Version of 9/26/00 8:14 PM

Whom to trust? Choice of partner in a trust game.

Catherine C. Eckel*
Department of Economics (0316)
Virginia Polytechnic Institute and State University

Rick K. Wilson
Department of Political Science
Rice University

1. Introduction.

In social exchanges, partners not only decide how to bargain with one another, but they also choose with whom to bargain. The choice of a partner, like the choice of whether to engage in exchange, is a strategic choice. On what basis does can such a strategic calculation be made?

In game theoretic models, the payoffs of the game, coupled with an assumption that all players are payoff-maximizers, determine one or more equilibria of the game. These models assume all partners are the same, and leave no room for the choice of a partner to affect the outcome of the game. However, by introducing uncertainty about the objectives or payoffs of potential partners, we accommodate choice of partner as a strategic move without abandoning the apparatus of game theory. For example, from the perspective of game theory, a choice among alternative partners can be a choice between probability distributions over fixed strategy choices. In this context, a partner's characteristics act as signals that affect others' expectations.

A few laboratory experiments have tried to incorporate aspects of the partner in bargaining games. Many researchers have investigated differences between men and women in a variety of games.[1] Most support the idea that there may be systematic differences in behavior by identifiable groups, and that subjects condition their strategy choices on observable characteristics of their partners. In the few experiments where subjects are permitted to choose their partners (Frank et al., 1993, Mulford, et al. 1998), players appear to choose a partner carefully and well, implying that they are able to identify partners who are more likely to cooperate.

---

[1] Eckel and Grossman (forthcoming) survey studies of public goods, ultimatum and dictator games. (Walters 1998) surveys negotiator competitiveness. (Blount 1995) compares people and machines. (Mulford, Orbell et al. 1998) focus on the physical attractiveness of a partner and the likelihood of choosing to play with that individual in a prisoner's dilemma game. (Scharlemann, Eckel et al. 2000)) show that the facial expression (a smile) of a partner affects strategic play.

Our subjects play a two-person, sequential "trust" game, which is based on a game developed by Berg et al. (1995).[2] In our experiments subjects choose to play a trust game with one of two partners, where the alternatives are labeled with stylized representations of facial expressions. We analyze the data controlling for the risk preferences of the subjects, which are elicited in a second stage of the experiment.

In the next section we discuss why we might expect individuals to be careful in their choice of a partner and the type of games in which strategic considerations about player type might make a difference. In the third section the experimental design is elaborated. The fourth section presents our analysis, followed by a general discussion and a conclusion.

2. Background

There is very little research that investigates how partners are chosen in an exchange situation, or how the characteristics of a partner affect the outcome. An exception is Mulford, Orbell et al. (1998), who focus on the role of attractiveness. In their study subjects observe one another and then play a series of prisoner's dilemma games. Half of the subjects are given the option to play the game or to exit. Once they completed their decisions (which were based on a series of paper and pencil tasks) the subjects rate their own and the other participants' attractiveness. The researchers found that subjects were more likely to play the game when they are assigned attractive partners and that subjects were *more likely to cooperate* with those judged as attractive. Men and women cooperate at different rates; men who gauged themselves as attractive were more likely to cooperate, while women who reported themselves as attractive cooperated less (p. 1585). These results suggest that people have a preference for certain characteristics of their partners, and that their behavior varies with respect to those characteristics.

Our design removes one potentially confounding effect in this experiment. The experiment was conducted face-to-face (seemingly necessary given the need to assess the characteristics of others). However, face-to-face interaction, even when verbal communication is prohibited, often allow the exchange of non-verbal signals; smiles, frowns, and looks of frustration may all contribute information about another actor that, if correlated with attractiveness, could introduce a confound. Our design eliminates face-to-face interaction, and replaces it with highly stylized representations of the players. At the same time we use an asymmetric game structure that focuses on the ability of one player to read the intention of a second player.

We adopt a variation of the "investment game" developed by Berg et al. (1995), which has also been studied by Glaeser, et. al, (2000), McCabe, Rassenti et al. (1998), Bolle (1998) and Eckel and Wilson (1999). In this two-person, sequential game, Player A moves first and has the choice of taking a fixed sum of money or passing some portion of this sum to the second player. If A chooses to keep the endowment, Player B receives nothing. If A passes, then the investment is increased (often doubled or tripled). At that point Player B may choose to return a portion of the investment to A, keeping the remainder. The subgame perfect Nash equilibrium of the game is for A to keep the full endowment, anticipating that B will keep whatever is sent. The interesting empirical

---

[2] This game also has been studied by (Fehr, Kirchsteiger et al. 1993), (McCabe, Rassenti et al. 1998), (Bolle 1998) and (Eckel and Wilson 1999).

regularity is that most first movers choose to pass some of the endowment. Equally surprising is that second movers often reciprocate by returning some of the investment back to the first mover.

