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

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Abstract:

We examine trusting behavior when subjects choose between two partners labeled with friendly or unfriendly icons. Subjects play a limited trust game: at the first node, player 1 chooses whether to trust; at the second, player 2 decides whether to reciprocate. Parameters of the game vary the risk and rewards to trust and reciprocity. Subjects prefer friendlier partners, and trust is higher than in similar games without partner choice. Game structure affects trust and reciprocity. More risk-averse subjects avoid riskier games. Survey measures of trustworthiness and altruism affect reciprocity, but not trust. Women are less likely to trust than men.

JEL codes: C91, Z13
Key words: trust, reciprocity, risk, altruism, trustworthiness, laboratory experiment

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1. Introduction.

In social exchanges involving trust, partners not only decide how to bargain with one another, but they also choose with whom to bargain. In contrast, most experimental studies of trust match subjects randomly with one another. Trusting behavior should be enhanced when subjects are able to choose their own partners. We report the results of experiments where subjects choose between two partners to play a two-person, sequential trust game, based on the investment game developed by Berg et al. (1995).[1] The two potential partners are labeled with icons. We analyze their behavior controlling for the risk preferences of the subjects as measured by an additional lottery-choice task, as well as preferences over altruism and trustworthiness, as measured by a survey instrument completed by subjects at the end of the experiments.

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,

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

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, games can be constructed that accommodate choice of partner as an initial strategic move. A choice among alternative partners can be seen as a choice between probability distributions over fixed strategy choices. In this context, a partner's characteristics act as signals that affect the decision-maker's expectations.

Several previous studies incorporate aspects of the partner into the study of bargaining behavior.[2] In particular, many researchers have investigated differences between men and women in a variety of games.[3] Most studies support the idea that there may be systematic differences in behavior by identifiable groups, and that subjects are likely to 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. In our study we label the two potential partners with icons that are "friendly" or "unfriendly". We show that subjects are more likely to choose to play a trust game with a friendly icon.

Several studies report experimental results using games similar to the investment game (Berg, et al., 1995; Bolle, 1998; McCabe, et al., 1998; Croson and Buchann, 1999). All report high levels of trust as compared with the Nash equilibrium of the trust game. A high proportion of subjects trust something to their partner, and on average reciprocity is sufficient to make trust

[2] Walters (1998) surveys negotiator competitiveness. Ball, et. al (2001) examine status differences. Blount (1995) compares people and machines. Mulford, 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, et al. (2000) show that the facial expression (a smile) of a partner affects strategic play.

[3] Eckel and Grossman (forthcoming) survey studies of sex differences in the play of public goods, ultimatum and dictator games.

worthwhile. A recent study by Glaeser, et al. (2000), takes a different approach, using the trust game as a measure of interpersonal social capital among a heterogeneous population of Harvard undergraduate subjects.

A notable aspect of experimental results on trusting behavior is the degree of heterogeneity across subjects. To control for differences in the initial propensities to trust, we collect additional data on preferences. In a second part of the experiment subjects complete a battery of survey items designed to measure altruism and trust. In the final part of the experiment subjects make a series of choices between gambles with different levels of risk. We show that more risk averse subjects choose less risky games, and are generally less likely to trust when risk levels are higher. The altruism and trustworthiness scales are unrelated to trusting behavior, but trustworthiness is positively related to reciprocity at the second stage of the game.

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 might affect strategic choices within the game. An exception is Mulford, et al. (1998), who focus on the role of attractiveness. In their study subjects observe one another and then choose whether to play a series of prisoner's dilemma games. The researchers found that subjects were more likely to play the game when they were assigned attractive partners and that subjects were more likely to cooperate with those judged as

attractive. These results suggest that people have a preference for certain characteristics of their partners, and that their behavior varies with respect to those characteristics. Frank, et al. (1993) allow subjects to engage in substantial pre-play discussion prior to making decisions in a prisoner's dilemma game. Following the discussion they are asked to predict whether their partners will cooperate or defect. The study finds that people are good at reading their partners -- both those who are likely to cooperate and those who are likely to defect.

Our design removes one potentially confounding effect of these experiments. Both were conducted with face-to-face interaction, which is seemingly necessary given the need to assess the characteristics of others. However, face-to-face interaction, even when verbal communication is prohibited, may allow the exchange of non-verbal signals; smiles, frowns, and looks of frustration may all generate information about another actor that can introduce a confound. Our design eliminates face-to-face interaction, and replaces it with highly stylized representations of the players.

We adopt a variation of the "investment game" developed by Berg, et al. (1995). 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 (either 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 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 is 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, 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 potential losses and potential gains to trusting. This assessment depends on the payoff structure of the situation. The actor's risk preferences play an important role; for example, a more risk-averse agent may be less likely to trust. An additional component depends on the agent's 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 parameters of the games, offer subjects their choice of a partner, and measure the preferences of individual actors over altruism, trustworthiness, and financial risk.

3. Experimental Procedures.

A total of 100 subjects (61 males and 39 females) 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 was 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 faced four decision problems 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 chose whether to keep an endowment or "trust" by passing an amount to an anonymous partner. In the Berg et al. game the passed amount was tripled, then the partner decided whether to return any of the resulting amount to the first player. In our games the passed amount was predetermined, and was either doubled or tripled. The decisions of the second mover also were limited. We constrained the set of actions available to subjects in order to focus on specific aspects of trust and reciprocity.

