

**TRUST AND RECIPROCITY:  
AN INTERNATIONAL EXPERIMENT<sup>^</sup>**

**Nancy R. Buchan**

Assistant Professor of Marketing  
University of Wisconsin – Madison, School of Business  
4261 Grainger Hall  
975 University Avenue  
Madison, WI 53706  
[Nbuchan@bus.wisc.edu](mailto:Nbuchan@bus.wisc.edu)  
Phone: (608)263-7720  
Fax: (608)262-0394

**Rachel T.A. Croson**

Associate Professor of Operations and  
Information Management  
The Wharton School  
University of Pennsylvania  
Steinberg Hall – Dietrich Hall  
Philadelphia, PA 19104  
[Crosonr@wharton.upenn.edu](mailto:Crosonr@wharton.upenn.edu)  
Phone: (215) 898-3025  
Fax: (212) 898-3664

**Eric J. Johnson**

The Norman Eig Professor of Business  
Uris Hall 514  
Columbia School of Business  
Columbia University  
3022 Broadway  
New York, New York 10027  
[Ejj3@columbia.edu](mailto:Ejj3@columbia.edu)  
Phone: (212) 854-5068  
Fax: (801) 761-6782

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## **ABSTRACT**

This paper identifies contexts in which trust and reciprocity are likely to arise. Using an experimental trust game we examine the influence of country, social distance and communication on trust and reciprocity in China, Japan, Korea, and the United States. We find mixed support for the commonly-accepted negative relationship between trust and social distance across the four countries. While social distance has the expected effect in the US, its effects internationally are more complex. We also show that even irrelevant communication influences game behavior, but that it is personal discussion rather than impersonal, that produces significantly higher levels of trust.

Virtually every commercial transaction has within itself an element of trust... (and) It can be plausibly argued that much of the economic backwardness in the world can be explained by a lack of mutual confidence. Arrow [1972], p. 357.

Trust is at the root of any economic system based on mutually beneficial exchange ... If a significant number of people violated the trust upon which our interactions are based, ... our economy would be swamped into immobility. Alan Greenspan, Harvard University Commencement Address [1999].

## **I. Introduction**

Trust and reciprocity are integral elements in economic transactions between companies, consumers and retailers, between employers and employees, as well as in determining economic performance.

The concept of trust has been given a great deal of attention across an array of academic disciplines for its role in promoting cooperation among individuals and groups [Berg, Dickhaut and McCabe 1995], and its positive influence on the economic performance of corporations [Barney and Hansen 1994], geographic regions [Putnam 1993], and even countries [Fukuyama 1995]. Knack and Keefer [1997] in their study of 29 market economies, empirically demonstrate the link between trust and economic performance. For each ten-percentage-point rise in their measure of trust, Knack and Keefer find an increase in annual growth of per capita income of four-fifths of a percentage point.

The concept of reciprocity has been invoked to explain the persistence of networks of personal, rather than anonymous, economic exchanges among tribal societies and modern day

ones [Kranton 1996]. Empirically, it has been used to explain the persistence of cooperative actions in the absence of immediate incentives to cooperate [Hoffman, McCabe and Smith 1998]. The idea of reciprocity underlies theories of product-quality assurance [Camerer 1988] and labor markets [Akerlof 1982]. Fehr and colleagues have experimentally investigated this last application of reciprocity in labor markets extensively and conclude that reciprocal behavior can increase the set of enforceable contracts and help markets to achieve efficiency gains [see e.g. Fehr, Gächter and Kirchsteiger 1997].

In this paper we experimentally examine a number of unresolved questions relating to the contexts in which trusting behavior and reciprocation are likely to arise, and the relationship between them. The issues we study include the relative strength of trust and reciprocity in other countries, the extent to which social distance affects the propensity to trust and reciprocate, and the types of irrelevant communication that influence the levels of trust and reciprocation extended.

