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

Yola Engler* Rudolf Kerschbamer† Lionel Page*

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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

*Engler and Page: School of Economics and Finance, Queensland University of Technology and QuBE (Email: yola.engler@qut.edu.au and lionel.page@qut.edu.au).

†Kerschbamer: Department of Economics, University Innsbruck (Email: rudolf.kerschbamer@uibk.ac.at)

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 theory of sequential reciprocity as introduced by Dufwenberg and Kirchsteiger (2004) and extended by Sebald (2010), a generous transfer by the first mover (FM, he) is interpreted by the second mover (SM, she) as less kind if the FM is believed to expect a high back-transfer in return. These models therefore predict that the pro-sociality of the SM *decreases* in her belief about the payoff expectation of the FM. 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 SM *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, others (as, for instance, 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 SMs. Some SMs may be mainly motivated by reciprocity, some others by guilt aversion and a third group of SMs 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 SMs in the trust game and we use it to classify experimental SMs 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, while we find some evidence that (at least directionally) supports our hypothesis of the coexistence of guilt-averse and reciprocal players, we do not find very clear evidence in support of our hypothesis that the no-correlation result in the aggregate data is caused by the heterogeneity in reactions. Overall, it seems that the behavior of SMs in the trust game is either not primarily driven by beliefs on the payoff expectations of the FM 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 SMs in an experimental binary investment game. The structure of the game is as illustrated in Figure 1:[1] There are two players, a FM and a SM. 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. Stopping occurs with probability $1 - p$ and 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. In the alternative state, occuring with probability p, the game continues and the SM can then decide on the integer amount x between 0 and 15 she wants to send back to the FM. The game then ends with the material payoffs as shown in the game tree. 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

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

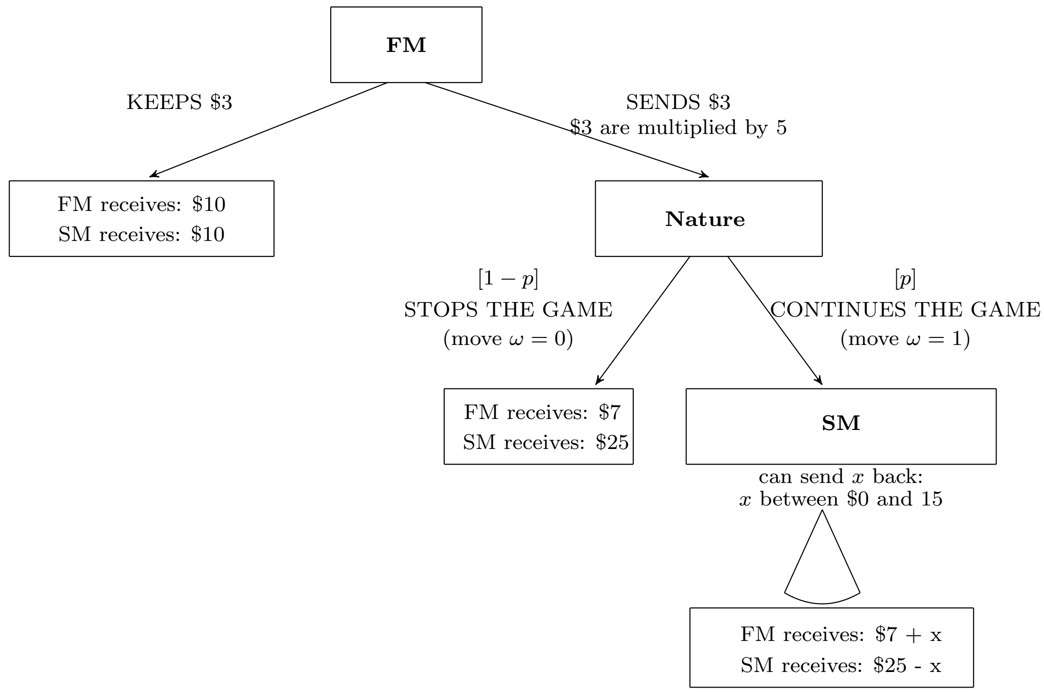

Figure 1: Structure of the modified trust game.

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, while keeping everything else constant. Specifically, the variable p takes on the values 50, 70 and 90 percent across our three treatments. Because we are interested in individual response patterns, every subject has to make a choice in each of the three treatments. For the FM this means that he has to make three binary decisions, one for each treatment. For the SM 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.