<Figure 1 about here.>

First-movers faced a two-branch game, with a trust game on each branch (see Figure 1). Each branch of the game was labeled with an icon, as explained below. The first mover selected the left or right branch, then chose a move either to end the game or pass to the second player. In Games 1 and 2, the branches were symmetric, while Games 3 and 4 had asymmetric branches that differed in potential gains and losses.

In Game 1 the first mover could retain $10, giving the second player $0, or pass the full amount. The second player then could keep the entire return ($30), or split the 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 could 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 presented 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 decision to trust. 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 game on the left branch of the relevant game in Figure 1, and the icon on the right with the game on the right. (In the experiment the branches of 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 determined the mix of icon pairs and games. While all four icons were used in the experiment, in a given session a first mover viewed three different types of icons. The "diamond" shaped icon was used as control. The remaining three icons were oval faces, 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 (smile) coupled with upturned eyebrows yields an image that reflects a happy emotion and invites trust. By contrast, the icon with an upturned mouth and down-turned eyebrows appears as devious, and was furthest removed from the happy icon. Finally, the down-turned mouth and down-turned eyebrows indicate an angry emotion, and this icon was rated as slightly more trustworthy than the devious icon. [4]

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. Finally, in some treatments, games 3 and 4 were presented with different icons. The combinations are detailed in Figures 1 and 2.

[4] In unreported analysis we replicated McKelvie's (1973) findings. Our analysis is based on a survey of a large undergraduate population that was asked to rate characteristics of icons using a 25-word-pair semantic differential scale.

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 chose. First movers were told that they were making a choice of a partner for the decision, each potential partner represented by one of 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.[5] 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. We develop the *Trustworthy* score from a 7-question general trustworthiness scale taken from Wrightsman's (1991) "Philosophies of Human Nature (PHN) Scales." The *Altruism* score is a similar scale from the same source that contains items designed to measures altruism. Both scales are simple additive aggregations of the relevant questionnaire items and have been reflected so that a higher score indicates greater trustworthiness or altruism.[6] Questions are contained in Appendix 1.

When subjects completed the questionnaire they were given the option to continue with another experiment lasting less than 10 minutes for additional earnings. (All agreed.) This decision task was designed to elicit risk preferences, and consisted of six choices between two

[5] This is different from the procedure used in (Eckel and Wilson 1999) 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.
[6] These scales are positively correlated with a pearson's r of .40.

different gambles. 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 chosen, the cards were turned over, shuffled on the screen and dealt. Subjects were asked to choose a single card and earned the value of the card they chose.

Twelve decks were designed that varied the expected values and the variances of the gambles as shown in Figure 3. Six specific pairings were pre-determined by the experimenters. The lines in Figure 3 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 the pairing between a certain deck with 10 cards, each worth one dollar, and a high-variance high-return deck with three cards worth five dollars and 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. A simple proxy for risk acceptance was computed by calculating the number times that the subject chose the relatively high-variance deck.

<Figure 3 About Here>

6. Predictions

The subject first chooses between two partners. Faced with a choice between two icons, we expected that subjects would be more likely to choose a "nice" or "neutral" icon when these are paired with more negatively-perceived icons. The greater the perceived difference between the icons, the more likely it is that the nicer icon will be chosen. 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 (Eckel and Wilson 1999). Given that the "diamond" icon presents no threatening facial cues, we expect it to be neutral, falling between Happy and the other two. We anticipate that choice behavior will reflect the assessments of the previous population.

The subject must next decide whether to make a trusting move or exit the game. Subjects will trust their partners depending on the perceived benefits and costs or risks of trusting. These costs and benefits are related to the characteristics of the game, characteristics of the partner (icon), and the characteristics of the decision-maker.

First, we anticipate that a subject who chooses her own partner will be more likely to trust that partner. Trust also should be related to the potential gains and losses associated with trusting. We measure the potential *Gain* as the difference between the payoff to player 1 at the first node and their equal-split payoff at the last node of the game. The potential *Loss* is the difference between the first-node payoff and the payoff associated with a failure by player 2 to reciprocate. Higher Gain should "pull" player 1 to trust, and higher Loss should "push" player 1 to exit the game. Finally, considerations of equity or fairness may lead first-movers to choose the exit option on the first move more frequently when it involves an equal split (games 2 and 4).

In addition, choice of a friendly icon might lead to a higher level of trusting behavior. The reasoning for this hypothesis is as follows. A subject's choice of a partner should depend on an anticipated action. Relying on Rabin (1993), we expect that subjects who anticipate reciprocity will choose "nice" icons. 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.

Characteristics of the decision maker, such as their own perceived trustworthiness, altruism, and risk attitudes, as well as the sex of the subject also might affect choices in the game. Glaeser, et al., (2000), found that more trustworthy individuals will trust more; we test for this result in our data. Altruism is also may be positively related to trust. In addition, more risk-averse subjects should be less likely to trust in all games, since a move to trust resembles a gamble. Since women show greater risk-aversion in many decisions, the sex of the subjects may also be correlated with behavior. In addition, since some of the games are more "risky" than others, a subject's attitude toward risk is likely to manifest itself in the choices within games, and in differences across games.

