Trust and risk revisited

Kim Fairley and Alan Sanfey and Jana Vyrastekova and Utz Weitzel

Radboud University Nijmegen, Department of Economics, Nijmegen, the Netherlands, Donders Institute for Brain, Cognition and Behavior, Radboud University Nijmegen, Nijmegen, The Netherlands, Department of Psychology, University of Arizona, Tuscon, USA, Utrecht School of Economics, Utrecht University, Utrecht, The Netherlands

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Kim Fairley[a,b,*], Alan Sanfey[b,c], Jana Vyrastekova[a] and Utz Weitzel[a,d]

[a]: Radboud University Nijmegen, Institute for Management Research, Department of Economics, Nijmegen, The Netherlands;
[b]: Donders Institute for Brain, Cognition and Behavior, Radboud University Nijmegen, Nijmegen, The Netherlands;
[c]: Department of Psychology, University of Arizona, Tuscon, USA;
[d]: Utrecht School of Economics, Utrecht University, Utrecht, The Netherlands.

Abstract

A trustor faces a risky choice in the trust game when he acts upon his belief regarding the chances of betrayal by the trustee. Despite intensive research there is no clear evidence for a link between lottery risk preferences and risk involved in trusting others. We argue that this is due to crucial differences between the risk measurements in the two settings. Trusting is giving up control to a human while lottery risk arises from a mechanistic randomization device. We propose a risky trust game that experimentally measures risk in the same context as the standard trust game, but nevertheless reduces the trust decision to objective risk. Our results show that transfers in the trust game can indeed be explained by individual risk attitudes elicited with the risky trust game, while lottery risk preferences have no explanatory power.

Keywords: Trust, trust game, decision making under uncertainty, risk, ambiguity, sources of uncertainty

JEL classification: C7, C9, D8

* Correspondence: K.Fairley@fm.ru.nl, Tel: +31-(0)24-3612718, Fax: +31-(0)24-3612379

1. Introduction

A crucial element of trust is “the willingness to increase one’s vulnerability to another person whose behavior is not under one’s control” (Zand, 1972). Namely, a trustor is always confronted with the possibility that his trust might not be honored. A trust decision, therefore, involves strategic uncertainty: a trustor forms a belief about the risk of betrayal by the trustee and, given this subjective probability, decides to trust or not. Moreover, if a trustor is confident about the probability of betrayal, say 50 per cent, she actually faces a lottery with corresponding outcomes and 50 per cent chance of losing. One could therefore argue that a trustor faces a risky choice in the trust game when he acts upon his belief regarding the chances of betrayal by the trustee (Coleman, 1990).

But do individual risk attitudes indeed explain trust? Many experimental studies have attempted to answer the question above, but could not identify a clear link between trust and trustors’ risk preferences (Eckel and Wilson, 2004; Ashraf et al., 2006; Ben-Ner and Halldorsson, 2010; Houser et al., 2010; and Etang et al., 2011).[1]

We argue that this is due to a mismatch between the measurement of risk and the type of risk a trustor faces in the trust game. The lottery setup, which has been typically used to elicit individual risk attitudes, does not fully capture the risk a trustor faces in the context of the trust game and thereby distorts the measurement of risk attitudes that are relevant in trusting behavior.

The essential difference between lottery risk and the risk taken in a trust game is that the former stems from a mechanistic randomization device while the latter stems from a conscious choice made by another human being. These different sources of risk can affect behavior even if both have the same objective probabilities and outcomes (Abdellaoui et al., 2011). Such different responses towards human and mechanistic sources of risk can have many reasons. Losing money to a randomization device (nature) can be perceived as bad luck, but incurring a loss to another decision-maker might be interpreted as wrong judgment; a signal of failure to assess the social situation properly (Trautmann et al., 2008); or as an exposure to conscious betrayal (referred to as 'betrayal aversion' by Bohnet and Zeckhauser (2004), and corroborated by Aimone and Houser (2012)). Intentionality may be another

[1] Subjects’ risk preferences are measured by a variety of tools, e.g. by questionnaires like Zuckerman’s sensation scale (Eckel and Wilson, 2004), a lottery setup with a menu of pair wise comparisons of two lotteries (Holt and Laury, 2002, Eckel and Wilson, 2004, Houser et al., 2010; Corcos et al., 2012), or by a task involving a choice between a lottery and a sure option, which mirror the distribution of outcomes in the trust games (Eckel and Wilson, 2004; Schechter, 2007; Ben-Ner and Halldorsson 2010), or not (Etang et al., 2011).

reason (Falk and Fischbacher, 2006). Imagine that John wants to drive home and has to choose between two roads. On both there is an equal objective risk of crashing because of a branch that may lie on the road. On one road the branch may have fallen off a tree by accident. On the other road a human may have intentionally broken off the branch. As the sources of risk differ, John may have a clear preference for the first road, although the probabilities and the direct outcomes are identical for both. Thus, a misalignment in the sources of risk might explain why previous studies could not find a link between risk that originates from a lottery and from a situation of trust.

The objective of this study is to identify the role of risk in trust and to suggest a novel measure of risk that is measured in the same context as the standard trust game by Berg et al. (1995). To elicit risk attitudes in the context of trusting, we developed a '*risky trust game*' where risk, as in the standard trust game, stems from a conscious decision of another person. We also measure lottery risk preferences by a standard lottery setup (Holt and Laury, 2002), which has been used by most studies that try to find a relationship between risk and trust (Eckel and Wilson, 2004; Houser et al., 2010; Corcos et al., 2012). We then relate both lottery risk preferences and risk preferences measured in the risky trust game to trustors' invested amount in the trust game.

We hypothesize that individuals' risk preferences stemming from the risky trust game influence trustors' decisions in the trust game, but lottery risk preferences do not. In both cases, the decision-maker faces pure risk, captured by objectively known probabilities of possible states of the world. However, in the lottery setup, the outcomes materialize due to the properties of the lottery mechanism, while the outcomes in the risky trust game were generated by a conscious choice of a human being.

In our risky trust game, the trustor objectively knows the probability that a trustee will honor her trust, and has to make a decision whether to trust or not. The fact that the probability of trustworthiness is objective and correct is guaranteed by implementing a conditional lottery design (Bardsley, 2000). We randomly match the trustor to one out of four trustees who decided individually and independently to honor trust or not. When deciding whether to trust and, if so, with which amount, the trustor knows that either none, one, two, three or all four trustee(s) are trustworthy. We ask the trustor to decide for each of these five possible scenarios which amount she would transfer to a randomly matched trustee. Hence, depending on the scenario, the trustor knows that the probability to be matched with a trustworthy trustee is either 0, 0.25, 0.5, 0.75 or 1.0. At the end of the experiment only one of the five scenarios, determined by the real return decisions made by trustees, is payoff-relevant for the trustor. Like a lottery, this risky trust game replicates a risky bet on a set of outcomes with objective probabilities. The essential difference is that the risk in the risky trust game stems from the decisions of other people and not solely from a mechanistic device. Hence, the decision in the risky trust game captures the effects of a trustor's vulnerability to another person (trustee), who is better off when keeping a trustor's transferred investment for himself.

To analyze a possible link between risk and trust we investigate the relationship between subjects' risk preferences elicited in the risky trust game and trustors' decisions in a *'standard trust game'*, which builds on Berg et al. (1995). In the standard trust game, we also randomly select one trustee from four possible trustees for reasons of implementation comparability. The only difference between the risky and the standard trust game is that, in the latter, the trustor cannot condition an investment level on an objectively known probability distribution of trustworthiness among trustees.

Our experimental results show that risk preferences, measured in the risky trust game, strongly predict transfers in the standard trust game, while lottery risk preferences (Holt and Laury, 2002) do not. These results are robust in bivariate and multivariate settings and also in regressions where both risk measurements are included together. Moreover, we find that risk preferences measured in the risky trust game setting and lottery risk preferences are not correlated with each other, supporting the notion that sources of risk matter (Abdellaoui et al., 2011; L'Haridon et al., 2013). Altogether, these results indicate that individual risk attitudes can predict trusting decisions, but only when elicited in the same context as the decision to trust.

This paper contributes to the continuing discourse on the role of risk in trust decisions, in particular to the following studies that attempted to analyze and elicit risk attitudes in trust-related settings.

Bohnet and Zeckhauser (2004) provide the first attempt of a direct assessment of risk in a trust setting. In their experiments with a binary trust game, they elicit the minimum acceptable probability (MAP) of being matched to a trustworthy trustee for which the trustor would choose to trust. This design ultimately converts the trusting decision into a decision under risk, because the trustor can condition trusting on the (subjective belief of the) trustworthiness of the trustees. The authors show that such a trusting decision is more than betting. Trustors reveal a higher willingness to bet on "trust" when a lottery generates the outcomes than when trustees decide. The authors refer to the costs of losing control to the benefit of trustee as *betrayal aversion*.

