

Decomposing trust and trustworthiness

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Abstract What motivates people to trust and be trustworthy? Is trust solely “calculative,” based on the expectation of trustworthiness, and trustworthiness only reciprocity? Employing a within-subject design, we run investment and dictator game experiments in Russia, South Africa and the United States. Additionally, we measured risk preferences and expectations of return. Expectations of return account for most of the variance in trust, but unconditional kindness also matters. Variance in trustworthiness is mainly accounted for by unconditional kindness, while reciprocity plays a comparatively small role. There exists some heterogeneity in motivation but people behave surprisingly similarly in the three countries studied.

Keywords Trust · Reciprocity · Social preferences · Cross-cultural experiments

JEL Classification C72 · C91

1. Introduction

Recently, one of the authors found herself standing in line in a supermarket, with a basket full of groceries but no wallet. She decided to ask the person behind her whether he could lend her \$20. He did and gave her his business card so that she could return the money. No questions asked.

In such a situation, one party, the trustor, makes himself vulnerable by taking a course of action that creates incentives for the other party, the trustee, to exploit him. Such behavior is

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commonly referred to as trust. It is assumed that the trustor would not choose the risky course of action if he did not expect the trustee to honor trust. Indeed, a large body of work in many disciplines assumes that trust is “calculative,” based on the *expectation of trustworthiness* (e.g., Rotter, 1980; Williamson, 1993; Hardin, 2002). Trustworthiness, in turn, is typically assumed to be *reciprocity* in behavioral economics (for surveys, see Camerer, 2003; Ostrom and Walker, 2003).¹

While the dominant view, these assumptions have recently been challenged by various scholars in economics, political science and psychology (e.g., Kramer, 1999; Mansbridge, 1999; Dufwenberg and Gneezy, 2000; Cox, 2004).² Rather than being motivated by expectations of return, the lender in the supermarket may have given the money because he enjoys trusting or being kind to others. And the borrower may have returned the money, not because she wanted to reciprocate the lender’s kindness but rather because she derived personal satisfaction from being trustworthy or more generally, from being kind to others. Such *unconditional kindness* could be due to social preferences such as altruism (Andreoni and Miller, 2002), inequity aversion (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) or quasi-maximin preferences (Charness and Rabin, 2002) or due to the psychological benefits, a “warm glow” (Andreoni, 1990), which an individual derives from being kind to others. Social preferences and internalized norms could induce people to trust and be trustworthy—despite the fact that trust often does not “pay” monetarily, and trustworthiness never “pays” monetarily in one-shot interactions. In his survey on experimental outcomes, Camerer (2003, p. 87) writes: “The fact that the return to trust is around zero seems fairly robust.”

In fact, the data suggest that if people perceived trust only as an investment decision under uncertainty—as suggested by the name of the game most widely used to measure trust, the “investment game” (Berg, Dickhaut and McCabe, 1995)—they would keep making bad investments. Already in the first study by Berg et al. (1995), trustors lost money on average, a finding that by now has been replicated in many experimental studies (e.g., Ortmann, Fitzgerald and Boeing, 2000; and for surveys, Camerer, 2003; Cardenas and Carpenter, 2005; and Greig and Bohnet, 2005).

To better understand the role social preferences play in trust situations, behavior in the investment game has been compared with giving in otherwise identically structured dictator games (Kahneman, Knetsch and Thaler, 1986) in recent studies. Dufwenberg and Gneezy (2000) and Cox (2004) find that only relatively small fractions of the money sent by the trustor and returned by the trustee are due to expectations of trustworthiness or reciprocity. Both studies use a between-subjects design. They assume that expectation-based trust and reciprocity are the additive difference between what is sent in the dictator and the investment games.

Our paper contributes to this discussion but does not make any such strong assumptions. Rather, we use a within-subject design where the same person participates in a dictator and an

¹ Reciprocity is defined as rewarding kindness with kindness and punishing unkindness with unkindness. Behavior conditional on one’s counterpart’s behavior or intentions has been formalized by Rabin (1993), Charness and Rabin (2002), Cox, Friedman, and Gjerstad (2005), Dufwenberg and Kirchsteiger (2004) and Falk and Fischbacher (2006). It has been examined experimentally in a large number of studies (for a survey, see Fehr and Schmidt, 2002).

² Kramer (1999, p. 573) argues that “trust needs to be conceptualized not only as a calculative orientation toward risk, but also a social orientation toward other people and toward society as a whole.” Mansbridge (1999: 294) notes the importance of “altruistic trust”: “To qualify as altruistic trust my move must . . . be motivated by a conscious or unconscious intent to benefit the other or an intent to uphold a principle that in the long run usually benefits others.” Recent neuroscientific evidence from Kosfeld et al. (2005) also suggests that trust is not only a belief: Trust is related to oxytocin levels, a hormone typically associated with love and pro-social behavior.

investment game (in varied order). We test whether the two decisions are related, controlling for expectations of trustworthiness and attitudes to risk.³ Used often in experimental psychology but little in experimental economics, within-subject designs automatically control for individual differences. Given the substantial heterogeneity in social preferences observed (e.g., Andreoni and Miller, 2002), we feel more comfortable with a within rather than a between-subjects design.

