Trust between individuals and groups: Groups are less trusting than individuals but just as trustworthy*

Gary Bornstein[a], Martin G. Kocher[b], Tamar Kugler[c#] and Matthias Sutter[b,d]

[a] *Hebrew University, Jerusalem*
[b] *University of Innsbruck*
[c] *University of Arizona*
[d] *Max-Planck Institute for Research into Economic Systems, Jena*

Abstract: We compared the behavior of groups and individuals in a two-person trust game. The first mover in this game, the *sender*, receives an endowment and can send any part of it to the *responder;* the amount sent is tripled, and the responder can then return to the sender any portion of the tripled sum. In a 2x2 design, the players in the roles of sender and responder were either individuals or groups of three players (who conducted face-to-face discussions to decide on a collective group strategy). We found that groups in the role of sender sent smaller amounts than individuals, and expected lower returns. In particular, groups sent nothing more often than individuals did (and were more likely to do so when the responder was another group). Groups and individuals in the role of responder returned on average the same fraction of the amount sent. Hence, we conclude that groups are less trusting than individuals, but just as trustworthy.

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# Corresponding author. E-mail: tkugler@eller.arizona.edu; Phone: (520) 626-7788, Fax: (520) 621-4171

1 Introduction

Trust is an essential ingredient of any successful society, be it as small as a family or as large as the European Union (Alesina and La Ferrara, 2002; Bewley, 1999; Fehr and Falk, 1999; Fehr, Kirchsteiger and Riedl, 1993; Fehr, Gächter and Kirchsteiger, 1997; Fershtman and Gneezy, 2001; Glaeser, Laibson, Scheinkman and Soutter, 2000). Trust is necessary because it allows members of the society to exchange favors, goods, and services, even though contracts to determine the quality or quantity of these transactions are essentially incomplete. Without mutual trust much of the exchange would not take place, to the detriment of the parties involved and the society at large (Knack and Keefer, 1997; Zak and Knack, 2001).

Obviously, trust plays an important role in any exchange relationship, whether the participants are individuals or groups. Yet, the experimental work on trust and trustworthiness has focused almost exclusively on individuals (see Camerer, 2003, for a recent survey of the experimental literature on trust). Since many important transactions take place between groups (governments, firms, bargaining committees, families), and since trust between two groups, or between a group and an individual, cannot be readily inferred from individual-level experiments (e.g., Davis, 1992; Kerr, MacCoun and Cramer, 1996), studying group behavior in the laboratory is indispensable. The aim of the present paper is to explore potential differences between groups and individuals in trusting and trustworthy behavior. Establishing the existence of such differences would have important implications for market transactions, bargaining in economic and political settings, and the institutional organization of companies.

As our research tool we used a slightly modified version of the trust game, originally introduced by Berg, Dickhaut and McCabe (1995). There are two players in this game: a sender and a responder. The *sender* receives an initial endowment, $X > 0$, and can send any amount x to the responder, with $0 \leq x \leq X$. The *responder* gets triple the amount sent ($3x$) and can return to the sender any amount y, with $0 \leq y \leq 3x$. The final payoff for the sender is $X - x + y$, and for the responder $3x - y$.

The amount x is traditionally used as a measure for the sender's trust in an anonymous interaction partner. The relative return $y/3x$ is taken as an indicator of the responder's trustworthiness. In the present setting, trust is the willingness to transfer a positive amount ($x > 0$) to the other person in the hope that this person will reciprocate at her own cost. This measure captures a widespread definition of trust: the deliberate willingness of an agent to make himself vulnerable to the actions of another agent (Mayer, Davis and Schoorman, 1995; Rousseau, Sitkin, Burt and Camerer, 1998).

If one assumes that the players have no benevolent other-regarding preferences (and that this is common knowledge), then the standard game-theoretic solution of the trust game prescribes that: (i) the responder will keep all of any tripled amounts transferred by the sender and, (ii) knowing this, the sender will not transfer any positive amount. This "completely selfish" (sub-game perfect) equilibrium is, of course, collectively inefficient, because it precludes the possible efficiency gains generated by trust.