7. Results.

Summary results are shown in Table 1. Overall, 45.5 percent of the subjects chose to trust; trust was reciprocated 34.4 percent of the time. Our findings are roughly consistent with those of Berg, et al., (1995) Bolle (1998), McCabe, Rassenti et al. (1998) and Glaeser, et al., (2000). The overall rate of trust reported here is higher than we have observed in a directly-related experiment. Comparing the level of trust in games 1 and 2 (41.2 percent) with identical games omitting the choice of partner (31.8 percent), we see a significantly higher level of trust ($t=2.27$, $p=.024$).[7]

<Table 1 About Here>

Table 2 summarizes trust and reciprocity for each game. As expected, trust varies by the type of game; trust is lowest in game 2 (33%) and highest in the left branch of game 4 (52.8%). There is more trust in Game 1 than Game 2. These two games differ only in the higher payoff to

player 2 if player 1 chooses to exit the game. Here we see that the presence of an equal split appears to lower the tendency to trust, perhaps by lowering its perceived benefit. However, a similar difference between Games 3 and 4 does not produce the same pattern of results. A more detailed analysis controlling for subject characteristics and preferences is below.

<Table 2 About Here>

Returning to Table 1, we find considerable heterogeneity in preferences. On average subjects chose 3.85 higher-variance (riskier) gambles in six pairwise choices; no subject always preferred the lower-variance choice, while 13 percent of the subjects chose the higher-variance gamble for all six pairs. The Altruism scale ranges from 1.8 to 4.3, with a mean of 3.07. The Trustworthy scale ranges from 2 to 5.1 with a mean of 3.46.

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. This would seem to indicate that subjects do not have fixed preferences, but rather respond to the characteristics of the situation in which they find themselves.

<Table 3 About Here>

We now examine the first mover's choice of an icon/game pair. 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

[7] In Eckel and Wilson (2001), subjects made a decision whether to trust in a one-branch game labeled with a particular icon. Similar to the experiments discussed here, first movers were given no feedback about their

can be seen, the Happy icon chosen more frequently than Devious. Likewise the Diamond is preferred to Devious and to Angry. However, in the aggregate data Angry is chosen at about the same rate as Happy (difference is not statistically significant). 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.

As described previously, the second mover was shown the icon to which he 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 the aggregate data there is no obvious 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 also 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.

<Table 4 About Here>

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counterpart's move.

Table 5 contains an analysis of the choice by player 1 of an icon/game branch. We present random-effects panel probit regressions where the dependent variable is 1 if the right branch of a given game is chosen, coded as indicated in Figure 1. (Recall that in the actual experiment the left-right orientation was randomized, to avoid any inherent bias.) The variable Icon Difference is an index of the relative ranking of the icon on the right. Icons are assigned friendliness ratings as follows: Happy =1, Diamond=0, Angry=-1, Devious=-2. Icon Difference is the rating for the icon on the right minus the rating for the icon on the left. Model 1 regresses this measure against the choice of branch, indicating a strong tendency for subjects to choose a relatively friendly face. Model 2 incorporates several additional variables that measure the preferences of the subjects. Neither the *Altruism* nor the *Trustworthy* score (described above) is related to the choice of icon/game. However, risk preferences do enter the decision. Risk x g34 is a variable equal to the risk scale for decisions involving games 3 and 4, and zero otherwise. Only in games 3 and 4 can a comparison between the two different games on the two branches be made. In both cases, a left move is more risky. The variable carries the expected sign, indicating that more risk-accepting subjects exhibit a lower probability of choosing the (lower-risk) right branch. Finally, Model 3 introduces two variables designed to capture sex differences in behavior. The first, Sex x g34, interacts sex (where 1=female) with games 3 and 4. Women are more likely to choose the less risky right branch of these games, even after adjusting for risk attitudes. This seems to indicate stronger risk aversion on the part of women over and above that captured by the gamble choice experiment. The second interacts sex with the Icon Difference, and shows no significant difference. Women are not more responsive than men to the icons.

<Table 5 About Here>

Table 6 examines the next decision in the experiment, where player 1 chooses whether to trust, passing to player 2 by moving down, or to exit the game at the first node. Model 1 includes variables that measure the icon and structure of the game; the dependent variable is equal to 1 if player 1 passes, and 0 if she exits the game. Chosen Icon is the friendliness rating of the icon that was chosen. At this stage, the icon has no effect on the decision to trust. Once a subject chooses a partner, the probability of trusting is not affected by the friendliness of the icon. The next four variables capture aspects of the structure of the game. Equity is a dummy variable equal to one for games 2 and 4, where the payoff to the decision to exit is equal for both players. Here we see that subjects are more likely to exit when this does not involve a zero payoff for player 2. Subjects seem reluctant to impose a zero payoff on their partners. Gain measures the highest potential gain to trusting, and is the difference between player 1's payoff at the bottom node and the first node. Loss measures the largest potential loss associated with trusting, and is the difference between player 1's payoff at the first node and at the second node (if player 2 defects). For example, for game 1, Gain = 5, and Loss = 10. Both significantly affect the subjects' decisions to trust, and in the expected directions. Finally, Same Icon is a dummy variable equal to 1 when the subject faces the same icon for both branches of the game. Our hypothesis was that trust might be lower in these games since the subject has less choice about their partner. However, the probability of trusting is not significantly different in these games.