We examine trust and reciprocation in an experiment run in China, Japan, Korea, and the United States using the trust game employed by Berg, Dickhaut and McCabe [1995].<sup>1</sup> Other researchers have investigated international behavior experimentally in different games including ultimatum games [Roth et al. 1991; Roth and Slonim 1999; Cameron 1999, Buchan, Croson, and Johnson 1999], public goods games [Kachelmeier and Shehata 1997] and market games [Roth et al. 1991]. We are the first to investigate the trust game internationally, as well as the first to examine the influence of social distance and communication on trust and reciprocation.

In the trust game two players, the sender and the responder are each given an endowment. The sender is told she can send some, all, or none of her endowment to her anonymous partner,

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<sup>1</sup> Others have investigated variations on the trust game within the US. See Kreps [1990], Van Huyck et al [1995] and McCabe, Rassenti and Smith [1996] for related games

the responder. Any money sent is tripled. The responder then chooses how much of his total wealth (his endowment plus the tripled money) to return to the sender. Any money the responder does not return is his to keep; thus the responder plays a dictator game with the pool of money generated by the sender's actions. The unique subgame perfect Nash equilibrium for this game is for the responder to return no money, and thus for the sender to send none.

Berg, Dickhaut, and McCabe found, in contrast, in the United States 30 of 32 senders deviated from this equilibrium and sent some of their \$10 endowment to their partner. In sending money, senders are trusting that the partner will return some money to them. They also found that 11 of the 30 responders returned more than was sent.

We build on this work in a number of ways. First we demonstrate similar deviations from equilibrium predictions across subjects in multiple countries, and give support for the idea that trust and reciprocation are influenced by a subject's country of origin – though not in the way other authors have suggested. Second, we test for the influence of social distance on trusting behavior and reciprocation [Hoffman et. al. 1999]. We find results consistent with previous experiments in the US, increasing social distance decreases trust and reciprocity. However, we also show that this pattern is far from universal. Finally we demonstrate that even irrelevant communication among participants has a powerful influence on their behavior, and that personal rather than impersonal irrelevant communication significantly increases levels of both trusting behavior and reciprocation in all the countries studied.

The paper is organized as follows. Section II discusses the factors whose influence on trust and reciprocation we examine and reviews previous experimental and cross-cultural research on these factors. Based on this research we develop hypotheses for behavior in our

game. Section III describes the experimental design and implementation and section IV presents the results. Finally section V concludes.

## **II. Factors Hypothesized to Influence Trust and Reciprocation**

Our experiment investigates the effects of country, social distance and communication on trust and reciprocation. This section introduces each of these concepts and presents hypotheses generated in each of the areas.

### **A. Country**

Recent research has brought into question whether trust is a country-based phenomenon. For example, the extraordinary post-war growth experienced by Japan through the 1980's prompted a rash of attributions from academics and the popular press. One of the most cited reasons was the role of Japan's unique culture in fostering trust; it was argued that this trust sustained the massive corporate networks in Japan, and led to economic success [Ouchi 1981].

In a widely read book, Fukuyama [1995] presents a slightly different version of nation-based trust. He correlates the level of generalized trust in society with economic prosperity and argues that countries such as Japan and the United States have a higher degree of generalized trust than do China and Korea, for example, as evidenced by their overall wealth. He explains that in contrast to the United States and Japan, where hiring of non-related managers is common, growth of the traditional Korean or Chinese firm is limited by the size of the owner's family; the reluctance of non-kin to trust one another precludes the hiring of non-related managers, and prevents the development of large-scale businesses.

Finally, Yamagishi and colleagues present yet another version of the relationship between trust and nationality. In numerous survey and experimental studies they demonstrate that it is Americans who display a higher level of generalized trust rather than the Japanese [See e.g.

Yamagishi, Cook and Watabe 1998]. Yamagishi argues that what appears to be trust in Japan is actually not trust at all, but rather mutual assurance based on a system of formal and informal mutual monitoring and sanctioning within networks of committed economic relationships.

Given the contrasting views of the relationship between trust and nationality, we include country as an independent variable in our analysis in this experiment. Our null hypothesis is that subjects from China, Japan, Korea, and the United States will not display different levels of trusting behavior and reciprocation; any differences in the specific directions mentioned above can be interpreted as support for the claims of those authors.

