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Guilt-Averse or Reciprocal? Looking at Behavioural Motivations in the Trust Game

Yola Engler* Rudolf Kerschbamer† Lionel Page*

May 2016

Abstract

For the trust game, recent models of belief-dependent motivations make opposite predictions regarding the correlation between back-transfers and second-order beliefs of the trustor: While reciprocity models predict a negative correlation, guilt-aversion models predict a positive one. This paper tests the hypothesis that the inconclusive results in previous studies investigating the reaction of trustees to their beliefs are due to the fact that reciprocity and guilt-aversion are behaviorally relevant for different subgroups and that their impact cancels out in the aggregate. We find little evidence in support of this hypothesis and conclude that type heterogeneity is unlikely to explain previous results.

JEL classification: C25; C70; C91; D63; D64

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1 Introduction

This paper investigates the ability of the most prominent models of belief-dependent motivations to explain second-mover behavior in the investment (or 'trust') game introduced by Berg *et al.* (1995). In models of belief-dependent motivations an agent's utility is defined over outcomes (as in traditional game theory) and hierarchies of beliefs. Such models are therefore deeply rooted in psychological game theory (as pioneered by Geanakoplos *et al.*, 1989 and Battigalli & Dufwenberg, 2007).

For second-mover behavior in the investment game, the two most prominent models of belief-dependent motivations make opposite predictions regarding the correlation between second-order beliefs and behavior. According to the reciprocity theories of Rabin (1993) and Dufwenberg & Kirchsteiger (2004) a generous transfer by the first mover is interpreted by the second mover as less kind if the first mover is believed to expect a high back-transfer in return. These models therefore predict that the pro-sociality of the second mover *decreases* in her belief about the payoff expectation of the first mover. By contrast, the guilt aversion model introduced by Charness & Dufwenberg (2006) and generalized and extended by Battigalli & Dufwenberg (2007) assumes that people experience a feeling of guilt when they do not live up to others' (payoff) expectations. This model therefore predicts that the pro-sociality of the second mover *increases* in her second-order belief.

Given the conflicting predictions of the two classes of models, it is ultimately an empirical question whether high expectations (about the payoff expectation of the other) are detrimental or beneficial for pro-social behavior. Previous studies investigating this issue – often obtained by employing variants of the trust game as the working horse – provide mixed results: while some papers (as, for instance, Guerra & Zizzo, 2004, Charness & Dufwenberg, 2006 and Bacharach et al., 2007) find a positive correlation between second-order beliefs and pro-social behavior, many others (as, for instance, Strassmair, 2009, Ellingsen *et al.*, 2010, or Al-Ubaydli & Lee, 2012) find no correlation, or even a (slightly) negative one.

This paper explores the possibility that the inclusive evidence reported in previous studies is due to preference heterogeneity in the population of second movers. Some subjects may be mainly motivated by reciprocity, some others by guilt aversion and a third group of subjects might not react to others' payoff expectations at all. If the former two groups are similar in size then in the aggregate the positive correlation between pro-social behavior and second-order beliefs and the negative one might simply cancel out. This could explain the no-correlation result obtained in several previous studies.

To investigate this possibility, we use a triadic (that is, a three-games) design implemented within subjects. Our experimental design is intended to exogenously manipulate the second-order beliefs of trustees in the trust game and we use it to classify experimental trustees into behavioral types depending on how they react to the belief manipulation. In line with previous findings, we find no pronounced effect of the induced shift in second-order beliefs in the aggregate data. More importantly, we also do not find convincing evidence in support of our hypothesis that the no-correlation result in the aggregate data is caused by heterogeneity in second-mover preferences. Overall it seems that the behavior of second movers in the trust game is either not primarily driven by beliefs on the payoff expectations of the first mover or that it is driven by more complex considerations than those reflected in existing theories.

2 The Experiment

2.1 Experimental Design

2.1.1 The Game

We employ a triadic (three-games) design implemented within subjects to manipulate the second-order beliefs of experimental trustees in a binary investment game. The structure of each of the three games is as illustrated in Figure 1:[1]

There are two players – a first mover (FM, he) and a second mover (SM, she). The players start with identical initial endowments of \$10 (all amounts are in Australian dollars). In the first stage the FM decides between keeping the endowment and sending the amount of \$3 to the SM. If the FM decides to keep the endowment, the game ends and both players receive their endowments of \$10 as their final payoffs. If the FM transfers the amount of \$3, this amount is multiplied by 5 and the resulting \$15 are then credited to the account of the SM. Now a random move by Nature determines whether the game stops. With the probability $1 - p$, the state of the world is $\omega = 0$ and the game stops. In this case, the FM receives the \$7 that are left from his initial endowment and the SM receives her initial endowment plus the \$15 from the transfer of the FM. With probability p, the state is $\omega = 1$ and the game continues. In this case, the SM can now decide how much money she wants to send back to the FM. She can choose any integer amount x between 0 and 15. The FM then receives the \$7 that are left from his initial endowment plus the SM's back-transfer x as the final payoff. The SM earns her initial endowment (\$10) plus

[1] A similar experimental design has previously been employed by Strassmair (2009) in an across-subjects study.