<Table 6 About Here>

The final stage of the game is analyzed in Table 7. This table includes only decisions where player 1 chose to trust player 2 (n=227). Here the dependent variable is equal to 1 if player 2 reciprocates trust by choosing the equal split at the bottom node, and 0 if he defects.

Again Model 1 includes variables for the icon and game structure. Assigned Icon is the icon observed by player 2. Recall that player 2 does not know that this icon/game was chosen by player 1. As in the decision to trust, player 2's decision is not affected by the icon he sees. Temptation is a measure of the gain to player 2 of defecting, and is equal to his payoff if he defects minus his payoff if he reciprocates. Not surprisingly, as temptation increases, the likelihood of reciprocating decreases. Model 2 keeps the same characteristics of the game and then adds the trustworthiness and altruism scales for player 2. The decision to trust to positively and strongly related to a subject's own score on the trustworthiness scale. The more trustworthy a subject, the more likely that subject will reciprocate trust. The coefficient on the altruism measure carries a sign opposite from the one we expected. Finally, females are somewhat less likely to reciprocate trust, but the effect is not significant and is quite weak.

<Table 7 About Here>

8. Conclusion

We began by proposing that the choice of a partner is an element of strategic behavior. Usually people will prefer partners with whom they have had beneficial exchanges or partners who are known to be trustworthy. However, in many settings, a trading partner must be chosen from a set of strangers. We argue that such a choice is not made randomly, but rather that decision makers use all available information, including the characteristics of individuals, in an attempt to choose a trustworthy partner. People will choose partners who *appear* to be the most trustworthy from among their choice set.

Our study utilizes a limited set of facial and nonfacial icons as a proxy for the characteristics of a trading partner. Subjects choose between potential partners who are labeled

with icons that appear friendly, neutral, or unfriendly. In our experiment we find that subjects tend to choose trading partners who are labeled with friendly icons. Once a partner is chosen, the frequency of trusting behavior is roughly the same across the set of icons, but is higher than in games where there is no choice of partner.

Subjects do pay attention to features of the game. They are concerned with the potential gains and losses, and the degree of risk in being taken for a "sucker". Subjects are more likely to trust if potential gains are high, and less likely to trust if potential losses are large. More risk acceptant subjects prefer riskier games, and even after taking risk preferences into account, women avoid riskier games. Subjects also are concerned with ensuring that their partner receives some payment in the game; if there is an opportunity to achieve an equitable split at the outset, then subjects choose to exit the game more frequently. Other characteristics of decision makers have little effect on decisions to trust.

Reciprocity is also affected by the parameters of the game: subjects are tempted to defect by large sums. Personal characteristics of the decision maker also affect their decisions. In particular whether or not a subject rates herself as trustworthy is positively related to reciprocity.

When subjects have little basis on which to choose between partners, minor factors such as the friendliness of a label can affect their choices. In many exchange settings, decision-makers do not have information about the reputation of their potential partners; little wonder that firms devote to cultivating an image, or that shop owners carefully train sales personnel on how to approach potential customers. Our study suggests that there are individual differences in trustworthiness, so that a consumer has an incentive to identify and pay attention to cues about the potential trustworthiness of a partner, as well as the incentive structure of the situation, in deciding whether to trust.

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Table 1
Summary data

Variable	***Mean***	***Standard Dev.***	***N***
Trust	.455	.500	499
Reciprocity	.344	.47	227
Risk Acceptance	3.85	1.28	100
Altruism	3.07	.61	100
Trustworthy	3.46	.65	100
Sex	.39	.49	100

Table 2
Percentage of Trust Moves by Game (Ignoring Icon Manipulations)

	Game 1	***Game 2***	***Game 3L***	***Game 3R***	***Game 4L***	***Game 4R***
Trust: *% of Trust Moves (Frequencies in Parentheses)*	49.5 (49/99)	33.3 (33/100)	51.2 (40/77)	41.1 (30/73)	52.8 (47/89)	45.9 (28/61)
Reciprocity: *% of Trust Moves Reciprocated by 2nd Player (Frequencies in Parentheses)*	34.7 (17/49)	30.3 (10/33)	40.0 (16/40)	46.7 (14/30)	23.4 (11/47)	35.7 (10/28)

Table 3
Distribution of "Trust" Move

Number of Trust Moves	***Number of Subjects***	***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)

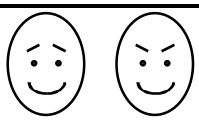
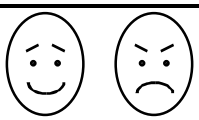
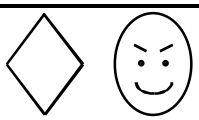
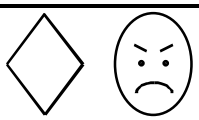
								
% of Moves to Branch/Icon (Frequencies in Parentheses)	61.5 (83)	38.5 (52)	47.7 (61)	52.3 (67)	61.1 (44)	38.9 (28)	64.1 (41)	35.9 (23)
% of Trust Moves (Frequencies in Parentheses)	49.4 (41)	48.1 (25)	34.4 (21)	49.3 (33)	50.0 (22)	32.1 (9)	46.3 (19)	26.1 (6)
% of Reciprocated Trust (Frequencies in Parentheses)	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
Random-Effects Panel Probit Estimates of the
First Mover Choosing the Right Branch.
(Standard Errors and p-Values in Parentheses)