Although Bohnet and Zeckhauser (2004) find that decisions differ between trust and risk environments, this is not supported by Kosfeld et al. (2005) and contradicted by Fetchenhauer and Dunning (2012). Houser et al. (2010) argue that the conflicting results can be due to the fact that the analyses are based on aggregate data analyses of distributions between games. By collecting individual-level data on risk attitudes, Houser et al. (2010) control for individual heterogeneity. Their experimental design consists of four variations of the trust game. In two of them, the decision-maker places a bet, and the return is decided by a computer according to a known probability distribution. The return decision either affects only the decision-maker, or it also affects a dummy player. Comparison of these two variants allows addressing the role of social preferences in placing the bet. Their role, however, is found to be negligible. In two other treatments, a trustee makes the return decision. The trustor has either no information about the trustworthiness of the trustee, or he receives social history information about the typical observed behavioral pattern in a trustees' population. Houser et al. (2010) find that subjects' lottery risk preferences, as measured by Holt and Laury (2002), explain behavior in their computerized risk treatments, but not in the interpersonal trust treatments. They state, "this finding does not necessarily imply that risk attitudes are unimportant to trusting decisions, but it does suggest that, to the extent that risk attitudes do modulate trusting decisions, the mechanism remains to be discovered".

Both Bohnet and Zeckhauser (2004) and Houser et al. (2010) attempt to align the measurement of risk preferences with uncertainty in the trust game. Risk is simulated via information about the distribution of trustees' decisions from previous rounds (Bohnet and Zeckhauser, 2004), or other experiments (Houser et al., 2010). Therefore, the information provided to trustors on which basis they can assess trustees' risk profile does not directly relate to the situation at hand and it might fail to induce purely objective risk.

In Bohnet and Zeckhauser (2004) participants' MAP was compared to a predetermined probability, P*, in both their decision problem (lottery) and the trust game. The value of P* in the decision problem was established by the fraction of trustees who chose to reward trust in the trust game in the first two sessions. Participants are not told how this P* is determined, nor what its value is. As P* is unknown it is up to the participants to form a prior. The P* for the trust game, on the other hand, is determined in each session separately by trustees' statements, before they actually decide, whether they would reciprocate if their matched partner would choose trust. This opens the possibility that participants interpreted the P* differently in the lottery and in the trust game. Also, participants remain uncertain whether the P* in the trust game is the correct description of the trustees they interact with. In summary, the design does not fully induce objectively known risk in the trust decision.

In Houser et al. (2010), the probability distribution of reciprocity in both trust treatments is similar to the social history information from Berg et al. (1995). Participants knew that this information describes trustee's choices in the past, and that it does not guarantee that it precisely reflects the decisions of trustees in the current session. The social history provided to participants might not correspond to the actual probability distribution of trustworthiness in a given session, and subjects might be aware of this. This leaves room for trustors to formulate alternative beliefs about trustworthiness of trustees. Most importantly, this information does not fully remove the uncertainty about the trustworthiness of trustees in the current session.

Thus, although both studies attempt to capture risk directly in a trust setting, they do not guarantee that the trustors know the probability distribution of trustworthiness with certainty. The simple design presented in this paper generates such an environment, with trustors acting upon an objective probability distribution of trustworthiness, which is both correct and payoff-dependent. We also use a within subject design to control, like Houser et al. (2010), for individual effect confounds due to individual heterogeneity.

The remainder of this paper is organized as follows. In the next section, we explain the experimental design and procedures. In Section 3 we present our results. Section 4 concludes.

2. Experimental design and procedures

2.1 The standard trust game

The standard trust game (STG) that we study as a baseline builds on the trust game by Berg et al. (1995). We implement the game as follows. The first mover, trustor, decides how much of his endowment E = 10 tokens (1 token = €0,50) to transfer to the second mover, the trustee. Transfer $x \in \{0, 1, \ldots, 9, 10\}$ is multiplied by three before reaching the trustee. Trustees on their behalf make a binary choice between either keeping the full amount or sending back half of the transferred tokens. We implement the game behind the veil of ignorance. All subjects make their decisions as a trustor first and then as trustee. They receive no feedback on decisions of others before providing complete information in the experiment. At the end of the experiment, one of these roles is assigned to each subject, and only the decisions in the assigned role are payoff-relevant for the subject.[2]

When taking their decision to honor trust, trustees do not know whether a trustor has sent money or not. Trustees make a binary choice between returning either half or nothing of the money in case of a transfer. Such a restricted trustee strategy set is also used in, for example, Bohnet and Zeckauser (2004). This design ensures that trustors choose a level of investment that exclusively stems from their inherent beliefs about trustees' trustworthy behavior and prevents that the decision to trust is confounded by other motives, for example signaling or elicitation of positive reciprocity.[3]

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[2] If subjects engage in both roles (as trustor and trustee) this can have a negative impact on trustworthiness (Casari and Cason, 2009). To the best of our knowledge, no studies have shown any significant effects on trust (Johnson and Mislin, 2011), which is the main focus of our study.

[3] Servátka et al. (2007), for example, argue that trustors may choose to invest a significant amount of their endowment in the hope that trustees are more inclined to reciprocate, possibly due to guilt aversion.

2.2 The risky trust game

For the risky trust game (RTG) we use the same setup as in the STG (see above) but implement the Conditional Information Lottery design developed by Bardsley (2000).[4] Trustors receive information that four trustees have been randomly assigned to them, and that one of these four trustees will be matched to them at random after the trustees' decisions have been made. The trustor is confronted with five possible scenarios: either none, one, two, three, or all four trustee(s) may choose to return one half of the received amount. In the moment of decision-making, the trustor does not know which of these five possible scenarios will materialize.

For each of the five possible scenarios, we ask the trustor to choose an amount that she wants to transfer to the trustee that will be eventually randomly matched to her. Thus, trustors in the RTG make five decisions, x_0, x_1, x_2, x_3 and x_4, where x_i, i=0,1,…,4, denotes the payoff-relevant transfer in case the group of four trustees assigned to the trustor contains i trustworthy trustees. Allowing trustors to condition their transfer in the RTG on all possible scenarios of trustworthiness that may occur, transforms the trust decision into a decision under risk with objectively known probabilities of trustees' trustworthiness (in our case probabilities are 0, 0.25, 0.5, 0.75, and 1).

At the end of the experiment, the actual distribution of trustworthiness in the group of four trustees will determine the payoff-relevant scenario for the trustor. The trustor's specific transfer in the materialized scenario of trustworthiness is randomly matched to one of the four trustees assigned to him. The return decision made by this trustee subsequently determines the monetary outcome of the randomly paired trustor and trustee.

For comparability reasons, we use the same matching procedure in the STG. Each trustor is assigned to four trustees, and one of the four trustees is randomly selected as the payoff-relevant trustee for the trustor. In the STG, as explained in the previous section, the trustor cannot condition the transfer on the trustworthiness of these four trustees. Hence, the only difference between both trust games is that trustors have objective probabilities about the trustworthiness of the trustees in the RTG but not in the STG.

[4] The Conditional Information Lottery offers all the benefits associated with deception in experiments, without actually deceiving anyone. The deceptive scenarios of designs, which use deceit, are replaced with scenarios, each of which, from a subject's viewpoint, has a chance of being true (Bardsley, 2000).

2.3 Risk preference measures

We elicit subjects' **lottery risk preferences** with a standard lottery setup (Holt and Laury, 2002). In this lottery risk task subjects make a sequence of 10 choices between two lotteries with changing probabilities of given outcomes. Subjects' lottery risk preferences are measured as the (last) point where a subject switches from option A, the less risky lottery, to option B, the more risky lottery (Holt and Laury, 2002).[5] At the end of the experiment one of the 10 choices between option A and B is randomly drawn and the chosen lottery (A or B) is then played out with another random draw by a mechanistic random device (the computer).

For all subjects, we also estimate their **RTG risk preferences** by using their decisions in the five conditional scenarios in the RTG. The expected utility of a trustor transferring x_i from an initial endowment (E) in a scenario with a fraction of p trustworthy trustees (p= $\frac{i}{4}$), who return half of the tripled transfer, is given by:

$$EU(x_i) = p * U\left(E - x_i + \frac{3}{2}x_i\right) + (1-p) * U(E - x_i) \quad (1)$$

We assume the functional form of the trustor's utility function to come from the family of constant relative risk aversion functions: $U(w) = W^{\alpha}$ (see, e.g., Holt and Laury, 2002; Wakker, 2008). The first order conditions of the trustor's expected utility maximization imply:

$$\ln\frac{p}{2(1-p)} = (\alpha - 1)\left[\ln(E - x_i) - \ln\left(E + \frac{1}{2}x_i\right)\right] \quad (2)$$

The parameter α is estimated by means of an ordinary least square estimation for each subject separately, and we use it as our measure of interest for RTG risk preferences.

