ELSEVIER

Journal of Economic Behavior & Organization
Vol. 55 (2004) 447–465

JOURNAL OF
Economic Behavior
& Organization

www.elsevier.com/locate/econbase

Is trust a risky decision?

Catherine C. Eckel[a,*], Rick K. Wilson[b,1]

[a] *Department of Economics, Virginia Polytechnic Institute, State University, Blacksburg, VA 24061, USA*
[b] *Department of Political Science, Rice University, Houston, TX 77251, USA*

Available online 30 July 2004

Abstract

In a series of laboratory experiments that focus on a two-person sequential, binary trust game, we examine the relationship between risk attitudes and the decision to trust an anonymous partner. Our experiments include two behavioral risk measures and one survey measure of risk attitudes in addition to the trust game. We find no statistical relationship between the behavioral risk measures and the decision to trust. With additional control variables, there is a weak relationship between risk measured from the survey and the decision to trust.

JEL classification: C9; D81; Z13

Keywords: Bargaining games; Trust; Risk aversion; Laboratory experiments

1. Introduction

Is trust risky? In much research on trust, the decision by someone whether to trust another person is viewed as similar to placing a risky bet on the trustworthiness of an anonymous counterpart in a situation where both can gain from reciprocal exchange. This abstract setting captures important elements of trade between two anonymous persons where there are potential gains from trade, but in which there are incomplete property rights or in which contract enforcement is costly. The decision to trust is conceived to be a problem of one individual offering an asset to another but it is uncertain whether the value of the asset will be returned. For example, if an actor A makes a loan to actor B and there is no costless

* Corresponding author. Tel.: +1 540 231 7707; fax: +1 540 231 5097.
E-mail addresses: eckelc@vt.edu (C.C. Eckel), rkw@rice.edu (R.K. Wilson).

[1] Tel.: +1 713 348 3352.

0167-2681/$ – see front matter
doi:10.1016/j.jebo.2003.11.003

mechanism for ensuring that the loan be repaid by B, then A must think of B as being trustworthy if the loan is to be made. A's decision to make the loan is often thought of as a risky bet about the trustworthiness of B.

In their survey of trusting and trustworthiness, Ben-Ner and Putterman (2001, p. 530, italics added) argue that trusting is related to risk: "Consider next the determinants of trusting. The main factors are A's information about B (and his trustworthiness), A's experience with trustworthiness in other transactions, and A's preferences and dispositions, including but not limited to, *her willingness to bear risk*." While there are a number of determinants of trusting behavior, if A has no reputation information about B (e.g., no prior interactions), then A's past experience in similar settings and A's own risk attitudes will determine a willingness to trust. Indeed, Ben-Ner and Putterman (2001, p. 532) posit "the proposition that greater risk aversion leads to less trusting." They are not alone in making this claim. Elsewhere Cook and Cooper (2003, p. 217) argue that trust is similar to a sequential prisoner's dilemma game. For them the problem is clear for the truster: "First, I decide whether or not to "trust" you (or take a risk on you) and cooperate on the first play of the game, then you must decide whether or not to "honor" that trust by cooperating in turn. Clearly, this behavior can be viewed as risk taking by the first player."

While many researchers appear to accept this relationship between risk and trust, the relationship between the risk orientation of the truster and trusting behavior has not been explicitly studied. In the closest exploration, Snijders and Keren (1999) use binary trust games (where the truster decides to trust or not and the trusted player has a choice between two alternatives) and manipulate the size of payoffs to introduce risky and tempting moves. They find that the potential losses for a truster are important, though whether this is a good measure of the riskiness of the decision is an open question. At the same time other evidence suggests that risk may not be the only, or even the primary, factor determining a decision to trust. A subject's risk orientation is likely to remain relatively stable over the course of an experiment. If risk attitudes determine trust, subjects should not change their strategy when playing multiple trusting decisions. However, there is evidence that subjects condition, their choice of strategies on a variety of available information when making multiple trust decisions (Eckel and Wilson, 2003b; Anderhub et al., 2002). We focus on the empirical question of whether the risk orientation of a subject is correlated with the decision to trust.

Given these views on the nature of trust as a risky behavior, two factors should determine trust. First, social distance, or knowledge of a counterpart, should affect the likelihood of trust. Anonymity heightens the riskiness of such interactions since strangers have no information about their counterparts. Second, individual predispositions toward risk ought to predict when individuals will choose to trust and when they will not.

We conduct experiments in which subjects are randomly assigned to the role of truster or trusted. The experiment employs a novel design such that subjects are guaranteed to be strangers. Our procedure pairs subjects over the internet, with members of each pair drawn from different Universities who are extremely unlikely to recognize or run into one another.

During the course of the experiment subjects are given three different tasks designed to measure risk. Two are incentivised choice tasks, where subjects choose between different lotteries or between lotteries and certain amounts. One of these is a general measure of risk attitudes while the other is tailored to mimic the payoff structure of the typical trust game. The third is a 40-item survey instrument, the Zuckerman Sensation-Seeking Scale

V (SSS-V; Zuckerman, 1994). These tasks are then correlated with behavior in the trust game.

2. Research procedure and design

2.1. Subjects

We conducted 10 experimental sessions with a total of 232 subjects, half at Virginia Tech and the other half at Rice University. Subjects were recruited from introductory classes in economics and from dining halls to participate at a specific time at off-campus laboratories located in Blacksburg, VA, and Houston, TX. The number of subjects varied across sessions, ranging from 10 to 34. Subjects were 57.3 percent male, 69.4 percent were Caucasian, 9.1 percent were African-American, 12.5 percent were Asian-American, 5.6 percent were Hispanic and the remaining 3.4 percent were foreign nationals.

2.2. Procedure[2]

When subjects arrived at the lab they were asked to sign a consent form, checked in and were given a card assigning them to a specific computer. Each subject was then led to the assigned computer and given permission to browse the internet until we were ready to begin the experiment. Because subjects arrived at different times and because we had to coordinate activity at two sites, we allowed subjects to browse rather than converse with one another once in the lab. Once both sites had an equal number of subjects, then everyone was asked to stop browsing and open a window on the machine pointing to the experiment.[3] Brief oral instructions were read to subjects before beginning. After that, subjects completed a set of self-paced, computerized instructions. In a post-experiment questionnaire, 91.4 percent indicated that the instructions were clear. Once subjects began the experiment, no talking was allowed. Subjects were asked to raise their hands if they had a question, and the experimenter would come to them.

Subjects went through four components to the experiment. The first involved a computerized 40-question survey, the Zuckerman Sensation-Seeking Scale. Each question involves subjects choosing between two different activities, one of which is more risky. Subjects earned 10 experimental laboratory dollars for completing the survey (the exchange rate was 2 lab dollars for each US dollar). In the second part of the experiment, subjects were randomly paired with another individual at the other site to play a one-shot trust game. The roles of first or second mover were randomly assigned. In this trust game, modeled on Berg et al. [BDM] (1995), first movers could keep the 10 experimental dollars they had just earned,

[2] This paper examines part of the data collected for a larger project that included several different treatment combinations. For this paper, we restrict our attention to sessions that included all three-risk measures and the trust game. Other aspects of the project are analyzed in the additional papers cited in the references section.