	Model 1	Model 2	Model 3
Intercept	-.160 (.073) (p=.028)	.597 (.354) (p=.092)	-.006 (.091) (p=.945)
Icon Difference (value of icon on right – value of icon on left)	**.122** **(.033)** **(p<.001)**	**.105** **(.031)** **(p=.001)**	**.094** **(.040)** **(p=.021)**
Trustworthy (additive scale from questionnaire)	--	-.115 (.091) (p=.208)	--
Altruism (additive scale from questionnaire)	--	-.056 (.104) (p=.590)	--
Risk x g34 Risk-scale from second stage, for games 3 and 4 only	--	**-.074** **(.027)** **(p=.006)**	**-.108** **(.029)** **(p<.001)**
Sex x g34 1 for Females in games 3 and 4; 0 otherwise	--		**.445** **(.149)** **(p=.003)**
Sex x Icon Difference	--		.032 (.059) (p=.585)
Log Likelihood	-337.72 n=499	-333.10 n=499	-328.96 n=499

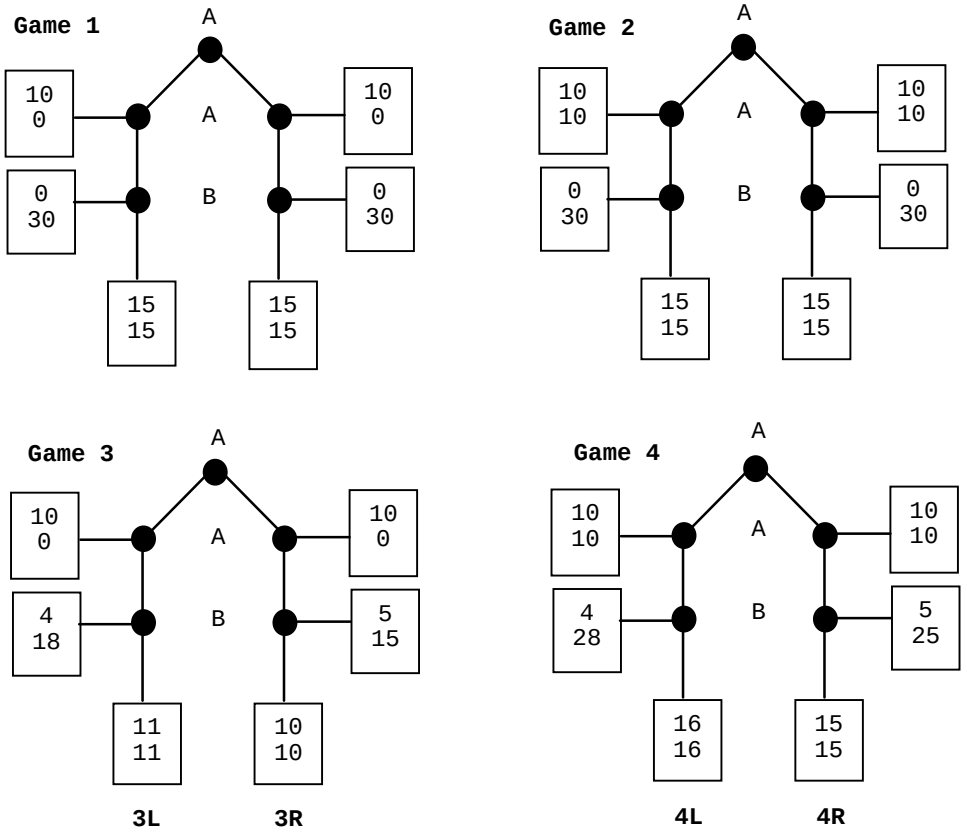
Table 6
Random-Effects Panel Probit Estimates of the First Mover's Decision to Trust .
(Standard Errors and p-Values in Parentheses)

	Model 1	Model 2
Intercept	.362 (.292) (p=.215)	-.857 (.823) (p=.298)
Chosen Icon (Positive toward friendlier icon)	.031 (.059) (p=.594)	.041 (.059) (p=.490)
Equity Game (1 for Games 2 and 4, 0 otherwise)	**-.559** **(.208)** **(p=.006)**	**-.553** **(.201)** **(p=.006)**
Gain (Potential gain for Player 1 if Player 2 is trustworthy)	**.135** **(.051)** **(p=.008)**	**.134** **(.051)** **(p=.009)**
Loss (Potential loss for Player 1 if Player 2 is untrustworthy)	**-.100** **(.039)** **(p=.011)**	**-.110** **(.037)** **(p=.003)**
Same Icon (1=subjects had no choice of partner icon, 0=otherwise	.129 (.169) (p=.444)	--
Trustworthy (additive scale from questionnaire)	--	.297 (.209) (p=.155)
Altruism (additive scale from questionnaire)	--	.269 (.231) (p=.246)
Risk (Risk measure from second stage)	--	-.067 (.096) (p=.484)
Sex (1=Females, 0=Males)	--	**-.771** **(.270)** **(p=.004)**
Log Likelihood	-305.42 n=499	-298.92 n=499