2.4 Experimental procedure

The experiments were conducted at ELSE (Experimental Laboratory for Sociology and Economics) at the University of Utrecht with 92 students (49 females and 43 males). The experiments were computerized using the software z-Tree (Fischbacher, 2007). At the

[5] Only four subjects switch more than once from the safer to the more risky lottery. The results we report later do not change if we drop subjects who switch more than once.

end of each session, subjects were paid, in cash and in private, €11.50 on average for a session lasting about one hour.

In the experiment, we control for individual heterogeneity by implementing a within-subject design. Subjects submit their decisions in two blocks. One block contained both versions of the trust game, the STG and RTG. Another block contained the measurement of lottery risk and some other incentivized auxiliary measures[6]. We balance the order of the trust games (RTG before or after the STG) in the trust game block, as well as the order of the two blocks themselves.

In the trust games, subjects always submit their decision in the role of a trustor first, and only then in the role of a trustee. All subjects received the same set of instructions and were aware of the fact that they had to submit choices for both roles in the trust game, and that payment in the trust game would depend on one role only. We also administered a non-incentivized post-experimental questionnaire.

All decisions were one-shot and we delayed any feedback about the decision of others and the outcomes of the randomization devices until the end of the experiment. The instructions for all tasks can be found in the appendix.

3. Experimental results

We first show descriptive statistics on trustors' decisions in the STG and RTG, as well as lottery risk preferences and RTG risk preferences. Figure 1 reports the distribution of transfer decisions in the STG. The transfer distribution reveals the common peaks at the extreme transfers, as well as a considerable mass of transfers between zero and half of the endowment. The average transfer is 3.6 out of maximum 10 tokens, which is lower than the average in Berg et al. (1995), but well within the bounds of previously reported trusting decisions (Johnson and Mislin, 2011).

INSERT FIGURE 1 HERE.

Figure 2 shows the transfers of trustors for all scenarios in the RTG. As expected, the transfers increase in the number of trustworthy trustees in a group. Average transfers in scenarios with 0, 1,...,4 trustworthy trustees per group are 1.02, 1.83, 3.45, 6.28 and 8.59

[6] We measured social preferences via a standard social value orientation task (Liebrand, 1984) and lottery ambiguity preferences (Fox and Tversky, 1995). Lastly, we also asked which scenario from the risky trust game participants thought to be most likely. The results reported in this paper remain intact when we control for any combination of these additional measurements (See web appendix).

tokens, respectively.[7] The transfer of a risk-neutral trustor in RTG would form a step-function with a transfer of 0 in scenarios with 0, 1, or 2 trustworthy trustees and transfer of all tokens in scenarios with 3 or 4 trustworthy trustees. The corresponding value of the parameter α for the constant relative risk aversion utility function is 0.656.

INSERT FIGURE 2 HERE.

Table 1 reports the estimates for parameter α in equation 2 above, which measures subjects' risk preferences in the RTG. There are 8 participants with value α=0.656, corresponding to risk-neutral behavior. However, the majority of participants (n=64) are risk averse in the RTG.[8] As Table 1 shows, the RTG risk preferences range from a minimum of -18.529 (one extreme outlier) to a maximum of 2, with a mean of -0.278 and a median of 0.378. Both of the latter are well below risk neutrality.

INSERT TABLE 1 HERE.

Table 2 provides descriptive statistics for risk preferences elicited with the Holt and Laury (2002) lottery task. A risk neutral subject would switch to Option B, the more risky lottery, after having chosen Option A four times. We find a mean switching point of 5.82, which indicates that our subjects are risk averse, on average, in the lottery task. Compared to Holt and Laury (2002) our subjects are slightly more risk averse as they report a mean switching point of 5.2. Our mean switching point, however, is well in line with previously reported figures. Houser et al. (2010), for instance, report a mean switching point of 5.86.

INSERT TABLE 2 HERE.

[7] We also observe that about 30% of subjects transfer more than zero in the scenario with zero trustworthy trustees. These positive transfers may reflect mistakes, warm glow from investing, or even belief that one can beat the odds even when this contradicts the available information (Andreoni and Miller, 2002; Ortmann et al., 2000). Most of these subjects transfer one or two units only, suggesting that some motivation rather than misunderstanding or noise guide such seemingly irrational transfers. At the other extreme, most of the subjects transfer the whole endowment when the probability to meet a trustworthy trustee is equal to one. Here, the omission to transfer the whole endowment, next to mistakes, may be explained by competitive social preferences because any transfer below 10 creates a payoff disparity to the advantage of the trustor.

[8] As a control measure, we analyze transfer decisions in scenario x_3 separately. In this scenario participants should transfer the whole endowment or at least much more compared to previous scenarios. The transfer in x_3 is highly correlated with the parameter α, elicited from all scenarios in the RTG.

Having described the most important data, we now move to bivariate analyses on risk and trust. Figure 3 reports the relationship between RTG risk preferences and trusting behavior in the STG. For visualization purposes we split the scores for risk preferences elicited from the RTG in three equally sized categories, ranging from risk averse to least risk averse. Subjects who are least risk averse send, on average, nearly 4 tokens more in the STG compared to subjects who are most risk averse.

INSERT FIGURE 3 HERE.

A Jonckheere-Terpstra test rejects the Null that there are no systematic relationships among the medians of the three different categories, in support of the alternative that the medians are ordered from most risk-averse (lowest) to least risk-averse (highest) ($p<0.001$). Moreover, a Pearson product-moment correlation test confirms that subjects' individual RTG risk preference measures are positively and statistically significantly correlated with corresponding transfers in the STG ($r=0.242$; $p<.05$). This is also confirmed by Kendall's tau rank correlation coefficient between RTG risk preferences and STG transfers, which is $\tau=0.341$ with $p<.01$. *Hence, as a first result, we find a strong positive bivariate relationship between risk preferences measured in a trust setting (RTG) and trusting behavior in the standard trust game (STG).*

Figure 4 shows the relationship between lottery risk preferences and trusting behavior in the STG. To enable a comparison with Figure 3 we split the lottery risk preferences into three equally sized categories ranging from most risk averse to least risk averse.[9]

INSERT FIGURE 4 HERE.

Although the mean transfer in the STG slightly increases from 2.85 to 3.15 and to 3.97 as we move into less risk averse categories, the bivariate relationship between lottery risk and trust is not statistically significant. A Jonckheere-Terpstra test cannot reject the Null that there are no systematic relationships among the medians of the three different categories ($p=0.220$). Also, the Pearson's correlation coefficient ($r=0.151$; $p=0.15$) and Kendall's tau rank correlation coefficient ($\tau= 0.114$; $p=0.17$) cannot reject that subjects' individual lottery risk preferences are uncorrelated with transfers in the STG. *Hence, as a*

[9] If we apply the categorization based on Holt and Laury (2002), we find that, on average, risk averse participants transfer 2 tokens, risk neutral participants 4.73 tokens and risk seeking participants 3.12 tokens.

second result, we find no bivariate relationship between lottery risk preferences and trusting behavior in the standard trust game.

As the RTG risk preferences of trustors predict transfers in the STG but lottery risk preferences do not, we expect to find no direct correlation between the two risk measures. Indeed the Pearson correlation coefficient for the two risk measurements is not statistically significant (r=-0.10; p=0.921). This also applies to Kendall's tau rank correlation coefficient (τ= 0.081; p=0.301), which rejects any significant relationship and suggests that the two risk preference measurements are orthogonal. *Hence, as a third result, we find no bivariate relationship between lottery risk preferences and RTG risk preferences.*

Finally, we support our bivariate findings with multivariate estimations where we use the transfers in the STG as dependent variable and both risk measures as independent variables. Table 3 presents the results of OLS regression models where we control for demographic variables and session fixed effects.

INSERT TABLE 3 HERE.