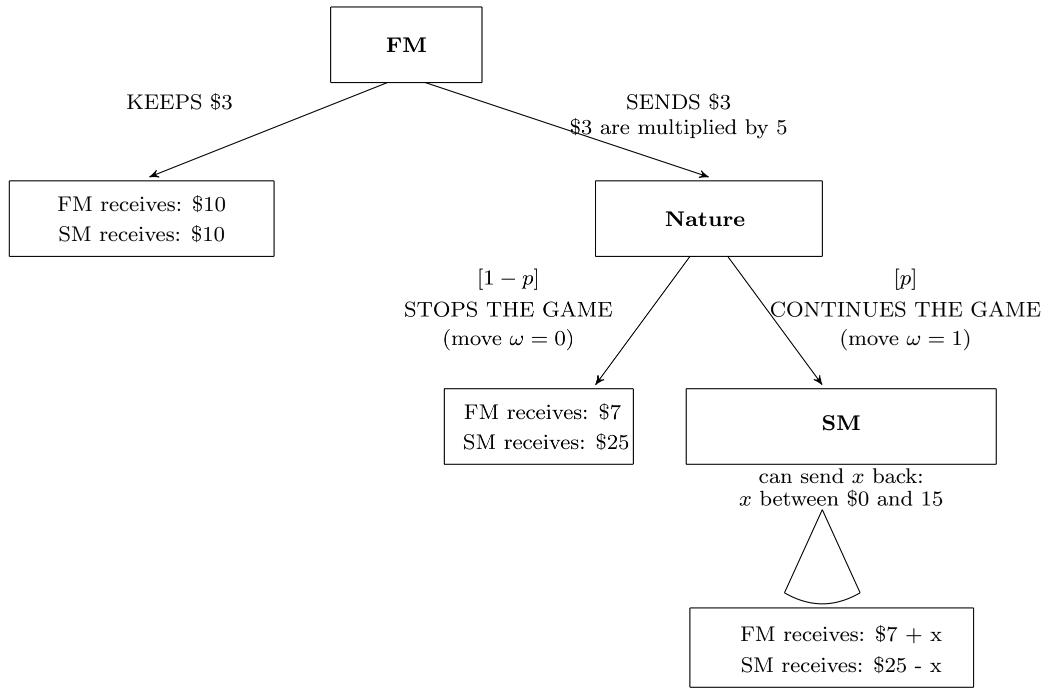

Figure 1: Structure of the modified trust game.

the multiplied transfer ($15) minus the amount x she has chosen to send back to the FM. At the end of the game, both players learn their payoffs and the outcome of Nature's move (i.e. whether the game was stopped or the SM had the opportunity to make a back-transfer).

The crux of our working horse trust game consists in the random move by Nature after the FM's sending decision. The game resembles a standard binary trust game if $p = 1$, as the SM can then make a back-transfer with certainty. By contrast, for $p = 0$, the game is reduced to a dictator game (with the FM as the dictator). To manipulate the belief of the SM about the payoff expectation of the FM (conditional on sending the amount of $3), we vary – across treatments – the probability p that the SM can make a back-transfer, while keeping everything else constant. Our treatment variation is based on the following considerations: The lower p, the lower the chance that the FM will receive some money back from the SM, the lower therefore arguably his payoff expectation conditional on making the transfer of $3, the lower therefore also the expectation of the SM on the payoff expectation of the FM. Conversely, the closer p is to 1, the higher the chance of a back-transfer from the SM, the higher therefore arguably also the SM's belief about the payoff expectation of the

FM. Because we are interested in individual response patterns, every subject has to make a choice in three treatments differing only in the continuation probability p. A subject in the role of the FM is asked whether he wants to make the transfer of $3 in each treatment. According to the game tree in Figure 1, whether or not the SM has a decision to make depends on the FM's choice and on Nature's random move. To collect data from all subjects in all treatments, we apply the strategy method. That is, subjects in the role of the SM are asked to make a decision regarding the back-transfer assuming the FM made the transfer and Nature did not stop the game. To make the SM's decision scenario plausible in each of the three treatments we decided to make the choice of the initial transfer by the FM quite attractive by using high values of p. Specifically, the variable p takes on the values 50, 70 and 90 percent across our three treatments.

2.1.2 The Observer

The experimental design is intended to manipulate the belief of the SM about the payoff expectation of the FM (conditional on sending the amount of $3). To verify that this manipulation works (i.e. that a higher continuation probability is associated with higher payoff expectations of the FM) we have a third player role in our experiment, the role of an impartial observer. The task of the Observer is to guess how much money the participants in the role of the SM send back, on average, to the paired FM assuming that the FM transferred the $3 and Nature did not stop the game. From these joint conditional beliefs, we can then calculate the expectation of the Observer about the expected payoff associated with the initial transfer by the FM for each of the three treatments. We can then check if and how this expected payoff varies with the continuation probability. We use an impartial observer to elicit beliefs to avoid the usual problems associated with eliciting beliefs from agents that also have to make a decision.[2]

[2]If beliefs are elicited before the decision is made, this might lead to an "experimenter demand effect", or to a "consistency effect": Subjects might condition their choice on the stated belief because they believe that the experimenter expects them to do so, or actions might be shaped by beliefs just to be consistent. Fleming & Zizzo (2015) test the impact of the experimenter demand effect on choices in a different context and indeed find convincing evidence in line with it. By contrast, if beliefs are elicited after the choices than actions might influence (or cause) beliefs. This is often referred to as the "projection hypothesis", or the "false consensus effect". Bellemare *et al.* (2011) test the importance of the (false) consensus effect and indeed find evidence in line with it.

2.2 Experimental Procedure

The experiment was conducted between February and June 2015. To the 15 experimental sessions we recruited 180 students from a large university in Australia via the ORSEE software (Greiner, 2015). Each session lasted approximately 45 minutes. No participation fee was paid and the average earnings were \$14.30. The experiment was programmed and conducted with the experimental software CORAL (Schaffner, 2013). At the beginning of the experiment, each participant was randomly assigned the role of either the FM, or the SM or the Observer and participants kept the role during the entire session. After session 10, we disposed the role of the Observer because we attained enough data to test whether our belief manipulation worked. At no time were subjects informed about the identity of their matched partner.

In each session participants where exposed successively to the three treatments distinguished only in the continuation probability p. Subjects received neither any feedback on the choices made by other participants nor on the outcome of Nature's move before all decisions were made. At the end of the experiment, one of the three treatments was randomly selected for payment. The players' actions as well as the move by Nature for that particular treatment were revealed and payoffs calculated accordingly.[3] The beliefs of subjects in the role of the Observer were incentivized using the quadratic scoring rule. Specifically, we implemented the payoff function

$$\text{Payoff}_{\text{Observer}} = 15 - 0.5(\bar{x} - x_{\text{Guess}})^2,$$

where $\bar{x}$ is the rounded average back-transfer made by subjects in the role of the SM and x_{Guess} is the Observer's associated guess.

3 Behavioral Types

To describe and distinguish individual behavioral patterns, we define four types of players – selfish (S), altruistic (A), guilt averse (G) and reciprocal (R) ones. For each of these types we assume a linear relationship between the continuation probability and the back-transfer. Specifically, the back transfer of a SM of type $i \in \{S, A, G, R\}$ is assumed to be a function of her unconditional altruism parameter c_i and of a parameter m_i which reflects how she reacts to our belief manipulation:

$$x_i(p) = c_i + m_i p \tag{1}$$

[3]The SM's decision was only revealed to the FM if the FM sent the \$3 and Nature did not stop the game.

