amount, that subject's risk-propensity will be equal to 7.

3.2 Procedures

Data refers to a total of 106 subjects (53 males and 53 females) recruited via posters and e-mails, among Economics, Law and Politics students at University of Cagliari, where the experiment was conducted during 6 sessions from 24 to 28 May 2010. Subjects were randomly assigned upon arrival to one of two large rooms, one for the A players and one for the B players. Then each subject received an ID card with a random number and a booklet containing the instructions, the Holt-Laury task, the IG and the EQ questionnaire. They were invited to write the ID number in the booklet and to keep the card. Instructions were read aloud and questions about the procedure and the payment rules were answered privately. After a series of illustrative examples, the choice task begun. After completing the Holt-Laury procedure, each subject selected his/her preferred strategy in the game, receiving no feedback about other players' choice until the end of the session. We adopted the strategy method (Selten, 1967) to elicit players B's strategy profile for the game. In the end, each subject completed the EQ questionnaire.

We rewarded participants using the "two-stage random-lottery incentive system" which is increasingly used when the experimental design presents particular features (Fong and Luttmer, 2009; Loewen, 2010; Pelligra and Stanca, 2010). We adopted this system to be able to present large payoffs and especially to implement the Holt-Laury procedure that involves the choice among lotteries whose prices vary from 0 to 200 euros, in a realistic way. At the end of the last session, all players' ID were randomly paired, one pair was randomly selected and one task, among the game and the Holt-Laury procedure, was randomly picked and paid according to the choices made by the selected players. Money was placed in two envelopes with the ID numbers of the corresponding players and the sealed envelopes were distributed to the subjects by members of the administrative staff to preserve the double blind design. Player A won 110 euros and player B 490 euros. The sessions lasted approximately one hour and a half. No additional show-up fee was paid.

4 Results

The data collected consist of the amount that players A sent to players B in the IG; the amount that players B sent back for each sum hypothetically received; risk-propensity and EQs for both players A and B.

It is important to note that the design we used in this paper does not allow us to test causal links between variables. The results, therefore, do not yield 'causal', but rather 'correlational' evidence. Summarizing this evidence, we can say that risk-propensity appears to be (weakly) positively correlated with proposers' choices in the IG; empathy does not correlate with the amount sent back but, instead, it strongly affects the "pattern" of reciprocal responses. There is also a strong gender-effect in the EQ distribution.

We first present the results for players A, then for players B.

Figure 1 shows the distribution of the sums sent to Bs in the IG. Only six subjects sent zero, while nine sent the entire endowment of 100 euros. The average amount sent was 56.79 euros. A Wilcoxon-Mann-Whitney rank sum test confirms no significant difference across gender in the amount sent ($Z = 0.932, p = 0.351$, two-tailed test).

[FIGURE 1 AND TABLE 1 ABOUT HERE]

Figure 1. Amount Sent in the IG (Players A)

The average EQ of players A is equal to 44.73, with a significant gender difference (40.80 for males and 48.51 for females; $Z = -2.885, p = 0.003$, Wilcoxon-Mann-Whitney rank sum test, two-tailed test). Their average level of risk-propensity is 7.34 (see Table 1 for As' summary statistics).

Figure 2 plots the correlation between the amount sent in the IG and the EQ. We estimated a simple OLS model (table 2) that shows that individual risk-propensity as measured by the Holt-Laury procedure, is the only variable to affect positively and in a significant way the amount sent in the IG; however, it is likely that this result is driven by two outliers that show extreme levels of risk-propensity.

[FIGURES 2 AND TABLE 2 ABOUT HERE]

Figure 2. Empathy and Amount Sent (Players A)

We now analyze data for B players. The average EQ is equal to 44.18 with, again, a significant gender difference (41.84 for males and 46.28 for females; $Z = -2.034, p = 0.004$, Wilcoxon-Mann-Whitney rank sum test, two-tailed test). The average level of risk-propensity is 6.32 (Table 3 for Bs' summary statistics).

[TABLE 3 ABOUT HERE]

Bs' behavior in the IG is depicted in figures 3. As a measure of reciprocity, we are able to compute for each subject the Spearman correlation coefficient between each hypothetical offer and the conditional amount sent back (see Figures 4). Only 5 out of 53 subjects sent back nothing independently of the amount received (n.2, n.5, n.34, n.36, n.40). The others show a positive relationship between the amount sent and the amount returned, the average Spearman correlation coefficient is equal to 0.794.

We estimate the effect of empathy and other individual variables on the amount returned in the IG using a series of OLS regressions (tables 4). The results show no significant effects.