However, the results of trust game experiments are clearly inconsistent with the prescription of the standard model. Berg et al. (1995) report that, with x=$10, the average amount transferred by senders was $5.16 and the average amount returned by

responders was $4.66.[1] Subsequent studies have reported similar figures (see Camerer, 2003). However, all these studies were limited to individual decisions. The only exception is a recent study by Cox (2002), who compared trust games played between two individuals with the same games played between two groups (of three individuals each). His main findings are that individuals and groups do not differ in the amount *x* sent, but groups in the role of responders return significantly smaller amounts *y*.

Our paper extends the work by Cox (2002) in two ways: First, and most importantly, we studied not only the symmetric games where both players are either individuals or groups, but also the asymmetric cases where a group plays against an individual and vice versa. Employing a complete 2x2 design where both sender and responder can be either an individual or a group, may help distinguish between effects that depend on the type of the decision maker and effects that depend on the decision-maker's expectations about the opponent's behavior.

Second, while Cox's experiment employed a within-subjects design where the same participants played the trust game first as individuals and then as members of a group, in our experiment each participant played the game only once, as either an individual decision-maker or a group member. This between-subjects design eliminates potential carry-over effects between the two conditions. In particular, it obviates the possibility that the individual decisions may serve as anchors for the later group decision, thereby blurring the existence of genuine differences between groups and individuals.

[1] When data from this experiment were provided to subjects in a subsequent experiment (the "social history" treatment), the average amount transferred by first-mover subjects was $5.36 and the average amount returned increased to $6.46 (see Berg et al., 1995).

The rest of the paper is organized as follows. Section 2 introduces the experimental design and procedure. Section 3 reports the experimental results, and section 4 concludes.

2 Experimental procedure

Subjects and design: The participants were 426 undergraduate students at the University of Innsbruck, recruited by campus advertisements promising monetary reward for participation in a decision-making task. They were randomly assigned to four experimental conditions: 64 participated in the individual (I-I) condition, 100 participated in each of the asymmetric conditions where groups bargained with individuals (G-I, I-G, where the first letter denotes the decision maker in the role of sender), and 162 in the group (G-G) condition. In total, 32 independent observations were obtained in the I-I condition, 25 observations in each of the asymmetric (G-I and I-G) conditions, and 27 in the G-G condition.

Procedure: All the participants in a session gathered in a lecture room, where they received written instructions. After reading the instructions aloud, the experimenters answered questions privately. Then the participants were randomly assigned their roles by drawing an envelope. Each group was escorted to a separate room and group members were free to discuss any issue without being monitored. The experimenters distributed and collected decision sheets and questionnaires. Individuals stayed in the lecture room separated from one another by sliding walls.

The instructions were phrased in neutral terms.[2] Participants were not instructed to maximize their earnings and no references to any specific strategies were made. Participants were told in advance that their decisions and their eventual payment would remain confidential. They were also assured that the game was played only once and that the experiment involved no deception.

Senders received an initial endowment (X) of 100 units of money.[3] Responders received no endowment. Final payoffs were determined by $X - x + y$ for the sender and $3x - y$ for the responder. For groups in either role these amounts were the payoffs for *each* group member. Groups were allowed free face-to-face communication and were instructed to decide on a single transfer in either role.

Decision-makers in the sender role wrote their decisions on forms which were put in sealed envelopes before being collected by the experimenters. Group senders had 15 minutes to decide on a common transfer.[4] The envelopes were then transferred to the responders in a predetermined manner that was not obvious to the participants. While responders decided on the transfer, senders filled in a questionnaire, in which they were asked about their prediction of the amount the responder would send back.[5] Participants were told that they would be rewarded for accurate predictions.[6] The responders' decision forms were shown to the corresponding senders. Before the subjects were paid,

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[2] See the experimental instructions in the Appendix.

[3] Throughout the experiment we used endowments of 100 money units (worth 7.3€ or 100 Austrian Schillings before the Euro was introduced).

[4] The time limit was not strictly enforced, though. Three groups had not reached a decision after 15 minutes. They were given five additional minutes, after which all of them had reached a consensus.

[5] Responders were not asked to state any predictions for the sender's transfer x, to avoid contamination of behavior.