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). It is based on the following consideration: 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. To verify that our treatment variation indeed influences beliefs in the predicted direction, we have a third player role in our experiment – that 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. We elicit the beliefs of impartial observers to avoid the well-known problems associated with eliciting beliefs from agents that also have to make a decision.[2]

2.2 Experimental Procedure

The experiment was programmed and conducted with the experimental software CORAL (Schaffner, 2013). We recruited 180 students from a large university in Australia via the ORSEE software (Greiner, 2015) to our 15 experimental sessions. At the beginning of a session, each participant was randomly assigned the role of either a FM, a SM or an Observer and participants kept the role during the entire session.[3] In each session participants where exposed successively to the three treatments. The beliefs of subjects in the role of the Observer were incentivized using the quadratic scoring rule. Subjects did not receive 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.[4] Each session lasted approximately 45 minutes. No participation fee was paid and the average earnings were \$14.30.

[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.

[3]After session 10, we disposed the role of the Observer because we attained enough data to test whether our belief manipulation worked.

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

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. Selfish SMs are assumed to be interested only in their own material payoff. Thus, their back-transfer is predicted to be zero in each of the treatments. Altruists are assumed to care positively for the material payoff of the FM – independently of their second-order beliefs. Thus, they are predicted to send money back if the weight on the material payoff of the FM in their utility function is large enough. The behavior of the other two types is predicted to be affected by our treatment variation.

Our prediction for guilt-averse agents builds on the theory of 'simple guilt' – as introduced by Charness and Dufwenberg (2006) and generalized and extended by Battigalli and Dufwenberg (2007). In this theory players experience a utility loss if they believe that they let others' payoff expectations down. To see the implications of this theory for the current setting, consider the treatment with continuation probability p and denote the SM's choice at her unique information set in that game by $x(p)$. Let $b^1(p)$ denote the FM's (initial) belief on $x(p)$ and let $b^2(p)$ denote the SM's estimate of $b^1(p)$ conditional on the FM having decided to send the \$3 to the SM and on Nature having chosen to continue the game. Using this notation we derive in Appendix A the prediction that at her unique information set, a guilt averse SM decides according to the utility function:

$$U_G(x(p), b^2(p), p) = 25 - x(p) - \theta_G[pb^2(p) - x(p)]^+, \tag{1}$$

where θ_G is a strictly positive guilt-sensitivity parameter that 'measures' the extent to which the SM is averse against letting the FM's payoff expectations down, and where $[y]^+$ is y for $y > 0$ and zero otherwise. It is important to note that with this functional form the SM's inclination to send money back increases in her expectation about the payoff expectation of the FM (that is, in $pb^2(p)$).

Reciprocal players are assumed to decide in accordance with the theory of sequential reciprocity as modeled by Dufwenberg & Kirchsteiger (2004) and extended – by allowing for chance moves – by Sebald (2010). In Appendix A we show that this theory implies that, at her unique information set, the SM is motivated by the utility function:

$$U_R(x(p), b^2(p), p) = 25 - x(p) + \theta_R[x(p) - 7.5][7.5 - pb^2(p)/2], \tag{2}$$

where θ_R is a strictly positive reciprocity parameter that 'measures' how strongly the SM is willing to react to a generous move by the FM by being generous herself. As is easily seen, with this functional form the SM's inclination to send money back decreases in her expectation about the payoff expectation of the FM (that is, in $pb^2(p)$).

Based on (1) and (2) and on our core assumption that $pb^2(p)$ is an increasing function of p, we now define our four behavioral types.[5] 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:

$$x_i(p) = c_i + m_i p \tag{3}$$

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

[5] In Appendix A we show that the assumption that $pb^2(p)$ is an increasing function of p is necessarily satisfied in any equilibrium of a model featuring S, A, G and R agents in known proportions. Below we verify that this assumption is also in line with the data collected from FMs, SMs and Observers in our experiment.

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. Observers were asked for a guess of the average $x(p)$, which is a back-transfer conditional on the FM having transferred the \$3 and Nature having decided to continue 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 elicited joint conditional belief of the Observers by the continuation probability p. The resulting number, $pb_o^1(p)$, estimated from the average of Observers' guesses, $b_o^1(p)$, is significantly increasing in p: $0.5b_o^1(0.5) = 1.86 < 0.7b_o^1(0.7) = 2.78 < 0.9b_o^1(0.9) = 3.67$ (Wilcoxon signed-rank test, p-values < 0.01). Assuming that Observers' beliefs are a good approximation of FMs' first-order beliefs, $b^1(p)$, and SMs' second-order beliefs, $b^2(p)$, we interpret this result as evidence indicating that our belief manipulation did what it was supposed to do.