As a robustness check, we run our study in three different countries, Russia, South Africa and the United States. To connect our research with earlier studies on trust,⁴ we also confronted subjects with the standard attitudinal trust question used in the World Values Survey and the General Social Survey: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” We focus on single-play anonymous interactions. While excluding important contextual features that may affect trust and trustworthiness in naturally occurring settings, they measure “pure trust and trustworthiness” and provide a benchmark for comparisons with more complex environments.

We aim to better understand what game people are playing when confronted with the investment game. Our design allows us to measure the relative importance of beliefs (reciprocity) as compared to unconditional kindness and whether there is heterogeneity in the motivation accounting for observed trust (trustworthiness) behavior. Our paper is organized as follows. In the next Section 2, we present the experimental design. Section 3 presents our conceptual framework. Section 4 discusses the experimental results and Section 5 concludes.

2. Experimental design

The experiment consisted of an introduction page detailing some general rules and five parts, which was common knowledge. Subjects were informed that they would receive the instructions for each part separately, remain anonymous during the experiment (i.e., identified by code numbers) and be randomly paid in the end. After having read the introduction, subjects were randomly assigned to two different rooms, one for the trustors and one for the trustees.

In Part I, all subjects were asked to complete a questionnaire, collecting information on demographic characteristics and trust attitudes.⁵ In Part II, all subjects played a dictator game in the role of the dictator. The dictator was asked to allocate a fixed endowment S between herself and a recipient who did not receive any money. The dictator earned $S - X_{DG}$ and the recipient earned X_{DG} . In Part III, all subjects played a triple dictator game in the role of the dictator. The only difference to the standard dictator game is that any amount X_{TDG} given to the recipient was tripled by the experimenter. Accordingly, the dictator’s earnings were, $S - X_{TDG}$, and the recipient’s earnings were $3X_{TDG}$.⁶

³ We will refer to attitudes to risk to describe our subjects’ behavior but are aware that we are dealing with relatively small stakes here and thus may want to describe behavior by attitudes to losses instead (Rabin 2000).

⁴ See the literature started by Glaeser, Laibson, Scheinkman and Soutter (2000).

⁵ The experimental instructions are available from the authors upon request. As Glaeser et al. (2000), we elicited trust attitudes before we measured trust behavior experimentally. This allows us to examine whether the—surprising—lack of a correlation between trust attitudes and trust behavior in the Glaeser et al. study was due to subjects knowing each other. Their investment game measured trust in a specific, identified individual, which may not be correlated with general trust attitudes.

⁶ While everyone played the game in the role of the dictator, subjects were informed that at the end of the whole experiment one of them would be randomly chosen to be the dictator and one the recipient.

In Part IV, subjects played the trust game—in room A in the role of the trustor and in room B in the role of the trustee. The only difference between the trust game and the triple dictator game was that the trustee could send back any amount of money Y between 0 and $3X$. The trustor's earnings thus were $S - X + Y$ while the trustee earned $3X - Y$. We used the strategy method where the trustees had to decide on a contingent action for every possible amount sent by the trustors. In addition to indicating how much they wanted to send, we also asked trustors to report what they expected to get back.⁷

In Part V, all subjects had to indicate for six risky choice tasks whether they preferred the gamble or the certain amount. They could choose to bet on a 50%-chance of winning 300CU or nothing or to accept a certain amount that varied between 40CU and 140CU in the six choice tasks. The more people prefer the sure thing to the gamble, the more risk averse they are.

The sequence in which subjects participated in Parts II, III, IV and V was varied. In half of our sessions, subjects played these parts in order; in the other half, subjects were confronted with Part IV first before participating in Parts II, III and V. Each part of the experiment was conducted like a “standard experiment”: The instructions for each part, consisting of one decision form, were distributed one at a time. After subjects had read the instructions, the experimenter read the instructions aloud. Participants were then invited to ask questions in private (hardly any questions were asked). Subjects then had to write down their decision, fold the decision form and put it into a box, which was passed around. Completed decision forms remained in the box in front of the room until the end of the experiment. The same procedure was repeated for each part.

The endowment S was 100CU (currency units) in our experiments. Adjusted for purchasing power parity, this meant $S = \$100$ in the United States, $S = 1000$ Roubles in Russia and $S = 400$ Rands in South Africa.⁸ In the trust game, the strategy method was implemented as follows: trustors had to choose between 11 possible amounts to be passed on to the trustee (0, 10, . . . , 100 CU) and trustees had to indicate for each possible positive amount how much they would return. We did not restrict subjects' choices in the dictator games. They could send any amount between 0 and 100CU.

Subjects were paid randomly at the end of the whole experiment; they did not learn about any results during the experiment. More specifically, for each game in parts II to IV, two people (a dictator and a recipient or a trustor and a trustee) were randomly selected and matched at the end of the experiment to be paid according to their choices in the corresponding game. For the individual decision task in part V, one person was randomly paid according to his or her choice.