Definition 1 (Selfish Agent) *A SM is said to act in a selfish manner if her back-transfer is always zero:* $c_S = 0$ *and* $m_S = 0$*, implying* $x_S(p) = 0$ *for all* p*.*

Definition 2 (Unconditional Altruist) *A SM is said to be an unconditional altruist if her choice is unaffected by her belief about the payoff expectation of the FM but she nevertheless returns a positive amount. Thus, her back-transfer* x *is a constant amount independent of the continuation probability* p*:* $c_A > 0$ *and* $m_A = 0$*, implying* $x_A(p) = c_A$ *for all* p*.*

Definition 3 (Guilt-Averse Agent) *A SM is said to be guilt averse if her pro-sociality is increasing in her belief about the payoff expectation of the FM. Thus, her back-transfer* x *is an increasing function of the continuation probability* p*:* $c_G \geqslant 0$ *and* $m_G > 0$*, implying* $x_G(p) = c_G + m_G p$ *– with* $m_G > 0$ *– for all* p*.*

Definition 4 (Reciprocal Agent) *A SM is said to be reciprocal if her pro-sociality is decreasing in her belief about the payoff expectation of the FM. Thus, her back-transfer* x *is a decreasing function of the continuation probability* p*:* $c_R \geqslant 0$ *and* $m_R < 0$*, implying* $x_R(p) = c_R + m_R p$ *– with* $m_R < 0$ *– for all* p*.*

4 Data and Results

In total, we collected data from 180 students – 70 subjects in the role of the FM, 70 subjects in the role of the SM, and 40 subjects in the role of the Observer. Since each subject made a decision in each of the three treatments, we have 210 observations for the role of the FM, 210 observations for the role of the SM, and 120 observations for the role of the Observer.

4.1 The Observer

To confirm the validity of our experimental belief manipulation, we first look at the data obtained from subjects in the role of the Observer. We first investigate their guesses about the average back-transfer and compare guesses with actual behavior. As can be seen from Figure 2, the Observers' average guesses are roughly \$1 higher than the actual choices of SMs for all continuation probabilities. However, this difference is not significant for any of the treatments (the Mann-Whitney ranksum test p-values are 0.0596, 0.1639 and 0.1619 for the continuation probabilities of 50%, 70% and 90%, respectively) so that the Observer's guess is on average a decent approximation of actual behavior.

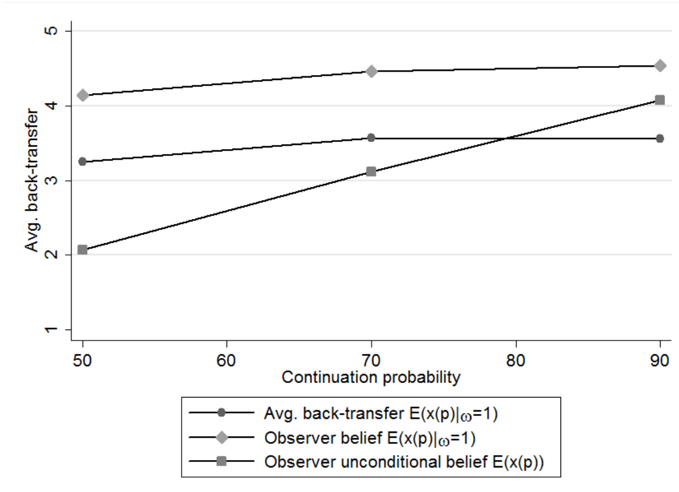

Figure 2: Average back-transfer by the SM as a function of the continuation probability p compared to the Observers' average guess and the associated expected return for the FM conditional on making the transfer.

Further, we can see a slight upwards trend in guesses as the continuation probability increases. Yet, the differences in average beliefs across the three continuation probabilities are not statistically significant (the Wilcoxon signed-rank test p-values are 0.3448 for H_0: $E(x|p = 50\%) = E(x|p = 70\%)$, 0.3180 for H_0: $E(x|p = 70\%) = E(x|p = 90\%)$ and 0.2468 for H_0: $E(x|p = 50\%) = E(x|p = 90\%)$).

It is important to note that we have elicited joint conditional beliefs about average back transfers. Specifically, subjects in the role of the Observer were asked how much they thought the SM would on average transfer back, assuming the FM transferred the \$3 and Nature did not stop the game. We are, however, interested in preferences which are influenced by the (belief of the SM on the) payoff expectation of the FM conditional only on the own decision (of sending the \$3). To obtain information on this expectation, we multiply the joint conditional belief by the continuation probability p. The resulting number $\widetilde{x}_1^O$, estimated from Observers' guesses, is significantly increasing in p: $E(\widetilde{x}_1^O|p = 50\%) = 1.86 < E(\widetilde{x}_1^O|p = 70\%) = 2.78 < E(\widetilde{x}_1^O|p = 90\%) = 3.67$ (Wilcoxon signed-rank test, p-values < 0.01). Assuming that Observers' beliefs are a good approximation of real players' beliefs, we interpret this result as evidence showing that our belief manipulation works.

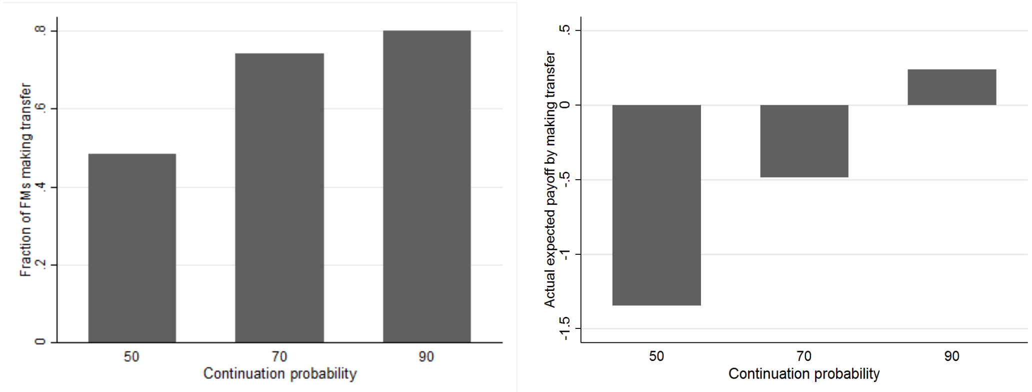

Figure 3: Left panel: Fraction of FMs making the transfer for each of the three continuation probabilities. Right panel: FMs' average payoff conditional on making the transfer for each of the three continuation probabilities.