[FIGURES 3 AND 4 ABOUT HERE]

Figure 3. Amount Sent and Payback (Players B)

Figure 4. Amount Sent and Fraction Returned (Players B)

[TABLE 4 ABOUT HERE]

However, if we consider the ratio between the amount returned and that received (figure 4), we can easily distinguish two different patterns of restitution: one described by a norm of "conditional reciprocity", and a second

one that follows a norm of "balanced reciprocity". Following a classification system introduced first by Fischbacher et al. (2001), we formally denote a trustee as "conditional reciprocator" if the Spearman correlation coefficient between the returned proportion and the amount received is significantly greater than zero ($\rho > 0$, with $p < 0.001$). On the other hand, a "balanced reciprocator" complies to a norm according to which the relative payback does not vary systematically with trust (see Camerer and Fehr, 2004; Greig and Bohnet, 2008). Following these definition we isolate 18 conditional[3] and 35 balanced reciprocators[4].

A Wilcoxon-Mann-Whitney rank sum test shows that the distribution of empathy among the conditional reciprocators (avg. 49.88, median 49) is significantly different ($Z = -3.065, p = 0.002$) from that associated with balanced reciprocators (avg. 42.97, median 42)[5]. Furthermore, we use a series of logit estimations to test for the effect of empathy on the likelihood to comply with a norm or another and find a significant effect. These results seem to suggest that subjects with higher EQs tend to behave as conditional reciprocators, while subjects with lower EQs have a propensity towards balanced reciprocity (see figure 5).

[FIGURE 5 ABOUT HERE]

Figure 5. Average Fraction Returned by Conditional and Balanced Reciprocators (Players B)

[TABLE 5 ABOUT HERE]

To summarize, our main results are two: trust in the IG appears to be weakly correlated with risk propensity. This first point seems to contradict the findings reported by Hauser et al. (2010) who observe that risk attitudes

[3]Subjects no. 1, 9, 11,12, 26, 30, 31, 37, 38, 39, 41, 45, 47, 48, 49, 50, 52, 53.

[4]Subjects no. 2, 3, 4, 5, 6, 7, 8, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 32, 33, 34, 35, 36, 40, 42, 43, 44, 46, 51

[5]The t-test between the two groups provides virtually the same result ($t = -3.415$, 51 $d.f.$, $p = 0.001$).

do not predict individual decisions in the investment-game. However our result is probably driven by two outliers with extreme risk-propensity values; our second and more important result refers to the fact that empathy affects trustworthiness in a more complicated way than we (and the formal models) initially hypothesized. Indeed, the EQ seems to be uncorrelated with the level of reciprocal behavior as measured by the Spearman coefficients, but it strongly affects the *patterns* of restitution (conditional vs balanced reciprocity) as measured by the ratio of amount received/payback. Our data seem to suggest that subjects with high EQ are more likely to be conditional reciprocators, whereas those with lower EQ tend to be behave more frequently as balanced reciprocators.

In the following section we discuss the meanings of these two models of reciprocity and the potential implications of our results.

5 Discussion

This paper presents both negative and positive results. The negative results are those indicating the lack of direct effect of empathy on trust and trustworthiness. They can be interpreted in, at least, three ways: first, the EQ Questionnaire that we used is not a good measure for individual empathy. However, we tend to dismiss this interpretation as the distributions we observe are very similar to many others found in the literature, especially with respect to gender differences. Second, the EQ is not a good proxy of individuals' sensitivity to guilt: in other words, we succeeded in measuring empathy which, however, is unrelated with guilt-aversion that ultimately triggers subjects' choices. Third, guilt-sensitivity, although related with empathy, does not *directly* affect trust and trustworthiness in the IG.

This latter view, which is in line with other psychological evidence (see Lindsey et al., 2007), would have strong implications for economic modeling, being at odds with the psychological foundations and the usual interpretation (the negative-state relief model) of both Fehr-Schmidt and Battigalli-Dufwenberg theories.

On the positive side, our results suggest that the decision to trust is weakly affected by a subjective assessment of the risk implied by that choice. Risk-loving subjects are, in fact, slightly more likely to trust than risk-averse ones. Furthermore, the absence of *direct* correlation between empathy and pro-social behavior in the IG, if corroborated by further research, could sug-

gest that the decisions to repay trust are driven more by compliance to an unconditional categorical norm than by a reasoning aimed at maximizing the net effect of material and psychological costs and benefits. In other words, in similar situations subjects obey, in different degrees, to a categorical imperative of the form: "if someone trusts me, I should not let her down". In particular, our data seem to show that higher levels of empathy supplement this norm-compliant behavior, by leading subjects to switch from a balanced form of reciprocity to a conditional one. Conditional reciprocity, according to which greater trust is rewarded with proportionally larger returns, is what is usually found in experiments with students in developed countries (see Greig and Bonhet, 2008). Balanced reciprocity, on the other hand, is a form of "no-loss" norm, that induces the trustee to maximize her material gain while refraining from making the trustor worse off with respect to the status-quo. This norm has been extensively observed in reciprocal-exchange economies from less developed countries (e.g., Platteau, 1997; Thomas and Worrall, 2002), where contracts are informally enforced by norms which obligate future quid-pro-quo (balanced) repayment of loans and gifts.