4.2 The First Mover

Turning to the data obtained from experimental FMs, the left panel of Figure 2 shows the fraction of FMs making the transfer for each of the three continuation probabilities. While only about 50% of FMs decide for the transfer in the $p = 0.5$ version of the game, 74% of FMs do so in the $p = 0.7$ version of the game, and 80% of FMs do so in the $p = 0.9$ version of the game. This is further evidence 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 2, making the transfer pays off, on average, only when the continuation probability is 90%. This is due to the fact that for lower continuation probabilities (50% and 70%), even though the SM sends back, on average, more than \$3, the game does not continue often enough for the initial transfer to pay off on average.

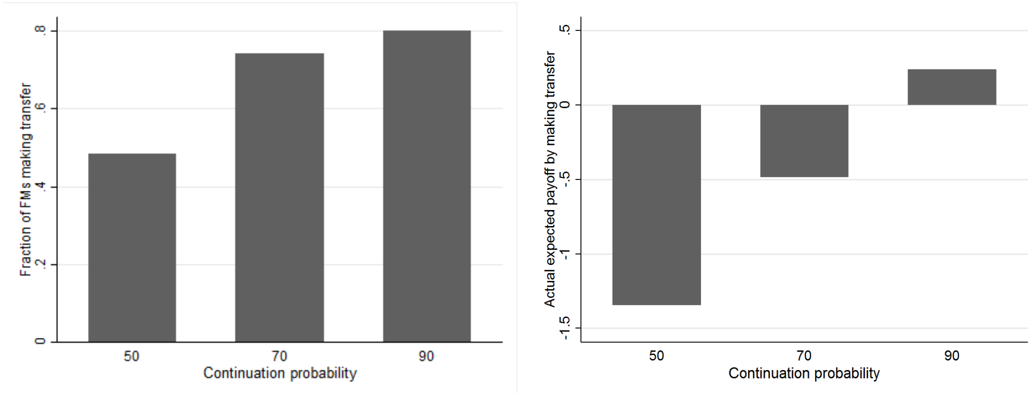

Figure 2: Left panel: Fraction of FMs making the transfer for each of the three continuation probabilities. Right panel: FMs' average payoff conditional on making the transfer for each of the three continuation probabilities.

4.3 The Second Mover

We now turn to our main data source, the data obtained from experimental SMs. First we look at the average back-transfer. It is rather similar across treatments. Specifically, it is \$3.3 for $p = 0.50$, \$3.6 for $p = 0.70$, and \$3.6 for $p = 0.90$. The corresponding proportions of funds returned are between 22% and 24% of the maximal amount, which is below the average observed in trust games (Johnson and Mislin 2011 report an average of 37% of funds returned). Statistical tests confirm that average back-transfers are not significantly different across treatments. The corresponding 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. The Kolmogorov-Smirnov test yields combined p-values of 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.[6] To simplify the

[6] A look at the distribution of contributions conditional on each continuation probability shows

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.[7] 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:

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

In this likelihood, the three m_t are restricted to correspond to each type of behaviour: $m_A = 0$, $m_G > 0$ 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:[8]

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

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. The estimated proportions of reciprocal and altruistic types are very close, 27% and 29%, respectively (p-value: 0.9359 for H_0: $\pi_A = \pi_R$). In comparison, the proportion of guilt averse types is with 46% fairly large and the difference to the other two proportions is near or within marginal significance (p-values: 0.1100 for H_0: $\pi_A = \pi_G$, 0.0815 for H_0: $\pi_G = \pi_R$). Yet, looking at the estimation results reveals very flat slopes for both, reciprocal ($m_R = -0.024$) and guilt-averse types ($m_G = 0.007$). Figure 3 graphically illustrates these findings. 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

that it is not unimodal – which supports the use of a mixture model. We thank one of the reviewers for recommending to look for such a pattern in the data.

[7] 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.

[8] While we allow several types, we assume an equal variance across types which is similar to assuming that the distribution of 'decision errors' is similar across types. Mixture models face convergence difficulties in practice. We therefore decided to limit the number of free parameters to get the model to converge.

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

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1: Maximum likelihood estimates of mixture model.