[3] The experimenter's component of the program contains a messaging system so that, for example, the experimenters at the two sites can communicate and coordinate when everyone was ready. However, because this was the first time that we had attempted this type of an experiment, we also kept an open telephone line during each experiment. The usual problem involved limited turnout at one site or the other.

or pass it to their counterparts. If the money was kept, then this part of the experiment was finished; if sent, the amount was doubled, and the counterparts then decided among nine different allocations of the twenty dollars. Both first movers and second movers were asked to predict the actions of their counterparts.

The third part of the experiment took subjects through two types of risky financial decisions. The first decision task replicates the risk instrument designed by Holt and Laury (2002). After subjects make a series of choices between pairs of lotteries, one decision is selected at random, and this gamble is completed (though not until after the other risk instrument is completed). In the second instrument, subjects face a choice between 10 dollars with certainty and a distribution of outcomes designed to mimic the typical distribution of returned amounts from previous trust game experiments. The final component of the experiment requires that subjects respond to a questionnaire that measures attitudes toward trust and altruism, complete debriefing questions, and provide demographic information.

Once subjects completed the experiment, they were paid one-at-a-time and in private. At that time subjects were handed a debriefing form and asked whether they had any questions. Throughout the course of the experiment no deception was used.

2.3. Experimental tasks and games

2.3.1. The survey risk measure

The Zuckerman SSS form V is a 40-question survey instrument designed to elicit subject preferences for seeking out novel and stimulating activities, attitudes, and values. The survey asks subjects to choose their preferred alternative from a pair of statements about risky activities. For example, in one item the choices are (a) skiing down a high mountain slope is a good way to end up on crutches, or (b) I think I would enjoy the sensations of skiing very fast down a high mountain slope. The survey is comprised of four subfactors measuring different aspects of sensation seeking. The Disinhibition (DIS) factor measures non-conformity with standards of acceptable social behavior and includes drinking, gambling, and sex. The Boredom Susceptibility (BS) factor measures aversion to routine in one's life and intolerance of boring people. The Thrill and Adventure Seeking (TAS) factor measures preference for the thrills inherent in risky activities such as parachute jumping. Finally, the Experience Seeking (ES) factor addresses the preference for mentally arousing activities and a non-conforming lifestyle. This scale has been shown in previous studies to be related to risky behavior in a variety of situations (see Zuckerman for examples). Eckel and Grossman (2002) compare the scale with subjects' decisions in an environment with financial stakes and find only a very weak relationship. We include this instrument to determine whether individuals' self-reported preferences over hypothetical risky alternatives are consistent with their choice about whether to "risk" lending money to a stranger.

2.3.2. The trust game

In the second part of the experiment subjects participate in the trust game. First movers must choose whether to keep the $10 they earned for completing the survey or pass the $10 to their counterpart (keep in mind that both the first and second mover had earned $10). If a truster keeps the money, then this part of the experiment is finished. Otherwise the amount is doubled and the counterpart must then decide among nine different allocations

of the $20, ranging from ($0, $20) to ($20, $0) in $2.50 increments. This game differs from BDM in three ways. First, our first movers made an all-or-nothing decision, while the BDM subjects chose to send $0–$10 in increments of $1. We made this choice in order to simplify the game and to enhance statistical power. Second, in our experiment the amount sent is doubled, while in theirs the amount sent was tripled. This decision was made for budgetary reasons. Finally, our decision is framed as a "loan," while theirs used neutral language. Instead of a decision to keep or send any portion of a $10 allocation, our first-mover's decision is framed as a choice of whether to make a loan of $10 experimental dollars to a counterpart. We framed the decision in this way to provide context for the decision. The responses of subjects to other abstract games made us suspect that subjects might not think of this as a situation involving trust, per se.

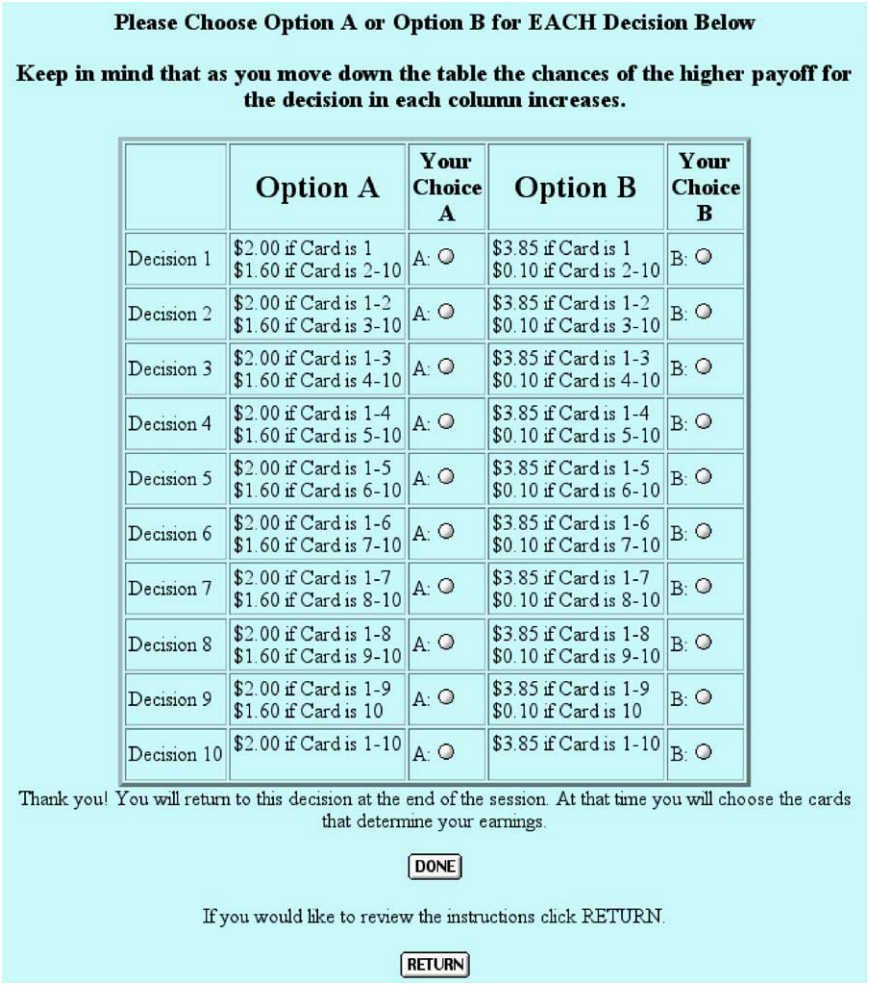
If the loan is made, subjects are told that the $10 will be "invested" and doubled. The second mover then determines the allocation of the resulting $20 in fixed increments. At one extreme the second mover could take all $20 and return $0 to the first mover, or the second mover could take $17.50 and return $2.50, and so on, as described above. In BDM, subjects make decisions in $1 increments. Finally, our experiment is computerized, while theirs is hand-run.