The IG that we considered in our experiment has an intrinsic element of super-additivity that leads a positive investment to generate social surplus. This game represents a typical exchange situation where trust and trustworthiness produce gains from trade. A conditional reciprocator shares with the trustee part of the surplus generated in the interaction, providing, this way, a good reason to invest a positive amount of her endowment. Conditional reciprocity tends, for this reason to promote a trusting attitude towards exchanges.

In the balanced reciprocity norm, instead, the entire surplus, or even more, is retained by the trustee. The problem with this pattern of behavior is that a mere "no-loss rule" may not be sufficient to induce the trustor to invest a positive amount of her endowment, and because of this, the potential gains of a successful trusting interaction may be lost.

One may speculate that, if corroborated by further researches, our results could link empathy, the ability to anticipate and share others' emotional sates, to the social capital literature. The prevalence of one norm or the other, in fact, may affect a community's ability to extract gains from trade. Only highly empathic subjects that are willing to reciprocate in a conditional way, are able to induce trust and contribute to lay the ground for the social benefits associated to high-trust communities, notably, the presence of large organizations (La Porta et al., 1997), a sustained rate of growth (Knack and

Keefer, 1997), a higher degree of financial development (Guiso et al., 2004), and better quality law enforcement (Knack and Zak, 1999).

We think that all these possibilities are worthy of further research and deeper exploration.

6 Conclusions

In this paper we report on an experiment designed to test the effect of individuals' empathy on pro-social behavior. Anticipatory guilt is an emotional state that leads subjects to avoid the psychological cost associated to any feelings of guilt which they may experience when their choice causes harm to other subjects. According to many psychologists and some behavioral economists, this emotion is mediated by empathy, the ability to share others' emotional states. It follows that subjects with higher EQ should be more sensitive to guilt and therefore, more willing to behave pro-socially. We observe players' behavior in an investment-game (IG) and measure their EQ. We find that players' EQ does not affect subjects' *level* of trust, but is correlated with different *patterns* of restitution ('conditional' vs 'balanced' reciprocity). We also find, in line with the literature on the subject, a significant difference in the empathy distribution across gender, and, contrary to other studies (Eckel and Wilson, 2004; Hauser et al., 2010) a weak correlation between risk-propensity and the amount sent in the IG. These results seem to indicate that empathy affects pro-social behavior in a more complex way than previously hypothesized by existing models of social preferences.

References

[1] Baron-Cohen, S., Wheelwright, S., 2004. The Empathy Quotient: An investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. Journal of Autism and Developmental Disorders, 34(2), 164175.

[2] Battigalli, P., Dufwenberg, M., 2007. Guilt in Games, American Economic Review (P&P) 97, 170-176.

[3] Baumann, D.J., Cialdini, R.B., Kendrick, D.T., 1981. Altruism as hedonism: Helping and self-gratification as equivalent responses. Journal of Personality and Social Psychology, 40, 1039-1046.

[4] Baumeister, R.F., Stillwell, A.M., Heatherton, T.F., 1994. Guilt: An interpersonal approach. Psychological Bulletin, 115, 243-267.

[5] Ben-Ner, A., Kong, F., Putterman, L., 2004. Share and share alike? Gender-pairing, personality, and cognitive ability as determinants of giving. Journal of Economic Psychology, 25, 581-589.

[6] Ben-Ner, A., Halldorsson, F., 2010. Trusting and trustworthiness: What are they, how to measure them, and what affects them. Journal of Economic Psychology, 31, 64-79.

[7] Berg, J., Dickhaut, J., McCabe, K., 1995. Trust, Reciprocity, and Social History. Games and Economic Behavior, 10,122-142.

[8] Birkimer, J.C., Johnston, P.L., Berry, M.M., 1993. Guilt and help from friends: Variables related to healthy behavior. Journal of Social Psychology, 133, 683-692.

[9] Bolton, G.E., Ockenfels, A., 2000. ERC - A Theory of Equity, Reciprocity and Competition. American Economic Review 90, 166-193.