Given that the size of the effect of the change in the continuation probability is rather small for the different types, we do not interpret our results as providing clear evidence in support of our hypothesis of the coexistence of guilt-averse and reciprocal agents. The absence of clearly significant results with the mixture model may potentially come from a lack of power of this estimation approach. Mixture models' likelihood functions tend to be rather flat. This can lead to imprecise parameters with large SEs. In order to get a better chance of finding clear evidence of individual heterogeneity in the reaction to second-order beliefs, we next try another approach. We estimate two versions of a linear regression model of the back-transfer on the continuation probability. Our "random-intercept" model allows only the intercept to vary between participants and reads

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

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 "random-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

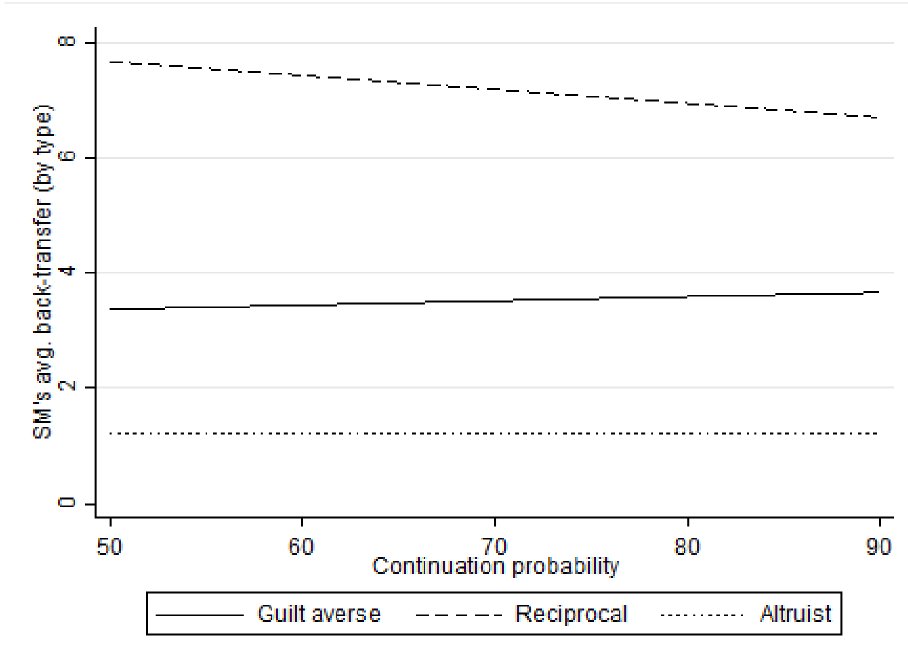

Figure 3: Plot of the estimated type-functions based on the estimates of the mixture model.

confirm the results obtained from the mixture model: The constant c is positive and 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 back-transfer 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.

A possible explanation for our null result is that our experimental treatment variation did not do what it was supposed to do – namely to manipulate the second-order beliefs of experimental SMs. However, independently of whether we look at the behavior of FMs, SMs or Observers, we observe qualitative patterns in the data that strongly suggest that a higher continuation probability is indeed associated with higher payoff expectations of the FM and therefore arguably also with higher second-order expectations of the SM. – as predicted by the theory. We therefore conclude that 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 SM in the trust game react to their beliefs about the payoff expectation of the FM. Further work is needed in this area to understand the role played by higher order beliefs for behavior.

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A Theoretical predictions

We are interested in how the back-transfer of the SM changes in the continuation probability *p*. Within a given treatment characterized by *p* there is a single information set where the SM is called upon to make a move – the information set that is reached when (i) the FM has decided to send the amount of \$3 to the SM and (ii) nature has decided to continue the game. Consider the treatment with continuation probability *p* and denote the SM's choice at her unique information set in that game by $x(p)$. By design $x(p) \in [0, 15]$ for all values of *p*. Let $b^1(p)$ denote the FM's (initial) belief on $x(p)$ and let $b^2(p)$ denote the SM's estimate of $b^1(p)$ conditional on the FM having decided to send the \$3 to the SM and on nature having chosen to continue the game.[1]

Sequential Reciprocity

We start by assuming that the SM has reciprocity concerns as modeled by Dufwenberg and Kirchsteiger (2004) and extended – by allowing for chance moves – by Sebald (2010). In line with the sequential reciprocity model presented in those papers we assume that at her unique information set the SM decides according to the utility function