Although our game has many possible Nash equilibria, the single subgame-perfect equilibrium is for the first mover to decide to not make the loan, with second mover receiving nothing. Previous results from variations on this game indicate that a large fraction of subjects trust by sending some positive amount, and trust is just reciprocated on average (Berg et al., 1995; Glaeser et al., 2000; Croson and Buchan, 1999; Scharleman et al., 2001).

We also vary the information given to subjects about their counterpart using three different treatments. In all treatments, subjects were not told the university with which they were paired, but were told their counterparts were in "Virginia" or "Houston." In the first treatment, subjects received no information about their counterpart, except that they were at the other location. The second treatment revealed the sex of the counterpart. In this treatment, before completing the Zuckerman scale, subjects were asked to answer eight questions with a limited number of responses. Based on these responses, subjects were told the answers to four of the questions: favorite color of their counterpart, whether their counterpart liked dogs, whether their counterpart liked movies and their counterpart's sex. In the third treatment, subjects were photographed as part of the check-in process, and observed a photograph of their counterpart just prior to making the trust decision.[4]

We also collected data on subjects' expectations of each others' decisions. Regardless of whether the loan was made, the first mover was asked to predict the second mover's choice if the loan were made. Likewise, before being informed of whether the loan was offered, the second mover was asked to predict what the first mover intended to do. Once both subjects finished their tasks, the outcome was revealed. Subjects were then asked to type a brief answer to the question, "We are very interested in what you thought about the decision problem that you just completed. In the space below please tell us what kind of situation this problem reminds you of." This allowed us to determine whether the subject thought of "trust" when making their decision.

[4] We are not concerned with these manipulations in this article, although they are taken into account in the analysis. For a more detailed discussion the interested reader is referred to Eckel and Wilson (2003a).



Please Choose Option A or Option B for EACH Decision Below

Keep in mind that as you move down the table the chances of the higher payoff for the decision in each column increases.

	Option A	Your Choice A	Option B	Your Choice B
Decision 1	$2.00 if Card is 1 $1.60 if Card is 2-10	A: ○	$3.85 if Card is 1 $0.10 if Card is 2-10	B: ○
Decision 2	$2.00 if Card is 1-2 $1.60 if Card is 3-10	A: ○	$3.85 if Card is 1-2 $0.10 if Card is 3-10	B: ○
Decision 3	$2.00 if Card is 1-3 $1.60 if Card is 4-10	A: ○	$3.85 if Card is 1-3 $0.10 if Card is 4-10	B: ○
Decision 4	$2.00 if Card is 1-4 $1.60 if Card is 5-10	A: ○	$3.85 if Card is 1-4 $0.10 if Card is 5-10	B: ○
Decision 5	$2.00 if Card is 1-5 $1.60 if Card is 6-10	A: ○	$3.85 if Card is 1-5 $0.10 if Card is 6-10	B: ○
Decision 6	$2.00 if Card is 1-6 $1.60 if Card is 7-10	A: ○	$3.85 if Card is 1-6 $0.10 if Card is 7-10	B: ○
Decision 7	$2.00 if Card is 1-7 $1.60 if Card is 8-10	A: ○	$3.85 if Card is 1-7 $0.10 if Card is 8-10	B: ○
Decision 8	$2.00 if Card is 1-8 $1.60 if Card is 9-10	A: ○	$3.85 if Card is 1-8 $0.10 if Card is 9-10	B: ○
Decision 9	$2.00 if Card is 1-9 $1.60 if Card is 10	A: ○	$3.85 if Card is 1-9 $0.10 if Card is 10	B: ○
Decision 10	$2.00 if Card is 1-10	A: ○	$3.85 if Card is 1-10	B: ○

Thank you! You will return to this decision at the end of the session. At that time you will choose the cards that determine your earnings.

DONE

If you would like to review the instructions click RETURN.

RETURN

Fig. 1. Screen options for Holt/Laury financial risk instrument.

2.3.3. Risky Decision 1

The third part of the experiment replicates the experiment in Holt and Laury. Subjects faced a set of choices between two risky lotteries for each of 10 decisions. The decision sheet is reproduced in Fig. 1. Our payoffs replicate their low payoff condition. Note that the payoffs for choice A are always $2.00 or $1.60, and for choice B are $3.85 or $0.10. Probabilities for high and low payoffs are the same for both alternatives for each decision. Thus choice B always has higher variance. As the subject moves down the decision sheet, the probability gradually shifts from the lower to the higher payoff. The expected return is higher for choice A for the first four decisions, and for choice B after that. As in the procedure followed in Holt and Laury, subjects were told that one of the decisions will be chosen at random, and the lottery they chose would be played. We implemented the random

draw and the outcome of the lottery using images of cards laid out on the screen. The subject chose one from a set of 10 cards, then played the decision on that card. The lottery itself was played similarly using 10 cards of a different color.

2.3.4. Risky Decision 2

Before learning their payoff for the choice in the Holt/Laury instrument, subjects completed a second risky decision, a choice between a certain amount and a risky bet with the same expected value. We had them make this choice before knowing their payoff in the Holt/Laury task in order to avoid wealth effects. In this part of the risk measure, subjects were presented with a certain gain of $10 and a lottery over $0, $5, $10, $15 and $20. The probabilities over the risky outcomes were chosen to mimic payoffs in the standard trust game, where trusters receive, on average, the amount sent (see Berg et al., 1995). The decision problem resembles the loan problem for the first movers in that the certain amount is similar to not making the loan. The risky choice is similar to making a loan because the repayment by the second mover is uncertain. This task allows us to calibrate risk in a setting resembling the payoff structure of the trust game.[5] Subjects who chose the lottery then saw the values represented on 10 cards. The probabilities were given by the number of cards indicating each outcome (respectively 1/10, 2/10, 4/10, 2/10 and 1/10) that were then shuffled and dealt on the screen, with the subject choosing one card. The subject earned the value of the card drawn.

2.3.5. Post-experiment questionnaire

After completing all decisions, subjects were asked to complete a three part questionnaire that collected (1) demographic information, (2) answers to survey questions designed to measure trustworthiness and altruism,[6] and (3) debriefing information. Altogether, subjects completed the Zuckerman Sensation-Seeking Scale, participated in a trust game, completed the financial risk instrument, and answered questions in an exit survey. Our primary interest is whether decisions to trust vary with respect to the individual risk orientations of the subjects as measured by three different instruments.

3. Results

3.1. Risk instruments

We first discuss the basic results and properties of the three risk instruments. Table 1 contains summary data for subjects at both sites on the Sensation-Seeking Scale (Zuckerman). Tests reveal no differences across the two groups of subjects. The table includes the subscales, which can take on a range from 0 to 10, and the overall measure, which can range from 0 to 40. The SSS is an additive scale, with each question taking on a value of zero or one. Higher scores indicate greater sensation-seeking behaviors. A validity check for the scale involves comparing across sex. Traditionally women have a lower value on the SSS

[5] Bohnet and Zeckhauser (this volume) present subjects with a similar choice task as one of their three treatments, but their clever approach elicits minimum acceptable probabilities over the risky outcomes.