Table 7
Random-Effects Panel Probit Estimates of the Second Mover Choosing to Reciprocate Trust.
(Standard Errors and p-Values in Parentheses)

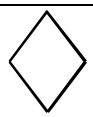
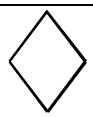
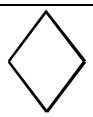
	Model 1	Model 2
Intercept	.007 (.347) (p=.984)	-1.426 (1.074) (p=.184)
Assigned Icon (Positive toward friendlier icon)	-.041 (.099) (p=.682)	-.070 (.099) (p=.480)
Temptation (Gain from defecting for Player 2)	**-.050** **(.028)** **(p=.076)**	**-.050** **(.028)** **(p=.076)**
Trustworthy (additive scale from questionnaire)	--	**1.030** **(.346)** **(p=.003)**
Altruism (additive scale from questionnaire)	--	**-.651** **(.332)** **(p=.050)**
Sex (1=Female, 0=Male)	--	-.230 (.336) (p=.494)
Log Likelihood	-131.52 n=227	-126.61 n=227

Figure 1
Games Used In the Experiment



Note: Player A's payoffs are at the top of each end node and Player B's payoffs are on the bottom. Each decision node is marked by a filled-in circle and a letter noting the player making the move.

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

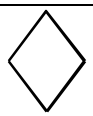
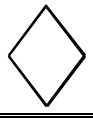
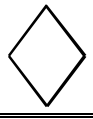
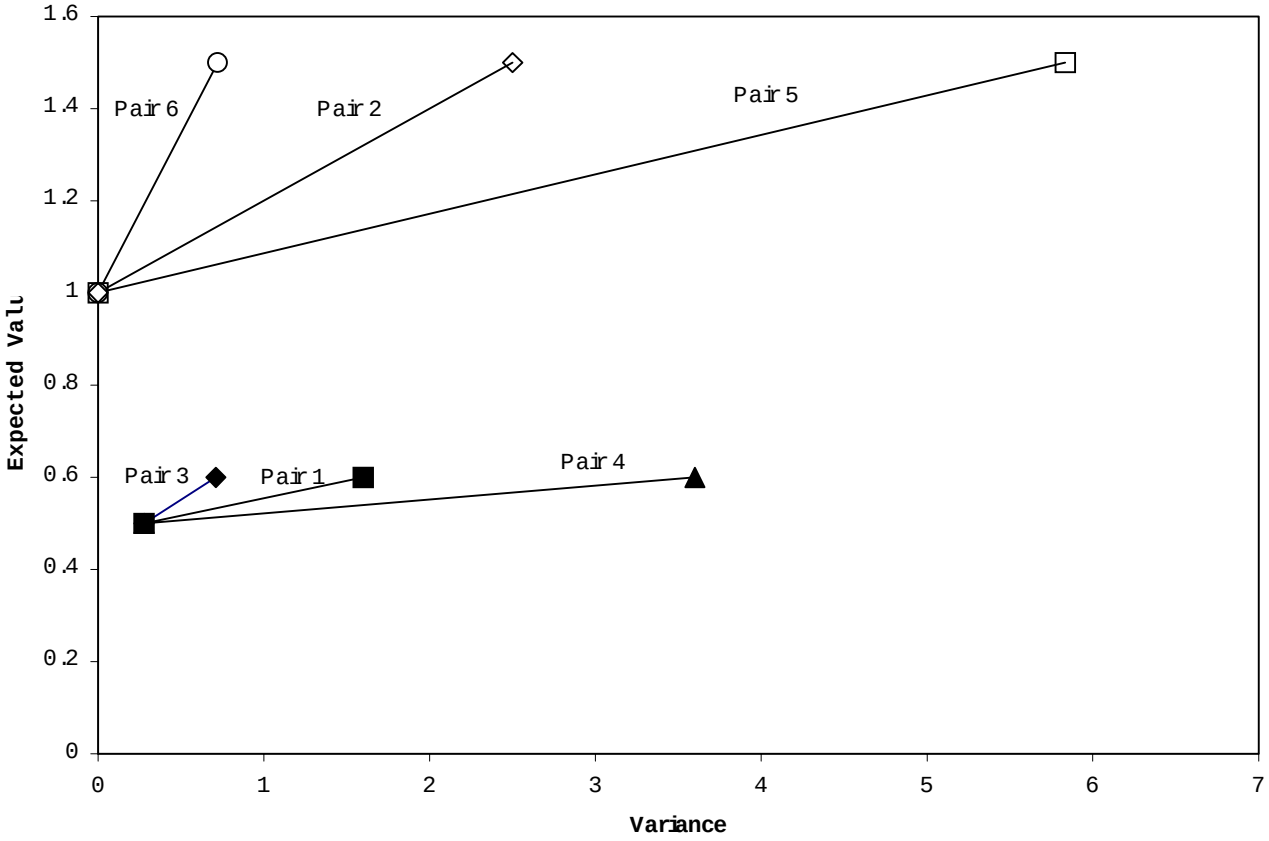
Block 3		
Left	Right	Game
		All
		All
		3
		4