[6] We asked for the proportion of the tripled amount ($3x$) that subjects predicted they would get back from the responder. We paid for the accuracy of predictions by using the following payoff role: $payoff = \max\{30 - |r_e - r_t|, 0\}$, where r_e denotes the predicted return and r_t the actual return in percent of $3x$. The payoff for predictions was explained in detail and introduced only after decisions about x had been collected by the experimenters.

privately and in cash[7], the participants were debriefed on the rationale and purpose of the experiment. Sessions that involved group players lasted approximately one hour, while sessions with individuals lasted only about 40 minutes.

3 Experimental results

3.1 Sender behavior

Table 1 presents the mean amount sent by individual and group senders to individual and group responders.

<Insert Table 1 Here>

The data were analyzed using a 2(sender) × 2(responder) ANOVA. The analysis reveals a significant effect of type of sender ($F(1,105)=9.05$, $p<0.001$) – individuals send higher amounts than groups. There is no significant effect of responder ($F(1,105)=0.001$, n.s.), and no interaction effect ($F(1,105)=2.08$, n.s.). The sender effect is corroborated by non-parametric statistics: pooling the two types of responders, we again find that individual senders transfer significantly higher amounts than groups ($U=1055$, $p < 0.01$, two-sided Mann-Whitney U-test; $Z=1.78$, $p < 0.01$, Kolmogorov-Smirnov test).

Figure 1 displays the distribution of x – the amount sent. To facilitate presentation, x is divided into 4 categories: nothing ($x=0$), up to half ($0<x\leq 50$), more than half

[7] In addition to payoffs from the trust game, we paid each participant a show-up fee of 2 €.

(50<x<100) and the entire amount (x=100). For each of these categories we performed a set of planned comparisons, testing first for differences between individual and group senders, and then for differences within each type of sender, depending on the type of responder. This analysis reveals that groups sent nothing (x=0) more often than individuals ($t_{(105)}$=1.67, p<0.049, one-tailed test). Moreover, groups sent nothing more often to another group than to an individual responder ($t_{(105)}$=2.02, p<0.046, two-tailed test). Individual senders, on the other hand, were equally likely to send nothing to a group and to another individual ($t_{(105)}$=0.63, n.s.). Individuals and groups were equally likely to send the whole amount, and both types of senders were as likely to send x=100 to a group as to an individual responder. However, individual senders were more likely to send more than half of the endowment (50<x<100) than group senders ($t_{(105)}$=2.9, p<0.004).

<Insert Figure 1 Here>

3.2 Responder behavior

Table 2 reports the mean percent of return y out of $3x$. The data were analyzed in a 2(responder) × 2(sender) ANOVA. Neither the two main effects nor the interaction effect were statistically significant.

Overall, the higher the amount sent, the higher the rate of return (this obviously means that the *absolute* returns are higher too). When the sender transfers the whole amount (x=100), responders return an average of 33.51% (of 300). This rate is significantly higher than the 17.63% which was the average return when the amount sent was over 50, but less than 100 (t(93)=5.06, p < 0.001), which in turn is significantly

higher than the rate of return for low amounts (x<50), which was only 9.12%. This means that senders who transferred the whole endowment did not, on average, lose money, although they did not profit either. Senders who sent less than 100 on average lost money as a result of this transaction. Sending less than the full amount (i.e. showing 'partial' trust) seems to be perceived rather as a signal of mistrust than of trust, which is not generally rewarded. The senders' full trust (with x=100) is on average compensated by responders' returning roughly one third of the tripled amount.[8]

<Insert Table 2 Here>

3.3 Predictions

Table 3 presents the mean *predicted* return (in percent of the amount sent). Comparing the actual return with the predicted return (compare Tables 2 and 3) reveals that the actual return is lower than that predicted in all treatments ($p<0.01$ for each of the cells, Wilcoxon signed rank test).

<Insert Table 3 Here>

Individuals generally predicted higher returns than groups ($F(1,91)=4.8$, $p<0.05$). But both types of senders predicted similar returns from individual and group responders ($F(1,90)=0.79$, n.s., for main effect of responder; and $F(1,90)=0.46$, n.s., for the interaction). Thus, senders did not have different predictions when the responder was an individual or a group.