[6] For more information on these scales and analysis of the results see Eckel and Wilson (2003a).

Table 1
Sensation-Seeking Survey scores by sex of respondent

	All subjects (N = 232)	Men (N = 133)	Women (N = 99)	Means test t statistics (P value)
Total (S.D.)	21.14 (6.03)	21.90 (6.05)	20.12 (5.87)	2.24 (.03)
DIS (S.D.)	5.09 (2.91)	5.23 (2.87)	4.90 (2.97)	0.874 (.40)
BS (S.D.)	3.42 (1.96)	3.68 (1.97)	3.06 (1.89)	2.43 (.02)
TAS (S.D.)	7.19 (2.40)	7.62 (2.23)	6.61 (2.49)	3.27 (.001)
ES (S.D.)	5.43 (2.13)	5.36 (2.26)	5.54 (1.95)	−0.55 (.52)

Table 2
The number of risky options chosen in the Holt/Laury instrument

Number of risky choices	Male (N = 133)	Female (N = 99)	Total (N = 232)	Total[a] (consistent) (N = 202)	Holt/Laury
0–1	0.06 (8)	0.04 (4)	0.05 (12)	0.06 (13)	0.01
2	0.05 (7)	0.03 (3)	0.04 (10)	0.04 (9)	0.03
3	0.12 (16)	0.14 (14)	0.13 (30)	0.14 (29)	0.13
4	0.22 (29)	0.22 (22)	0.21 (51)	0.22 (44)	0.23
5	0.19 (25)	0.35 (35)	0.26 (60)	0.23 (46)	0.26
6	0.23 (31)	0.15 (15)	0.20 (46)	0.20 (41)	0.26
7	0.09 (12)	0.04 (4)	0.07 (16)	0.07 (14)	0.06
8	0.01 (1)	0.00 (0)	0.00 (1)	0.01 (1)	0.01
9–10	0.03 (3)	0.02 (2)	0.03 (6)	0.02 (5)	0.01
Mean number of risky choices	4.7	4.5	4.6	4.5	4.8

[a] This column removes subjects whose choices were inconsistent with the typical pattern of choices (i.e., A at the top, switching to B at some point). Most of those excluded appeared to be choosing randomly between the two alternatives. Excluding these subjects changes none of the results. They are included in subsequent analysis.

than males. Indeed, we find that for the general scale, men score higher than women. Only two of the four subscales show strong differences between the sexes (Boredom Susceptibility (BS) and Thrill and Adventure Seeking (TAS)). On the Disinhibition (DIS) subscale, men scored slightly higher than women, but the difference was not statistically significant. With ES, women score (insignificantly) slightly higher than men.

Table 2 contains summary data for the choices in the Holt/Laury task. Data are coded by the number of risky (B) choices.[7] Zero risky options indicate extreme risk-aversion, and choosing 10 risky options indicates extreme risk-seeking behavior. Subjects are on average somewhat risk-averse, with an average number of risky choices of 4.6 (six risky choices indicate risk neutrality). Consistent with most findings in the risk literature (see Eckel and Grossman, in press), women are more risk-averse in this instrument than men, though the difference is not statistically significant (t = 0.529, d.f. = 230, P = .30). The distribution of results is quite similar to Holt/Laury; however, our subjects are slightly more risk-averse than Holt/Laury report for their subjects, and our distribution of risk attitudes has fatter

[7] Note that Holt and Laury report their data by the number of safe choices. We have made the appropriate adjustments in comparing our data with theirs.

Table 3
Distribution of choices in Card Gamble by sex of the subject (frequencies in parentheses)

	Male	Female
Certain amount	23.3% (31)	26.3% (26)
Risky gamble	76.7% (102)	73.7% (73)

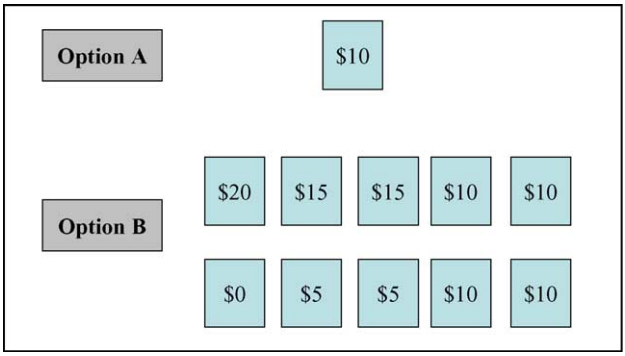


Fig. 2. Screen of Card Gamble risk instrument.

tails (more extreme risk aversion and risk seeking). This instrument is designed such that subjects choose less risky alternatives and then switch over at some point to the higher variance gamble. However, we find that 12.9 percent of the subjects were inconsistent, switching back and forth at least once. Column 5 contains only subjects with a single crossover between A and B choices. This sub-sample is slightly more risk-averse, but the distribution is not significantly different from the full sample. In subsequent analysis, we include all subjects' choices.[8]

Table 3 contains summary data for the Card Gamble risk instrument (Fig. 2), the choice between $10 and a distribution of outcomes that mimics payoffs in the trust game. About 75 percent of our subjects chose the gamble over the certain amount, indicating risk-seeking preferences, in contrast to the risk-aversion found with the Holt/Laury instrument. Males are slightly more likely to take the risky gamble than females, although there is no statistical difference between the sexes ($\chi^2 = 0.267$, d.f. = 1, $P = .61$).

Table 4 contains correlations for the three instruments with the P values in parentheses. The table also breaks out the correlations by treatment. Looking first at the overall correlations in the first two columns of the table, our primary finding is that the behavioral measures are only weakly correlated with each other. The overall Zuckerman scale and several of its components are positively and significantly correlated with the Holt/Laury measure; however these correlations are small in magnitude (around .2). Interestingly, the subscale that is most closely associated with gambling for its own sake, "Thrill and Adventure Seeking," is the only item not correlated with the Holt/Laury instrument. Neither of the other

[8] Harrison et al. (2003) reanalyze the full sample of Holt/Laury data, using interval regression, and treat subjects who switch back and forth as indifferent. They also analyze the relationship between individual characteristics (sex, income, etc.) and risk attitudes in their own data and find results similar to ours below.