(A1) $\mathrm{U}_{\mathrm{SM}}(x(p), b^2(p), p) = \pi_{\mathrm{SM}}(x(p)) + Y_{SM}\, \kappa_{\mathrm{SM}}(x(p))\, \lambda_{\mathrm{SM}}(b^2(p), p)$,

where the first term on the RHS, $\pi_{\mathrm{SM}}(.)$, is the SM's material payoff and the second term, $Y_{SM}\, \kappa_{\mathrm{SM}}(.)\, \lambda_{\mathrm{SM}}(.)$, is her expected psychological payoff. Since the SM has the last move in the game, her material payoff depends only on her own behavior. Specifically, we have $\pi_{\mathrm{SM}}(x(p)) = 25 - x(p)$. The SM's psychological payoff is the result of the multiplication of three terms, the strictly positive reciprocity parameter, Y_{SM}, which 'measures' the SM's sensitivity to the (un)kindness of the FM, the SM's perception of the kindness of the own behavior, $\kappa_{\mathrm{SM}}(x(p))$, and the SM's perception of the kindness of the sending behavior of the FM, $\lambda_{\mathrm{SM}}(b^2(p), p)$.[2] In the sequential reciprocity theory by Dufwenberg and Kirchsteiger (2004) and its extension by Sebald (2010) the SM's perception of the own kindness (as assessed at her unique information set) is defined as the material payoff the SM intends to give to the FM by her transfer minus a reference payoff (the 'equitable payoff'), which is the average between the maximum and the minimum material payoff the SM could give to the FM by varying her back-transfer. Specifically, $\kappa_{\mathrm{SM}}(x(p)) = \pi_{\mathrm{FM}}(x(p)) - \pi^{e}_{\mathrm{FM}}$, where $\pi_{\mathrm{FM}}(x(p)) = 7 + x(p)$ is the payoff the SM gives to the FM and where $\pi^{e}_{\mathrm{FM}} = (7 + 22)/2 = 14.5$ is the SM's perception of the equitable payoff for the FM. Thus, $\kappa_{\mathrm{SM}}(x(p)) = x(p) - 7.5$, implying that the SM perceives herself as unkind if she gives less than 7.5 and kind if she gives more and that her "kindness increases in the size of the gift". Turning to the last term in the psychological payoff, the SM's perception of the kindness of the sending decision of the FM, $\lambda_{\mathrm{SM}}(b^2(p), p)$, it is defined similarly. Specifically, $\lambda_{\mathrm{SM}}(b^2(p), p) = \pi_{\mathrm{SM}}(b^2(p)) - \pi^{e}_{\mathrm{SM}}$, where $\pi_{\mathrm{SM}}(b^2(p)) = 25 - pb^2(p)$ is the payoff the SM expects that the FM intends to give to her (by sending the \$3) and $\pi^{e}_{\mathrm{SM}} = [10 + 25 -$

[1] Our focus throughout is on pure strategies and point beliefs. In the experiment the SM can choose only integer amounts between 0 and 15. Here, in the theory part, we allow her to choose from the interval [0, 15] to keep the exposition simple. As is easily seen, our main points do not depend on this simplification.

[2] The mathematical functions in the theory papers by Dufwenberg and Kirchsteiger (2004) and Sebald (2010) are slightly more complex but lead to a utility with the same best response correspondence. Also, the theory papers allow for $Y=0$ which represents the special case of selfish preferences. Since our aim is to compare the behavioral consequences of the theories of sequential reciprocity and simple guilt it does not make any sense to allow for selfish preferences in any of the models.

$pb^2(p)$]/2 is the average between the minimum and the maximum the SM believes the FM believes he can assign to the SM (the minimum is reached when the FM decides to keep the \$3 and the maximum is reached when the FM decides to send the \$3; only in the latter case does the payoff depend on the SM's second order belief). Thus, $\lambda_{SM}(b^2(p), p) = 7.5 - pb^2(p)/2$. Here it is important to note that the SM's perception of the kindness of the sending move by the FM depends on the continuation probability p: For a given second-order belief of the SM, the sending move by the FM is perceived as kinder if the continuation probability is lower.[3] Combining all the elements yields the function

(A2) $\quad U_{SM}(x(p), b^2(p), p) = \pi_{SM}(x(p)) + Y_{SM}\, \kappa_{SM}(x(p))\, \lambda_{SM}(b^2(p), p)$
$\quad = 25 - x(p) + Y_{SM}\, [x(p) - 7.5][7.5 - pb^2(p)/2]$.