This game was designed to measure an individual's level of trust. A trusting action involves an individual taking a move that puts her payoff at the mercy of another person's decision. Here a trusting action taken by the first mover involves passing to the second mover. The first-mover's payoff then depends on the decision of the second player, who has the option to keep the full amount. A trusting action only pays off if the second mover is trustworthy and reciprocates that trust. Trust and reciprocity can lead to a higher payoff for both players, relative to the equilibrium of the game.

What circumstances might increase the likelihood of a decision to trust? First, if an actor is able to choose her partner, then she might be more willing to trust. An actor will presumably choose based on the characteristics of alternative partners, and the cues they provide about the likelihood of trustworthy behavior. For example, direct reputation in the form of past experience with alternative partners is very valuable in assessing whether different partners can be trusted, and gossip about others may also be a source of information. Stereotypes based on physical characteristics (sex, ethnicity, age) often affect expectations about future behavior. Even facial expressions may serve to signal valuable information about a partner's likely actions.

In choosing whether to trust, an agent must assess both the risks and potential gains to trusting. Part of this assessment depends on the payoff structure of the situation, the potential gains and losses associated with trust and reciprocity, or its failure. Here, the actor's risk preferences play an important role. An additional component depends on the agent's potential partners. If the situation is very risky, or hold little promise of additional payoff, then the agent will choose not to trust, and will ignore the characteristics of the potential partners.

Trusting behavior entails risk and requires confidence in the trustworthiness of a partner. We conjecture that when actors can choose their partner, they will attend to characteristics of others that might signal trustworthiness. In the experiment detailed below we simultaneously vary the degree of risk across several games, offer subjects their choice of a partner, and measure the risk preferences of individual actors.

3. Experimental Procedures.

A total of 100 subjects were recruited to participate in 9 sessions, with between 8 and 12 subjects in each session. All subjects were recruited from large introductory social science classes at Virginian Polytechnic Institute and State University.

Sessions were conducted the Laboratory for the Study of Human Thought and Action at Virginia Tech. Upon arriving at the laboratory, subjects were randomly assigned to one of twelve computers. The laboratory design is such that no subject can see the computer screen of another subject. Subjects first were given a brief set of oral instructions read from a script, then began a set of self-paced computerized instructions. In a post-experiment questionnaire 99 of 100 subjects indicated that the instructions were clear.

Subjects were randomly assigned to be either the first or second mover, and maintained that role throughout the experiment. Subjects were randomly re-matched for each of ten decisions across four different games, and were given no information that

enabled them to identify their partner at any decision. Moreover, first movers were given no feedback about the outcome for any decision. The order of presentation of the decisions was randomized for each session. All subjects in the same session experienced the same sequence of decisions. At the conclusion of the experiment first movers were given a complete listing of actions and outcomes for each decision. Second movers observed their own and their partner's actions, as described below.

Subjects were told at the outset that they would be paid for only one of the 10 decisions. At the conclusion of the experiment subjects were asked to draw one card from a deck of 10 electronic cards displayed on their computer screen. When a card was chosen a period was randomly selected and the subject's earnings were displayed. Subjects filled out an on-line questionnaire and then were given an opportunity to participate in a second experiment designed to elicit risk preferences. An experimental session (including instructions, both experiments and the questionnaire) averaged 40 minutes. Earnings averaged $15.23 and ranged between $1.00 and $37.00, in addition to the $5 show-up fee.

4. Games and Icons

Subjects face four decision structures shown in Figure 1, each repeated 2-3 times. All entries on the figure are in U.S. dollars. These "trust games" are variants of the investment game (Berg, et al., 1995), in which subjects must choose whether to keep an endowment or "trust" by choosing an amount to pass to an anonymous partner. In their game the passed amount is tripled, then the partner must decide whether to return any of the resulting amount to the first player. In our games the passed amount is predetermined, and is either doubled or tripled. The decisions of the second mover also are limited. We constrain the set of actions available to subjects in order to focus on specific aspects of trust and reciprocity.

<Figure 1 about here.>

First-movers face a two-branch game, with a trust game on each branch (see Figure 1). Each branch of the game is labeled with an icon, as explained below. The first mover selects the left or right branch, then chooses a move to end the game or pass to the second player. In Games 1 and 2, the branches are symmetric. In Games 3 and 4 there is a $1 difference between the left and right branches in what is passed by the first mover.