The experiments were conducted with 359 college students: 118 students from universities in Moscow, Russia, 129 students from universities in Capetown, South Africa, and 112 students from universities in Boston, United States. We ran four experimental sessions in each country, two with the dictator games first and two with the trust game first. The experimenters who ran experiments in Russia and in South Africa also ran one session in the United States.

⁷ To decrease complexity in an already quite complex experiment, we chose not to reward subjects for accuracy of expectations. The evidence about whether payment increases accuracy or not is not conclusive. In a recent extensive study on the relationship between beliefs and actions, Costa-Gomes and Weizsäcker (2003) conclude that the effects of the belief elicitation procedure on actions is mostly insignificant. There is general agreement that subjects are more likely to take their counterpart's incentives into account when beliefs are elicited than when making action choices only (e.g., Croson, 2000, Costas-Gomez and Weizsäcker, 2003).

⁸ We chose denominations such that the monetary incentives relative to subject income and living standards were approximately equal across countries. The experiments were conducted in 2001. The average lunch in the student cafeteria cost \$ 5 in Boston, 50 Roubles in Moscow and 20 Rands in South Africa.

No experimenter effects could be found.⁹ The experiment took about one hour and thirty minutes. A show-up fee of 10CU was paid and subjects earned on average an additional 22CU.

A non-standard experimental format was required to test our hypotheses—a within-subject design to control for subjects' social preferences and expectations; a three-country design to allow for heterogeneity in behavior and motivation more globally than just among American subjects; the strategy method to learn about each trustee's return function; and high stakes with random payment to make conducting such a long and complex experiment feasible. We address the first two aspects of our design by controlling for order and country effects econometrically. There is only little evidence on how the latter two design aspects might affect behavior. For example, Brandts and Charness (2000) suggest that the strategy method does not affect behavior differently from the choice method and Laury (2002) presents evidence supporting the validity of the random-choice payments method. She found that subjects take (high) stakes at their stated value and do not scale-down to account for random payment. While we control for design effects to the best of our ability, we cannot exclude the possibility that our design affects behavior differently than other, more standard, designs.

3. Conceptual framework

Trust is defined as the amount sent in the trust game, X , and trustworthiness as the amount returned, Y , divided by the amount received, $3X$, that is $Y/3X$. $E(Y/3X)$ indicates trustors' expectations of the fraction returned. $X_{\text{T DG}}$ is the amount sent in the triple dictator game and X_{DG} the amount sent in the dictator game. Table A.1 in the Appendix provides the specific definitions of all our variables. We estimate the following equations:

$$X = \alpha + \beta E(Y/3X) + \gamma X_{\text{T DG}} + \delta \text{controls} \quad (1)$$

$$Y/3X = \alpha + \beta 3X + \gamma X_{\text{DG}} + \delta \text{controls} \quad (2)$$

We compare the following hypotheses for trust:

H1_T: Trust is only based on expectations of trustworthiness.

We take as evidence for $H1_{\text{T}}$ if X is related to the expected fraction returned, $E(Y/3X)$, but not to the amount sent in the triple dictator game, $X_{\text{T DG}}$.

H2_T: Trust is only based on unconditional kindness.

$H2_{\text{T}}$ is supported if X is related to the amount sent in the triple dictator game, $X_{\text{T DG}}$, but not to the expected fraction returned $E(Y/3X)$.

Further support for both hypotheses is provided if the constant is close to zero, indicating that trustors do not derive any intrinsic benefits from the act of trusting.

For trustworthiness, we compare:

H1_{TW}: Trustworthiness is only based on reciprocity.

We take as evidence for $H1_{\text{TW}}$ if $Y/3X$ is related to the amount received, $3X$, but not to the amount sent in the dictator game, X_{DG} .

H2_{TW}: Trustworthiness is only based on unconditional kindness.

⁹ In order to ensure equivalence of experimental procedures across countries, we followed Roth et al. (1991) on designs for multinational experiments and controlled for experimenter, currency and language effects to the best of our ability.

$H2_{TW}$ is supported if $Y/3X$ is strongly related to the amount sent in the dictator game, X_{DG} , but not to the amount received in the trust game, $3X$.¹⁰

To be able to compare our results with earlier work (Dufwenberg and Gneezy, 2000; Cox, 2004), we use behavior in the dictator and the triple dictator games to assess our subjects' unconditional kindness. We acknowledge that this is a relatively crude step as we assume that kindness is unconditional on what one's counterpart's actions are (or are expected to be) as well as on the payoff-possibilities following those (expected) actions.