Table 4
Correlations among risk measures, by treatment

Risk attitude measure	All Treatments		No Information (n = 46)		Information Only (n = 48)		Counterpart Photo (n = 138)	
	Holt/Laury	Card Gamble	Holt/Laury	Card Gamble	Holt/Laury	Card Gamble	Holt/Laury	Card Gamble
Holt/Laury	–	−0.08 (P = .20)	–	−0.19 (P = .20)	–	−0.03 (P = .83)	–	−.07 (P = .41)
Zuckerman SSS-V	0.21 (P = .001)	0.05 (P = .48)	−0.05 (P = .73)	0.20 (P = .18)	0.17 (P = .24)	0.002 (P = .99)	0.29 (P = .001)	.01 (P = .91)
Disinhibition	0.22 (P = .001)	0.09 (P = .19)	−0.02 (P = .88)	0.26 (P = .08)	0.16 (P = .26)	−0.19 (P = .20)	0.31 (P = .001)	.13 (P = .14)
Boredom Susceptibility	0.18 (P = .007)	−0.12 (P = .06)	0.10 (P = .50)	0.04 (P = .76)	0.34 (P = .02)	0.06 (P = .67)	0.14 (P = .10)	−.21 (P = .01)
Thrill and Adventure Seeking	−0.002 (P = .97)	0.08 (P = .22)	−0.27 (P = .06)	0.008 (P = .96)	−0.08 (P = .60)	0.14 (P = .31)	0.09 (P = .26)	.06 (P = .46)
Experience Seeking	0.15 (P = .025)	0.03 (P = .62)	0.10 (P = .51)	0.11 (P = .47)	0.08 (P = .60)	0.03 (P = .85)	0.19 (P = .03)	−.007 (P = .93)

measures is significantly correlated with the Card Gamble. The low correlation among the instruments is somewhat surprising and inconsistent with the notion that individuals have a fixed, domain-general utility function that is applicable to all risky situations.

Examining the experimental treatments separately, we see that for all treatments, the correlation between Holt/Laury and the Card Gamble is very low and statistically insignificant. The overall Zuckerman scale is positively correlated with Holt/Laury for the Information Only and Counterpart Photo treatments, and close to zero for the No Information treatment. This scale has a small, insignificant positive correlation with the Card Gamble for all treatments. The pattern of correlations between the Zuckerman subscales and the Holt/Laury measure is roughly consistent when comparing the Information Only and the Counterpart Photo treatments. Correlations between these scales are insignificant for the No Information treatment, though the TAS subscale is most strongly correlated with Holt/Laury for this treatment. Correlations are low for virtually every comparison.

We further examine the properties of the risk instruments by regressing them on demographic variables. Table 5 contains regression results using the three risk measures as dependent variables. OLS is used for the Zuckerman and Holt/Laury measures, and probit for the discrete Card Gamble measure. For the sex variable (female = 1), the coefficient is significantly negative only for the Holt/Laury instrument, indicating greater risk aversion for women, a result consistent with most studies that examine gender differences (see Eckel and Grossman, in press). The income variable is a self-reported index of family income, taking on values from 1 (less than $20,000) to 5 (more than $120,000). Income and income squared are consistently insignificant in the regressions: the Zuckerman and Card Gamble regressions have the expected sign indicating that higher income increases risk seeking, but at a diminishing rate. We control for whether subjects were first born or only children (this accounts for about half of the sample). This variable is strongly related ($P = .065$) to only the Card Gamble, with first born and only children more risk-averse. Coefficients on the first-mover variable are also insignificant for all measures, indicating that the subjects' experience as a first or second mover in the trust game did not affect their play of the gamble measures. Together these variables explain little of the variance in the measures, with R^2 values of 2–4 percent.

Table 5
Risk instruments regressions

	Zuckerman (coefficient (S.E.) *P* value)	Holt/Laury (coefficient (S.E.) *P* value)	Card Gamble (coefficient (S.E.) *P* value)
Constant	15.29 (4.03) .00	5.16 (1.18) .00	−0.80 (0.97) .407
Sex (0 = male, 1 = female)	−1.74 (0.80) .030	−0.13 (0.23) .586	0.12 (0.18) .522
Income	3.50 (2.34) .137	−0.67 (0.69) .330	0.19 (0.56) .731
Income^2	−0.44 (0.33) .191	0.13 (0.10) .197	−0.026 (0.08) .746
First born or only child (1 = yes, 0 = no)	−0.04 (0.40) .924	0.07 (0.12) .574	−0.19 (0.10) .065
First mover (1 = yes, 0 = no)	0.37 (0.79) .635	0.10 (0.23) .675	0.08 (0.18) .649
R^2	.037	.027	.016

OLS is used for the Zuckerman and Holt/Laury instruments, while probit is used for the Card Gamble instrument.

Table 6
Percentage of first movers making the loan (frequencies in parentheses)

Manipulation	Loan (trusting)	No loan (not trusting)
No Information	95.65 (22)	4.35 (1)
Information Only	79.17 (19)	20.83 (5)
Photo of Counterpart	78.26 (54)	21.74 (15)
Total	81.90 (95)	18.10 (21)

3.2. Trust and risk

The rates of trusting behavior broken out by experimental manipulation are contained in Table 6. A quick glance at the table reveals two things. First, the rate of trusting (making the loan) is exceedingly high across all treatments. Overall, more than 80 percent of the subjects make the loan. Second, the rate of making loans is higher for the no information treatment. Here we find that the greater the social distance (the No Information manipulation), the higher the rate of making the loan (see Hoffman et al., 1994, 1996). Using a chi-square test for overall differences across the three treatments, we cannot reject that they are the same (χ^2 = 3.67, P = .16); pairwise Wilcoxon tests suggest that the no information treatment may be different from the other two (No Information = Information, z = 1.68, P = .09; No Information = Photo, z = 1.90, P = .06; Information = Photo, z = 0.09, P = .93). With less social distance, where the first mover observed the counterpart's photo, the lower the rate of making the loan.[9]

Modally, second movers returned exactly what was loaned. While this might seem like a fair allocation, it only means that the money was returned to the first mover while the second mover kept the surplus. This varied somewhat by manipulation. Table 7 details the distribution, by experimental manipulation, for the values returned. Keep in mind that subjects were limited to fixed allocations of the $20. The primary difference here is that under the photograph manipulation second movers were less likely to return $5 or less (16.7 percent did so compared with 31.8 percent for those with No Information concerning their counterpart and 21.1 percent who knew the sex of their counterpart). We find no significant difference in distributions across treatments. A Kruskal–Wallis test across the three treatments shows no difference in the distribution of choices ($\chi^2(2)$ = 0.58, P = .75; accounting for ties does not change this result). Taking pairwise Wilcoxon tests across the distributions also shows no differences (No Information = Information, z = 0.00, P = 1.00; No Information = Photo, z = −0.710, P = .48; Information = Photo, z = −0.662, P = .51). In short,

[9] This counterintuitive result comes from differences in subjects' beliefs about whether they were really matched with another person. We discuss the effect of using the internet for experimental research, exploring its effect on subjects' beliefs and behavior (Eckel and Wilson, 2004). In that paper we develop and test a procedure for ensuring that subjects believe that they are matched with a real counterpart. A large number of subjects in these sessions reported not believing that they were matched with a real person. For first movers in the No Information, Information Only and Counterpart Photo conditions, 43.5, 58.3 and 28.5 percent, respectively, had doubts about whether they were paired with another person. We think this means they were making a decision whether to trust the experimenters. However, even if we do the analysis on those who did believe, we get the same qualitative results.