Figure 3
Gamble Choice Pairs by Expected Value and Variance



Appendix 1
Post-Experiment Questionnaire

1. Sex of player	0=male 1=female	
2. "The amount I earned was too little."	*Likert 5 pt	
3. "My counterparts were: people/computers"	1=people 2=computers	
4. "If I participated again I would make more money"	*Likert 5 pt.	
5. "The Instructions were clear."	1=yes 2=no	
6. "People usually tell the truth, even when they know they would be better off lying."	**Likert 6pt	*Trust*
7. "Most people do not hesitate to go out of their way to help someone in trouble."	**Likert 6 pt	*Altruism*
8. "Most students do not cheat when taking an exam."	**Likert 6pt	*Trust*
9. "It's only a rare person who would risk his own life and limb to help someone else."	**Likert 6 pt	
10. "If you want people to do a job right, you should explain things to them in great detail and supervise them closely."	**Likert 6pt	*Trust*
11. "People pretend to care more about one another than they really do."	**Likert 6pt	*Altruism*
12. "Most people would tell a lie if they could gain by it."	**Likert 6pt	*Trust*
13. "The typical person is sincerely concerned about the problems of others."	**Likert 6pt	*Altruism*
14. "Most people are honest only because they're afraid of getting caught."	**Likert 6pt	*Trust*
15. "If you act in good faith with people, almost all of them will reciprocate with fairness toward you."	**Likert 6pt	*Trust*
16. "Most people exaggerate their troubles in order to get sympathy."	**Likert 6pt	*Altruism*
17. "Most people would stop and help a person whose car is disabled."	**Likert 6pt	*Altruism*
18. "People are usually out for their own good."	**Likert 6pt	*Altruism*
19. "Most people lead clean, decent lives."	**Likert 6pt	*Trust*
20. Age of player	1=under22 2=22 to 30 3=over 30	
21. "My grade point average is approximately:"	1=4.0, 2=3.75, … , 10=1.75	

*Likert 5 point: 1=Strongly Agree 2=Agree 3=Uncertain 4=Disagree 5=Strongly Disagree	**Likert 6 point 1=Strongly Agree 2=Somewhat Agree 3=Slightly Agree 4=Slightly Disagree 5=Somewhat Disagree 6=Strongly Disagree

Appendix 2
Instruction Screens for the Experiment

Screen 1

In this experiment you will participate in several two-person decision problems. At each decision you will be randomly paired with another individual in this room: your counterpart.

The joint decisions made by you and your counterpart will determine how much money you will earn for this decision problem.

Your earnings for this decision will be paid to you in cash at the end of this experiment. No one will know your earnings, and I ask you not to discuss your earnings with others.

Click OK when you are ready to continue.

OK

Screen 2

You will make many decisions with the other participants in this experiment.

At the conclusion of the experiment, ONE of the decisions will be randomly selected. You will be paid for that decision.

On the sheet of paper I have provided, please record your potential earnings for each decision. This will help you keep track of what you earn at the end.

Click OK when you are ready to continue.

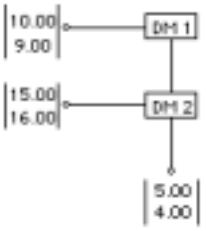
OK

Screen 3

You and another person will participate in decision problems similar to that displayed below. This other person is referred to as your counterpart.
Click OK to continue.

OK

Screen 4



You will be either Decision Maker (DM) 1 or 2. You will be told which decision maker you are before you begin.

Click RETURN to repeat or click OK to continue.

OK

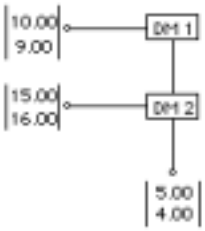
RETURN

Screen 5

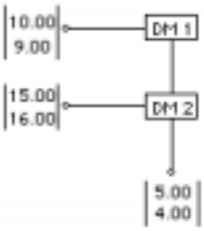
Notice the open boxes with the numbers in them. These boxes show the different earnings that you and your counterpart can make.

Click OK to continue.

OK



Screen 6



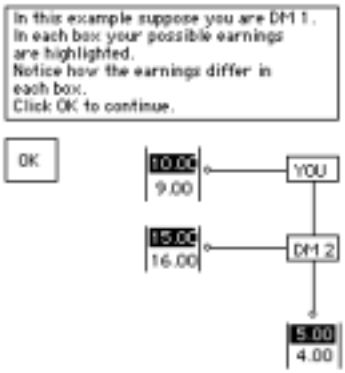
There are two numbers in each box. The number on the top is DM 1's earnings if this box is reached. The number on the bottom is DM 2's earnings.

Click OK to continue or RETURN to review.