Guilt Aversion

Consider now the alternative scenario where the SM is motivated by a desire to avoid 'simple guilt' as introduced by Charness and Dufwenberg (2006) and generalized and extended by Battigalli and Dufwenberg (2007). In the theory of simple guilt players experience a utility loss if they believe that they let others' payoff expectations down. Using the same notation as before we assume – in line with the mentioned papers – that at her unique information set the SM decides according to the utility function

(A3) $\quad U_{SM}(x(p), b^2(p), p) = \pi_{SM}(x(p)) - \theta_{SM} D_{FM}(x(p), b^2(p), p)$,

where the first term on the RHS, $\pi_{SM}(.)$, is again the SM's material payoff and the second term, $\theta_{SM} D_{FM}(.)$, is her expected psychological payoff which now results from guilt from letting the FM's payoff expectations down. The SM's material payoff is again $\pi_{SM}(x(p)) = 25 - x(p)$. The SM's psychological payoff is now the result of the multiplication of two terms, the strictly positive guilt-sensitivity parameter θ_{SM}, which 'measures' the SM's sensitivity to letting the FM's payoff expectations down, and the expression $D_{FM}(.)$, which measures the damage done to the FM by the other players (the SM and nature). This latter term is defined as $D_{FM}(x(p), b^2(p), p) = \max\,\{0, E[\pi_{FM} \mid b^2(p), p]\} - \pi_{FM}(x(p))\}$, where $E[\pi_{FM} \mid b^2(p), p]$ is the SM's belief regarding the FM's payoff expectation (conditional on sending the \$3) for a given p and $\pi_{FM}(x(p))$ is the FM's actual payoff given the SM's actual back-transfer. Now, $E[\pi_{FM} \mid b^2(p), p] = 7 + pb^2(p)$ and $\pi_{FM}(x(p)) = 7 + x(p)$. Thus, $D_{FM}(x(p), b^2(p), p) = \max\,\{0, pb^2(p) - x(p)\}$, implying that (3) becomes

(A4) $\quad U_{SM}(x(p), b^2(p), p) = \pi_{SM}(x(p)) - \theta_{SM} D_{FM}(x(p), b^2(p), p) =$
$\quad = 25 - x(p) - \theta_{SM}[pb^2(p) - x(p)]^+$,

where $[x]^+$ is x for x > 0 and 0 otherwise.

[3] Here it is important to note that – in line with the extension by Sebald (2010) of the sequential reciprocity concept by Dufwenberg and Kirchsteiger (2004) – at the SM's unique information set we let her evaluate the kindness of the sending move by the FM on the basis of her belief that the FM believes that nature will continue the game with probability p and not with probability 1. That is, in line with Sebald (2010) the SM does not update her belief about the FM's belief regarding the move by nature.

Predictions:

On the basis of the motivation functions (2A and 4A) we get to the following predictions:

Observation 1 (Common Knowledge that the SM is Motived by Sequential Reciprocity): *Consider two games (as displayed in Figure 1) characterized by their continuation probabilities p_1 and p_2, with $1 > p_2 > p_1 > 0$. Assume that it is common knowledge that the SM behaves in accordance with the sequential reciprocity theory as introduced by Dufwenberg and Kirchsteiger (2004) and extended by Sebald (2010), with known reciprocity parameter Y_{SM}. Further assume that the equilibrium involves $x(p_i) \in (0, 15)$ for at least one p_i. Then $p_2b^2(p_2) > p_1b^2(p_1)$ and $x(p_1) > x(p_2)$.*

Proof: The proof is by contradiction. Consider two continuation probabilities p_1 and p_2, with $p_2 > p_1$ and assume that the back-transfer in the SRE of the game induced by p_2 is weakly larger than the back-transfer in the SRE of the game induced by p_1. As in any SRE beliefs of all orders are correct, it must be the case that $b^2(p_1) = x(p_1)$ and $b^2(p_2) = x(p_2)$. But then $b^2(p_1) \leq b^2(p_2)$ and hence $[7.5 - p_1b^2(p_1)/2] > [7.5 - p_2b^2(p_2)/2]$. As a consequence, the SM perceives the transfer of \$3 by the FM as kinder in the SRE of the game with the smaller continuation probability p_1 than in the SRE of the game with the larger continuation probability p_2. But then the SM cannot return weakly more in the SRE of the game with the larger continuation probability because this is inconsistent with maximizing the function (2) which requires that $x(p)$ increases in the SM's perception of the kindness of the FM. ■