The approach is of particular concern for trustworthiness as the relative income positions of the trustee and the trustor may differ dramatically from the relative income positions of the dictator and the recipient. In contrast, in the trust and the triple dictator game, both, the trustor and the dictator, start with CU100 and the trustee and the recipient with zero (plus a show-up fee of 10CU in both cases). To test for the robustness of our results, we thus run two sets of regressions for trustworthiness, one where we include dictator game giving directly as a proxy for unconditional kindness and one where we impose a particular social preference profile on all trustees, namely fixed distributional preferences. This provides us with a measure of how much the trustee would need to return in the trust game in order to create the same ratio of payoffs between herself and her counterpart as she created in the dictator game. We call this the *predicted (distributional preference-based) remit function*, $(Y/3X)_{predicted}$.¹¹

We are somewhat uneasy about imposing one specific preference profile on all our subjects, given the substantial heterogeneity in subjects' preference profiles found in dictator games (e.g., Andreoni and Miller, 2002). We examine the degree of heterogeneity in our subjects' response modes by comparing our subjects' behavior in the dictator and the triple dictator games. We find that a majority of our subjects, 53 percent, behave according to a fixed distributional preference profile. While we clearly notice substantial heterogeneity, a fixed distributional preference profile describes our subjects better than any other profile.¹²

4. Experimental results

We first present an overview of our behavioral data and trustors' expectations of return and then proceed with the specific results related to our hypotheses.

Overview

On average, our trustors send 45CU of their endowment of 100CU to their trustees (N = 179), and our trustees return 27 percent of the money received to their trustors (N = 1790). As we used the strategy method, we have ten times as many data points for the trustees than for the trustors because the latter indicated how much they would return for each possible

¹⁰ A positive intercept can be interpreted similarly as above but we do not discuss it further as trustees could not return a positive amount when they received zero.

¹¹ For details on this calculation, see the working paper by Ashraf, Bohnet and Piankov (2005). Fixed distributional preferences are compatible with inequity aversion, see Fehr and Schmidt (1999) and Bolton and Ockenfels (2000).

¹² Of the remaining 47 percent, 16 percent send the same positive amount in the DG and the TDG, and 31 percent respond to the decrease in the price of giving in the TDG by sending more in the TDG than in the DG.

positive amount sent to them. (We cluster the data by individuals in the regressions.) The method also keeps us from losing data due to those trustees who would not have received anything. In the dictator game, subjects send 25CU, and in the triple dictator game, 24CU (N = 358) on average.

We first note that the mean amounts sent and returned in our games are surprisingly close to the standard results in trust and dictator games despite the fact that our design substantially differs from earlier designs. Camerer (2003) reports in his survey of experimental results that typically dictators send about 20 percent while trustors send about 50 percent of their endowment, and trustees return about the amount that trustors sent to them, i.e. about one third of the tripled amount on average. The triple dictator game has not been studied widely. Cox (2004) finds that subjects send 36 percent of their endowment on average, which is somewhat more than what we find.

Figures 1a–1d in the Appendix present the distribution of choices in all games for the three countries. A Mann-Whitney and a Kolmogorov-Smirnov test reveal no significant differences in the means and the distributions of choices of Americans, Russians and South Africans or of men and women in the three games.¹³ The biggest difference in behavior can be found between white and nonwhite South Africans in the trust game, with nonwhite trustors sending 33CU and white trustors sending 52CU to their trustees (M-W U-test, $p < 0.01$, K-S test, $p < 0.05$).

159 of our 175 trustors¹⁴ send a positive amount to their trustees. Out of those who trust, 38% expect to get back less than they sent, 26% expect to break even and 36% expect back more than they sent. Expectations are surprisingly well calibrated and close to the average amount returned, the social norm, in a given country. Comparing average amounts expected back for each possible amount sent with the actual returns received, we find that the only significant outlier is full trust, i.e., $X = 100\text{CU}$. Trustors expect to get back about 150CU but trustees only return about 100CU on average (M-W U-test, $p < 0.01$).

Result 1: Trust: Expectations of trustworthiness or unconditional kindness?

In order to better understand what is driving the variation in our sample, we run multivariate regressions where in addition to expectations of return and unconditional kindness, we control for attitudes to risk, a number of demographic variables, attitudes to trust and order effects.

Table 1 presents the regressions for the trustors. A basic model of demographic characteristics, trust attitudes and risk preferences explains little of the variation observed (15% of the total variation, see Column 1). This basic model suggests that risk preferences do not matter for trust,¹⁵ that South African non-whites trust less than others and that there is

¹³ The experimental evidence on gender is not conclusive. However, in most dictator games, women tend to send more than men and in most trust games, women tend to be less trusting but more trustworthy than men (for a survey, see Croson and Gneezy, 2004). For more information on the break-down of our data, please see our working paper (Ashraf et al., 2005).

¹⁴ Out of the 179 trustors in our full sample, 2 did not answer the question to measure expectations of return, and 2 expected back a sum that they couldn't possibly get back because it was above 3 times the amount they sent.

¹⁵ Studies focusing on the relationship between people's willingness to take risk and trust behavior report mixed results (e.g., Eckel and Wilson, 2004, Schechter forthcoming). Bohnet and Zeckhauser (2004) suggest that in addition to attitudes to risk, attitudes to betrayal have to be taken into account in the trust game.