## B. Social Distance

Social distance is a measure of the closeness between players in a strategic interaction and has recently been acknowledged to have a profound influence on individual decisions (see Akerlof [1997] for a model that incorporates social distance to explain individual economic decisions that bear social consequences). Glaeser et al. [1999] demonstrate that the level of demographic similarity between the sender and responder (e.g. being members of the same race or nationality), generally predicted the level of trust and reciprocation in a trust game run in the US. Hoffman, McCabe and Smith [1996] experimentally demonstrate the effect of social distance in dictator game experiments. They conclude that as social distance (isolation) increases, offers in the dictator game decrease.

The traditional way of manipulating social distance in experimental games, which we use in this experiment as well, is through the creation of groups in the experiment. A player is then partnered for the game either with a member of his group (the ingroup), who is closer in social distance, or with someone not from his group (the outgroup) who is further away. A robust finding in the United States is the ingroup bias, i.e. a significant increase in the amount of



cooperation extended to a member of an ingroup rather than to a member of the outgroup. For example, Orbell, van de Kragt, and Dawes [1988] and Frey and Bohnet [1997] both demonstrate significant ingroup biases in other settings. In Orbell et al.'s social dilemma setting, 79% of subjects cooperated when paired with an ingroup member, but only 30% when paired with an outgroup member. In Frey and Bohnet's three-person dictator game, recipients with whom the dictator had interacted received 37% of the pie, while excluded recipients received only 17%.

These results lead us to hypothesize similar effects of social distance on trusting behavior and reciprocation in our experiment. Thus we hypothesize greater levels of trusting behavior and reciprocation among ingroup partners than among outgroup partners in the US.

We wonder, however, if these manipulations will be equally as effective internationally. Research in the United States, a predominantly individualist culture, has revealed that groups are easily established in experimental settings.<sup>2</sup> Experiments using this technique (called the minimal group paradigm) demonstrate that even the arbitrary categorization of individuals into one of two mutually exclusive groups is sufficient to create an ingroup bias in intergroup evaluations and allocations (see the review article by Messick and Mackie [1989]; for an economics application see Ball and Eckel [1998]).<sup>3</sup> This ease with which groups are manipulated in the United States might explain the effectiveness of manipulations of social distance in these experiments.

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<sup>2</sup> Gerte Hofstede [1980] classified countries on the collectivist or individualist dimensions based on a factor analysis of survey responses by IBM Corp. employees in 126 countries. According to this research, collectivist cultures are typically found in Asia, the Middle East and Latin and South America. Individualist cultures are typically found in Western Europe, Canada, and the United States.

<sup>3</sup> Methods of categorization include distinguishing those who prefer Klee from those who prefer Kandinsky [Tajfel et al. 1971]; separating those who underestimate the number of dots on a page from those who overestimate [Tajfel et al. 1971], placing groups of subjects in separate rooms for ten minutes prior to the experiment [Orbell, van de Kragt and Dawes 1988], isolating a outgroup member from two ingroup members who are allowed to communicate with one another [Frey and Bohnet 1997], and assigning subjects to groups based on answers to an economic trivia quiz [Ball and Eckel 1998].

Cross-cultural research suggests however, that the ingroup bias may not be as evident in countries possessing a collectivist culture [Mann, Radford, and Kanagawa 1985]. Among collectivist cultures, such as in China, Japan, or Korea, ingroups are few, tend to be more permanent, and are formed on the basis of shared personal characteristics (e.g. family or clan, hometown, or shared school or company affiliation), while among individualist cultures, such as in the US, ingroups are more plentiful, tend to be temporary and flexible, and are based on the common beliefs and interests of group members [Triandis et al. 1988]. Because of these differences in the methods of establishing and defining groups, we have contrasting hypotheses for the influence of social distance on these two cultural types. Despite the actual increase in experimental social distance with the creation of ingroups and outgroups, we hypothesize that subjects from the more collectivist countries of China, Japan, and Korea, will behave the same regardless of the group membership of their partner in the trust game. Conversely subjects from the more individualistic United States will trust and reciprocate more when matched with an ingroup member than with an outgroup member, as has been found in previous research.