The estimation results in Table 3 clearly show that risk preferences stemming from the risky trust game remain economically and statistically significant predictors of trust. RTG risk preferences are an important predictor of trusting behavior in the STG with or without lottery risk preferences as simultaneous independent variable (see Model 1 and 3). In contrast, as expected, we find no relation between lottery risk preferences and transfers in the STG, neither individually (Model 2) nor in combination with RTG risk preferences (Model 3). *Hence, as a fourth and most prominent result, we find an economically and statistically significant relationship in multivariate regressions between risk preferences and trusting behavior, provided that risk preferences are measured in a trust setting and not with a lottery setup.*

We conducted several robustness checks to analyze the validity of the above results. First, we ran regression models in which we included all auxiliary measures elicited in the experiment (lottery ambiguity preferences, social preferences and trustor's beliefs). In line with previous studies (Dufwenberg and Gneezy, 2000) we find that trustors' beliefs about trustees' return decisions play a role when explaining the variation of transfers in the STG. We also ran regression models in which we excluded all subjects from the regression analyses, who transferred more than zero (less than ten) tokens in the scenarios with zero (with four) trustworthy trustees. This resulted in a smaller sample of 51 subjects. In all these models, RTG risk preferences remain highly significant while lottery risk preferences fail to be meaningful predictors of trust.[10]

4. Conclusion

In this paper we propose a measure of risk preferences relevant for decisions of trustors in the trust game. We present a new design, the 'risky trust game', which fully aligns the context for the measurement of risk preferences with the context of the trust game. We show that subjects' risk preferences, measured in the risky trust game, explain transfers in the standard trust game. In contrast, and in line with previous studies, our results also show that subjects' lottery risk preferences are not able to explain variations in transfers in the trust game. This suggests that subjects perceive the same objective risk in trusting differently from the risk in a lottery. In fact, we find that risk preferences that are elicited in a trust setting (in our risky trust game) are completely uncorrelated with risk preferences elicited with the well-known Holt and Laury (2002) lottery design. Subjects' risk preferences are context dependent, and the risk measure obtained in the lottery context does not sufficiently capture the risk that subjects perceive in the trust decisions.

Our findings relate to recent research on sources of risk (Weber et al., 2002; Abdellaoui et al., 2011; L'Haridon et al., 2013). Rather than describing a risky decision purely in terms of the set of states and objectively known probabilities of these states, the sources of risk take into account that human decision-makers process objectively known probabilities in a context-dependent way. This notion is supported by recent neurocognitive studies, which propose that the origins of source dependence in risk processing can be found in human neurobiology. They highlight the importance of a brain circuit that specifically underlies the representation of other's beliefs and intentions (Saxe, 2006; Behrens et al., 2008; 2009; Hampton et al., 2008). The dissociation in processing of risks from social and non-social sources was also linked to neuroanatomy. Brain signals from the regions processing social risk are strongly interconnected with other brain regions involved with the processing of emotions and facial expression (Van Hoesen et al., 1993). Closely related to our research, Lauharatanahirun et al. (2011) observe that risky decisions in a social vs. non-social setup recruit different brain regions of interest, giving further support to the source perspective of risk decisions of human decision-makers.

Coming back to the question we started this paper with – can trust in the standard trust game be explained by a person's risk preferences – our results suggest the following

[10] All results are available in the web appendix.

answer: Yes, it can, but only if we align the measurement of risk preferences to the source of uncertainty a person faces in trust decisions.

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Tables and Figures

Table 1 RTG risk preferences

Descriptives	Parameter α
Minimum	- 18.529
q 0.25	0.354
Median	0.378
q 0.75	0.656
Maximum	2
Mean	- 0.278
Standard deviation	2.416

Table 2 Lottery risk preferences

Number of safe choices	Total (N=92)	Holt and Laury
0-1	0.00 (0)	0.01
2	0.01 (1)	0.01
3	0.01 (1)	0.06
4	0.16 (15)	0.26
5	0.16 (15)	0.26
6	0.25 (32)	0.23
7	0.27 (25)	0.13
8	0.00 (0)	0.03
9-10	0.03 (3)	0.01
Mean	5.82	5.2

Table 3 OLS regression models explaining transfer in STG.

	Model 1	Model 2	Model 3
Constant	3.729 (0.890)	1.855 (1.326)	2.053 (1.436)
RTG risk preferences	0.303*** (0.098)	-	0.316*** (0.091)
Lottery risk preferences	-	0.367 (0.265)	0.405 (0.273)
Gender	-0.048 (0.817)	0.084 (0.857)	0.236 (0.834)
Economics major	-0.001 (0.844)	-0.008 (0.820)	-0.123 (0.808)
Session 1	0.291 (1.209)	0.387 (1.243)	0.121 (1.192)
Session 2	-2.029** (1.016)	-1.868* (1.047)	-2.137** (0.970)
Session 3	0.595 (1.066)	1.080 (1.058)	0.627 (1.039)
Session 4	0.121 (1.133)	0.177 (1.155)	-0.288 (1.083)
Session 5	-0.197 (1.301)	0.128 (1.326)	-0.350 (1.274)
N	92	92	92
F test	(8, 83) 2.96	(8, 83) 1.67	(9, 82) 3.00
Prob. > F	0.0057	0.1168	0.0038
R - squared	0.1363	0.1085	0.1596

***, **, * significant at the 0.01, 0.05, 0.1 level, respectively. Heteroskedasticity-corrected (robust) standard errors in parentheses.

Figure 1 Distribution of transfers in the standard trust game (STG)

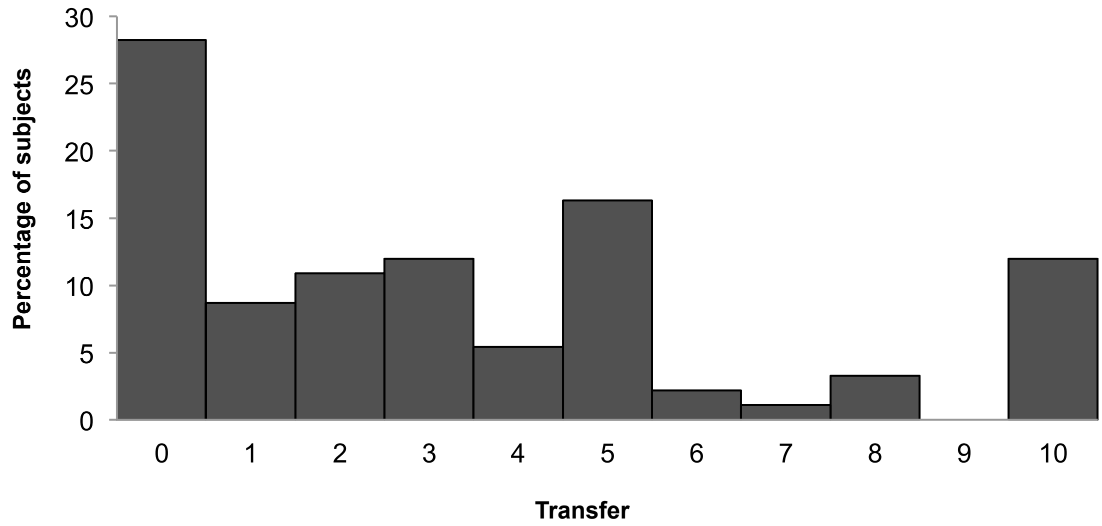


Figure 2 Distribution of transfers in the risky trust game (RTG), for each scenario

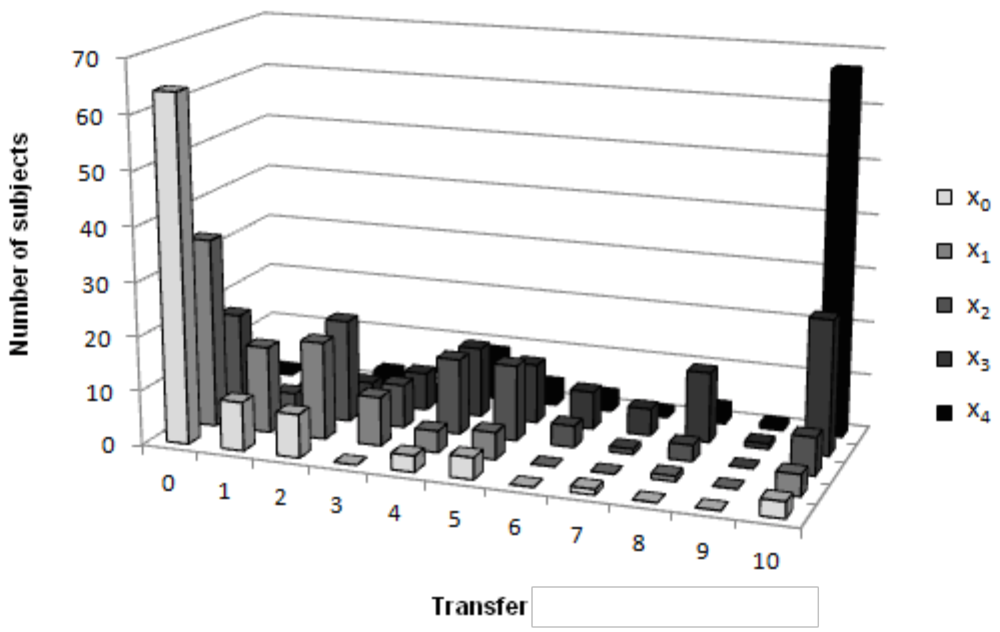


Figure 3 Relating risk preferences measured in RTG and transfer in the standard trust game (STG)