Table 1 Determinants of amount sent in the trust game¹⁶

	(1)	(2)	(3)	(4)
Expectations, $E(Y/3X)$		112.774 (8.969)***		101.291 (9.005)***
Uncond. kindness, X_{TGD}			0.708 (0.119)***	0.379 (0.093)***
Risk aversion	-1.702 (1.580)	-1.054 (1.115)	-2.165 (1.432)	-1.368 (1.066)
Dictator 1 st (yes = 1)	-17.227 (4.987)***	-6.399 (3.618)*	-15.410 (4.524)***	-6.530 (3.449)*
South Africa	12.728 (9.128)	9.196 (6.438)	6.345 (8.330)	6.143 (6.183)
Russia	5.910 (7.882)	0.751 (5.570)	7.773 (7.140)	2.272 (5.322)
US non-white	-6.346 (8.979)	-0.963 (6.342)	-0.609 (8.184)	1.556 (6.078)
SA non-white	-28.447 (8.997)***	-18.110 (6.394)***	-19.241 (8.289)**	-14.240 (6.169)**
Gender (male = 1)	-5.128 (5.405)	-3.112 (3.813)	-6.079 (4.895)	-3.826 (3.639)
Age group (1–6)	-0.480 (4.167)	-1.046 (2.937)	-1.137 (3.773)	-1.340 (2.800)
Econ. situation (1–6)	-3.985 (2.805)	-3.627 (1.977)*	-3.149 (2.542)	-3.217 (1.887)*
Economics major	1.520 (6.628)	-4.354 (4.694)	4.178 (6.015)	-2.335 (4.502)
# of organizations	-0.674 (1.951)	-1.393 (1.376)	-0.083 (1.769)	-1.003 (1.316)
Trust strangers	1.781 (6.787)	-0.582 (4.786)	-1.013 (6.160)	-1.835 (4.573)
Constant	74.334 (16.562)***	39.410 (11.997)***	55.618 (15.317)***	32.960 (11.546)*** [2pt]
Observations	168	168	168	168
R-squared	0.15	0.58	0.31	0.62
Adjusted R-squared	0.09	0.55	0.25	0.59

The dependent variable is X, the amount sent in the trust game. Robust standard errors in parentheses.

*Significant at 10%.

**Significant at 5%.

***Significant at 1%.

¹⁶Our sample size for the trust regressions is 168. From our complete sample of 179, we lose 11 subjects because of missing or implausible observations. Note that 24 of our trustors send *less* in the trust game than in the triple dictator game, suggesting that expectation-based trust is not just the additive difference between what is sent in the trust and the triple dictator game. Comparing men and women, expectations matter more for women's and unconditional kindness more for men's trust (see Ashraf et al. 2005 for a more detailed analysis).

an order effect: those who play the dictator game first, send significantly less in the trust game ($X = 37\text{CU}$) than those who play the trust game first ($X = 52\text{CU}$). Column 2 presents a regression where we add the expected proportion returned, $E(Y/3X)$, to the set of explanatory variables. The coefficient on expectations is highly significant statistically and economically: an increase in expected proportion returned by 1% increases the amount sent by 1.1CU, on average. The inclusion of expected fractions returned substantially reduces the order effect, both in magnitude and in significance. When people play the dictator game first, they expect to get back a slightly though not significantly smaller fraction ($E(Y/3X) = 0.28$) than when they play the trust game first ($E(Y/3X) = 0.32$).¹⁷ Column 3 includes the amount sent in the triple dictator game in addition to the controls. $X_{\text{T DG}}$ is highly significant. Those who send 1CU more in the triple dictator game tend to send 0.7CU more in the trust game.

In Column 4, we find that trust decisions are related to both expectations of return and unconditional kindness, although the coefficients on both, proportion expected back and especially $X_{\text{T DG}}$, decrease in magnitude when the two are included together. In all specifications, the constant is significantly positive, suggesting that trustors derive satisfaction from trusting independent of amounts expected back and unconditional kindness. Column 4 also suggests a persistent race effect in South Africa: nonwhites trust less than whites in South Africa but not in the U.S. Our findings on race are in line with earlier results on race: It is the groups that historically felt discriminated against, which are less likely to trust (Alesina and LaFerrara, 2002). At the beginning of the 21st century, such discrimination is more prevalent in South Africa than in the United States.

Result 2: Trustworthiness: Reciprocity or unconditional kindness?

A trustee returns money to the trustor if she is motivated by reciprocity and/or unconditional kindness. The positive relationship between amounts received and amounts remitted has mostly been interpreted as an indicator for reciprocity in the literature so far (e.g., Camerer and Fehr, 2004). However, without further analysis the conclusion that a positive slope of the return function is an indicator for reciprocity seems only warranted for unconditionally selfish players who send nothing in the dictator game. Any positive fraction that they return in the trust game cannot be due to innate kindness. For everyone else, however, a positive relationship between amounts received and fractions remitted warrants further analysis.

As trustors send more money to the trustees (and keep less for themselves), trustees have to return proportionally more money to live up to their distributional preferences. An egalitarian type with fixed distributional preferences, for example, would not remit any money for small amounts sent but would remit 50% if she received 300CU. Figure 1 illustrates how much an egalitarian type who sends 50CU in the dictator game would have to remit in the trust game according to the predicted remit function introduced above, i.e., if she were motivated by her distributional preferences only. The theoretical preference-based remit function is compared with the experimentally observed remit function. Figure 1 shows that egalitarian types remit more than predicted by the preference-based theoretical remit function when sent small amounts and less when sent large amounts. This pattern does not suggest that these players are motivated by reciprocity.