[10] Camerer, C., Fehr, E., 2004. Measuring Social Norms and Preferences Using Experimental Games: A Guide for Social Scientists, in Foundations of Human Sociality, edited by J. Henrich, R. Boyd, S. Bowles, C. Camerer, E. Fehr, and H. Gintis. Oxford, UK: Oxford University Press, 5596.

[11] Charness, G., Rabin, M., 2002. Understanding Social Preferences with Simple Tests. Quarterly Journal of Economics, 817-869.

[12] Davis, M.H., 1983. Measuring individual differences in empathy: Evidence for a multidimensional approach, Journal of Personality and Social Psychology 44, 113-126.

[13] Davis, M.H., Mitchell, K.V., Hall, J A., Lothert, J., Snapp, T., Meyer, M., 1999. Empathy, expectations, and situational preferences: personality influences on the decision to participate in volunteer helping behaviors. Journal of Personality 67(3), 469-503.

[14] de Vignemont, F., Singer, T., 2006. The empathic brain: how, when and why? Trends in Cognitive Science, 10 , 435-441 .

[15] Dufwenberg M., 2002. Marital Investment, Time Consistency and Emotions. Journal of Economic Behavior & Organization 48, 57-69.

[16] Dufwenberg M., Kirchsteiger, G., 2004. A Theory of Sequential Reciprocity. Games and Economic Behavior 47, 268-298.

[17] Eckel, C., Wilson, R.K., 2004. Is trust a risky decision? Journal of Economic Behavior & Organization, 55(4), 447-465.

[18] Falk, A., Fischbacher, U., 2006. A Theory of Reciprocity. Games and Economic Behavior 54, 293-315.

[19] Fehr, E., Gatcher, S., 2000. Fairness and Retaliation. The Economics of Reciprocity. Journal of Economic Perspectives 14, 159-181.

[20] Fehr, E., Schmidt, K.M., 1999. A Theory of Fairness, Competition, and Cooperation, Quarterly Journal of Economics 114, 817-868.

[21] Fischbacher, U., Gachter, S., Fehr, E., 2001. Are People Conditionally Cooperative? Evidence from a Public Goods Experiment, Economics Letters, 71, 397-404

[22] Fong C., Luttmer, E., 2009. Do Race and Fairness Matter in Generosity? Evidence from a Nationally Representive Charity Experiment. NBER Working Paper n. 15064.

[23] Gallese , V., 2003. The manifold nature of interpersonal relations: the quest for a common mechanism . Philosophical Transaction of the Royal Society of London, B 358, 517-528.

[24] Gallese, V., Goldman, A., 1998. Mirror neurons and the simulation theory of mind-reading. Trends in Cognitive Sciences 2(12), 493-501.

[25] Greig, F., Bohnet, I., 2008. Is There Reciprocity In A Reciprocal-Exchange Economy? Evidence Of Gendered Norms From A Slum In Nairobi, Kenya. Economic Inquiry 46(1), 77-83

[26] Guiso, L., Sapienza, P. Zingales, L., 2004. The Role of Social Capital in Financial Development. American Economic Review, 94(3), 526-556.

[27] Gunnthorsdottir, A. McCabe, K., Smith, V., 2002. Using the Machiavellianism instrument to predict trustworthiness in a bargaining game. Journal of Economic Psychology, 23, 49-66.

[28] Houser, D., Schunk, D., Winter, J., 2010. Distinguishing trust from risk: An anatomy of the investment game. Journal of Economic Behavior & Organization 74, 72-81

[29] Hoffman, M.L., 1982. Development of prosocial motivation: Empathy and guilt. In N. Eisenberg (Ed.), The development of prosocial behavior (pp. 281-313). San Diego, CA: Academic Press.

[30] Hoffman, M.L., 2000. Empathy and Moral Development: Implications for Caring and Justice, Cambridge University Press, Cambridge.

[31] Holt, C.A., Laury, S.K., 2002. Risk aversion and incentive effects in lottery choices. American Economic Review 92 (5), 1644-1655.

[32] Knack, S., Keefer, P., 2007. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. Quarterly Journal of Economics, 112, 1251-88.

[33] Krajbich, I., Adolphs, R., Tranel, D., Denburg, N.L., Camerer, C.F., 2009. Economic Games Quantify Diminished Sense of Guilt in Patients with Damage to the Prefrontal Cortex. The Journal of Neuroscience, 29(7), 2188-2192.

[34] Jackson, P.L., Meltzoff, A.N., Decety, J., 2005. How Do We Perceive the Pain of Others: A Window into the Neural Processes Involved in Empathy. NeuroImage, 24(3), 771-79.

[35] La Porta, R., Lopez de Silanes, F., Shleifer, A., Vishny, R., 1997. Trust in large organizations. American Economic Review, 87(2), 333-338.