In Game 1 the first mover can retain $10, giving the second player $0, or pass the full amount. The second player then can keep the entire return ($30), or split return equally between the two. The subgame-perfect Nash equilibrium is for the first player to exit the game without investing, anticipating that the second player will rationally choose the unequal split. However, both players can be made better off than the equilibrium if the first player trusts by passing and the second player reciprocates by choosing the equal split. Game 2 is similar, except that if the first player exits, both players receive $10 (again, the Nash equilibrium). If the first mover trusts by passing, the amount is doubled and the second player again can choose between keeping the entire return (plus her own endowment) and an equal split. A comparison of Games 1 and 2 allows us to distinguish between trust and equity. If subjects value equity in these games, they may "trust" only to obtain the equal split, expecting the second player also to value the equal split. In

Game 2, however, the choice not to trust is equitable, with an equal amount for both players. If subjects choose to pass (invest) in both games, then the likely explanation lies with trusting behavior.

Games 3 and 4 are asymmetric, with different amounts ($5 or $6) passed on the two branches. Game 3 begins with an endowment of $10 for the first mover only, and Game 4 has $10 for each player at the first node. In both games the passed amount is tripled and the second mover can take all of the return or split it evenly. Again the Nash equilibrium for either branch is for the first mover not to trust. Because the first node is identical for either branch, the first mover who plans not to trust is indifferent between branches. However, a trusting move on the left branch puts a larger amount at stake, but has a higher potential gain for the first-mover if trust is reciprocated.

The primary manipulation for the experiment involved presenting the first mover with a choice of a partner. Our interest is in whether subjects systematically choose a specific kind of partner (icon) and whether the choice of icon affects the first mover's behavior. To this end we manipulate the set of partners available to the first mover at each decision period. At the outset of each decision the first mover is presented with a pair of icons as shown in Figure 2. The icon on the left was always associated with the left branch of the relevant game in Figure 1, and the icon on the right with the right branch. In the experiment the branches for the game (and the associated icons) were randomly reversed to control for any form of a left/right bias in decisions.

<Figure 2 About Here>

Experimental sessions were assigned to one of three blocks that determine the choice and order of icons/games. As can be noted from the figure, during the course of the experiment a given first mover viewed three different types of icons. Throughout the experiment all four icons were used. The "diamond" shaped icon was used as control. The remaining three icons used an oval, with upturned or down turned eyebrows as well as an upturned or down turned mouth. In prior research McKelvie (1973) and Eckel and Wilson (1999) show that an upturned mouth (and smile) coupled with upturned eyebrows yields an image that reflects a happy emotion and invites trust.[3] By contrast, the icon with an upturned mouth and down turned eyebrows is furthest removed from the happy icon, and reflects deviousness. Finally, the down turned mouth and down turned eyebrows reflects an angry emotion, more closely related to deviousness than to happiness.

The first movers began each game by choosing a branch/icon combination, then made the first move in the game they chose. For some decisions, the game was the same and the icons differed. For others, the games (games 3 and 4) differed and the icon was the same; this was done in order to test for a systematic preference for games with marginally greater risk, holding the icon constant. It is important to note that only the first mover observed this game in its entirety; the second mover saw only the branch game and icon that the first mover has chosen. First movers were told that they were making a choice of a partner for the decision, each potential partner represented by one of

[3] On this point it is instructive to see Scharlemann, et al. (2000) who provide evidence that still photographs of a smiling partner promotes trust in investment games.

the icons. Once the first mover made a choice of a partner/branch of the game, second movers were shown the icon that the first mover had chosen and told that this was their icon for that decision.[4] This procedure allows us to focus on the first mover's choice of an icon partner and the subsequent decision of whether to trust.

5. Questionnaire and risk preference elicitation

At the conclusion of the trust experiment, subjects were given a battery of questionnaire items. These included a manipulation check that asked about features of the experiment, a standard set of demographic items, and two scales designed to measure subjects' preferences over trust and altruism. Most of the items were arrayed along 5 and 6-point Likert scales. When subjects completed the questionnaire they were given the option to continue with an additional experiment lasting less than 10 minutes for additional earnings. (All agreed.). This experiment was designed to elicit risk preferences, and consisted of six different gamble choices. A subject first chose between two electronic decks of cards with 10 cards in each deck. The cards were displayed with dollar values showing on each card. Once a deck was picked, the cards were turned over, shuffled on the screen and dealt. Subjects were asked to pick a single card and earned the value of the card they chose.

The card values and their distribution in each deck were systematically chosen to change the expected value and the variance between decks. Twelve decks were used with specific pairings pre-determined by the experimenters. The six pairings are plotted in Figure 3. The lines link a pair of card decks, with the different decks represented in mean/variance space. For example, the longest line joining two decks (at the top of the figure) illustrates a high variance, high expected value deck paired with a certain deck. The certain deck had 10 cards, each worth one dollar. The other deck had three cards worth five dollars, with the remaining cards worth zero. The first deck had an expected value of $1.00 and no variance, while the second deck had an expected value of $1.50 and a variance of 5.83. The six different pairings allow us to estimate the extent to which individuals avoid risk. A simple proxy for risk acceptance was computed by calculating the number of high variance choices made by each subject.