Table 7
Distribution of second mover decisions (frequencies in parentheses)

Allocation: first mover/second mover	No Information	Information Only	Counterpart Photo
$0.00/$20.00	13.64 (3)	15.79 (3)	5.56 (3)
$2.50/$17.50	0.0 (0)	0.0 (0)	3.70 (2)
$5.00/$15.00	18.18 (4)	5.26 (1)	3.70 (2)
$7.50/$12.50	9.09 (2)	10.53 (2)	14.81 (12)
$10.00/$10.00	40.91 (9)	63.16 (12)	62.96 (34)
$12.50/$7.50	13.64 (3)	0.0 (0)	1.85 (1)
$15.00/$5.00	4.55 (1)	5.26 (1)	3.70 (2)
$17.50/$2.50	0.0 (0)	0.0 (0)	0.0 (0)
$20.00/$0.00	0.0 (0)	0.0 (0)	3.70 (2)

a large majority of first movers decided to send their earnings to their counterpart, risking a return of zero. In return, they typically received only what they put in. Only a handful of subjects returned more than $10 (two in the photograph condition returned all $20).

We now turn to an analysis of the relationship between trust and risk attitudes. Table 8a contains correlations between the risk measures and the decision to trust. The second column shows that, over all treatments, none of the risk measures is significantly correlated with the decision whether to trust. Given the large number of tests, it is not surprising that the correlation between one of the subscales and the decision to trust in one treatment approaches statistical significance (Boredom Susceptibility, $P = -.09$), but there is no clear pattern of significant correlations. We find no evidence from this analysis that trust is perceived to be a risky decision.

Turning to Table 8b, we examine the decision to reciprocate by returning at least $10 to the first mover. This analysis is purely exploratory, as we have no prior hypotheses about the relationship between risk attitudes and reciprocity. While neither the Zuckerman nor Card Gamble results show significant relationships with reciprocity, the Holt/Laury instrument is significantly negatively correlated with this decision for all treatments taken together and for two out of the three treatments individually, indicating that people who are risk-averse return more to the first mover. This may be picking up a kind of social risk aversion: people who are more sensitive to the judgment of others may be both more risk-averse and more likely to return a loan. At the bottom of the table, we break out the Zuckerman subscales. Here there is no clear pattern of statistically significant results across treatments. The Boredom Susceptibility and Thrill and Adventure Seeking subscales are significantly related to the

Table 8a
Correlations between risk measures and the decision to trust (loan $10), by experimental treatment

Risk instrument	All Treatments	No Information	Information Only	Counterpart Photo
Zuckerman	0.07 ($P = .44$)	0.08 ($P = .72$)	−0.04 ($P = .86$)	0.15 ($P = .21$)
Holt/Laury	0.06 ($P = .52$)	−0.32 ($P = .13$)	0.06 ($P = .78$)	0.14 ($P = .24$)
Card Gamble	0.02 ($P = .81$)	0.10 ($P = .66$)	−0.05 ($P = .83$)	0.06 ($P = .63$)
Disinhibition	0.08 ($P = .37$)	0.14 ($P = .51$)	0.14 ($P = .52$)	0.07 ($P = .63$)
Boredom Susceptibility	−0.05 ($P = .57$)	−0.13 ($P = . 56$)	−0.35 ($P = .09$)	0.07 ($P = .54$)
Thrill and Adventure Seeking	0.04 ($P = .66$)	0.03 ($P = .88$)	0.00 ($P = 1.00$)	0.11 ($P = .35$)
Experience Seeking	0.09 ($P = .32$)	0.04 ($P = .86$)	−0.01 ($P = .96$)	0.15 ($P = .23$)

Table 8b
Correlations between risk measures and the decision to reciprocate (return at least $10) by experimental treatment

Risk instrument	All Treatments	No Information	Information Only	Counterpart Photo
Zuckerman	0.02 (P = .82)	0.36 (P = .10)	−0.18 (P = .46)	−0.03 (P = .81)
Holt/Laury	−0.33 (P = .001)	−0.62 (P = .002)	−0.62 (P = .004)	−0.17 (P = .21)
Card Gamble	−0.04 (P = .70)	0.24 (P = .27)	−0.20 (P = .40)	−0.10 (P = .45)
Disinhibition	−0.05 (P = .61)	0.07 (P = .77)	−0.05 (P = .84)	−0.08 (P = .58)
Boredom Susceptibility	−0.01 (P = .90)	−0.02 (P = .91)	−0.15 (P = .52)	0.04 (P = .77)
Thrill and Adventure Seeking	0.06 (P = .54)	0.51 (P = .02)	−0.04 (P = .87)	−0.06 (P = .65)
Experience Seeking	0.08 (P = .44)	0.47 (P = .03)	−0.23 (P = .35)	0.04 (P = .79)

Table 9
The determinants of trust

Variable	Coefficients	
	Model 1[a]	Model 2[b]
Zuckerman	0.036 (0.027) P = .172	0.160 (0.068) P = .019
Holt/Laury	0.057 (0.104) P = .585	−0.047 (0.170) P = .784
Card Gamble	0.018 (0.348) P = .958	0.453 (0.554) P = .414
Belief that counterpart is not real	1.124 (0.494) P = .023	2.245 (1.084) P = .038
Information Treatment	−1.181 (0.610) P = .053	−1.202 (0.996) P = .228
Photo Treatment	−0.835 (0.535) P = .119	−1.047 (0.993) P = .292
Expected Return	–	0.406 (0.094) P < .001
Intercept	0.152 (0.866) P = .861	−4.876 (2.107) P = .021
Log likelihood	−47.45	−21.87
Pseudo-R^2	.135	.601
N	116	116

Dependent variable = 1 if loan is made. Probit regression: (1) parameter estimate, (2) S.E., (3) P value.

[a] Variables included, but not reported: sex and ethnicity of the subject.

[b] Variables included, but not reported: sex and ethnicity of the subject; sex and ethnicity of the counterpart, conditional on the experimental condition.

decision to reciprocate in the No Information case only. This implies that risk-seekers were more likely to reciprocate, which contradicts the previous result. We are skeptical of this result because it holds in only one of the experimental conditions.

The next step in the analysis estimates multivariate models of the decisions to trust and reciprocate. Table 9 contains two probit regressions for the trust decision. Model 1 controls for the sex and ethnicity of the subject, treatments, and whether the subject reports believing that his counterpart is real. We see that none of the risk instruments is significantly related to the decision to trust. Additional analysis (not reported) indicates no effect of the risk instruments interacted with treatments.[10]

[10] We also estimated model 1 excluding all of the risk instruments. The likelihood ratio test between the two models is $\chi^2(3) = 2.58$, P = .46, indicating that collectively the risk instruments have no effect. In addition, we estimate a model that includes interaction terms and demographics (income, income squared, grade point average, and birth order). None of the variables is significant, and the likelihood ratio test for adding those variables is

Model 2 incorporates beliefs about the counterpart. The first belief has to do with expectations about how much the counterpart will return. First movers were asked, immediately after their decision, how much they thought would be returned. Those who did not make the loan were asked how much they thought their counterpart would have returned. The second type of belief stems from an assessment of the characteristics of the counterpart. What subjects knew about the counterpart varied by experimental condition. The most prominent aspects included the sex and ethnicity of the counterpart; these are included in the estimates, but omitted from the table.[11] Only the first set of beliefs is significantly related to the decision to trust. Not surprisingly, higher expected returns are associated with a higher probability of making the loan. Caution is necessary in interpreting these results: because of the timing of the elicitation of beliefs, we cannot rule out the possibility that subjects report beliefs that justify their decisions. In addition, subjects were not rewarded for their guesses, so they had no incentive to guess correctly.