[36] Lawrence E.J., Shaw, P., Baker, D., Baron-Cohen, S., David, A.S., 2004. Measuring Empathy: Reliability and Validity of the Empathy Quotient. Psychological Medicine, 34, 911-919

[37] Leith, K.P., Baumeister, R.F., 1998. Empathy, shame, guilt, and narratives of interpersonal conflicts: Guilt-prone people are better at perspective taking. Journal of Personality, 66, 1-37

[38] Lindsey, L., 2005. Anticipated guilt as behavioral motivation: An examination of appeals to help unknown others through bone marrow donation. Human Communication Research, 31, 453-481.

[39] Lindsey, L., Ah Yun, K., Hill, J.B., 2007. Examination of Empathy as a Moderator Anticipated Guilt as Motivation to Help Unknown Others: An Examination of Empathy as a Moderator. Communication Research, 34(4), 468-480.

[40] Loewen, PJ., 2010. Partisanship and Altruism: Results from a dictator game experiment. University of Toronto Working Paper.

[41] Morrison, I., Lloyd, D., di Pellegrino, G., Roberts, N., 2004. Vicarious Responses to Pain in Anterior Cingulate Cortex: Is Empathy a Multisensory Issue? Cognitive, Affective, and Behavioral Neuroscience, 2004, 4(2), 270-78.

[42] OKeefe, D. J. 2002. Guilt as a mechanism of persuasion. In J. P. Dillard and M. Pfau (Eds.), The persuasion handbook: Developments in theory and practice (329-344). Thousand Oaks, CA: Sage.

[43] Pelligra, V., 2010. Trust Responsiveness: On the Dynamics of Fiduciary Interactions. Journal of Socio-Economics, 39(6), 653-660.

[44] Pelligra, V., Stanca, L., 2010. To Give or Not To Give? Equity, Efficiency and Altruistic Behavior in a Survey-Based Experiment. CRENoS, Working Paper Number 2010-32.

[45] Platteau, J., 1997. Mutual Insurance as an Elusive Concept in Traditional Rural Communities. The Journal of Development Studies, 33, 764-796.

[46] Rabin, M.,1993. Incorporating Fairness into Game Theory and Economics. American Economic Review 83, 1281-1302.

[47] Rizzolati, G., Fogassi, L., Gallese, V. 2001. Neurophysiological mechanisms underlying the understanding and imitation of action. Nature Reviews of Neuroscience 2, 661-70

[48] Selten, R., 1967. Die Strategiemethode zur Erforschung des eingeschrnkt rationalen Verhaltens im Rahmen eines Oligopolexperiments, Beitrge zur experimentellen Wirtschftsforschung 1, 136-168.

[49] Singer, T., 2009. Understanding Others: Brain Mechanisms of Theory of Mind and Empathy, in Paul W. Glimcher, Colin F. Camerer, Ernst Fehr, Russell A. Poldrack (Eds.) Neuroeconomics: Decision Making and the Brain. London, Academic Press, pp. 251-268.

[50] Singer, T., Kiebel, S.J., Winston, J.S., Dolan, R.J., Frith, C.D., 2004a. Brain Responses to the Acquired Moral Status of Faces. Neuron, 41(4), 653-62.

[51] Singer, T., Seymour, B., O'Doherty, J.P., Kaube, H. Dolan, R.J., Frith, C. D., 2004b. Empathy for Pain Involves the Affective but not Sensory Components of Pain. Science, 303(5661), 1157-62.

[52] Singer, T. and Fehr, E., 2005. The neuroeconomics of mind reading and empathy, American Economic Review 95(2), 340-345.

[53] Sobel J., 2005. Interdependent Preferences and Reciprocity. Journal of Economic Literature 43, 392-436.

[54] Tangney, J.P., Stuewig, J., Mashek, D.J., 2007. Moral Emotions and Moral Behavior. Annual Review of Psychology, 58, 345-72.

[55] Thomas, J.P., Worrall, T., 2002. Gift-giving, Quasi-credit and Reciprocity. Rationality and Society, 14, 308-352.

[56] Tomasello, M., Carpenter, M., Call, J., Behne, T. and Moll, H., 2005. Understanding and sharing intentions: The origins of cultural cognition, Behavioral and Brain Sciences 28(05), 675-691.

[57] Zak P. J., Knack, S., 2001. Trust and growth. Economic Journal, 111, 295-321.

Tables

Table 1: Summary statistics (Players A)

Variable	**Mean (All)**	**(M)**	**(F)**
Sent	56.792	62.692	51.111
	(34.124)	(29.096)	(38.062)
Empathy	44.735	40.807	48.518
	(9.499)	(7.271)	(9.966)
Risk	7.340	7.438	7.246
	(3.700)	(3.794)	(3.676)
N.	53	26	27

Note: standard errors reported in brackets.