<Figure 3 About Here>

6. Predictions

Our predictions for the play of these games are as follows. The predictions are straightforward. If subjects are willing to trust, then they will choose icons that are more trustworthy.

Our hypotheses are summarized as follows:

1. *Game theoretic*: In all games, first movers will choose alternative partners with equal probability, and will exit the game at the first move. If trusted,

[4] This is different from the procedure used in (Eckel 1998) in which subjects were assigned a specific icon over a number of decisions. In those games both the first and second movers were given a permanent icon assignment over the course of the experiment.

second-movers will choose the alternative with the highest payoff for themselves.

2. *Equity/fairness*: First-movers will choose the exit option on the first move more frequently when it involves an equal split (games 2 and 4).

3. *Behavioral*: Subjects will trust their partners depending on the perceived benefits and costs or risks of trusting. These costs and benefits will be related to:

   a. the characteristics of the partner (icon), and
   b. the characteristics of the decision-maker.

The anticipated benefits of trusting depend on the likelihood that trust will be reciprocated. Based on our previous research, we predict that subjects' preference-ordering over icons will be: Happy Icon > Diamond Icon > Angry Icon = Devious Icon. Our earlier research finds that an independent population rates the characteristics of the "happy" icon to be more cooperative and friendly than the "angry" or "devious" icons. Given that the "diamond" icon presents no threatening facial cues, we expect it to be neutral, falling between Happy and the other two. We expected that their choices would reflect the previous assessments.

When a "nice" or "neutral" icon is chosen ("Happy" or "Diamond"), we expect the rate of trusting behavior to be higher. A subject's choice of a partner should depend on their anticipated action. Relying on Rabin (1993), we expect that subjects who anticipate reciprocity will choose "nice" icons. If a subject plans to trust, then a subjects should choose a "nice" icon. By contrast if a subject chooses a not-so-nice icon, then that subject is unlikely to plan on taking a trusting action. Subjects planning to trust should be more likely to choose a “happy” icon when it is paired with a devious or angry icon, and more likely to choose a diamond when it is paired with a devious or angry icon.

The characteristics of the decision maker that we expect to affect behavior include their own perceived trustworthiness, altruism, and risk attitudes. Following Glaeser, et al., (2000), we expect that more trustworthy individuals will trust more. Altruism is also likely to be positively related to trust. In addition, more risk-averse subjects should be less likely to trust in all games. However, note that some of the games are more "risky", in the sense of variance of possible outcomes, than others for the first-mover. In games 1 and 2 the first mover risks earning zero if the partner is untrustworthy. In games 3 and 4 the first mover invests only part of the endowment, lowering both the risk and expected return to trusting. A subject's attitude toward risk is likely to manifest itself in the choices within games, and in differences across games.

7. Results.

Overall, 45.5 percent of the subjects chose to trust; trust was reciprocated 34.4 percent of the time. These rates are higher than we have observed in a related experiment

where we find levels of trust as low as 19.1 percent (Eckel and Wilson, 2000).[5] Consistent with the findings of Berg, et al., (1995) Bolle (1998), McCabe, Rassenti et al. (1998) and Glaeser, et al., (2000), hypothesis 1 is rejected by prevalence of trusting and reciprocal behavior. Table 1 summarizes trusting and reciprocating moves for each game. As expected, trust varies by the type of game; trust is lowest in game 2 (33%) and close to 50% for all other games. However, that variation does not provide strong support for hypothesis 2, that expects subjects seek equity in payoffs. If subjects were choosing equity norms, then we would expect that "trust" moves would be taken more frequently in Games 1 and 3 and less frequently in Games 2 and 4. While behavior in Game 2 is consistent with this hypothesis, the highest levels of trust are found in Game 4. Table 1 also provides weak support for the importance of risk attitudes. On average there is more trusting behavior in games 3 and 4 than in games 1 and 2, though the difference is not statistically significant. In the former set there is a bit less risky for first movers -- they are guaranteed some level of earnings in such games. We turn to a detailed multivariate analysis below.

<Table 1 About Here>

Turning to our survey and risk data, we find that subjects vary in their risk attitudes. On average, subjects chose 3.85 higher-variance (riskier) gambles in pairwise choices. Table 2 provides the distribution. None of the subjects always preferred the lower-variance choice, while 13 percent of the subjects always preferred the higher-variance gamble. In subsequent analysis we use a proxy risk measure consisting of the number of risky choices by a subject.

<Table 2 About Here>

Table 3 breaks out the number of times that each subject chose to trust during the course of the experiment. Subjects do not play fixed strategies (which might be a function of their predispositions), but instead alter their behavior across games. Only 20 percent of the first movers chose either never to trust or always to trust. It is not the case that subjects choose a particular type of strategy in these games and then stick with it.