Another effect of including expected return is that the coefficient of one risk measure, the Zuckerman scale, becomes statistically significant. There is no similar change in the coefficients for the two gamble measures, which are again insignificantly related to the trust decision. What, then, is the substantive impact of preferences as measured by Zuckerman scale on the likelihood of making a loan? First, the overall effect is weaker than the effect of expectations. Setting the coefficients to their mean or modal category and varying the Zuckerman scale by plus or minus one standard deviation gives a change in probability from .64 to .98 in making the loan. When setting the Zuckerman scale at its mean and varying expectations by one standard deviation around the mean, the probability of making the loan changes from .23 to .99. This increase is substantial and ranges from very unlikely to make the loan to almost certain to do so. The Zuckerman scale has an effect, but it is smaller than the effect of expectations.[12]

We also estimated models that disaggregate the Zuckerman scale and find that almost all of the effect can be assigned to the Disinhibition subscale. This subscale taps the willingness of subjects to use drugs, alcohol and have sex in novel settings. As such it says that uninhibited individuals, conditional on how much they believe will be returned, are more likely to make the loan. This does not strike us as reflecting the usual story told about trust as a risky decision. Clearly the financial risk instruments do not predict a trusting choice. Instead, Disinhibition, coupled with a post hoc evaluation of prospects, is related to trust. Additional research may be necessary to disentangle the specific relationship.

$\chi^2(4) = 2.82$, $P = .59$. To test whether the absence of results is due to biases in standard errors introduced by collinearity among the risk instruments, we estimated model 1 with each instrument separately. Coefficients on the risk instruments are Zuckerman only: 0.028, $P = .253$; Holt/Laury only: 0.066, $P = .488$; card only: 0.139, $P = .671$. None is statistically significant on its own in any specification. We also took the interaction of the risk instruments with treatments and find no effect. These were done one at a time because of statistical limitations of the data. Likelihood ratio tests give us the following: interaction with the Information Only treatment: $\chi^2(3) = 2.04$, $P = .56$; interaction with the Counterpart Photo treatment: $\chi^2(3) = 0.84$, $P = .84$.

[11] In these estimates, including or excluding attributes of the counterpart by experimental condition has no effect on the strength, direction or significance of the risk coefficients. Eckel and Wilson (2003a) detail how these characteristics affect the willingness to make a loan.

[12] Note that the impact of expectations on the significance of the Zuckerman coefficient does not appear to be due to collinearity. The correlation between the two variables is low and insignificantly different from zero.

Table 10
The determinants of reciprocity

Variable	Coefficients	
	Model 1[a]	Model 2[b]
Zuckerman	0.026 (0.025) $P = .306$	0.018 (0.026) $P = .494$
Holt/Laury	−0.286 (0.086) $P < .001$	−0.73 (0.091) $P = .003$
Card Gamble	−0.183 (0.317) $P = .564$	−0.097 (0.329) $P = .766$
Loan Expectation	0.061 (0.288) $P = .831$	0.268 (0.359) $P = .456$
Information Treatment	–	0.249 (0.472) $P = .598$
Photo Treatment	–	0.225 (0.401) $P = .574$
Intercept	1.442 (0.653) $P = .027$	1.348 (0.719) $P = .061$
Log likelihood	−51.67	−49.95
Adjusted-R^2	.128	.157
N	95	95

Reciprocity (dependent variable = 1 if ≥$10 is returned). Probit regression: (1) parameter estimate, (2) S.E., (3) P value.

[a] Variables included, but not reported: sex and ethnicity of the subject.

[b] Variables included, but not reported: sex and ethnicity of the subject; sex and ethnicity of the counterpart, conditional on the experimental condition.

For completeness, we also analyze the relationship between risk attitudes and reciprocity, although we have no prior theory-based expectations about the relationship. The regressions in Table 10 show that the decision to reciprocate is negatively related to the Holt/Laury instrument. The first model correlates the decision to return at least $10 with the main risk instruments. Controls for the sex and ethnicity of the second mover are included in the estimations, but not reported (they have no effect on the coefficients). Both of the financial gamble instruments are negatively correlated with reciprocity, but only the Holt/Laury measure is statistically significant. In effect, risk seeking as measured by this instrument leads to less reciprocation. No other variable is significantly related to this decision. The second model adds expectations. Prior to being told whether or not their counterpart made the loan, subjects were asked to predict (without reward) their counterpart's action. This variable takes on a value of 1 if the subject expected to be trusted. Likewise variables measuring treatment effects and available information about counterpart characteristics under each treatment are added to the estimates. None of these variables is significantly related to the decision to reciprocate. Indeed, a likelihood ratio test between models 1 and 2 indicates there is no additional statistical effect from including these variables ($\chi^2(5) = 3.44$, $P = .63$). Still, the Holt/Laury measure remains the only predictor of reciprocity. Why this risk measure should be related to the decision to reciprocate, when none of the others do, is worth additional research.

3.3. Perceptions, trust and reciprocity

As part of our trust game procedure, we ask subjects an open-ended question, "What does this situation remind you of?" We then coded what topics the subjects mentioned in their answers. Table 11 presents the full set of categories.

Table 11
Perceptions of subjects

Mentioned in answer to "What does this situation remind you of?"	First movers	Second movers
Trust	29	10
Personal risk/gambling	12	8
Institutional risk (stock market, etc.)	7	5
Loan—friend	20	22
Loan—stranger	4	5
Loan—bank or institution	1	9
Game theory, strategic game (prisoners dilemma, for example)	14	2
Other	23	47

Clearly first and second movers see the game differently. About one third (29/110) of first movers mention trust, while less than 10 percent (10/108) of second movers mentioned trust.[13] Nearly half of second movers but only 20 percent of first movers could not be categorized according to our criteria. Only 19 first movers and 13 second movers mention risk in their answer to the question. We take this as further evidence that calculation of risk plays at best a small role in the play of this trust game. This coding gives us the opportunity to analyze separately the relationship between risk attitudes and trust for different perceptions of the game. Taking the sub-sample mentioning trust, we find no relationship between any risk measures and trust behavior. Looking separately at those who mention risk, we also find no relationship between the risk measures and trust. (Details of these results are available from the authors.) Using this classification system, we still do not find any evidence that risk attitudes play an important role in the decision to trust.

4. Conclusion

In this study we find little evidence that trust is related to survey or decision measures of general risk aversion. In the literature on trust, it is assumed that the truster is confronted with a risky choice when considering whether a counterpart is trustworthy, in a manner similar to gambling or making a risky investment. While this seems like a logical inference given the nature of the trust game, it is surprising that the relationships between trust and measures of risk aversion have not been explicitly tested. The experiment reported here puts subjects into a one-shot trust game and tests across three different measures of individual risk orientation.