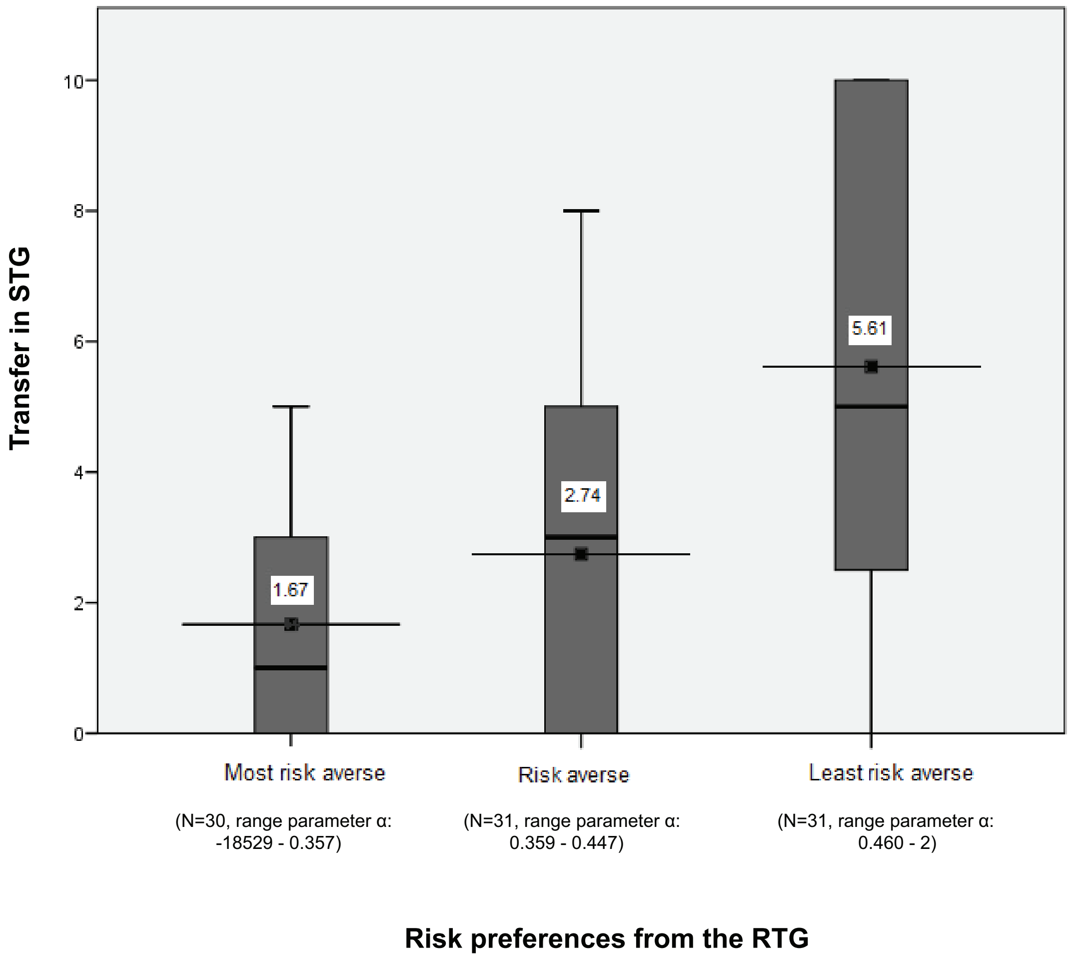
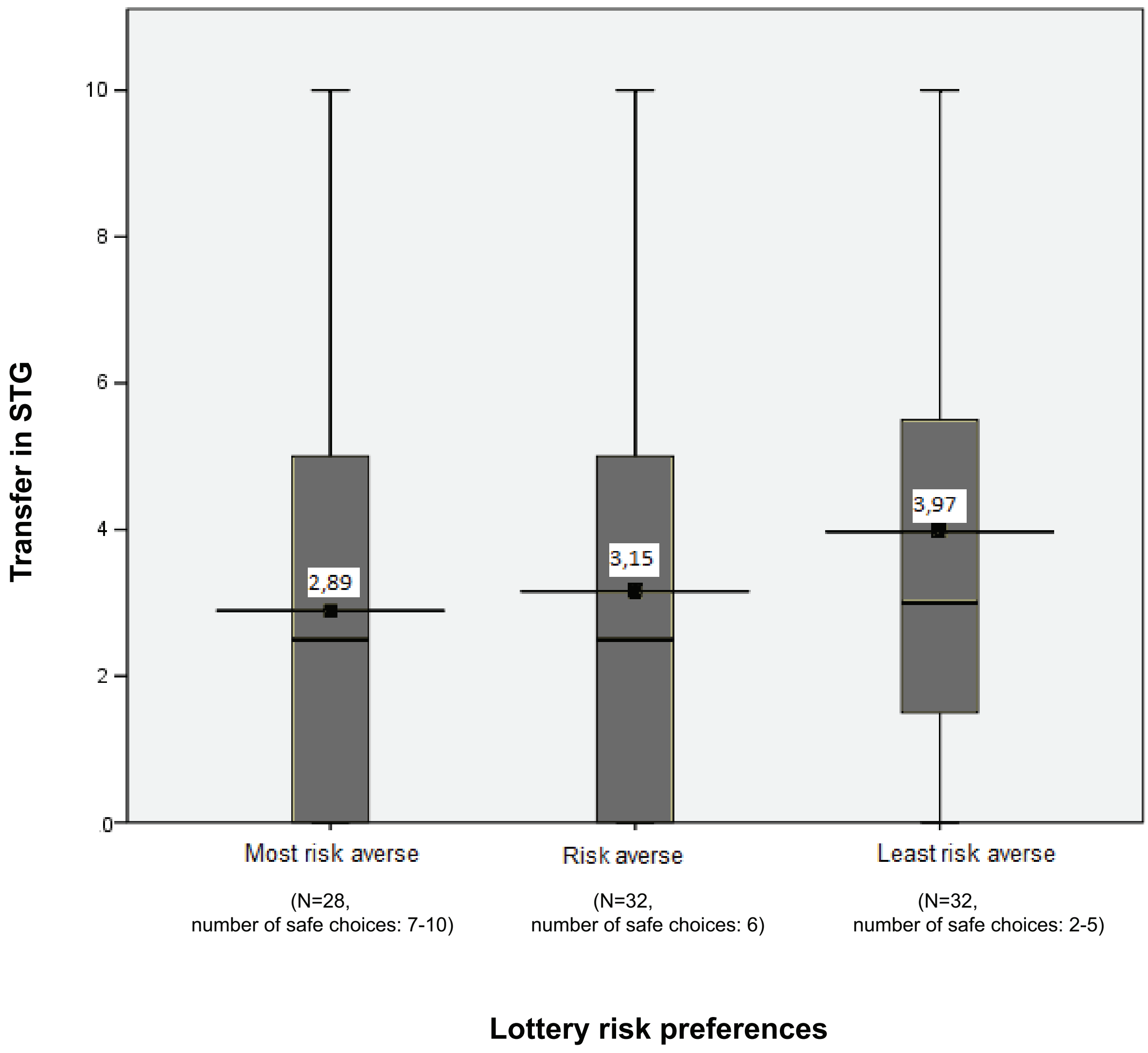


Figure 4 Lottery risk preferences and transfer in the standard trust game



Web appendix for reviewers

You can find the instructions of our experiment below. Subsequently we explain the coding scheme of remaining incentivized auxiliary measures we did not discuss in the main paper. Finally we perform additional robustness analyses to show that our main results hold.

Instructions

Note: task 1 is the lottery ambiguity task, task 2 is the social preferences task, task 3 is the lottery risk task and finally task 4 is the trust game.

INTRODUCTION

You will now participate in an economic experiment. In this experiment, you will earn money depending on the decisions that you will make. For this reason, it is very important that you read these instructions carefully.

During the experiment, your income will be expressed in tokens. The total amount of tokens which you earn will be converted to Euro's at the end of the experiment; the following conversion rate applies:

1 token = € 0,50

You will be paid in cash at the end of the experiment. The payment will be made in privacy; no other participant will learn how much you earned.

Please note that you are not allowed to communicate with other participants during this experiment. Should you have any questions, please raise your hand and we will come to you to answer them. Note however that we do not answer questions of the type - 'what shall I do in the experiment' – this is your own choice. We, however, are happy to answer questions on how to use the computer to make decision, and to explain the details of the experiment instructions.