¹⁷ These beliefs appear to be well-calibrated: trustees give back slightly less in the trust game when they played the dictator game first ($Y/3X = 0.26$) than when they played the trust game first ($Y/3X = 0.28$).

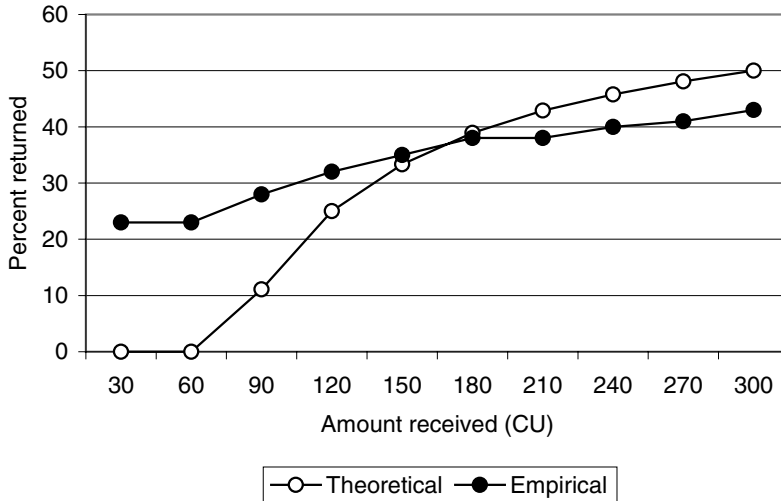


Fig. 1 Fractions remitted by egalitarian types based on their predicted (theoretical) and observed (empirical) remit functions.

In order to differentiate between the two motives more precisely, we run a regression. Table 2 presents the regression results for the trustees. We take it as an indicator of reciprocity if the percent returned, $Y/3X$, increases with the amount received, $3X$, controlling for kindness. To test for whether the specification of kindness affects results, we include the amounts sent in the dictator game directly into our regressions in Column 3 and use a fixed distributional preference profile in Column 4.

Our control variables in Column 1 explain only 7% of the variation in our sample. Two control variables are significant. Russians remit more than others and “Trust strangers” is related to the percentage returned, suggesting that generally, the trust question picks up trustworthiness rather than trust. This finding is line with Glaeser et al.’s (2000) results for Harvard undergraduates. When our main explanatory variables—amount received in the trust game, amount given in the dictator game and predicted distributional preference—are included, all have high statistical and economic significance. In Column 2, we find that one extra CU received increases the percentage of the money returned by 0.05%, which means that when a subject receives the full 300CU, she returns about 15% of the amount received. Column 3 shows that our subjects return 0.3% more of the amount received for every CU they send in the dictator game, meaning that an “egalitarian” person who splits the money equally in the dictator game will return 15% more than an egoist who keeps all the money in the dictator game.

When reciprocity, $3X$, and unconditional kindness, X_{DG} , are combined in Column 5, both variables maintain their levels and significance, suggesting that these two factors coexist in the decision process. However, if X_{DG} is replaced by the predicted distributional preferences, the effects of reciprocity disappear (Column 6). This suggests that the observed positive slope of percentage returned need not be based on people’s willingness to reward trust by being kind in return. They may only care about their distributional preferences.

Independent of the specification, including the behavioral variables increases the variation explained to a bit more than 20%. Overall, we reject both our hypotheses. However, in contrast

Table 2 Determinants of percentage returned in the trust game¹⁸

	(1)	(2)	(3)	(4)	(5)	(6)
Amount received, 3X		0.00052 (0.00006)***			0.00052 (0.00006)***	0.00010 (0.00009)
Uncond. kindness, X _{DG}			0.003 (0.001)***		0.003 (0.001)***	
Predicted distr. pref.				0.442 (0.051)***		0.416 (0.066)***
Risk aversion	-0.009 (0.009)	-0.009 (0.009)	-0.010 (0.008)	-0.009 (0.008)	-0.010 (0.008)	-0.009 (0.008)
Dictator 1st (yes = 1)	-0.023 (0.024)	-0.023 (0.024)	-0.014 (0.021)	-0.016 (0.021)	-0.014 (0.021)	-0.016 (0.021)
South Africa	0.028 (0.038)	0.028 (0.038)	0.024 (0.036)	0.026 (0.036)	0.024 (0.036)	0.026 (0.036)
Russia	0.073 (0.033)**	0.073 (0.033)**	0.061 (0.030)**	0.060 (0.030)**	0.061 (0.030)**	0.061 (0.030)**
US non-white	0.011 (0.035)	0.011 (0.035)	0.033 (0.036)	0.022 (0.035)	0.033 (0.036)	0.021 (0.035)
SA non-white	-0.019 (0.038)	-0.019 (0.038)	-0.023 (0.035)	-0.025 (0.035)	-0.023 (0.035)	-0.025 (0.035)
Gender (1 = male)	-0.004 (0.024)	-0.004 (0.024)	0.003 (0.022)	0.002 (0.022)	0.003 (0.022)	0.002 (0.022)
Age Group (1-6)	0.001 (0.021)	0.001 (0.021)	0.001 (0.019)	0.001 (0.019)	0.001 (0.019)	0.001 (0.019)
Economic situation (1-6)	-0.001 (0.011)	-0.001 (0.011)	0.003 (0.011)	0.004 (0.011)	0.003 (0.011)	0.004 (0.011)
Economics major	0.044 (0.031)	0.044 (0.031)	0.026 (0.028)	0.027 (0.029)	0.026 (0.028)	0.028 (0.029)
# of organizations	-0.002 (0.008)	-0.002 (0.008)	-0.002 (0.007)	-0.001 (0.007)	-0.002 (0.007)	-0.001 (0.007)
Trust strangers	0.085 (0.028)***	0.085 (0.028)***	0.054 (0.025)**	0.057 (0.025)**	0.054 (0.025)**	0.059 (0.025)**
Constant	0.257 (0.073)***	0.172 (0.074)**	0.174 (0.070)**	0.196 (0.068)***	0.089 (0.071)	0.184 (0.069)***
Observations	1770	1770	1770	1770	1770	1770
R-squared	0.07	0.13	0.18	0.22	0.24	0.23
Adjusted R-squared	0.06	0.12	0.18	0.22	0.24	0.22