<Table 3 About Here>

Now we turn to the hypotheses that focus on the icon manipulations. Recall that our previous research shows that the "happy" icon is rated as much friendlier and perceived to be more cooperative than the "angry" or "devious" icons Eckel and Wilson (1999), with the Diamond a more neutral category. Evidence that subjects hold this kind of ordering when evaluating the icons is provided by the post-experiment questionnaire, where subjects were asked whether they found a specific icon to be cooperative, trustworthy and fair. Responses to three questions for each icon were aggregated into a

[5] In Eckel and Wilson (2000), subjects were given no information about their counterpart. Similar to the experiments discussed here, first movers were given no feedback about their counterpart's move. Subjects made four distinct decisions, and several of the games were the same as reported here.

simple additive scale that gives findings similar to those in Eckel and Wilson (1999). However, to our surprise, we find that the Diamond and the Happy icons are rated the same. Both are perceived as more cooperative, trustworthy and fair than either the Devious or Angry icon.[6]

Table 4 aggregates across games the percentage of choices of one icon over another, conditional on the pairing. The top of the table represents the pairing (four distinct pairings were used in the experiment). The first row of data presents the percentage of time that the icon was chosen given the pairing. As can be seen, the Happy icon is preferred to Devious. Likewise Diamond is preferred to Devious to Angry. However, Angry is slightly preferred to Happy (although the difference is not statistically significant). We find partial support for Prediction 2, although the fact that subjects chose Angry slightly more often than Happy is unexpected.

<Table 4 About Here>

We also can test whether subjects choose an icon conditional on whether they intend to trust or not. For instance, if a subject knows that she will exit at the first decision node (e.g., not be "nice"), then she will be indifferent between the Devious or Angry icon. The middle row of Table 4 indicates the percentage of time that a trust move was taken contingent on the icon chosen. While subjects who chose Happy took a trusting move slightly more often than those who chose Devious, the difference is not significant. By contrast, and unexpectedly, subjects who chose an Angry icon were more likely to trust than those who chose a Happy icon. Finally, a Diamond icon is always trusted more than either an Angry or a Devious icon. These findings do not consistently support our predictions.

As described previously, the second mover was shown the icon to which she was assigned for each decision. The last row of Table 3 indicates the percentage of times trust was reciprocated, given that the first mover had taken a trust move. Across all icons and icon pairings the levels of reciprocated trust are relatively low. The only anomalous case is in the last pairing, with 63 percent of the subjects reciprocating trust in the Diamond/Angry pairing. This is more than twice the reciprocated trust in the other cells of the table.

From these data it does not appear that there is any systematic effect of icon labels on the choice of branches or the decision to trust. However, the design is complicated in that subjects not only endogenously choose their partner's type, but choose the game they wish to play. To tease out all of the effects on an individual's choice we turn to several multivariate models. These models focus on the first mover's choice. Because each

---

[6] This was tested using a General Linear Model and then pairwise Scheffe tests, adjusted for post-hoc comparisons. The GLM model included dummy variables indicating the icon and the earnings associated with each icon. It was thought that an individual's assessment of the icon might be affected by what was earned when paired with that icon. However, only the icons were significant. There was no difference between the pairs of Angry and Devious or Happy and Diamond. However between the pairs, all differences are statistically significant at the .05 level. The ordering is consistent with that in Eckel and Wilson (1999) -- with the surprising finding that Diamond is regarded as cooperative.

player made a series of moves, we use a random-effects panel data model to control for unobserved individual differences in propensities to trust/reciprocate.

In each of our models the dependent variable is equal to one if the first mover trusted the second player and chose to invest, and zero otherwise. The independent variables include controls variables icon, game, and individual characteristics. *Friendly* is a dummy value for whether the icon that was chosen was rated as friendly or not (=1 for Happy or Diamond; 0otherwise). Likewise, dummy variables were generated for two characteristics we have noted in these games. *Equity* is set to 1 for games 2 and 4 which include an equal split at the first move, and 0 for games 1 and 3. *Risky* is an additional dummy variable equal to 1 for the risker games 1 and 2, and 0 for the less-risky Games 3 and 4 where the first mover is not forced to invest his full endowment.

We also include a number of other variables that measure individual characteristics that might affect trust choices. Foremost among these is the risk orientation of a subject. *Risk* is the additive risk scale described above. We also include *Female*, a dummy variable taking on a value of 1 for women and 0 for men. An alternative model interacts sex of the first mover and their risk score. Another series of measures derive from the post-experiment questionnaire. *Trustworthy* is an aggregation of a 7-item general trustworthiness scale from Wrightsman's (1991) "Philosophies of Human Nature (PHN) Scales." *Altruism* is a similar scale from the same source that measures altruism. Both scales are simple additive aggregations of the relevant questionnaire items.[7] These two items capture a subject's own characteristics, rather than an assessment of the partner. Finally, we add a variable indicating the subject's GPA (all subjects were enrolled at the University -- Glaeser et al., (2000) find some effect of GPA on trusting behavior).