The experiment consists of five independent Tasks. At the beginning of each task, you will receive instructions.
You will make decisions in each of the Tasks, and will be paid based on your decisions, and possibly decisions of other subjects in the experiment.

At the end of the experiment, you will learn the outcome of each Task, as well as how many tokens you collected in the individual Tasks. The total amount earned in the experiment will be then paid to you, individually. No other experiment participant will learn how much you earned.

Task 1

This task consists of two parts. In EACH part, there are 20 rows. In each row, you are asked to choose between Option A and B. After the experiment, the computer will randomly pick one of the 20 rows of each part of the Task, and determine your earnings based on your decision in these rows.

If you choose option A in the selected row, you will receive the amount of tokens given at this row. If you choose option B, the computer will randomly pick one out of 10 balls. Each ball is either blue or yellow. If the color of the ball picked by the computer is yellow, your earning will be 5 tokens, otherwise 0 tokens.

There is only one difference between part 1 and part 2 of this task.

In part 1, THERE ARE 5 blue and 5 yellow balls, and the computer randomly picks one out of them.
In part 2, YOU WILL NOT learn from how many blue and yellow balls there are among the 10 balls, and any composition of the two colors of the balls is possible.

1) In this first part of the task, there are 10 balls**: 5 yellow balls and 5 blue balls.** Please indicate for each row if you prefer receiving the certain amount of tokens at that row, or you choose to draw a ball. If you choose to draw a ball, the computer will randomly select one out of the 5 blue and 5 yellow balls, and the color of the selected ball will determine your earnings. You will be asked to enter your decision at the computer screen.

	Option A	Option B
1	O I choose the certain amount of 0.25 tokens	O I choose to draw a ball
2	O I choose the certain amount of 0.50 tokens	O I choose to draw a ball
3	O I choose the certain amount of 0.75 tokens	O I choose to draw a ball
4	O I choose the certain amount of 1 tokens	O I choose to draw a ball
5	O I choose the certain amount of 1.25 tokens	O I choose to draw a ball
6	O I choose the certain amount of 1.50 tokens	O I choose to draw a ball

7	O I choose the certain amount of 1.75 tokens	O I choose to draw a ball
8	O I choose the certain amount of 2 tokens	O I choose to draw a ball
9	O I choose the certain amount of 2.25 tokens	O I choose to draw a ball
10	O I choose the certain amount of 2.50 tokens	O I choose to draw a ball
11	O I choose the certain amount of 2.75 tokens	O I choose to draw a ball
12	O I choose the certain amount of 3 tokens	O I choose to draw a ball
13	O I choose the certain amount of 3.25 tokens	O I choose to draw a ball
14	O I choose the certain amount of 3.50 tokens	O I choose to draw a ball
15	O I choose the certain amount of 3.75 tokens	O I choose to draw a ball
16	O I choose the certain amount of 4 tokens	O I choose to draw a ball
17	O I choose the certain amount of 4.25 tokens	O I choose to draw a ball
18	O I choose the certain amount of 4.50 tokens	O I choose to draw a ball
19	O I choose the certain amount of 4.75 tokens	O I choose to draw a ball
20	O I choose the certain amount of 5 tokens	O I choose to draw a ball

1) In this second part of the task, there are 10 balls**: but you will not be informed how many of them are blue and how many are yellow.** Please indicate for each row if you choose the certain amount at that row, or you choose to draw a ball. If you choose to draw a ball, the computer will randomly select one out ten balls of unknown color mix between yellow and blue balls, and the color of the selected ball will determine your earnings. You will be asked to enter your decision at the computer screen.

	Option A	Option B
1	O I choose the certain amount of 0.25 tokens	O I choose to draw a ball
2	O I choose the certain amount of 0.50 tokens	O I choose to draw a ball
3	O I choose the certain amount of 0.75 tokens	O I choose to draw a ball
4	O I choose the certain amount of 1 tokens	O I choose to draw a ball
5	O I choose the certain amount of 1.25 tokens	O I choose to draw a ball
6	O I choose the certain amount of 1.50 tokens	O I choose to draw a ball
7	O I choose the certain amount of 1.75 tokens	O I choose to draw a ball
8	O I choose the certain amount of 2 tokens	O I choose to draw a ball
9	O I choose the certain amount of 2.25 tokens	O I choose to draw a ball
10	O I choose the certain amount of 2.50 tokens	O I choose to draw a ball
11	O I choose the certain amount of 2.75 tokens	O I choose to draw a ball
12	O I choose the certain amount of 3 tokens	O I choose to draw a ball
13	O I choose the certain amount of 3.25 tokens	O I choose to draw a ball
14	O I choose the certain amount of 3.50 tokens	O I choose to draw a ball

15	O I choose the certain amount of 3.75 tokens	O I choose to draw a ball
16	O I choose the certain amount of 4 tokens	O I choose to draw a ball
17	O I choose the certain amount of 4.25 tokens	O I choose to draw a ball
18	O I choose the certain amount of 4.50 tokens	O I choose to draw a ball
19	O I choose the certain amount of 4.75 tokens	O I choose to draw a ball
20	O I choose the certain amount of 5 tokens	O I choose to draw a ball

You will be informed about the outcome of this task at the end of the experiment. Please raise your hand if you have any questions.

Task 2

In this task, you will be randomly matched to one another subject in this experiment. One of you two will be assigned at random the role of the SENDER in this task, and the other one is assigned the role of the RECEIVER.
You will learn whether you are SENDER or RECEIVER in this task, only at the end of the experiment. Therefore, you have to indicate your choice below for the case that you will be assigned the role of the SENDER.

In this task, you will face 24 situations. In each of them, you are asked to choose one out of two options. In case you will be assigned the role of the SENDER, the option that you choose could have monetary consequences for you and also for the other person, the RECEIVER.
In case you will be assigned the role of the RECEIVER, the choices made by the other subject, the SENDER, will determine your earnings.

At the end of the experiment, the computer will select one out of the 24 decision situations at random, and the chosen alternative of the SENDER in that situation will determine the earnings of the SENDER and the RECEIVER.

Let us now explain the options available in each of the 24 decision situations. For each option, two numbers will be displayed: the number of points you will receive yourself (positive or negative) when you choose this option, and the number of points (positive or negative) the other subject will receive when you choose this option. These situations are listed below. You will be asked to enter your decision at the computer screen.

	OPTION A		OPTION B	
	SENDER	RECEIVER	SENDER	RECEIVER
SITUATION1	3 tokens	0 tokens	2.90 tokens	-0.78 tokens
SITUATION2	2.90 tokens	-0.78 tokens	2.60 tokens	-1.50 tokens
SITUATION3	2.60 tokens	-1.50 tokens	2.12 tokens	-2.12 tokens
SITUATION4	2.12 tokens	-2.12 tokens	1.50 tokens	-2.6 tokens
SITUATION5	1.50 tokens	-2.60 tokens	0.78 tokens	-2.90 tokens
SITUATION6	0.78 tokens	-2.90 tokens	0 tokens	-3 tokens
SITUATION7	0 tokens	-3 tokens	-0.78 tokens	-2.90 tokens
SITUATION8	-0.78 tokens	-2.90 tokens	-1.5 tokens	-2.60 tokens
SITUATION9	-1.50 tokens	-2.6 tokens	-2.12 tokens	-2.12 tokens
SITUATION10	-2.12 tokens	-2.12 tokens	-2.6 tokens	-1.50 tokens
SITUATION11	-2.60 tokens	-1.50 tokens	-2.90 tokens	-0.78 tokens
SITUATION12	-2.90 tokens	-0.78 tokens	-3 tokens	0 tokens
SITUATION13	-3 tokens	0 tokens	-2.90 tokens	0.78 tokens
SITUATION14	-2.90 tokens	0.78 tokens	-2.6 tokens	1.50 tokens
SITUATION15	-2.60 tokens	1.50 tokens	-2.12 tokens	2.12 tokens
SITUATION16	-2.12 tokens	2.12 tokens	-1.50 tokens	2.6 tokens
SITUATION17	-1.50 tokens	2.60 tokens	-0.78 tokens	2.90 tokens
SITUATION18	-0.78 tokens	2.90 tokens	0 tokens	3 tokens
SITUATION19	0 tokens	3 tokens	0.78 tokens	2.90 tokens
SITUATION20	0.78 tokens	2.90 tokens	1.50 tokens	2.6 tokens
SITUATION21	1.50 tokens	2.60 tokens	2.12 tokens	2.12 tokens
SITUATION22	2.12 tokens	2.12 tokens	2.6 tokens	1.50 tokens
SITUATION23	2.60 tokens	1.50 tokens	2.90 tokens	0.78 tokens
SITUATION24	2.90 tokens	0.78 tokens	3 tokens	0 tokens

You will be informed about the outcome of this task at the end of the experiment. Please raise your hand if you have any questions.