The dependent variable is Y/3X, the amount returned divided by the amount received. Robust standard errors in parentheses; observations are clustered by individual.

*Significant at 10%.

**Significant at 5%.

***Significant at 1%.

¹⁸Our sample size for the trustworthiness regressions is 177. From our complete sample of 179, we lose 2 subjects because of missing observations for one of the independent variables.

to trust, unconditional kindness accounts for most of the variance explained while reciprocity plays a comparatively small role.

5. Conclusions

In his book on “Behavioral Game Theory”, Colin Camerer (2003) suggests that one of the “Top Ten Open Research Questions” is the following: “What game do people think they are playing?” Our results suggest that many people may play a different game than researchers thought they were playing when confronted with the “investment game.” Only 36 percent of the 159 trustors who decided to send any money in our “investment game” expected to make money.

Trust is based on beliefs of trustworthiness and on unconditional kindness; trustworthiness is related to unconditional kindness and reciprocity. Expectations of trustworthiness account for most of the observed variance in trust and unconditional kindness for most of the explained variation of trustworthiness behavior.

We would not have been able to estimate the relative importance of expectations of return and reciprocity as compared to unconditional kindness, had we only compared average behavior in a between-subject design. Our experiments are a first attempt at better understanding what motivates people to do the things they do, by including preferences, as revealed by behavior, as explanatory variables. We believe that many other economic experiments could benefit from a combination of within- and between-subjects designs.

Our design allowed us to solve one of the important trust puzzles, namely that people trust even though hardly anyone makes money by doing so. We found that generally, people are aware of this. They trust even though they know it does not pay monetarily. They enjoy the act of trusting and being kind to others, even to anonymous strangers. If these psychological returns of trust are taken into consideration, people may not make a bad investment when trusting.

Appendix

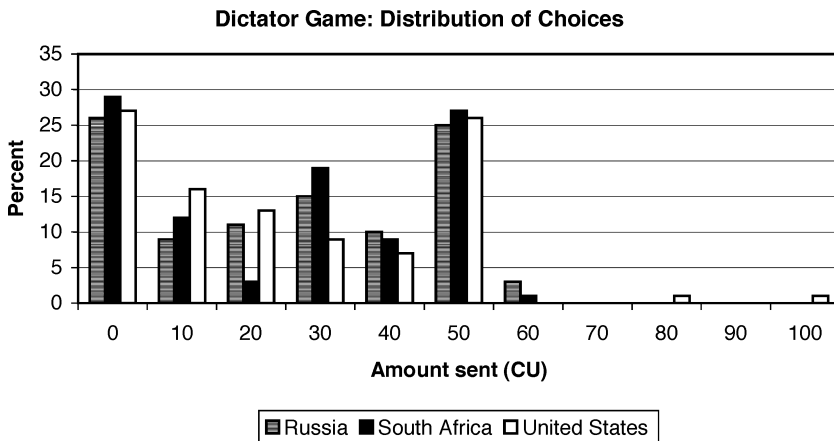


Fig. 1a Dictator game choices.