4.2 The First Mover

We now turn to the data obtained from experimental FMs. The left panel of Figure 3 shows the fraction of FMs making the transfer for each of the three continuation probabilities. Over 50 percent make the transfer independent of p, but there is a clear increase in the fraction as p increases – more FMs send the money when the probability that the SM can actually send a back transfer is higher. This is a further indication in support of our main hypothesis that the payoff expectation of the FM (conditional on sending the \$3) is increasing in p. As can be seen from the right panel of Figure 3, making the transfer pays off, on average, only when the continuation probability is 90%.

4.3 The Second Mover

We now turn to our main data source, the data obtained from experimental SMs. First we look at average back-transfers. Figure 2 shows that average SM behavior is quite similar across the three continuation probabilities. Statistical tests confirm that average back-transfers are not significantly different across treatments (the Wilcoxon signed-rank test p-values are 0.0822 for H_0: $E(x|p = 50\%) = E(x|p = 70\%)$, 0.3518 for H_0: $E(x|p = 70\%) = xE(x|p = 90\%)$ and 0.0451 for H_0: $E(x|p = 50\%) = E(x|p = 90\%)$). Similarly, the distributions of choices do not vary across p (Kolmogorov-Smirnov test, combined p-values: 0.959 for H_0: $\Phi(x|p = 50\%) = \Phi(x|p = 70\%)$, 0.959 for H_0: $\Phi(x|p = 70\%) = \Phi(x|p = 90\%)$ and 0.751 for H_0:

$\Phi(x|p = 50\%) = \Phi(x|p = 90\%)$). These results are in line with the no-correlation results obtained in several previous studies (see, for instance, Strassmair 2009, Ellingsen et al. 2010, or Al-Ubaydli and Lee 2012).

Looking at individual behavior, we next run a mixture model (Harrison & Rutström, 2009), which allows us to estimate the fraction of subjects whose choices are consistent with one of the types defined earlier. The mixture model allows different types to coexist in the same sample and it determines the support for each of the types indicating their respective importance in the population. To simplify the estimation procedure of the mixture model, we decided to identify and exclude the selfish agents manually as they can easily be detected. We ended up removing 15 individuals who never returned any money from our data set, and four agents who returned \$1 once and zero otherwise. Hence, 27 percent of our SMs behave roughly in accordance with the selfish benchmark.[4] Using the definitions in Section 3, we specify one likelihood function for the remaining competing types $t \in \{A, G, R\}$, conditional on the respective model being correct:

$$\ln L_t(x, c_t, m_t, \sigma) = \sum_i \ln l_{ti} = \sum_i \ln[\Phi_t(x_i)],$$

where m_t is restricted: $m_A = 0$, $m_G > 0$ and $m_R < 0$. Our grand likelihood of the entire model is then the probability weighted average of the conditional likelihoods, where π_t denotes the probability that the respective type applies and where l_{ti} is the respective conditional likelihood:

$$\ln L(x, c_t, m_t, \sigma, \pi_t) = \sum_i \ln[(\pi_A \times l_{Ai}) + (\pi_G \times l_{Gi}) + (\pi_R \times l_{Ri})].$$

The parameter estimates can directly be found by maximizing this log-likelihood. Table 1 presents the resulting maximum likelihood estimates of the mixture model. The first finding is that the estimates for the probabilities of our type specifications are all positive and significantly different from zero. Their respective size refers to the fraction of choices characterized by each. For the data at hand, guilt-aversion seems to dominate slightly – with 46 percent – but closer inspection reveals that we cannot reject the hypothesis that the three probabilities are identical (p-values: 0.1100 for H_0: $\pi_A = \pi_G$, 0.0815 for H_0: $\pi_G = \pi_R$ and 0.9359 for H_0: $\pi_A = \pi_R$). Yet, looking at the estimation results reveals very flat slopes for both, reciprocal ($m_R = 0.007$) and guilt-averse types ($m_G = -0.024$). Figure 4 graphically illustrates these findings.

[4]We also run the mixture model including the selfish types where they would form a "neutral" type together with the unconditional altruists. The higher likelihood was however reached by excluding them.

It shows – for each of the three types – the plot of the estimated function of the back-transfer on the continuation probability. Although there seem to be behavioral tendencies present, the effect of a change in the continuation probability seems to be rather weak, especially for guilt-averse agents. But also the effect for reciprocal agents is not very pronounced.

Mixture Model (N=153): $\ln L(x, c_t, m_t, \sigma, \pi_t) = \sum_i \sum_t \ln[(\pi_t \times l_{ti})]$

Parameter	Estimate	Robust SE
c_G	3.008***	.742
c_R	8.881***	.955
c_A	1.236**	.424
m_G	.007**	
m_R	-.024***	
σ	1.161	
π_G	.464***	.069
π_R	.273***	.062
π_A	.293***	.071

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1: Maximum likelihood estimates of mixture model.