Our analysis suggests three main results. First, the three measures of risk attitudes that we report are not strongly correlated with each other.[14] While several of the correlations are statistically significantly different from zero, none exceeds .22. Each of the measures has some face validity, and the Zuckerman scale has been replicated and validated in a number of settings. In addition, two are lottery choice measures with monetary stakes. Nevertheless, they are uncorrelated with each other.

[13] Several subjects did not enter any information and as a consequence they are excluded from this discussion.

[14] We are not the first to report this result: the earliest evidence of this result is reported by Slovic (1964), who found very low correlations among risk measures.

Second, the risk instruments are not significantly correlated with the decision to trust. With the exception of a model in which we include a measure of beliefs that could be a post hoc justification for the decision to trust, the risk instruments are unrelated to the decision to trust a stranger. We anticipated that this experimental design, in which subjects really are strangers and are unlikely ever to meet, would increase the likelihood that the decision would be seen as a gamble or risky investment. Our results suggest that subjects do not think of trust decisions and financial gambles as similar.

Third, we have the surprising finding that the Holt/Laury gamble instrument is related to the decision to reciprocate. The relationship is negative, so that more risk-seeking people are less likely to return at least the loan. While there is no obvious theoretical basis interpretation of this finding, we speculate that the relationship between the two variables may be a function of social risk aversion, in which people who are more sensitive to social sanction are more willing to return at least the loan. Our study does not contain an instrument with which to test this conjecture, although it may be worth exploring in future research.

From this and our other studies, we are comfortable concluding that subjects are not randomly choosing whether to trust an unknown counterpart. The analysis reported here suggests that there is little evidence that trusting decisions are thought of as risky gambles. We do not find that subjects view the decision whether to trust as a gamble about the trustworthiness of their counterpart. It may be the case that there are other risk instruments, testing other facets of an individual's risk orientation that are correlated with trust decisions. However, we are doubtful that this will be a fruitful avenue for understanding the commonly observed heterogeneity in trusting decisions.

In related papers (Eckel and Wilson, 2003a,b), we show that subjects rely on information about their counterparts in making the decision whether to trust. It appears that when people are uncertain about the trustworthiness of their counterpart, subjects make inferences about reliability from all information about the counterpart that is available to them, conditioning their decision to trust on this information. Among the things that are used are the sex, ethnicity and attractiveness of the counterpart. We infer that subjects do not see trust as a problem of risk, but rather as a problem of judgment. People pride themselves on their ability to "read" others and to make a decision about whether someone is trustworthy. Although people may vary in their capacity to make accurate judgments, the choice to trust appears to be one of conditional judgment, not a calculated financial gamble.

Acknowledgement

Funding for this study was provided by the National Science Foundation (SES 98-19671; SES 98-19943) and the John D. and Catherine T. MacArthur Foundation, Network on Preferences and Norms. Experiments were conducted in the Lab for the Study of Human Thought and Action at Virginia Tech and in the Behavioral Research Lab at Rice University. We are indebted to Selhan Garip, who supervised the experiments at Virginia Tech, and Narine Badasyan, Robert Cave, Adam Ferguson, Evan Moore, Matt Parrett, and Sara Rangos, who assisted. Nancy Martorano, Denise Torres, Mike Flynn-O'Brien and John Cornthwaite assisted with experiments at Rice. The design and analysis of the paper benefited greatly from the comments of many people, including Rob Boyd, Ernst Fehr, Alex Kacelnik,

Michael Kosfelt, Eric Johnson, Lise Vesterlund, Elke Weber, participants at sessions at ASSA, ESA, SEA, and German Experimental Economics meetings, and workshop participants at Columbia University, Carnegie Mellon University, and the Wissenschaftskolleg zu Berlin, as well as the conference this issue is based upon. We are grateful for comments of two referees and the editors of this issue for comments that significantly improved the paper.

References

Anderhub, V., Engelmann, D., Guth, W., 2002. An experimental study of the repeated trust game with incomplete information. Journal of Economic Behavior and Organization 48, 197–216.

Ben-Ner, A., Putterman, L., 2001. Trusting and trustworthiness. Boston University Law Review 81, 523–551.

Berg, J., Dickhaut, J., McCabe, K., 1995. Trust, reciprocity and social history. Games and Economic Behavior 10, 122–142.

Bohnet, I., Zeckhauser, R., this volume. Trust, risk and betrayal.

Cook, K.S., Cooper, R.M., 2003. Experimental studies of cooperation, trust and social exchange. In: Ostrom, E., Walker, J.M. (Eds.), Trust and Reciprocity: Interdisclpinary Lessons from Experimental Research, vol. 6. Russell Sage Foundation, New York, pp. 209–244.

Croson, R., Buchan, N., 1999. Gender and culture: international experimental evidence from trust games. American Economic Review 89, 386–391.

Eckel, C., Grossman, P., 2002. Sex differences and statistical stereotyping in attitudes toward financial risk. Evolution and Human Behavior 23, 281–295.

Eckel, C.C., Grossman, P., in press. Men, women and risk aversion: experimental evidence. In: Plott, C., Smith, V. (Eds.), Handbook of Experimental Results. Elsevier, New York.

Eckel, C.C., Wilson, R.K., 2003a. Conditional trust: sex, race, and facial expressions in a trust game. Paper prepared for the Conference on Trust and Institutions, Harvard University, April 24–26, 2003.

Eckel, C.C., Wilson, R.K., 2003b. Is there a mechanism for detecting trustworthiness? Paper presented at the Western Political Science Association, Denver, CO, March 2003.

Eckel, C.C., Wilson, R.K., 2004. Internet Cautions. Working Paper, Virginia Tech.

Glaeser, E., Laibson, D.I., Scheinkman, J.A., Soutter, C.L., 2000. Measuring trust. Quarterly Journal of Economics 115, 811–846.

Harrison, G.W., Johnson, E., McInnes, M., Ruström, E.E., 2003. Risk Aversion and Incentive Effects: Comment. Working Paper, University of South Carolina.

Hoffman, E., McCabe, K., Shachat, K., Smith, V.L., 1994. Preference, property rights, and anonymity in bargaining games. Journal of Games and Economic Behavior 7, 346–380.

Hoffman, E., McCabe, K., Smith, V.L., 1996. Social distance and other-regarding behavior. American Economic Review 86, 653–660.

Holt, C.A., Laury, S.K., 2002. Risk aversion and incentive effects. American Economic Review 92, 1644–1655.

Scharleman, J., Eckel, C.C., Kacelnik, A., Wilson, R.K., 2001. The value of a smile: game theory with a human face. Journal of Economic Psychology 22, 617–640.

Slovic, P., 1964. Assessment of risk-taking behavior. Psychological Bulletin 61, 330–333.

Snijders, C., Keren, G., 1999. Determinants of trust. In: Budescu, D.V., Erev, I., Zwick, R. (Eds.), Games and Behavior: Essays in Honor of Amnon Rapoport. Lawrence Erlbaum Associates, Inc., Mahwah, NJ, pp. 355–383.

Zuckerman, M., 1994. Behavioral Expression and Biosocial Bases of Sensation Seeking. Cambridge University Press, New York.