Table 2: Determinants of Trust (Players A)

	(1)	(2)	(3)	(4)
Empathy	-0.111	-0.068	-0.137	0.151
	(0.502)	(0.482)	(0.505)	(0.558)
Risk Propensity		2.874**	2.893**	2.8690**
		(1.239)	(1.246)	(1.244)
Age			-0.634	-0.399
			(1.260)	(1.270)
Gender				-12.133
				(10.108)
Constant	61.796	38.740	1302.623	827.035
	(22.944)	(24.194)	(2509.194)	(2529.220)
R^2 adj.	-0.018	0.061	0.047	0.056
Observations	53	53	53	53

Note: OLS estimates, dependent variable: Amount sent (IG). Standard errors reported in brackets. "Risk-Propensity" indicates the switch from the risky lottery to the certain option (0= strongly risk-averse, 15=strongly risk-loving). * p <0.1, ** p <0.05, *** p <0.01.

Table 3: Summary statistics (Players B)

Variable	**Mean (All)**	**(M)**	**(F)**
Empathy	44.188	41.840	46.285
	(7.475)	(7.498)	(6.927)
Risk	6.327	6.127	6.504
	(3.417)	(3.446)	(3.445)
N.	53	27	26

Note: standard errors reported in brackets.

Table 4: Determinants of Trustworthiness (Players B)

	(1)	(2)	(3)	(4)
Empathy	0.009	0.008	0.013	0.016
	(0.008)	(0.008)	(0.009)	(0.009)
Risk Propensity		0.028	0.028	0.029
		(0.017)	(0.017)	(0.017)
Age			0.028	0.032
			(0.019)	(0.020)
Gender				-0.107
				(0.129)
Constant	0.110	-0.004	-56.609	-64.016
	(0.373)	(0.374)	(39.468)	(39.540)
R^2 adj.	0.006	0.034	0.054	0.135
Observations	53	53	53	53

Note: OLS estimates, dependent variable: Spearman Correlation Coefficient (IG). Standard errors reported in brackets. "Risk-Propensity" indicates the switch from the risky lottery to the certain option (0= strongly risk-averse, 15=strongly risk-loving). * p <0.1, ** p <0.05, *** p <0.01.

Table 5: Empathy and patterns of Reciprocity (Players B)

	(1)	(2)
Empathy	0.148***	0.147***
	(0.051)	(0.051)
Risk Propensity		-0.082
		(0.093)
Constant	-7.565***	-7.049***
	(2.458)	(2.522)
$Pseudo - R^2$	0.161	0.173
Observations	53	53

Note: Logit estimations. Dependent variable: Pattern of reciprocity (Balanced vs Conditional). Standard errors reported in brackets. "Risk-Propensity" indicates the switch from the risky lottery to the certain option (0= strongly risk-averse, 15=strongly risk-loving). * p <0.1, ** p <0.05, *** p <0.01.

Figure 1: Amount Sent in the IG (Players A)

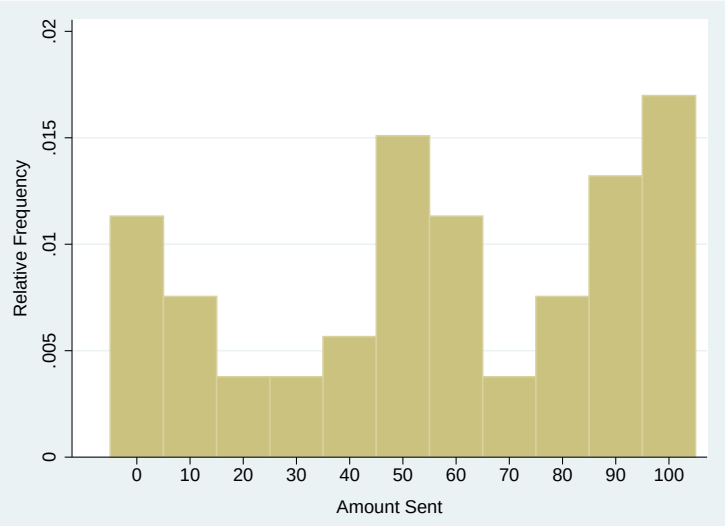


Figure 2: Empathy and Amount Sent (Players A)