Two different models were estimated using Random-Effects Probit regressions. Both models estimate decisions for the games where subjects had a choice between two icons as partner (see Table 5). Because the coefficients are for the most part stable with respect to the specification of the model, we discuss both models together. First it is clear that the friendly icons have only an insignificant positive effect on the likelihood of choosing to trust. Trusting is lower in games in which there is an equity choice at the first move. The effect statistically significant at the .1 level. *Risky* carries a negative, insignificant coefficient.[8] The parameters of the game appear to have a stronger impact on trusting behavior than the choice of a partner.

<Table 5 About Here>

The altruism scale registers an insignificant positive effect on the propensity to trust. The personal trustworthiness scale also carries a positive, insignificant coefficient, which might indicate (weakly) that individuals who score higher on the trustworthiness scale are somewhat more likely to trust, irrespective of the game they are facing. Finally, the self-reported grade point average of subjects has a negative effect, although not statistically significant. The sign is consistent with that reported in Glaeser et al. (2000), that subjects with lower GPA were less likely to engage in trusting behavior

---

[7] These scales are positively correlated with a pearson's r of .40.

[8] In other models not reported here, we separately estimate trusting choices using either the equity or the risky dummy variable. The coefficients are very similar. Keep both dummy variables in the equation does not create any problems with estimation or interpretation.

Model 1 constrains the risk measure to have the same impact on trusting for women and men. Here we find no significant relationship between risk preferences and trust, but a strong negative correlation with the variable sex, indicating that are less likely to trust. This is consistent with findings by Scharlemann, Eckel et al. (2000). However, in other experiments we have found a differential effect of risk preferences on choices by women and men, and a correlation between gender and risk preferences. For this reason we estimate Model 2 to test whether the impact of risk attitudes on trusting behavior is different for women and men. Two new variables interact the risk measure with the sex of the decision-maker, allowing the coefficient on risk to differ for the two groups. Here the coefficient on the sex variable drops to insignificance. Moreover, we are able to reject the hypothesis that risk attitudes affect behavior in the same way for women and men. (Likelihood ratio test, $\chi^2 = 2.81$, p=.09).

8. Conclusion

We began by proposing that the choice of a partner is a strategic behavior. Usually people will choose partners with whom they have had beneficial exchanges. In most instances this means choosing to exchange with people who are known to be trustworthy. However, in many settings, people must choose a trading partner from among strangers. We argued that such a choice is not made randomly, but rather by focusing on particular characteristics of individuals. We think several of those individual characteristics have credible signaling value. People will choose partners who appear to be trustworthy.

We chose to focus on a limited set of facial expressions for a trading partner. Using highly stylized icons we provided a limited set of partners with very distinct expressions. This allowed us to differentiate between friendly and unfriendly partners.

In our experiment we find that subjects tend to choose friendly icons as a trading partner. We also thought that this would translate into subjects being more likely to make trusting choices. However, while we find that subjects have a pronounced preference for selecting friendlier partners, this does not mean that trusting behavior follows. Our analysis indicates that the type of icon does not matter for an individual's decision to trust. We do find that subjects engage in substantial trusting behavior. However, it is uncorrelated with their choice of partner.

Subjects do pay attention to some features of the game. They are concerned with the degree of risk in being taken for a "sucker" in several of the games. They are also concerned with ensuring that their partner gets something in the game -- if there is an opportunity to achieve an equitable split at the outset, then subjects often do so. It is also the case that risk characteristics about the decision maker matter. Here females who are more risk acceptant are less likely to trust. This is a surprising and anomalous finding. Other characteristics of decision makers have little effect on decisions to trust.

It is reasonable to ask why there is such a disjunction between a preference for a type of partner and then no correlation in trusting behavior and the type of partner chosen. First, it may be that subjects considered this a two-stage problem and dealt with it sequentially. Their first concern was to choose a partner -- which they did without regard to the different games displayed before them. Once the partner was selected, then subjects turned to the game itself. Once the choice of partner was completed, it is

plausible that subjects never looked back. Second, it may be that the icons are too artificial and have little bearing on a complicated game. Because they are so abstract, subjects do not regard them as having any credible signal value about the partner to which the icon is assigned. In no sense does the second mover "earn" such an icon. In this sense, it cannot have any credible signaling value and is treated as such. It is merely a cheap talk signal -- a bit of noise that is overcome by other features of the game.

Our subsequent work is moving to "credible signals" -- images of partners that have meaning and are more natural than the highly abstract icons used in this experiment.

References.

Berg, J., et al. (1995). "Trust, Reciprocity, and Social History." *Games and Economic Behavior* **10**(1): 122-42.