[8] The same pattern has been found by Pillutla, Malhorta and Murnighan (2003) for individuals. Our

3.4 Payoffs and efficiency

Table 4 presents the average joint payoffs (sender + responder) for each treatment. The data were analyzed in a two-way ANOVA with two between-subjects factors (type of sender and type of responder). The analysis reveals a significant effect of sender ($F(1,105)=9.05$, $p<0.005$) on collective efficiency. The most efficient conditions are those with individual senders. The main effect of responders ($F(1,105)=0.001$, n.s.) and the interaction effect ($F(1,105)=2.08$, $p<0.153$) are not statistically significant.

Next we look at the difference between the senders' and the responders' payoffs, which is also listed in Table 4. Responders earned more than senders in all conditions. The size of the responder advantage was significantly affected by the type of sender. When the sender was an individual, the responders' advantage was larger than when the sender was a group ($F(1,105)=7.04$, $p <0.01$). The effects of the type of the responder and the sender/responder interaction were not statistically significant.

<Insert Table 4 Here>

4 Concluding discussion

This paper studies a trust game between individuals and groups. Previous studies – starting with Berg et al. (1995) – have shown that individuals do not play this game in a completely selfish and rational way, but rather show considerable level of trust and trustworthiness, thereby increasing the efficiency of the mutual exchange. The questions that we focus on here are (i) whether groups behave differently than individuals and (ii)

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data show that group responders behave very similarly in (not) rewarding (partial) trust.

whether individual or group decision makers condition their behavior on whether the type of their bargaining partner is an individual or a group.

Previous research suggests that there could be differences between individual and group decisions. For example, research on the two-person prisoner's dilemma game (Insko and Schopler, 1987; Schopler and Insko, 1992) has documented a consistent tendency of groups to play this game more competitively than individuals. Insko and Schopler offer two explanations for this observed difference, termed the "discontinuity" effect.[9] The "social support for shared self-interest" hypothesis argues that groups are more selfish than individuals because group members provide each other with support for acting in a selfish, ingroup-oriented way, support which individual players do not have.

Given the logic of backward induction inherent in the theoretical (sub-game perfect) solution of the trust game, the "social support for shared self-interest" hypothesis should be applied first to the behavior of the group in the responder role. If group members have social support for acting selfishly, groups should send back smaller amounts than individuals. Cox (2002) indeed found this to be the case. Receiving about the same amount *x*, group respondents in his experiment returned significantly lower amounts *y* than individuals. The present study, on the other hand, failed to detect significant differences between individual and group responders in the relative size of returns.

Next we direct our attention to the beliefs and resulting behavior of individuals and groups in the sender role. Specifically, we ask whether groups more likely than

[9] A recent experimental study by Winquist and Larson (2004) disentangled two different sources of the discontinuity effect: one is playing against a group, which makes people more competitive, and the other is playing as a member of a group, which promotes selfish behavior. Both explanations are

individuals to assume that the responders are selfish and therefore should not be trusted. Insko and Schopler's answer to this question is a definite "yes". Their "schema-based distrust" hypothesis postulates that groups are more competitive than individuals in playing the Prisoner's Dilemma game because they are more likely to *expect* their opponent to act competitively and want to defend themselves against the possibility of being exploited. Nevertheless, Cox's experiment failed to replicate this difference in the trust game. Groups in his experiment sent out the same amount *x* as individuals, even though they ended up receiving less back (from group responders). Again, our experiment yields a different result. We find that groups in the role of the sender are generally less trusting than individuals. Groups expect significantly lower relative returns than individuals, and consequently transfer significantly smaller amounts to both individual and group responders.[10]

The present experiment, unlike that of Cox, also studied the asymmetric cases where groups and individuals play against each other as either senders and responders. Thus, in addition to testing whether groups are generally less trusting and/or trustworthy than individuals, our design enables us to detect whether the greater selfishness of groups (as compared with individuals) is "common knowledge". In particular, we could test whether groups trust other groups less than they trust individuals. Unfortunately, our results fall short of providing a definitive answer to this question. On the one hand, the average amount sent in the G-G condition was not significantly different from that

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consistent with the explanations provided in the text, i.e. the "social support for shared self-interest" hypothesis and the "schema-based distrust" hypothesis.