Since we do not interpret these results as convincing evidence in support of our hypothesis of the coexistence of guilt-averse and reciprocal agents, we next try another approach to test for the presence of heterogeneity in the reaction to the second-order belief. Specifically, we estimate two versions of a linear regression model of the back-transfer on the continuation probability. One model allows only for random intercepts, while the other allows for random intercepts *and* random slopes. Our "random-intercept" model reads

$$x_i(p) = c + \beta p + u_{0i} + \epsilon_i,$$

where x_i is subject i's back-transfer, c is a constant, p is the continuation probability and u_{0i} is the subject-specific random effect. The srandom-slope" model – allowing the intercept *and* the slope to vary between participants – reads

$$x_i(p) = c + \beta p + u_{0i} + u_{1i} p + \varepsilon_i,$$

where u_{1i} is the additional subject-specific random effect on the slope of p. The results for both models are reported in Table 2. The estimates of the "fixed" parameters confirm the results obtained from the mixture model: The constant c is positive and

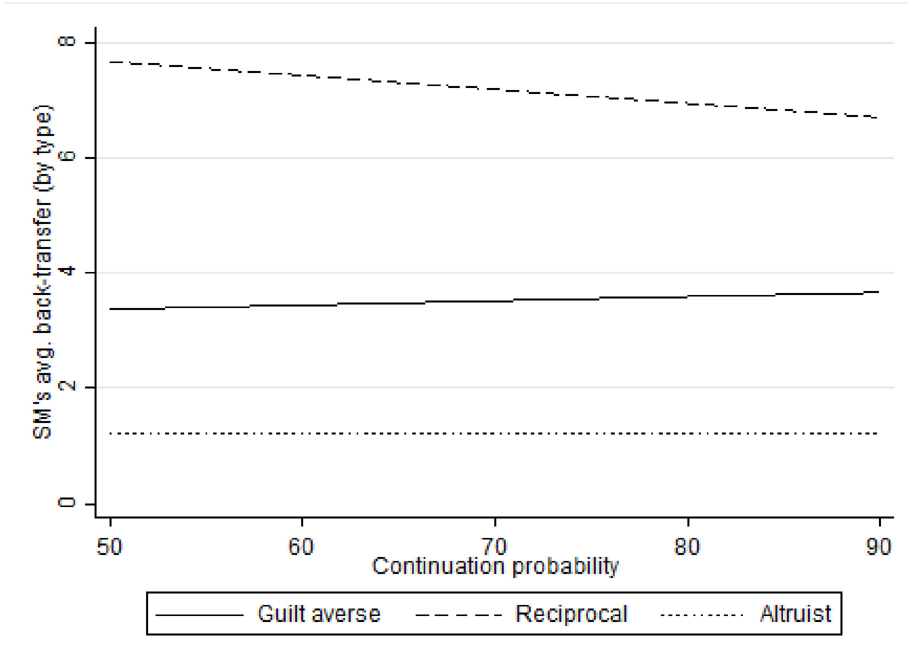

Figure 4: Plot of the estimated type-functions based on the estimates of the mixture model.

significant but the effect of p on back-transfers is insignificant. Our main interest lies in the results obtained for σ_{u_0} and σ_{u_1} as they represent the between-subject variation in the intercept and the slope of p, respectively. The significance of σ_{u_0} can be tested using the likelihood ratio (LR) test of the linear regression model in its restricted version of the random-intercept model. The null hypothesis that $\sigma^2_{u_0}$ is zero can be rejected at the 0.01 percent significance level (p-value < 0.0001). To test the significance of σ_{u_1}, we again use a LR test. This time, we test the random-slope model against the random-intercept model. The p-value is 0.2116 so that we cannot reject the null hypothesis that $\sigma^2_{u_1} = 0$ and thus that the slope of the backtransfer as a function of the continuation probability p is the same for all subjects.

Multi-level Models (N=210):	$x_i(p) = c + \beta p + u_{0i} + u_{1i}p + \varepsilon_i$			
	Random-intercept model		**Random-slope model**	
Parameter	Estimate	Robust SD	Estimate	Robust SD
p	.007	.007	.007	.007
c	2.988***	.609	2.988***	.578
Random effects				
σ_{u_1}			.018	.008
σ_{u_0}	2.746***	.262	2.456***	.359
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Table 2: Mixed-effects maximum likelihood estimates of multi-level models.

5 Discussion

We have experimentally investigated the empirical relevance of the most prominent models of belief-dependent motivations for behavior in the binary trust game. Our triadic design implemented within subjects has allowed us to study individual response patterns to exogenously manipulated second-order beliefs. Results obtained from a mixture model allowing for reciprocal and guilt-averse agents as well as for unconditional altruists suggested that individual differences exist only in the *level* of exhibited pro-social behavior. The effect of the induced change in second-order beliefs on choices was found to be negligible – on average *and* on the type level. We have confirmed these findings by estimating two versions of a random coefficient model allowing the reaction of the SM to the belief manipulation to differ within our sample. While we found support for heterogeneity in the level of unconditional altruism, we do not find convincing evidence for heterogeneity in how second movers react to the induced shift in their second-order beliefs. Our results suggest that the most prominent models of belief-dependent motivations – reciprocity and aversion against simple guilt – may not accurately reflect how players in the role of the second mover in the trust game react to their beliefs about the payoff expectation of the first mover. Further work is needed in this area to understand the role played by higher order beliefs for behavior.

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A Instructions

General Instructions

General Remarks
Thank you for participating in this experiment on decision-making. During the experiment you and the other participants are asked to make a series of decisions.
Please do not communicate with other participants. If you have any questions after we finish reading the instructions please raise your hand and an experimenter will approach you and answer your question in private. Please consider all expressions as gender neutral.

Three Roles
There are three roles in this experiment: **Player 1**, **Player 2** and the **Observer**. At the start of the experiment you will be assigned to one of these three roles through a random procedure. Your role will then remain the same throughout the experiment. Your role will only be known to you.

Earnings
Depending on your decisions, the outcomes of some random moves and the decisions of other participants you will receive money according to the rules explained below. All payments will be made confidentially and in cash at the end of the experiment.

Privacy
This experiment is designed such that nobody, including the experimenters and the other participants, will ever be informed about the choices you or anyone else will make in the experiment. Neither your name nor your student ID will appear on any decision form. The only identifying label on the decision forms will be a number that is only known to you. At the end of the experiment, you are asked to collect your earnings in an envelope one-by-one from a person who has no involvement in and no information about the experiment.

Decisions Per Period

The experiment is divided into **three periods**. You are asked to choose your preferred option in each of these periods. Only one period will be randomly selected for cash payments; thus you should decide which option you prefer in the given period **independently** of the choices you make in the other periods.

There are three roles in the experiment: Player 1, Player 2 and an Observer.

Player 1 and Player 2

In each period, Player 1 is randomly matched with one Player 2 but none of the participants will interact with the same other participant twice and no one will ever be informed about the identity of the participant he was paired with. Both players receive an endowment of $10 in each period.

The first move is made by **Player 1**. He is asked to choose whether he wants to send $3 of his endowment to Player 2 or not.