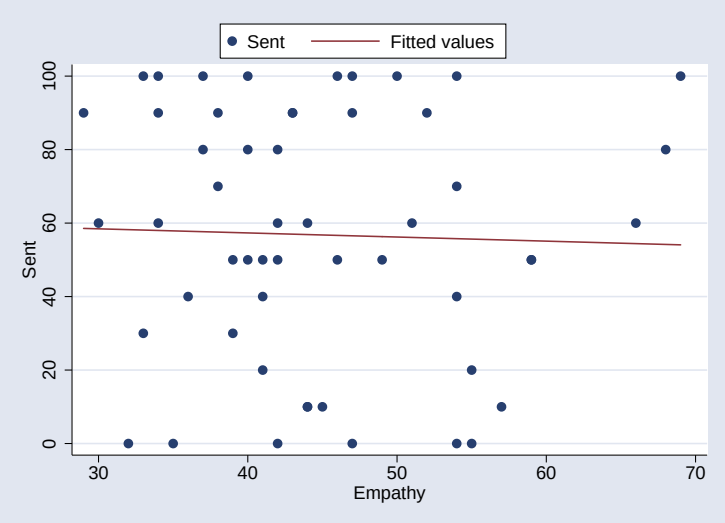
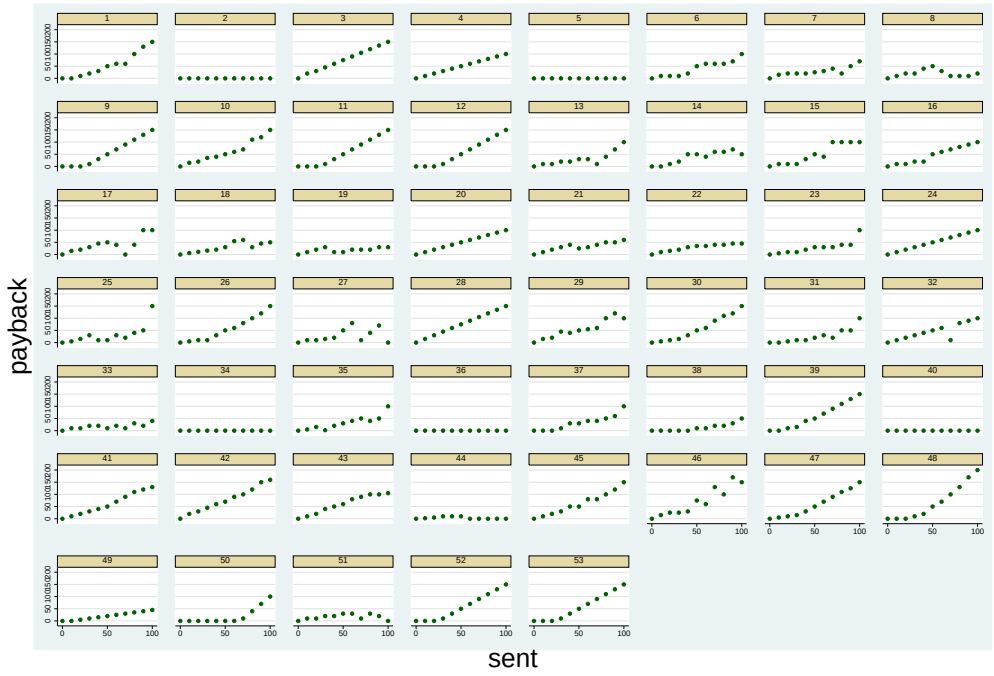
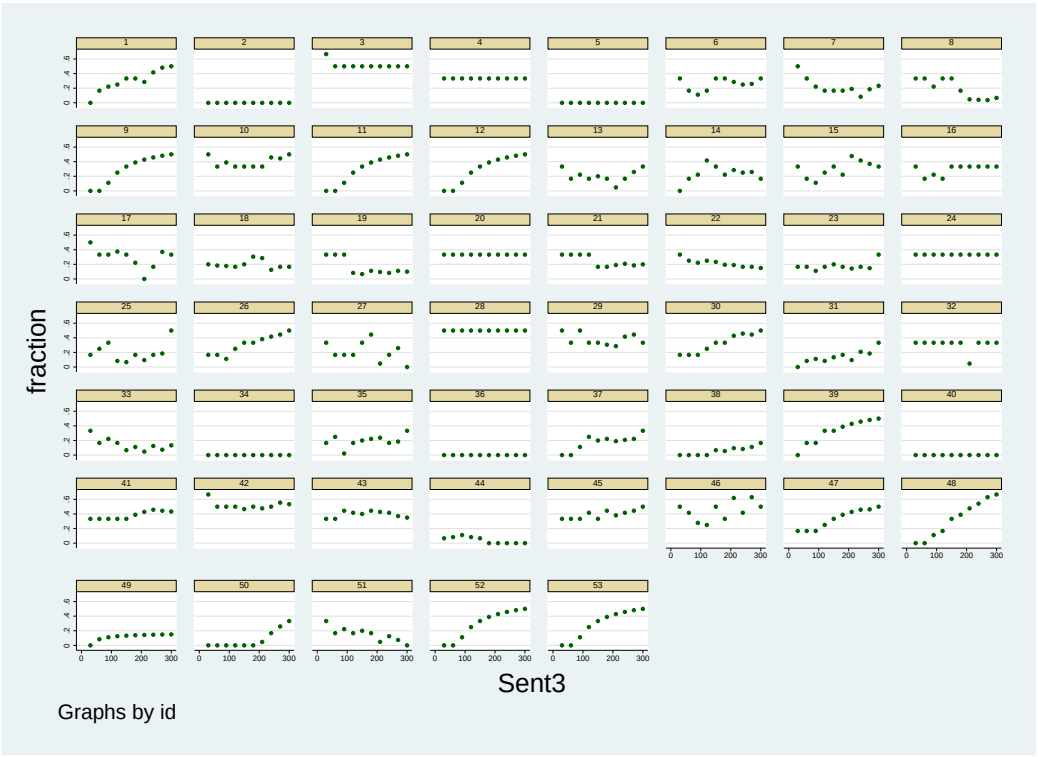