Task 3

In this task you will be presented with 10 rows. In each row, you are asked to choose one out of two alternatives. At the end of the experiment, the computer will choose one of these 10 rows at random, and this row will determine your earnings in the following way.

The computer will identify which of the two options A or B did you choose in the selected row. The computer will then select at random one out of chips to determine your earnings. These chips have value which is

- either 2 tokens or 1.60 tokens if you choose Option A, or
- either 3.85 tokens or 0.10 tokens, if you choose Option B.

In each row, the number of chips with the respective prizes the computer selects from is described below. For example, in row 1 in Option A, the computer chooses one out of 10 chips, where one of these chips has the prize 2 tokens, and 9 of these chips have the prize 1.60 tokens

You will be asked to enter your decision at the computer screen.

Option A	Option B
1/10 of 2 tokens, 9/10 of 1.60 tokens	1/10 of 3.85 tokens, 9/10 of 0.10 tokens
2/10 of 2 tokens, 8/10 of 1.60 tokens	2/10 of 3.85 tokens, 8/10 of 0.10 tokens
3/10 of 2 tokens, 7/10 of 1.60 tokens	3/10 of 3.85 tokens, 7/10 of 0.10 tokens
4/10 of 2 tokens, 6/10 of 1.60 tokens	4/10 of 3.85 tokens, 6/10 of 0.10 tokens
5/10 of 2 tokens, 5/10 of 1.60 tokens	5/10 of 3.85 tokens, 5/10 of 0.10 tokens
6/10 of 2 tokens, 4/10 of 1.60 tokens	6/10 of 3.85 tokens, 4/10 of 0.10 tokens
7/10 of 2 tokens, 3/10 of 1.60 tokens	7/10 of 3.85 tokens, 3/10 of 0.10 tokens
8/10 of 2 tokens, 2/10 of 1.60 tokens	8/10 of 3.85 tokens, 2/10 of 0.10 tokens
9/10 of 2 tokens, 1/10 of 1.60 tokens	9/10 of 3.85 tokens, 1/10 of 0.10 tokens
10/10 of 2 tokens, 0/10 of 1.60 tokens	10/10 of 3.85 tokens, 0/10 of 0.10 tokens

You will be informed about the outcome of this task at the end of the experiment. Please raise your hand if you have any questions.

Task 4

General description:

In this task, your earnings will depend on your decision and the decision of one randomly selected other participant in this experiment. You will not learn the identity of this participant, neither during nor after the experiment.

In this task, one of the subjects in the pair will be assigned the role of SENDER, and the other one will be assigned the role of RECEIVER. We will now explain the payments and the decision procedure.

The payments:

At the beginning of this Task, both SENDER and RECEIVER will receive an endowment of 10 tokens.

Then, SENDER will be asked to make a choice first. SENDER will be asked to choose how many of his/her 10 tokens he/she transfers to RECEIVER.

- **SENDER can choose to send either 0, 1, 2 … 10 tokens to RECEIVER**.

The tokens will be multiplied by three on the way to RECEIVER, i.e. RECEIVER receives three times as many tokens as SENDER transferred to him/her.

After that, RECEIVER will be asked to make a choice. RECEIVER will be asked how many tokens he/she wants to send back to SENDER from the tokens received. RECEIVER can choose either to send back nothing, or to send back half of the received tokens.

- **RECEIVER can choose to send back either one half of the received tokens**, or **nothing**.

At the end of the task, the payments to SENDER and RECEIVER will be made based on the tokens they hold, that means:

SENDER will be paid for

(10 tokens) <u>MINUS</u> (number of tokens transferred to RECEIVER) <u>PLUS</u> (tokens received from RECEIVER)

and

RECEIVER will be paid for

(10 tokens) <u>PLUS</u> (three times number of tokens transferred by SENDER to RECEIVER) <u>MINUS</u> (either half of the received tokens, or zero, depending on RECEIVER's decision)

The decision procedure:

We will now describe the procedure by which you will make your decisions in this Task.
In the experiment, you will be randomly assigned the role of SENDER , or the role of RECEIVER. The computer will match at random subjects into pairs, consisting of one SENDER and one RECEIVER. You will learn your role only at the end of the experiment. Therefore, we will ask you to submit your decision both as SENDER and as RECEIVER. Your decision in the role randomly assigned to you will determine your earnings in the following way.

The decision procedure of sender:

Each SENDER will be faced with a situation of being randomly matched to one out of FOUR possible RECEIVERS. We will ask you, in the role of the SENDER, to submit your decision on how many tokens you choose to send to the RECEIVER. You will do it in SIX possible scenarios. Please be aware that you have an endowment of 10 tokens in every possible scenario. You need to decide how much of this 10 tokens to send to the RECEIVER in each of the six scenarios.

One scenario without information:

In one of these scenarios, you will not be informed about the choices of the four possible RECEIVERS. You will be simply asked to choose the number of tokens to send to the RECIVER. Then one out of the four possible RECEIVERS will be randomly matched to you.

Five scenarios with information:

In five scenarios, you will be able to choose the number of tokens you send to the RECEIVER. You have to choose the number of tokens that you send for each of the following scenarios:

→ none of the four possible receivers returns back half of the received tokens
→ one of the four possible receivers returns back half of the received tokens
→ two of the four possible receivers returns back half of the received tokens
→ three of the four possible receivers returns back half of the received tokens
→ all of the four possible receivers returns back half of the received tokens.

After the four possible RECEIVERS have made their choices, we will count the number of RECEIVERS which chose to send back half of the tokens. This number will then determine which of the five above scenarios (with information) the computer will consider when calculating your earnings for this part of the experiment. Thus, out of these five scenarios, only one can be an actual scenario that is relevant for your earnings. In this actual scenario, one out of the four possible RECEIVERS is then randomly matched with you.

You will submit your decisions at six different computer screens, one for each of the six scenarios.

After your six decisions, the computer will randomly select either the scenario without information, or the one actual scenario with information, to be the scenario that is relevant for your earnings. Depending on your decision, how much to send in this specific scenario, and on the RECEIVER'S individual decision on returning back half or not, your payoff for this task is determined.

The decision procedure of receiver

After the decision made by SENDER, the RECEIVER will make his/her decision.

- DECISION OF RECEIVER IS either RETURN NOTHING or RETURN ONE HALF

Note that RECEIVER will not be informed about how many tokens did SENDER transfer to him/her, but makes only one decision to either send nothing or half of the received tokens back.

At the end of the experiment, the computer will randomly assign the role of SENDER to half of the subjects, and the role of RECEIVER to the other half.

Your payments will depend on the role that is assigned to you, and the decision of the subject matched to you by the computer, in the other role, as described above.

Auxiliary measures

We tested participants' lottery ambiguity preferences, their social preferences and their beliefs regarding the behavior of trustees in the trust game.

To elicit **lottery ambiguity preferences**, each subject made a sequence of 20 pair wise choices between a lottery with a known composition of the urn and a sure option (risk choice list); as well as a sequence of 20 pair wise choices between a lottery with an unknown composition of the urn and a sure option (ambiguous choice list). The sure option increases with each row to a maximum amount of 5 tokens. From both choice lists we define a subject's certainty equivalent as the midpoint of two sure payoffs related to the choice before and at the (last) switching point. For instance when a subject chooses ten consecutive times to draw a ball from the urn before switching to the sure payoff of 2.75 tokens, this subject's certainty equivalent is 2.625 tokens (midpoint between 2.5 and 2.75 tokens). We estimate each subject's lottery ambiguity preferences based on certainty equivalents (Wakker, 2010).

$$\textit{Lottery ambiguity preferences} = (CE_R - CE_A) / (CE_R + CE_A)$$

CE_r and CE_a denote the certainty equivalents of the risk choice list respectively the ambiguous choice list. This measure ranges from -1 (extreme ambiguity seeking) to 1 (extreme ambiguity aversion). A score of 0 indicates ambiguity neutrality. The difference between CE_r and CE_a is divided by the absolute level of risk and ambiguity attitude in order to control for the fact that similar differences in certainty equivalents will weigh more heavily for a risk averse subject than a risk neutral or risk seeking subject (Sutter et al., 2013).