If Player 1 decides to transfer $3 to Player 2, his transfer will be multiplied by 5 while being sent. After Player 2 has received the $15, it is randomly determined whether the round is stopped at this point of time or if Player 2 has the opportunity to send money back to Player 1:

- With the probability $1 - p$, the round continues.
  In this case, **Player 2** can decide how much money he wants to send back to Player 1. He can choose any amount between $0 and $15. Player 1 then receives his remaining $7 plus Player 2's back-transfer as a payment. Player 2 earns his initial endowment ($10) plus the multiplied transfer ($15) minus the amount he has chosen to send back to Player 1.
- With a probability p, the round is stopped.
  In this case, Player 1 receives the $7 that are left from his initial endowment and Player 2 receives his initial endowment ($10) plus the by five multiplied transfer of Player 1 ($15).

If Player 1 decides not to transfer the $3 to Player 2, nothing happens and both players receive their initial endowment of $10.

The stopping probability p can take values of 10%, 30% or 50%. The realization of p will be stated to all players at the beginning of each period.

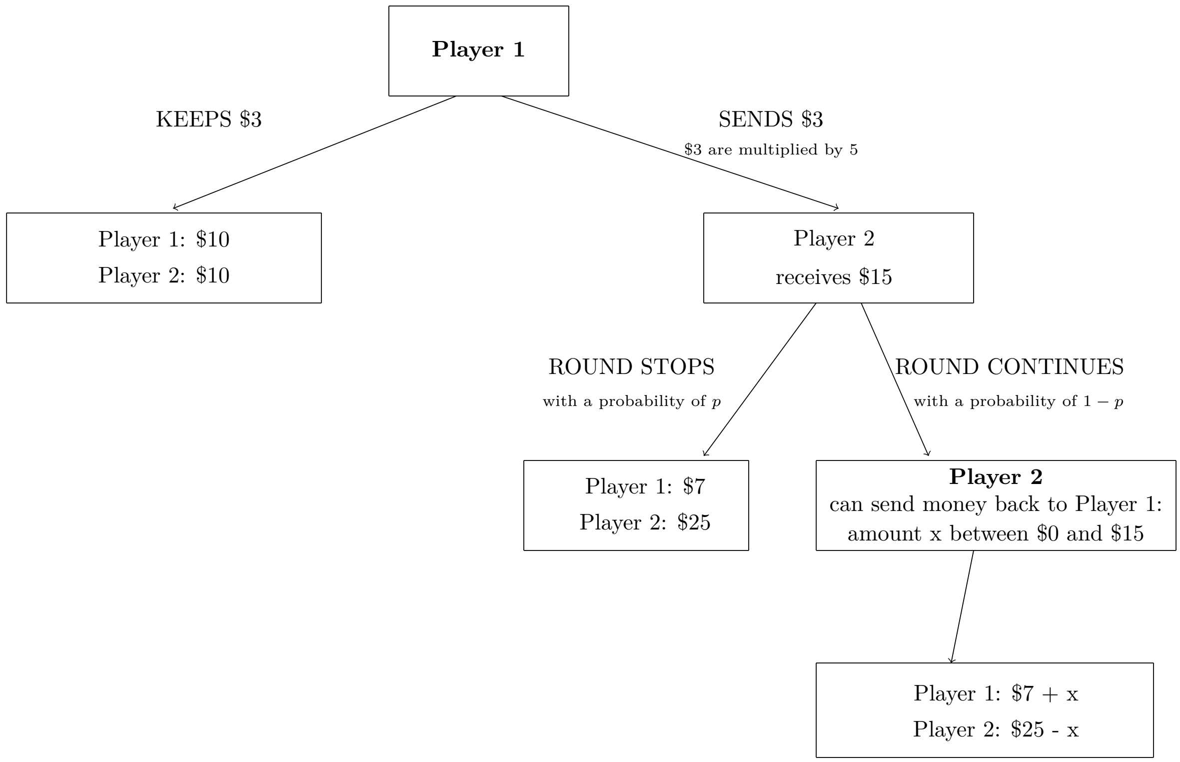
The decision procedure for Player 1 and Player 2 is illustrated by the graph on the following page.

Decision Task Player 1
If you are assigned the role of Player 1, you are asked to choose – in each of the three periods – whether or not to transfer $3 to Player 2.

Decision Task Player 2
If you are assigned the role of Player 2, you do not know what decision Player 1 is about to make nor what the outcome of the random draw will be. You are therefore asked to decide on how much money you would like to back-transfer to Player 2 assuming Player 1 transferred the $3 to you and the game was not stopped by the random draw. In each of the three periods, you can choose any amount between $0 and $15.

Information Disclosure
At the end of the experiment, one of the periods will be chosen randomly to calculate the cash payments. For this particular period, both players learn whether Player 1 made the transfer of $3. If he did, it is determined whether the round stops according to the stopping probability p of the chosen period. If the round is not stopped, both players also learn Player 2's decision about his back-transfer.

Decision Stages Player 1 and Player 2



The Observer

In each period, the Observer is asked to guess how much money the participants in the role of Player 2 send on average back to Player 1 assuming that Player 1 transferred the $3 and the random draw allows Player 2 to send money back (the round is not stopped).

Earnings

At the end of the experiment, only one of the periods will be chosen randomly to calculate the cash payments. The exact payments are determined according to the choices that were made and the stopping probability.

Earnings – Player 1 and Player 2
The table below summarizes the payoffs for Player 1 and Player 2 depending on their respective choices.

Choice Player 1	Random Draw	Choice Player 2	Payoff Player 1	Payoff Player 2
no transfer	-	-	$10	$10
transfer	game continues	back-transfer $x	$7 + $x	$25 - $x
	game stops	-	$7	$25

Earnings – Observer
The Observer earns money depending on the accuracy of his guess. His payment depends on how much his guess differs from the (rounded) average of all Player 2s' actual choices on the back-transfer in the randomly selected period. The payoffs are summarized in the table below.

Deviation from the average stated back-transfers	Observer's Payoff
$0	$15
$1	$14.5
$2	$13
$3	$10.5
$4	$7
$5	$2.5
>$5	$0

B Screenshots Experiment

Introduction

Thank you for participating in this experiment. The purpose of this experiment is to study how people make decisions. In case you should have questions at any time, please raise your hand. Please do not speak to other participants during the experiment and please turn off your mobile phone now. We also ask you not to reveal any details about the experiment after you have participated.