Discussion of Observation 1: Observation 1 tells us that for the special case where it is common knowledge that the SM is motivated by sequential reciprocity a la Dufwenberg and Kirchsteiger (2004) and Sebald (2010), the SM's second-order belief is increasing and her back-transfer is decreasing in the continuation probability. The requirement $x(p_i) \in (0, 15)$ for at least one p_i is needed for the result to exclude 'corner solutions' where the back-transfer is either 0 or 15 for both values of p_i. This happens if either $Y_{SM} \leq 2/15$ (in this case $x(p_1) = x(p_2) = 0$) or $Y_{SM} \geq 2/15(1-p_2)$ (in this case $x(p_1) = x(p_2) = 15$). This can be shown by deriving the conditions for the existence of the two 'corner solutions' and for the existence of an interior equilibrium with $x(p_i) \in (0, 15)$. A necessary and sufficient condition for a corner solution with $x(p_i) = 0$ is that the weight on $x(p)$ in the psychological term in (A2) is weakly smaller than 1 when $b^2(p_i)$ is set to 0. This condition translates to $Y_{SM} \leq 2/15$ for all $p_i \in (0, 1]$. The necessary and sufficient condition for a corner solution with $x(p_i) = 15$ is that the weight on $x(p)$ in the psychological term in (2) is weakly larger than 1 when $b^2(p_i)$ is set to 15. This condition translates to $Y_{SM} \geq 2/15(1-p_i)$ for all $p_i \in (0, 1)$. The necessary and sufficient condition for an interior equilibrium is that the weight on $x(p)$ in the psychological term in (A2) is exactly 1 when $b^2(p_i)$ is set to $x(p)$. This yields the condition $x(p_i) = (15Y_{SM} - 2)/\, p_iY_{SM}$. These considerations together imply that the SRE is unique for any combination of $Y_{SM} > 0$ and $p_i \in (0, 1]$.

Now consider the other extreme where it is common knowledge that the SM is motived by simple guilt. For this special case we immediately get the following result:

Observation 2 (Common Knowledge that the SM is Motived by Guilt Aversion): *Consider the game displayed in Figure 1. Assume that it is common knowledge that the SM* *behaves in accordance with the theory of simple guilt as introduced by Charness and Dufwenberg (2006) and generalized and extended by Battigalli and Dufwenberg (2007). Then equilibrium necessarily involves $x(p) = 0$ for any $p < 1$. Indeed, common knowledge of rationality alone already implies that $x(p) = 0$ for any $p <1$.*

Proof: First note that in game p the term $D_{FM}(x(p), b^2(p), p)$ is equal to zero for $x(p) \geq 15p$ independently of $b^2(p)$. This follows from the fact that a FM who decides to send the \$3 cannot have a payoff expectation large than $7 + 15p$. Thus, in game p any back-transfer larger than $15p$ is dominated for the SM by the back transfer of $15p$ (because the higher back-transfer causes a material cost without yielding any benefit in terms of reduced guilt). If the FM correctly anticipates that in game p any back transfer larger than $15p$ is dominated, then he cannot have a payoff expectation large than $7 + 15p^2$, implying that the expectation of D_{FM} is zero for any $x(p) \geq 15p^2$ independently of $b^2(p)$. Proceeding with the same argument we see that common knowledge of rationality plus aversion against simple guilt together yield the prediction that $x(p) = 0$ for any $p <1$ and any arbitrary θ_{SM}! ■

Discussion of Observation 2: Observation 2 tells us that with 'simple guilt' á la Charness and Dufwenberg (2006) and Battigalli and Dufwenberg (2007) the back-transfer is zero for any arbitrary value of p_i. This is somewhat counterintuitive because one would expect that guilt aversion has some bite in this context and because intuition suggests that the bite should increase in the continuation probability simply because the payoff expectation increases in the continuation probability. Why does guilt aversion exactly nothing in the context under consideration? The problem seems to be that when the SM is actually deciding, she knows that nature has already been 'nice' to the FM. She does therefore not feel guilty for giving him less than what the FM initially expected her to give him (because even with a lower back transfer the payoff expectation of the FM is still met). One could argue that this is against the spirit of guilt aversion as introduced by Charness and Dufwenberg (2006) and generalized and extended by Battigalli and Dufwenberg (2007), and that the SM should feel guilty if she sends back less than what the FM expected her to send back. However, our aim here is not to develop an alternative theory of guilt aversion.