We measure **social preferences** by applying the value orientation task (ring task) (Liebrand, 1984). By collecting 24 decisions on pairs of payoffs this task measures the willingness to increase/decrease the payoff of an anonymous co-player at a cost. All pair of choices can be represented in a circle on adjacent equally spaced coordinates. The horizontal axis of the imaginary circle indicates the amount of money allocated to oneself and the vertical axis indicates the amount of money allocated to the other anonymous person. Summing all decisions, a measure of the unconditional willingness to give or take is obtained. Five roles can be distinguished, namely altruistic subjects (vectors lying between 67.5 – 112.5), cooperators (vectors lying between 22.5 – 67.5), individuals (vectors lying between -22.5 – 22.5), competitors (vectors lying between -67.5 – -22.5) and finally aggressors (vectors lying between -112.5 – -67.5).

We also collected subjects' **beliefs** by administering a non-incentivized questionnaire in which they indicated (on a 5-point Likert scale) how likely they considered each of the scenarios of trustworthiness from the RTG to materialize. The variable beliefs records the most likely scenario of x_0, x_1,…,x_4 that subjects expect. A higher value indicates subjects' optimism about the general trustworthiness in trustees.

On average, participants can be classified as ambiguity averse (Table 1), individualistic (Table 2) and holding quite pessimistic beliefs with regard to trustees' reciprocity (Table 3).

Table 1 Lottery ambiguity preferences

Certainty equivalent of the risk lottery minus certainty equivalent of ambiguous lottery, while controlling for the absolute level of risk and ambiguity preferences (range: -1 to 1)		
Normalized ambiguity attitude	Total in % (N=92)	Type
>0	40.22 (37)	Ambiguity averse
0	29.35 (27)	Ambiguity neutral
<0	30.43 (28)	Ambiguity seeking
Mean value	-0.054	

Table 2 Social preferences

Social preferences categorization (angle)	Total in % (N=92)
Cooperative (22.5 – 67.5)	39.13 (33)
Individualistic (-22.5 – 22.5)	51.09 (47)
Competitive (-67.5 – -22.5)	3.26 (3)
Aggressive (< -67.5)	6.52 (6)
Mean Angle	11.0

Table 3 Beliefs with regard to risky trust game (RTG): scenarios that subjects find most likely

RTG scenario	Frequency in % (N=92)
0	0.18 (17)
0.5	0.09 (8)
1	0.12 (11)
1.5	0.02 (2)
2	0.31 (29)
2.5	0.08 (7)
3	0.09 (8)
3.5	0.00 (0)
4	0.11 (10)

Note: When the highest score was attached to more than one RTG scenario, we report the average.

Robustness analyses

We run additional multivariate analyses to show that the main results reported in the paper are robust. First we report the results of analyses where we included the auxiliary measures to the main models reported in the paper (Table 4 and 5). In Table 4 we specifically test for the order in which we implemented our experimental tasks: lottery risk and auxiliary measures either before or after the trust game, and the order of the trust game treatment (RTG before or after the STG). In Table 5 we control for session fixed effects.

The effect of the RTG risk preferences on transfer in the STG remains valid in both models. The order in which the standard and the risky environment are presented to the subjects in the experiment affects their transfer in the standard trust game. Subjects, who first participated in the RTG, transfer on average 1.5 tokens less in the STG compared to subjects who were first exposed to the STG. This order effect is significant as can be seen in Table 4 by the negative and statistically significant coefficient of the dummy variable indicating an ordering of RTG before STG (equal 1 and 0 otherwise). We also find that trustors' beliefs about trustees' return decisions play a role when explaining the variation of transfers in the STG (Table 4 and 5).

Lastly, we excluded all subjects from the regression analyses, who either transferred more than zero tokens and/or less than ten tokens in the scenarios x_0 and x_4, respectively (Table 6). This resulted in a smaller sample of 51 subjects. All our results remain qualitatively valid.

Table 4 Trust and risk: controlling for additional individual measures

Transfer in STG (dependent variable)	Model 1	Model 2	Model 3
Constant	2.842 (0.915)	1.043 (1.406)	1.072 (1.467)
RTG risk Preferences	0.344*** (0.096)		0.367*** (0.090)
Lottery risk preferences		0.364 (0.267)	0.434 (0.270)
Lottery ambiguity preferences	-0.351 (1.395)	-0.617 (1.356)	-0.121 (1.230)
Social preferences	-0.002 (0.015)	-0.002 (0.016)	-0.007 (0.016)
Beliefs	0.703** (0.309)	0.631 (0.313)	0.707** (0.308)
Gender	-0.192 (0.849)	-0.052 (0.914)	0.142 (0.877)
Economic major	-0.064 (0.860)	-0.047 (0.853)	-0.141 (0.827)
Session 1	-0.033 (1.255)	0.103 (1.328)	-0.273 (1.251)
Session 2	-2.008* (1.055)	-1.822 (1.130)	-2.200** (1.049)
Session 3	0.088 (1.163)	0.681 (1.177)	0.101 (1.144)
Session 4	0.069 (1.026)	0.167 (1.092)	-0.308 (0.958)
Session 5	-0.345 (1.181)	0.099 (1.256)	-0.574 (1.148)
N	92	92	92
F test	(11, 80) = 3.32	(11, 80) = 2.07	(12, 79) = 3.63
Prob > F	0,0009	0,0319	0,0002
R - squared	0,1995	0,1596	0,2249

***, **, * significant at the 0.01, 0.05, 0.1 level, respectively. Heteroskedasticity-corrected (robust) standard errors in parentheses.

Table 5 Trust and risk: controlling for additional individual measures and sessions

Transfer in STG (dependent variable)	Model 1	Model 2	Model 3
Constant	-4.567 (2.045)	1.083 (2.168)	1.072 (1.467)
RTG risk Preferences	13.842*** (3.184)		0.367*** (0.090)
Lottery risk preferences		0.579 (0.380)	0.434 (0.270)
Lottery ambiguity preferences			-0.121 (1.230)
Social preferences			-0.007 (0.016)
Beliefs			0.707** (0.308)
Gender	1.237 (0.834)	0.525 (1.244)	0.142 (0.877)
Economic major	0.582 (1.226)	0.196 (1.547)	-0.141 (0.827)
Session 1	1.510 (1.400)	-0.338 (1.738)	-0.273 (1.251)
Session 2	-1.128 (1.232)	-3.223 (1.100)	-2.200** (1.049)
Session 3	1.359 (1.646)	0.806 (1.668)	0.101 (1.144)
Session 4	0.844 (1.338)	-0.613 (1.698)	-0.308 (0.958)
Session 5	-1.177 (1.67)	-0.796 (1.700)	-0.574 (1.148)
N	51	51	51
F test	(8, 42) = 4.93	(8, 42) = 3,32	(8, 42) = 4.93
Prob > F	0,0002	0,0049	0,0002
R - squared	0,4398	0,1657	0,4398

***, **, * significant at the 0.01, 0.05, 0.1 level, respectively. Heteroskedasticity-corrected (robust) standard errors in parentheses.

Table 6 Trust and risk: smaller sample (subjects who transferred more than zero tokens and/or less than ten tokens in the scenarios x_0 and x_4, respectively)

Transfer in STG (dependent variable)	Model 1	Model 2	Model 3	Model 4
Constant	-4.567 (2.045)	1.083 (2.168)	-5.219 (2.075)	-5.238 (2.424)
RTG risk Preferences	13.842*** (3.184)		13.357*** (3.360)	11.496*** (3.683)
Lottery risk preferences		0.579 (0.380)	0.216 (0.340)	0.272 (0.324)
Lottery ambiguity preferences				0.001 (0.117)
Social preferences				0.046 (0.030)
Beliefs				0.440 (0.333)
Gender	1.237 (0.834)	0.525 (1.244)	1.394 (0.880)	0.596 (1.010)
Economic major	0.582 (1.226)	0.196 (1.547)	0.489 (1.218)	-0.212 (1.191)
Session 1	1.510 (1.400)	-0.338 (1.738)	1.396 (1.449)	1.758 (1.345)
Session 2	-1.128 (1.232)	-3.223 (1.100)	-1.252 (1.254)	-0.457 (1.128)
Session 3	1.359 (1.646)	0.806 (1.668)	1.332 (1.662)	1.498 (1.583)
Session 4	0.844 (1.338)	-0.613 (1.698)	0.613 (1.411)	-0.245 (1.260)
Session 5	-1.177 (1.67)	-0.796 (1.700)	-1.197 (1.148)	-1.414 (1.503)
N	51	51	51	51
F test	(8, 42) = 4.93	(8, 42) = 3,32	(9, 41) = 4.89	(12, 38) = 7.54
Prob > F	0,0002	0,0049	0,0002	0,0002
R - squared	0,4398	0,1657	0,4458	0,4458

***, **, * significant at the 0.01, 0.05, 0.1 level, respectively. Heteroskedasticity-corrected (robust) standard errors in parentheses.