Figure 3: Amount Sent and Payback (Players B)



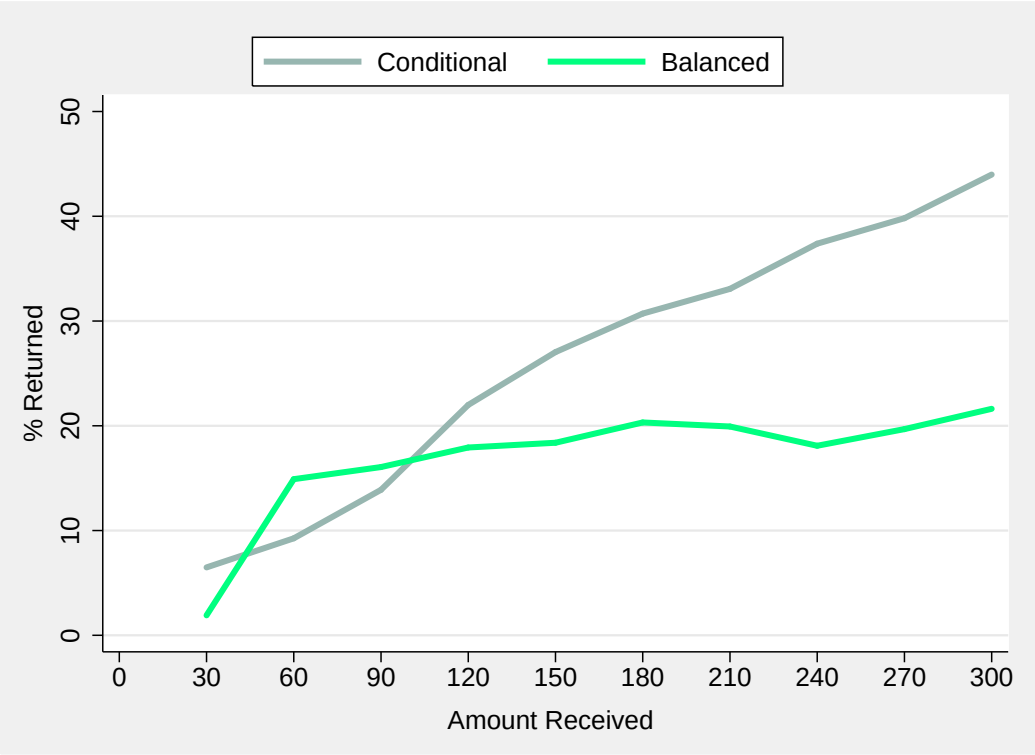
Note: Individual responses of players B (IG). The axis measure the hypothetical amount received and the amount sent back (in euros).

Figure 4: Amount Sent and Fraction Returned (Players B)



Note: Individual responses of players B (IG). The axis measure the hypothetical amount receved and the fraction of the received investment sent back (in euros).

Figure 5: Average Fraction Returned by Conditional and Balanced Reciprocators (Players B)



Note: Average fraction of the amount received sent back (IG). The axis measure the hypothetical amount received by B and the fraction of investment sent back (in euros), by conditional and balanced reciprocators.

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Finito di stampare nel mese di Luglio 2011
Presso **studiografico&stampadigitale Copy Right**
Via Torre Tonda 8 – Tel. 079.200395 – Fax 079.4360444
07100 Sassari

www.crenos.it

ISBN 978-88-84-67-676-4