Table A.1 Variable definitions

Concept	Variable Name	Variable Description	Range of values
Trust behavior	X	Amount trustor sends in Trust Game	0 to 100CU
Trustworthiness behavior	Y/3X	Amount trustee returns, as a proportion of amount received	0 to 1
Unconditional kindness for Trust	X _{TDG}	Amount subject sends in Triple Dictator Game	0 to 100CU
Unconditional kindness for Trustworthiness	X _{DG}	Amount subject sends in Dictator Game	0 to 100CU
Predicted distr. Preferences for Trustworthiness	(Y/3X) _{predicted}	Predicted distributional preferences for trustworthiness based on subject's behavior in Dictator Game	0 to 1
Expectations of return	E(Y/3X)	Amount trustor expects back, as a proportion of amount received by trustee	0 to 1
Reciprocity (amount received)	3X	Amount trustee receives in Trust Game	0 to 300CU
Attitude to risk	Risk aversion	Number of risky gambles rejected in favor of sure thing by subject	0 to 6
Order effect	Dictator 1 st	Whether the subject played the dictator game prior to the trust game	0 = No, 1 = Yes
South Africa	South Africa	Whether the subject participated in the experiment in South Africa	0 = No, 1 = Yes
Russia	Russia	Whether the subject participated in the experiment in Russia	0 = No, 1 = Yes
Race	Race	Whether the subject is non-white	0 = White, 1 = Non-white
Race in US	US non-white	Whether the subject is a non-white person in the US	0 = No, 1 = Yes
Race in SA	SA non-white	Whether the subject is a non-white person in South Africa	0 = No, 1 = Yes
Gender	Gender	Gender of the subject	0 = female, 1 = male
Age	Age group	Age of the subject	1 to 6 (1 = "Under 20", 6 = "Over 60")
Economic situation	Economic situation	Economic well-being of the subject	1 to 6 (1 = "Poor", 6 = "Wealthy")
Education	Economics major	Whether the subject majors in economics	0 = No, 1 = Yes
Organizational membership	# of organizations	Number of organizations the subject belongs to	Integer value
Trust attitude towards strangers	Trust strangers	"Generally speaking, which of the following people do you feel you could trust not to cheat you?"	1—if subject trusts one of the following: members of one's religion, citizens of one's country, or foreigners. 0—if subject does not trust any of the above groups

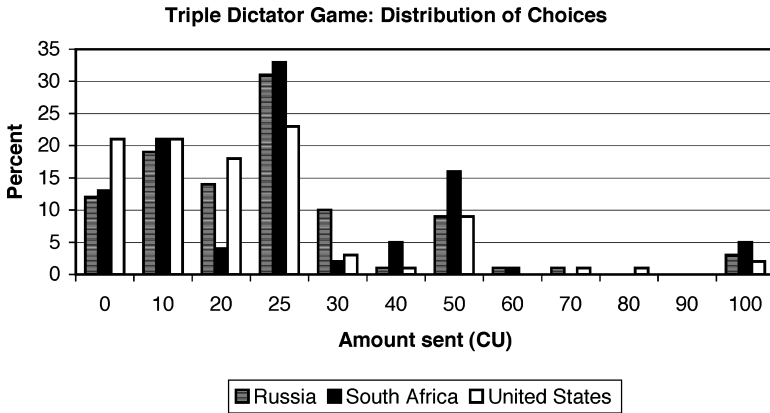


Fig. 1b Triple dictator game choices.

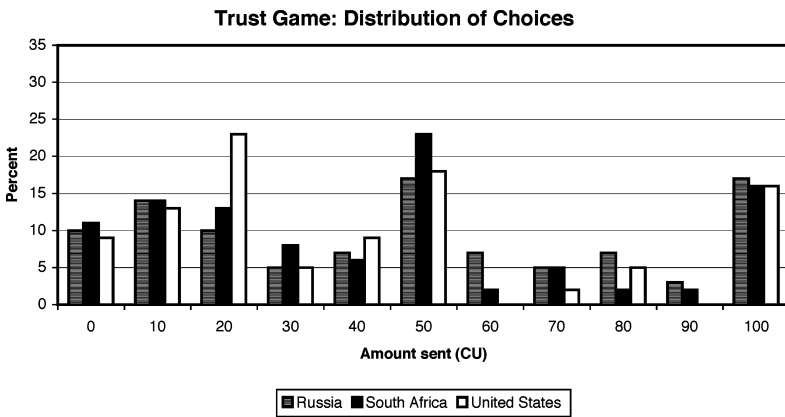


Fig. 1c Trust game choices—trustors.

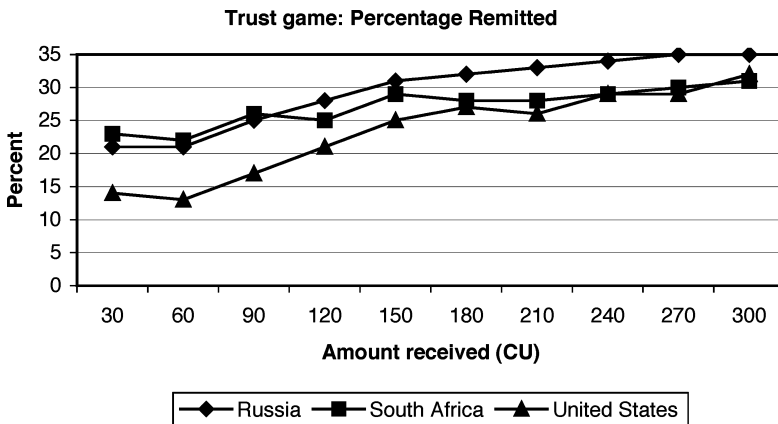


Fig. 1d Trust game choices—trustees.

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