Discussion of Observations 1 and 2: Observations 1 and 2 consider two extreme cases, in one of them it is common knowledge that the SM is motivated by reciprocity concerns, in the other it is common knowledge that she is motivated by simple guilt. None of these scenarios is in line with the core assumption of the present paper, which is the assumption that SMs are heterogeneous in their reactions to second-order beliefs: Some SM are assumed to have preferences in line with equation (A2), others are assumed to have preferences in line with equation (A4), still others are assumed to be selfish ($x(p) = 0$ for all p) or altruistic ($x(p) = k > 0$ for all p). Let us now consider such a framework.

Heterogeneous Preferences: To keep the analysis simple suppose that it is common knowledge that there are exactly four types of SMs in the population, selfish (S) SMs who never send money back ($x_S(p) = 0$ for all p), altruistic (A) SMs who send a fixed amount k for any p ($x_A(p) = k$ for all p), guilt averse (G) SMs who behave according to the utility function (4A) with known $\theta_{SM} > 1$, and reciprocal (R) SMs who behave according to the utility function (2A) with known $Y_{SM} > 2/15$. Further suppose that the four types of agents have

B 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 <u>to transfer</u> $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 <u>not to transfer</u> 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.

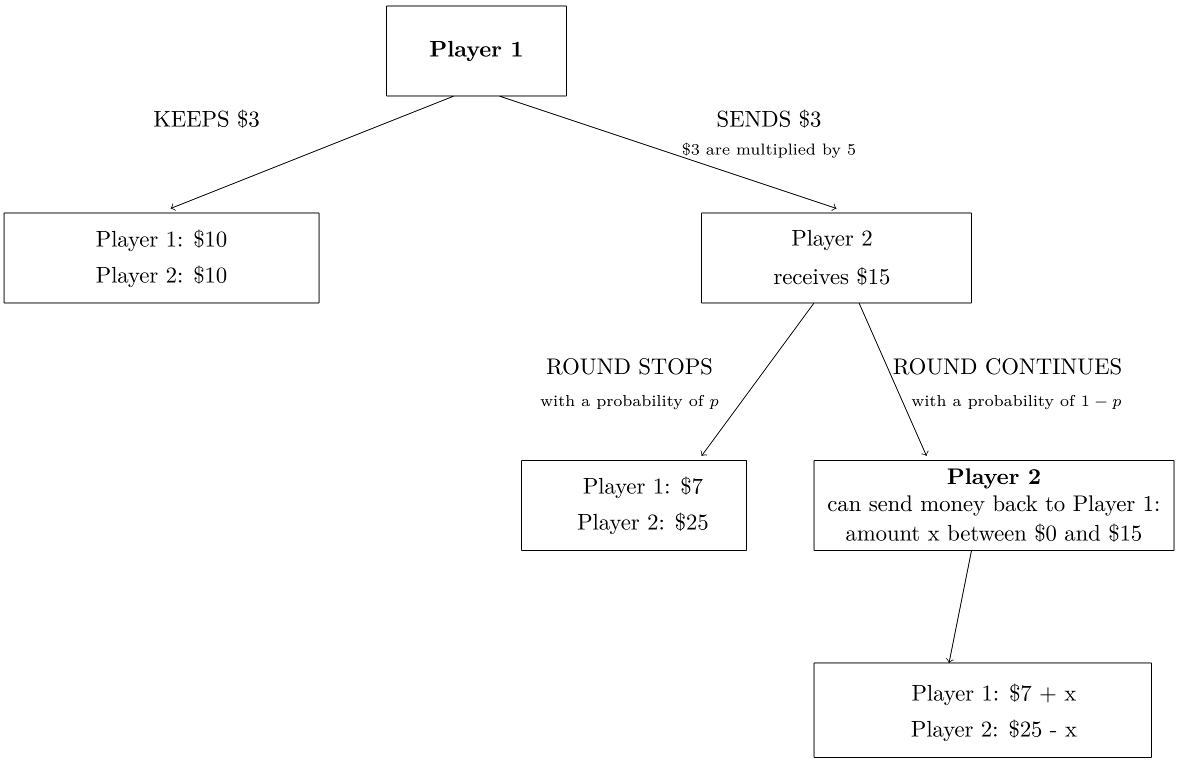
The decision procedure for Player 1 and Player 2 is illustrated by the graph on the following page.

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

C 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?

- (•) 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?

- (•) 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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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?

- (•) 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

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 ?	-
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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

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$

Continue