#### D. Communication

Like nationality, the influence of communication on behavior is controversial. Many authors have demonstrated that face-to-face, relevant (strategy-related) communication affects decisions in contexts such as bargaining [Radner and Schotter 1989], social dilemmas and public goods games [Orbell, van de Kragt, and Dawes 1988; Isaac and Walker 1998], coordination games [Moreno and Wooders 1998], signaling games [Sopher and Zapater 1993] and dictator games [Bohnet and Frey 1999b]. A meta-analysis by Sally [1995] comparing over 100 articles on the prisoners' dilemma reveals a robust influence of discussion in increasing cooperation

rates. The controversy stems from *why* communication helps in these various settings, and in particular, whether the communication must be relevant to the experimental game.

For example, Roth [1995] examined the influence of face-to-face “social” communication: a two-minute period of conversation during which groups of subjects were required to learn each others’ first names and year in school, but were not allowed to discuss the bargaining game. He finds that such “social” irrelevant communication leads to the same amount of cooperation (agreement) as relevant communication in bargaining games. In contrast, Dawes, McTavish and Shaklee [1977] studied the influence of a 10-minute period of fact-related communication; e.g. discussion concerning the percentage of people at certain income levels in Eugene, Oregon, but again, not concerning strategy in the game. In contrast to Roth, Dawes and co-authors find that such irrelevant communication yields the same amount of cooperation as *no* communication in social dilemma games. In our experiment we will attempt to reconcile the two results by demonstrating that it is the content of irrelevant communication that is making the difference in behavior.

We do this by comparing the influence of two types of irrelevant communication on game behavior. In the *personal* discussion cells, using a manipulation similar to Roth [1995], subjects will share personal (but not strategy-related) information about themselves. In the *impersonal* discussion cells, using a manipulation similar to Dawes, McTavish and Shaklee [1977], subjects discuss facts but no personal information is shared.

In our experiment one-quarter of the subjects will be paired with a partner with whom they have communicated personally (personal communication-ingroup), one-quarter with whom they have communicated impersonally (impersonal communication–ingroup), and one-half with a subject with whom they not communicated (either type of communication-outgroup). We

hypothesize the following result. Trust and reciprocity will be highest among the personal communication-ingroup pairs and lower among impersonal-ingroup communication and no communication pairs.

A consistent finding in previous studies regarding a carryover effect of communication on cooperative behavior prompts us to consider an additional communication hypothesis. The carryover effect occurs when communication increases cooperativeness not only with partners who spoke to one another, but also with partners who have not been party to the communication. Frey and Bohnet [1997] demonstrate in a three person dictator game that when the dictator can communicate (irrelevant discussion) with one of the two recipients, the percentage of the pie sent to the excluded third party increases from 28% to 54%. Similarly, Orbell, van de Kragt, and Dawes [1988] find that strategy-relevant communication raises cooperation in social dilemma games even when subjects are paired with counterparts with whom they have not communicated. Finally, Braver and Wilson [1986] show that even partial (sub-group) relevant communication substantially increases overall cooperation in a public goods experiment. Based on these findings, we hypothesize an alternative, “carryover” effect of communication: people who have communicated personally will be more trusting and reciprocal to everyone than those who have communicated impersonally.

### **III Experimental Design and Procedures**

In this section we detail the experimental design and procedures, which we use to test the hypotheses above. We also explain the controls taken to ensure equivalence in experimental procedure across countries.

#### **A. Experimental Design**

A total of 188 subjects participated in this experiment: 50 students from Nankai University in Tianjin, China, 50 students of Seoul National University in Korea, 44 students from Tokyo University in Japan, and 44 students from the University of Pennsylvania in the United States. Subjects were primarily sophomore or junior students in economics or business classes, who were paid their actual monetary earnings from the experiment.

Participants in our study were organized randomly into groups, engaged in some type of non-relevant discussion (personal or impersonal), and then paired to play the trust game. Half of the subjects were paired with a counterpart who was in their discussion group (the ingroup), and the other half, with a counterpart from another discussion group (the outgroup). We compare the amounts sent by the sender to the responder and the proportion of money returned by the responder to the sender.