[10] Recall that we asked for predictions of relative returns (= $y/3x$), not absolute returns (= y). Given that group senders transfer lower amounts x it would have been no surprise if they predicted lower *absolute* returns. However, our results show that they also predict significantly lower *relative* returns than individuals do.

in the G-I condition. On the other hand, groups sent nothing (x=0) to group responders significantly more often than they did to individual responders.

Pairing an individual with a group raises efficiency considerations that are absent in the symmetric cases. To the extent that collective efficiency is a concern, individuals and groups senders are expected to send higher amounts x to a group responder than to an individual responder. Whereas each unit sent to an individual is multiplied by three, each unit transferred to group is multiplied by nine. For similar reasons, both individuals and groups responders should send back a smaller amount y to an individual than to a group sender. In particular, groups should send back less to an individual than to another group, since each unit sent back costs the group three units (one for each group member), while the benefit to the individual recipient is only one unit. Obviously, neither group nor individual behavior (of either senders or responders) is consistent with these predictions.

To summarize, we found that groups in the role of sender are generally less trusting than individuals, but there is no difference in relative returns between group and individual responders. This finding is different from that of Cox, who found differences between individual and group respondents, but not between individual and group senders. Obviously, more experimental work is needed in order to establish the precise differences between individuals and groups.

What can already be concluded at this point is that groups are not any *more* trusting or trustworthy than individuals. This rather weak conclusion is nevertheless valuable, since it is consistent (or at least not inconsistent) with what we already know about group versus individual bargaining. Bornstein and Yaniv (1998), who compared bargaining behavior of individuals and groups in a standard one-shot ultimatum game,

found that groups demand more than individuals but are willing to accept less. Kocher and Sutter (2002) showed that, in a one-shot gift exchange game, where party A can determine a 'wage' for party B, and party B can reciprocate by choosing a level of effort (greater effort is more beneficial for A, but has higher costs for B), groups chose the smallest possible wage and effort, respectively. Bornstein, Kugler and Ziegelmeyer (2004) found that groups terminate the increasing-sum centipede game earlier than individuals, meaning that group decisions are guided by a concern for payoff-maximization more than individual decisions. In sum, the experimental literature on bargaining games with face-to-face communication among group members seems to support the existence of the "discontinuity" effect detected by Insko & Schopler in the PD game.[11] From the viewpoint of the larger society the behavior of groups is clearly problematic, since it entails large efficiency costs.

[11] The only experiment that suggests otherwise is a study by Cason and Mui (1997) who found that groups made more other-regarding allocations than individuals in a dictator game, where one decision maker can divide an amount *x* between himself and a powerless recipient. However, Kocher, Luhan and Sutter (2004) were unable to replicate the finding of Cason and Mui (1997). Rather, Kocher et al. (2004) found that groups are significantly more selfish in the dictator game than individuals. Hence, it seems that the evidence of the dictator game is inconclusive and not completely inconsistent with most of the literature that indicates that groups are more selfish and competitive than individuals.

References

Alesina, A. and La Ferrara, E. (2002), Who trusts others? *Journal of Public Economics* 85: 207-234.

Berg, J., Dickhaut, J. and McCabe, K. (1995), Trust, reciprocity, and social history. *Games and Economic Behavior* 10: 121-142.

Bewley, Truman F. (1999), *Why Wages Don't Fall during a Recession*. Harvard University Press.

Bornstein, G. and Yaniv, I. (1998), Individual and group behaviour in the ultimatum game: Are groups more 'rational' players?. *Experimental Economics* 1: 101-8.

Bornstein, G., Kugler, T. and Ziegelmeyer, A. (2004), Individual and group decisions in the centipede game: Are groups more "rational" players? *Journal of Experimental Social Psychology* 40: 599-605.

Camerer, C. F. (2003), *Behavioral Game Theory. Experiments in Strategic Interaction*. Princeton University Press.

Cason, T. N. and Mui, V.-L. (1997), A laboratory study of group polarisation in the team dictator game. *Economic Journal* 107: 1465-1483.

Cox, J. C. (2002), Trust, reciprocity, and other-regarding preferences: Groups vs. individuals and males vs. females. In: Rami Zwick and Amnon Rapoport, (eds.), *Advances in Experimental Business Research*. Kluwer Academic Publishers.