Your payment depends on the decisions you make in the experiment. It is therefore important that you pay attention to the instructions and make your choices thoughtfully. At the end of the experiment, you can collect your payment in cash privately in a sealed envelope from the Economics and Finance front office.

Please enter your 5-digit participant number here: 11111

Continue

Introduction

Thank you for participating in this experiment. The purpose of this experiment is to study how people make decisions. In case you should have questions at any time, please raise your hand. Please do not speak to other participants during the experiment and please turn off your mobile phone now. We also ask you not to reveal any details about the experiment after you have participated.

Your payment depends on the decisions you make in the experiment. It is therefore important that you pay attention to the instructions and make your choices thoughtfully. At the end of the experiment, you can collect your payment in cash privately in a sealed envelope from the Economics and Finance front office.

Please enter your 5-digit participant number here: 22222

Continue

Start of the experiment

You have been randomly assigned the role of **Player 2 .**

Did you read the instructions and do you understand what your role requires you to do?

Yes

No

Continue

Start of the experiment

You have been randomly assigned the role of **Player 1 .**

Did you read the instructions and do you understand what your role requires you to do?

Yes

No

Continue

Practice Questions

1. Suppose the stopping probability was 30%. So in 70 out of 100 times, the game continues if Player 1 decides to transfer the $3 to Player 2. Suppose further that all Player 1s indeed chose to make this transfer and the average back-transfer by Player 2 was $X. Which of the following statements is correct?

- (selected) In addition to their remaining $7, all Player 1s earn on average 0.7*$X.
- In addition to their remaining $7, all Player 1s earn on average $X.
- In addition to their remaining $7, all Player 1s earn on average $0.

2. Suppose now that the stopping probability was 50%. So in around 50 out of 100 times, the game continues if Player 1 decides to transfer the $3 to Player 2. Suppose further that all Player 1s again chose to make this transfer and the average back-transfer by Player 2 was $X. Which of the following statements are correct?

- (selected) All Player 1s earn on average less than if the stopping probability was 30%.
- All Player 1s earn on average more than if the stopping probability was 30%.
- All Player 1s earn on average more than if the stopping probability was 10%.

Next

Practice Questions

1. Suppose the stopping probability was 30%. So in 70 out of 100 times, the game continues if Player 1 decides to transfer the $3 to Player 2. Suppose further that all Player 1s indeed chose to make this transfer and the average back-transfer by Player 2 was $X. Which of the following statements is correct?

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- (selected) All Player 1s earn on average less than if the stopping probability was 30%.
- All Player 1s earn on average more than if the stopping probability was 30%.
- All Player 1s earn on average more than if the stopping probability was 10%.

Next

Decision Player 2

In this period, the probability that the game stops after Player 1 made the transfer is **30%**. This means that Player 1 receives your back-transfer in 70% of the time and in 30% he earns his remaining $7.

Assume Player 1 transferred you the $3 and the game has not stopped so that you can send money back to Player 1.

How many of the received $15 would you want to send back to Player 1? Please enter a number between 0 and 15:

$ 5

Continue

Decision Player 1

You can now decide if you want to send $3 to Player 2.
If you do so your transfer gets multiplied by 5 before reaching Player 2.

In this period, the probability that the game stops after you made the transfer (and Player 2 cannot return any money) is **30%**.

What do you want to do?

send $3

keep $3

Continue

Decision Player 2

In this period, the probability that the game stops after Player 1 made the transfer is **50%**. This means that Player 1 receives your back-transfer in 50% of the time and in 50% he earns his remaining $7.

Assume Player 1 transferred you the $3 and the game has not stopped so that you can send money back to Player 1.

How many of the received $15 would you want to send back to Player 1? Please enter a number between 0 and 15:

$ 5

Continue

Decision Player 1

You can now decide if you want to send $3 to Player 2.
If you do so your transfer gets multiplied by 5 before reaching Player 2.

In this period, the probability that the game stops after you made the transfer (and Player 2 cannot return any money) is **50%**.

What do you want to do?

send $3

keep $3

Continue

Decision Player 2

In this period, the probability that the game stops after Player 1 made the transfer is **10%**. This means that Player 1 receives your back-transfer in 90% of the time and in 10% he earns his remaining $7.

Assume Player 1 transferred you the $3 and the game has not stopped so that you can send money back to Player 1.

How many of the received $15 would you want to send back to Player 1? Please enter a number between 0 and 15:

$ 9

Continue

Decision Player 1

You can now decide if you want to send $3 to Player 2.
If you do so your transfer gets multiplied by 5 before reaching Player 2.

In this period, the probability that the game stops after you made the transfer (and Player 2 cannot return any money) is **10%**.

What do you want to do?

send $3

keep $3

Continue

Final Payoff

The random draw determined period **1** for payments. The associated probability that the game stopped was **30%**. In this period, the following choices and random draws were made:

Decision Player 1	Round Stopped	Your Back-Transfer
send	NO	2

Your resulting final payoff is $23.