Blount, S. (1995). "When Social Outcomes Aren't Fair: The Effects of Causal Attributions on Preferences." *Organizational Behavior and Human Decision Processes. 63*(2)): 131-144.

Bolle, F. (1998). "Rewarding Trust: An Experimental Study." *Theory and Decision*. **45**: 83-98.

Eckel, C. C. and P. Grossman (forthcoming) "Differences in the Economic Decisions of Men and Women: Experimental Evidence." *Handbook of Experimental Results* (edited by Charles Plott and Vernon Smith. New York): Elsevier.

Eckel, C. C. and R. K. Wilson (1999). "Reciprocal Fairness and Social Signaling: Experiments with Limited Reputations." American Economic Association, New York, NY.

Eckel, C. C. and R. K. Wilson (2000). "Experimental Evidence on Risky Trust in Simple Negotiation Games." Unpublished manuscript. Houston, TX. Rice University.

Eckel, C. C. a. R. K. Wilson. (1998). "Reputation Formation in Simple Bargaining Games." Unpublished Manuscript.

Fehr, E., G. Kirchsteiger, et al. (1993). "Does Fairness Prevent Market Clearing? An Experimental Investigation." *Quarterly Journal of Economics* **108**(2): 437-459.

Glaeser, Edward L., David I. Laibson, José A. Scheinkman, and Christine L. Soutter. 2000. "Measuring Trust" *Quarterly Journal of Economics* 155(3): 811-846. August.

McCabe, K. A., S. J. Rassenti, et al. (1998). "Reciprocity, Trust, and Payoff Privacy in Extensive Form Bargaining." *Games and Economic Behavior* **24**(1-2): 10-24.

McKelvie, S. J. (1973). "The meaningfulness and meaning of schematic faces." *Perception and Psychophysics* 14(2)): 343-348.

Mulford, M., J. Orbell, et al. (1998). "Physical Attractiveness, Opportunity, and Success in Everyday Exchange." *American Journal of Sociology* **103**(6): 1565-1592.

Rabin, M. (1993). "Incorporating Fairness into Game Theory and Economics." *American Economic Review* **83**(5): 1281-1302.

Scharlemann, J. P. W., C. C. Eckel, et al. (2000). "The Value of a Smile: Game Theory with a Human Face." Unpublished manuscript: Virginia Tech, Department of Economics.

Sell, J. a. W. I. Griffith, and R. K. Wilson. (1993). "Are Women More Cooperative than Men in Social Dilemmas? Evidence from Two Experiments." *Social Psychology Quarterly* **56**((September)): 211-222.

Walters, A. S., A. & Meyer, L. (1998). "Gender and Negotiator Competitiveness: A Meta-Analysis." *Organizational Behavior and Human Decision Processes* **76**(1): 1-29.

Table 1
Percentage of Trust Moves by Game (Ignoring Icon Manipulations)

	Game 1	***Game 2***	***Game 3***	***Game 4***
% of Trust Moves	49.5	33.3	46.7	50.0
(Frequencies in Parentheses)	(49)	(33)	(70)	(75)
% of Reciprocated Trust by 2nd Player	34.7	30.3	42.9	28.0
(Frequencies in Parentheses)	(17)	(10)	(30)	(21)

Table 2
Distribution of "Risky" Choices by Subjects
(0=Not risky, 6=Always risky)

# of Risky Choices	***Frequency***	***Percentage***
0	0	0
1	2	2.0%
2	14	14.0%
3	23	23.0%
4	32	32.0%
5	16	16.0%
6	13	13.0%

Table 3
Distribution of "Trust" Moves by First Movers

Number	***Frequency***	***Percentage***
0	5	10.0
1	1	2.0
2	4	8.0
3	9	18.0
4	10	20.0
5	4	8.0
6	6	12.0
7	4	8.0
8	1	2.0
9	1	2.0
10	5	10.0

Table 4
Percentage Picking the Icon and Choosing to Trust (Across all Games)

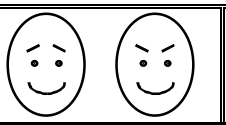
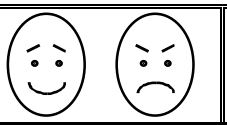
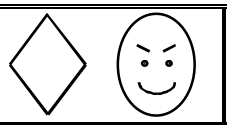
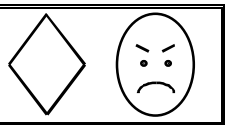
								
% of Moves to Branch/Icon (Frequencies in Parentheses)	61.5 (83)	38.5 (52)	47.7 (61)	52.3 (67)	61.1 (44)	38.9 (28)	64.1 (41)	35.9 (23)
% of Trust Moves (Frequencies in Parentheses)	49.4 (41)	48.1 (25)	34.4 (21)	49.3 (33)	50.0 (22)	32.1 (9)	46.3 (19)	26.1 (6)
% of Reciprocated Trust (Frequencies in Parentheses)	31.7 (13)	28.0 (7)	28.6 (6)	21.2 (7)	27.3 (6)	33.3 (3)	63.1 (12)	33.3 (2)