Cox, J. C., and Hayne, S. C. (2002), Barking up the right tree: Are small groups rational agents? Working paper, University of Arizona.

Davis, J. H. (1992), Some compelling intuitions about group consensus decisions, theoretical and empirical research, and interpersonal aggregation phenomena: Selected examples, 1950-1990. *Organizational Behaviour and Human Decision Processes* 52: 3-38.

Fehr, E. and Falk, A. (1999), Wage rigidity in a competitive incomplete contract market. *Journal of Political Economy* 107: 106-134.

Fehr, E., Gächter, S. and Kirchsteiger, G. (1997), Reciprocity as a contract enforcement device. *Econometrica* 65: 833-860.

Fehr, E., Kirchsteiger, G. and Riedl, A. (1993), Does fairness prevent market clearing? An experimental investigation. *Quarterly Journal of Economics* 108: 437-460.

Fershtman, C. and Gneezy, U. (2001), Discrimination in a segmented society: An experimental approach. *Quarterly Journal of Economics* 116*:* 351-377.

Glaeser, E., Laibson, D. I., Scheinkman, J. A. and Soutter, C. L. (2000), Measuring trust. *Quarterly Journal of Economics* 115: 811-846.

Insko C.A. and Schopler, J. (1987), Categorization competition and collectivity. in: H. Clyde (ed.), *Group Processes*, Newbury Park, CA: Sage.

Kerr L.N., MacCoun, R.J. and Kramer G.P. (1996), Bias in judgment: Comparing individuals and groups. *Psychological Review* 103: 687-719.

Knack, S. and Keefer, P. (1997), Does social capital have an economic payoff? *Quarterly Journal of Economics* 112: 1251-1273.

Kocher, M., Luhan, W. and Sutter, M. (2004), Individual and team behavior in the dictator game: A re-examination. Mimeo, University of Innsbruck.

Kocher, M.G. and Sutter, M. (2002), Wage bargaining in the laboratory – Are groups or individuals tougher?. Discussion Papers on Strategic Interaction 27-2002, Max-Planck Institute, Jena.

Mayer, R. C., Davis, J. H. and Schoorman, F. D. (1995), An integrative model of organizational trust. *Academy of Management Review* 20: 709-734.

Pillutla, M. M., Malhotra, D. and Murnighan, J. K. (2003), Attributions of trust and the calculus of reciprocity. *Journal of Experimental Social Psychology* 39: 448-455.

Rousseau, D. M., Sitkin, S. B., Burt, R. S. and Camerer, C. F. (1998), Not so different after all: A cross-discipline view of trust. *Academy of Management Review* 23: 393-404.

Schopler J. and Insko, C.A. (1992), The discontinuity effect in interpersonal and intergroup relations: Generality and mediation. In: W. Strobe and M. Hewstone (Eds.), *European Review of Social Psychology*. Chichester: Wiley.

Sutter, M., Kocher, M. G. and Strauß, S. (2004), Groups bid more aggressively than individuals in auctions. Experimental evidence. Working Paper, University of Innsbruck.

Winquist, J. R. and Larson, J. R. (2004), Sources of the discontinuity effect. Playing against a group versus being in a group. *Journal of Experimental Social Psychology* 40: 675-682.

Zak, P. J. and Knack, S. (2001), Trust and growth. *Economic Journal* 111: 295-321.

Appendix: Experimental instructions (for the G-G treatment; translated from German)

You are about to participate in a decision-making experiment. During the experiment you will be asked to make a decision, and so will the other participants. Your own decision, as well as the decisions of the others, will determine your monetary payoff according to rules that will be explained shortly.

You will be paid in cash at the end of the experiment exactly according to the rules. Please keep quiet throughout the entire experiment and do not communicate in any way with the other participants!!!

If you have any questions, please raise your hand and one of the experimenters will approach you and answer your questions privately.

In this session, 42 people are participating in the experiment. At the beginning of the experiment, the participants will be divided randomly into 14 groups of 3 each. Each of these groups will be paired with another group throughout the experiment. In each such pair, one group will be assigned the role A and the other group the role B. This assignment to roles will be done randomly. You have no way of knowing who you are paired with or the roles of the other participants.