Continue

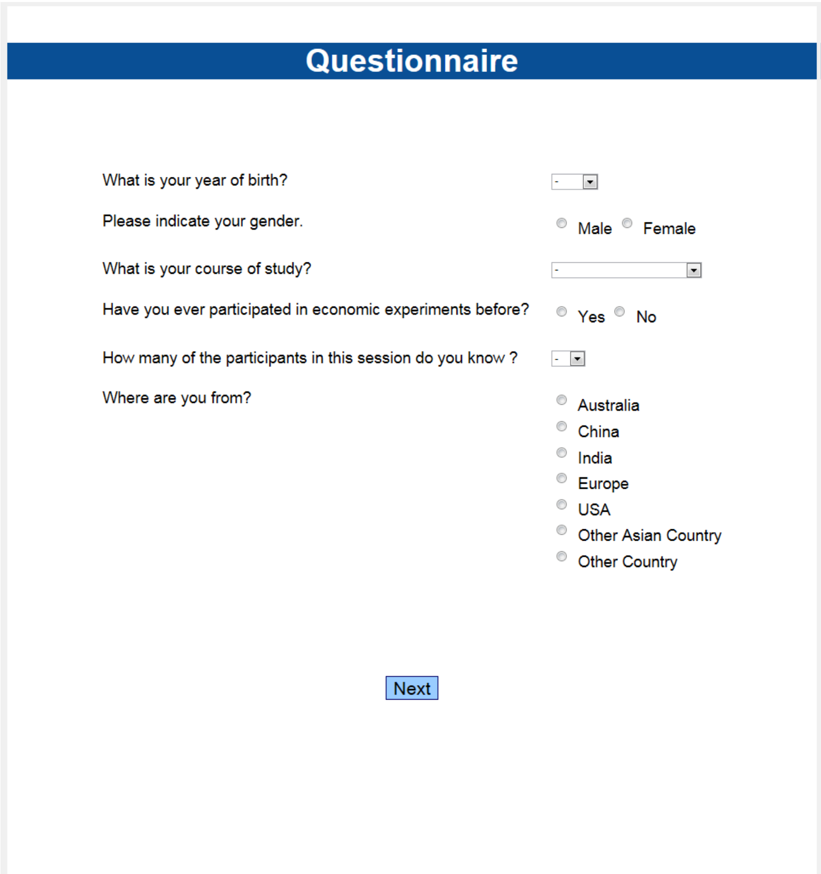
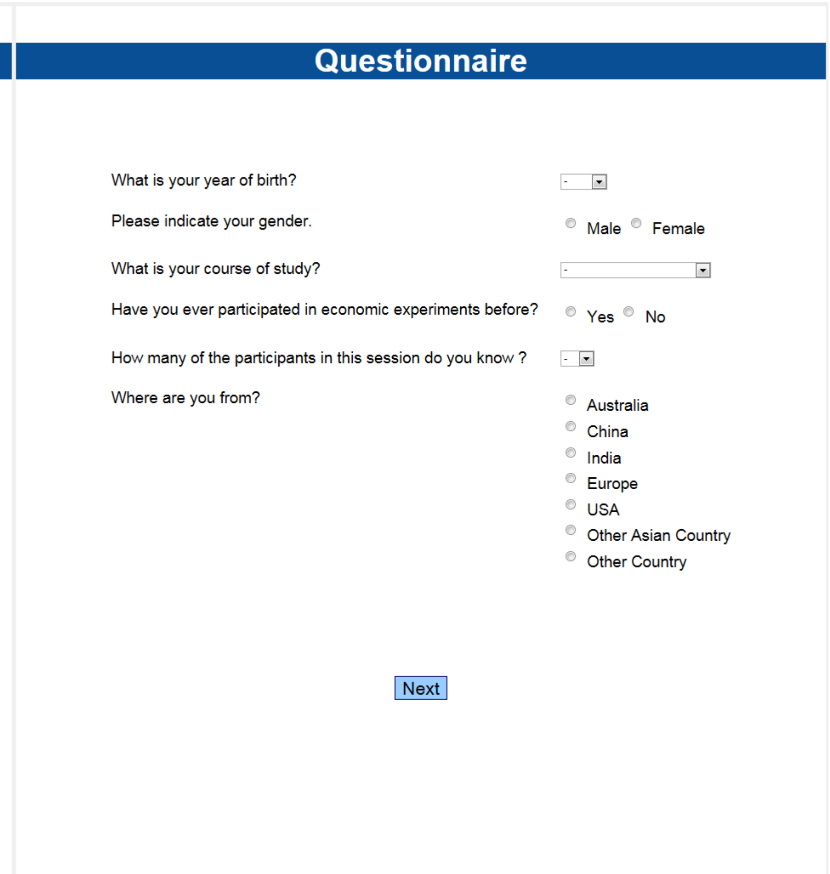
Final Payoff

The random draw determined period **2** for payments. The associated probability that the game stopped was **50%**. In this period, the following choices and random draws were made:

Your Choice	Round Stopped	Back-Transfer Player 2
send	NO	2

Your resulting final payoff is $9.

Continue


Questionnaire
What is your year of birth?
Please indicate your gender.
Male
Female
What is your course of study?
Have you ever participated in economic experiments before?
Yes
No
How many of the participants in this session do you know ?
Where are you from?
Australia
China
India
Europe
USA
Other Asian Country
Other Country
Next

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No
How many of the participants in this session do you know ?
Where are you from?
Australia
China
India
Europe
USA
Other Asian Country
Other Country
Next

Questionnaire

Did you follow a specific strategy during the game?

Do you have any comments, ideas or improvement suggestions?

Next

Questionnaire

Did you follow a specific strategy during the game?

Do you have any comments, ideas or improvement suggestions?

Next

FINISHED

The experiment is finished now, please wait for instructions to collect your payment.

FINISHED

The experiment is finished now, please wait for instructions to collect your payment.

Guess Player 3

For this decision round the probability that the game stops after Player 1 made the transfer is 10%.

Assume Player 1 transferred Player 2 the $3 and the game has not stopped. Differently stated: Player 2 can send an amount between $0 and $15 back to Player 1.

How much money do you think the participants in the role of Player 2 send on average back to Player 1?

$ ______

Continue

Guess Player 3

For this decision round the probability that the game stops after Player 1 made the transfer is 30%.

Assume Player 1 transferred Player 2 the $3 and the game has not stopped. Differently stated: Player 2 can send an amount between $0 and $15 back to Player 1.

How much money do you think the participants in the role of Player 2 send on average back to Player 1?

$ [ ]

Continue

Guess Player 3

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$

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Yola Engler, Rudolf Kerschbamer, Lionel Page

Guilt-averse or reciprocal? Looking at behavioural motivations in the trust game

Abstract
For the trust game, recent models of belief-dependent motivations make opposite predictions regarding the correlation between back-transfers and second- order beliefs of the trustor: While reciprocity models predict a negative correlation, guilt-aversion models predict a positive one. This paper tests the hypothesis that the inconclusive results in previous studies investigating the reaction of trustees to their beliefs are due to the fact that reciprocity and guilt-aversion are behaviorally relevant for different subgroups and that their impact cancels out in the aggregate. We find little evidence in support of this hypothesis and conclude that type heterogeneity is unlikely to explain previous results.

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