Table 5
Probit Estimates of Whether the First Mover will Choose a Trust Move. (Standard Errors and p-Values in Parentheses)

	Model 1	Model 2
Intercept	-.854 (.800) (p=.286)	-1.250 (.818) (p=.126)
Friendly (1 if Happy or Diamond Icon, 0 otherwise)	.186 (.152) (p=.219)	.180 (.151) (p=.235)
Equity (1 if Games 2 or 4, 0 otherwise)	**-.272** **(.143)** **(p=.057)**	**-.274** **(.143)** **(p=.055)**
Risky (1 if Games 1 or 2, 0 otherwise)	-.200 (.143) (p=.160)	-.201 (.143) (p=.158)
Altruism (additive scale of post-experiment questionnaire)	.194 (.242) (p=.423)	.254 (.238) (p=.286)
Trustworthy (additive scale of post-experiment questionnaire)	.261 (.214) (p=.223)	.165 (.214) (p=.440)
Sex (1 if female, 0 if male)	**-.751** **(.296)** **(p=.011)**	.570 **(**.821**)** (p=.488)
Risk (additive Risk measure)	-.060 (.104) (p=.563)	--
Female x Risk	--	**-.285** **(.169)** **(p=.091)**
Male x Risk	--	.076 (.131) (p=.560)
Log Likelihood	-238.154 n=399	-236.748 n=399

Figure 1
Games Used In the Experiment

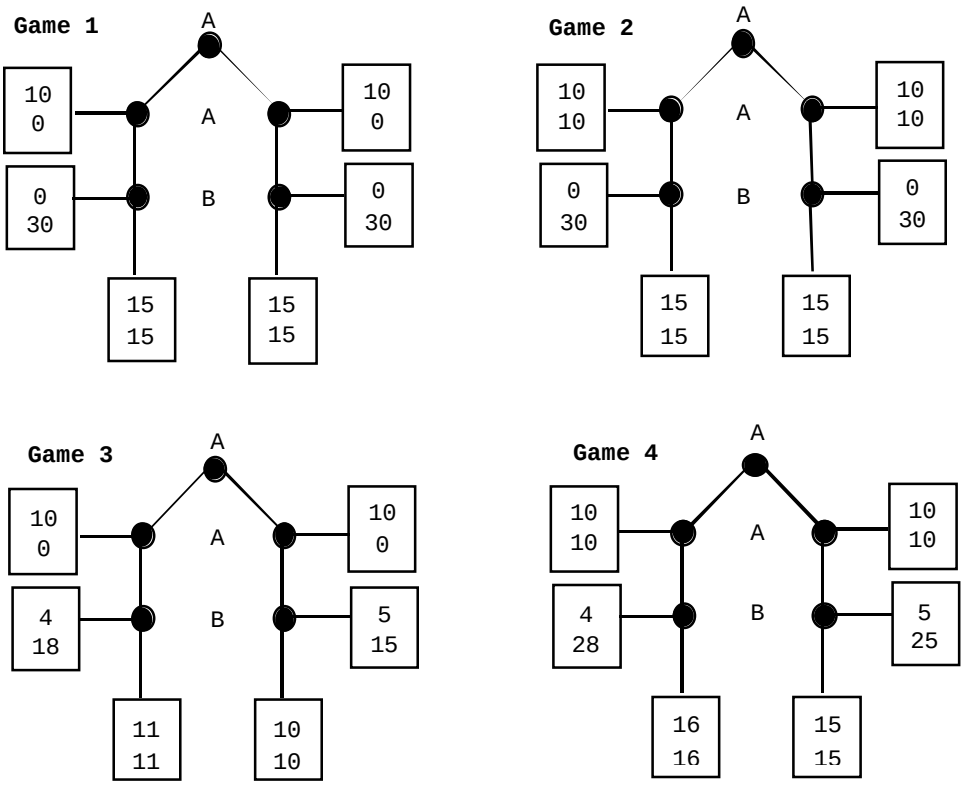
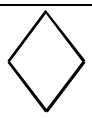
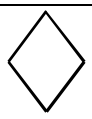
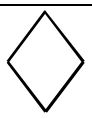


Figure 2
Icon Pairs, Games and Blocks Used in Experimental Design

Block 1			Block 2		
Left	Right	Game	Left	Right	Game
		All			All
		All			All
		3,4			3
--	--	--			4

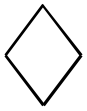
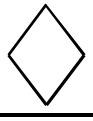
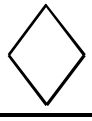
Block 3		
Left	Right	Game
		All
		All
		3
		4

Figure 3
Deck Pairs plotted by Expected Value and Variance