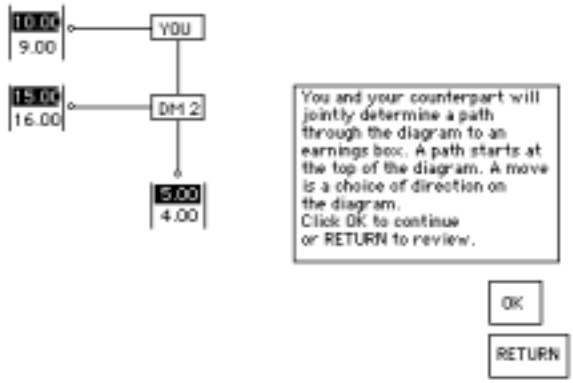
OK

RETURN

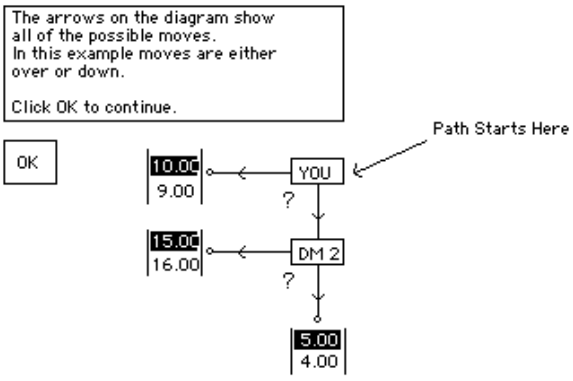
Screen 7



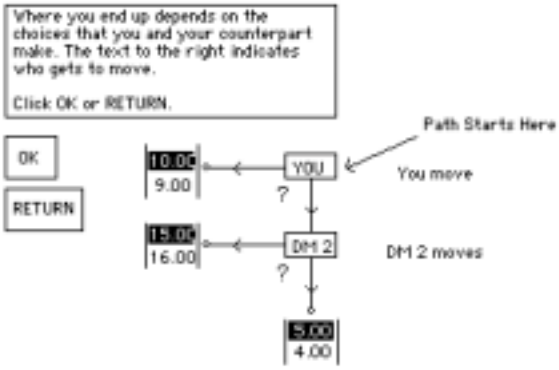
Screen 8



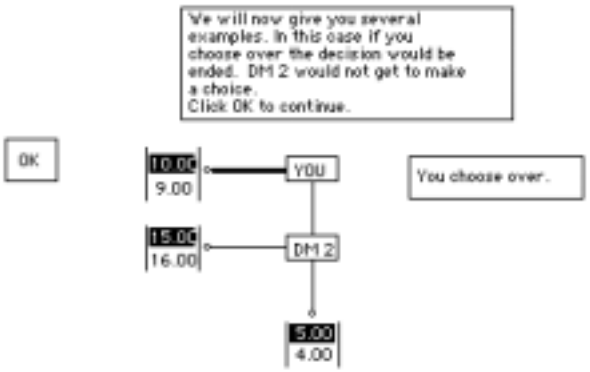
Screen 9



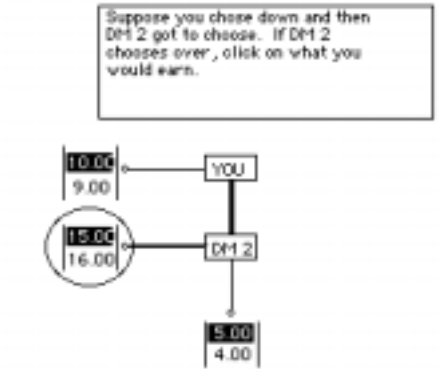
Screen 10



Screen 11

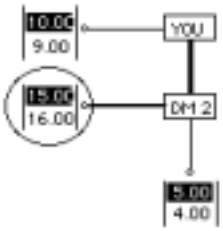


Screen 12

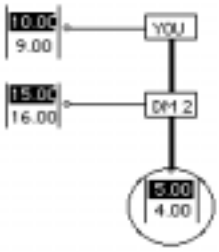


Screen 13

Suppose you chose down and then DM 2 got to choose. If DM 2 chooses over, click on what you would earn.



Screen 14



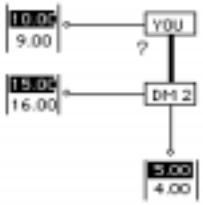
Note that the bold lines trace the path through the diagram. Also note that you and your counterpart make choices one at a time and in order.

Click OK to continue.

OK

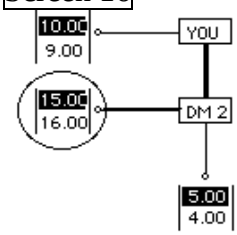
Screen 15

Here is an example of moving through the diagram. The blinking lines and the question mark indicate it is your turn to make a choice. Click on a blinking line to make your choice and then click OK to continue.



OK

Screen 16

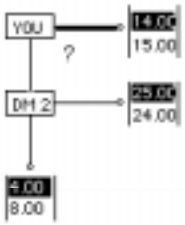


You chose to go down. In this example DM 2 might choose to go over. You would earn 15.00 and DM 2 would earn 16.00. The circle around the earnings box indicates the end of the decision.
Click OK to continue.

OK

Screen 17

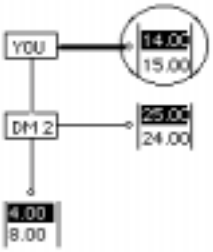
The same principle holds if the decision problem looks like the following. Again assume you are DM 2. Please make a choice by clicking on a blinking line.



OK

Screen 18

You chose to go over to the earnings box. If this happened in the decision problem you would earn 14.00 and DM 2 would earn 15.00. The circle around the earnings box indicates the end of the decision.
Click OK to continue.



OK

RETURN

Screen 19

You are about ready to begin. You will make several different decisions. However, you will only be paid for one of the decisions that you and your counterpart make. At the end of all of your decisions one will be randomly selected and you will be paid for that decision. You have a sheet of paper and a pencil to mark your earnings from each decision. Please keep track of how much you could make following each decision. If you have any questions, please ask them now. Otherwise click OK to continue.

OK