At the beginning of the experiment group A will receive 100 Austrian Schilling (ATS). Group B will not receive any money. A will have to decide how much of the 100 ATS to send to B. A can send any amount X between 0 ATS and 100 ATS to group B. A will keep the amount not sent (100-X), while the amount sent to B will be tripled. That is, for the X ATS sent by A, B will receive 3X ATS.

Now it is group B's turn to make a decision. B has to decide how much of the amount received from A to send back. Again, B can send back to A any amount Y between 0 ATS and 3X ATS (Note: this amount will not be tripled!). B will keep the amount not sent back to A (3X-Y).

At the end of the experiment both groups will be paid in cash. *Each of the members of group A* will receive the amount they kept out of the original 100 ATS (100-X), plus the amount sent back to them by B (Y). *Each of the members of group B* will receive triple the amount sent to them by A (3X) minus the amount sent back to A (Y).

You will now be asked to choose an envelope at random. Inside the envelope you will find a subject number. Your group number and role (A or B) will be printed on the card on which you see your subject number. Please keep the subject number until the end of the experiment. You will need it to receive your payment.

After all the participants have opened the envelopes, participants will be guided to rooms, where they can discuss their decision. Please keep quiet while waiting or moving to the other rooms.

Decision of group A:

(1) Only when asked, open the decision envelope you receive from the experimenter. Inside you will find a decision form. You have up to 15 minutes to discuss your decision.
(2) Please read the decision form carefully. Raise your hand if you have any questions.
(3) After the decision is made, fill in your group number and the amount you decide to send to group B.
(4) Place the completed form inside the white decision envelope and seal it. The experimenter will come to collect the envelope.
(5) The envelope containing your form will be delivered to the corresponding group B, and you will be asked to complete a short questionnaire.

Decision of group B:

(6) When you receive the decision envelope from group A, open it. Inside you will find a decision form with the amount sent to you by A. Remember that the

amount you receive has been tripled, that is, if A sent you X ATS, you actually receive 3X ATS.

(7) Please read the decision form carefully. Raise your hand if you have any questions.

(8) Now open your decision envelope. Inside you will find your decision form. Fill in your group number, the amount sent to you by A, the amount you received (that is, 3 times what was sent to you) and the amount you have decided to send back to A. You have 15 minutes to discuss your decision.

(9) After filling out the form, place it back inside your decision envelope, together with the envelope and decision form sent to you by A. Seal it and give it back to the experimenter.

(10) When all participants finish filling out the forms, you will be asked to complete a short questionnaire.

You will be paid in cash at the end of the experiment exactly according to the rules. You will receive your payoff in a sealed envelope. The other group will have no way of knowing your identity and neither will any of the other participants. In addition, the experimental results are recorded in a such way that none of the experimenters will be able to associate your identity with your decisions and payoffs. The experiment is played only once. *Please consider your decisions carefully.*

Table 1: Mean amount *x* sent by senders (standard deviation in parentheses)

Responder / Sender	I(ndividual)	G(roup)
I(ndividual)	65.5 (36.4) N = 32	76.3 (31.2) N = 25
G(roup)	54.0 (41.6) N = 25	43.7 (42.4) N = 27

Table 2: Mean return in % *y/3x* (standard deviations in parentheses)

Respondent / Sender	I	G
I	25.1 (19.5)	25.1 (17.5)
G	23.3 (22.1)	16.7 (18.7)

Cases with *x*=0 are excluded

Table 3: Mean predicted return in % (standard deviations is parentheses)

Respondent / Sender	I	G
I	30.8 (19.0)	37.5 (25.6)
G	24.4 (18.6)	25.3 (18.4)

Cases with *x*=0 are excluded. For groups, predictions are averaged over the group members.

Table 4: Mean payoffs (excluding bonus for accurate predictions)

Responder / Sender	I	G
I	Sender: 89.7 Responder: 141.3 Joint: 231 Diff: -51.6	Sender: 87.6 Responder: 165 Joint: 252.6 Diff: -77.36
G	Sender: 99.8 Responder: 108.1 Joint: 207.9 Diff: -8.24	Sender: 88 Responder: 99.3 Joint: 187.3 Diff: -11.26

Figure 1: Distribution of x