## B. Experimental procedure

### *Discussion Groups*

Subjects arrived and were randomly assigned to one of four color-coded groups of approximately 12 members each.<sup>4</sup> Subjects in each group were then told to discuss an assigned topic for ten minutes. In two of the groups, subjects were told to introduce themselves and to discuss a personal question pertaining to their birthdays (personal communication). The two remaining groups were told to answer a list of questions obtained from the World Almanac, while one person from the group recorded the answers (impersonal communication). Notice that both types of communication are non-strategy-relevant; subjects did not know they were about to play a trust game. Copies of the communication instructions are available from the authors.

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<sup>4</sup> 12 of the experimental groups had 12 members each, three groups had 11 members each, and one group had 10 members.

### *The Trust Game*

After the ten-minute discussion period, subjects were randomly assigned roles of sender or responder and were directed to separate rooms. They then received written instructions for the trust game, and were given a numbered envelope containing their experimental fee (\$10 in the US and equivalent amounts in other countries) and two colored index cards, one of which had a number, the other of which was blank. The numbered index card represented the color of the subject's own discussion group and the subject's identification number. The color of the second blank index card represented the color of the partner's discussion group. In this way, the partner's identity remained anonymous to the subject, yet the partner's status as an ingroup or outgroup member was revealed. Half the subjects were paired with a member of their discussion group (and thus had two cards of the same color), the other half with a member of a different discussion group (and thus had two different colored cards).

Senders put any money they wish to send to their partner in their envelopes. Monitors collected the envelopes and took them to the experimenter in a different room who recorded the amount sent, tripled it and placed the tripled money into separate numbered envelopes for delivery by another monitor to the appropriate responder. Notice that this implements a double-blind experiment [Hoffman et al. 1993]. The monitor who saw the participant did not know the amount they sent, while the experimenter, who saw the amount sent, did not know the participant. The subjects, of course, did not know the identity of their partner but did know the group affiliation through the use of the colored cards. Our experiment was run double-blind to prevent self-presentation (face-saving) effects which are particularly prevalent in Asia [Bond and Hwang 1995].

The responders then opened their envelopes, and decided how much of their own experimental fee plus any (tripled) money received, to return to the sender. Monitors collected the envelopes from the responders, and gave them to the experimenter who recorded the amounts returned, placed the money back into the senders' original envelopes, and forwarded the envelopes into the senders' room for distribution by the monitors.

### *Cross-country controls*

The international character of this research warranted that we control for country or culture-specific variables that could influence our results. Specifically, we addressed the following issues as suggested by Roth et al. [1991].

1. *Controlling for subject pool equivalency.* We controlled for equivalency in educational background and knowledge of economics among the subject populations in three ways: First, the universities chosen for the experiment were all top tier universities in their countries. Second, subjects were all sophomore or junior economics or business undergraduate students and were paid for their earnings in the experiment and third, subjects were questioned as to their level of exposure to economic theory and to game theory in particular. Answers to these questions are entered as covariates in the final analysis of results.

2. *Controlling for currency effects.* We controlled for purchasing power parity by choosing denominations such that monetary incentives relative to subject income and living standards were approximately equal across countries (as in Kachelmeier and Shehata [1992]). Amounts used were Japan (2,000 yen), Korea (1,000 won), China (10 yuan), United States (10 dollars). These amounts were based on information from the US Bureau of Labor Statistics [Monthly Labor Review 1996], and on the recommendations of three independent experts on each economy.

3. *Controlling for Language Effects.* To control for any nuances in language which may impact results across countries, instructions for the experiments in China, Japan, and Korea were translated into the native language and back-translated into English using separate external translators.

4. *Controlling for Experimenter Effects.* Various measures were taken to control for differences among experimenters in different countries. First, in each country, the lead experimenter was an advanced student in business, and a native of that country. Second, an extremely thorough experimental protocol was designed based upon the procedure used in the United States and used in all four countries. The protocol included information such as the positioning of the experimenter in the room, and the method to be used in answering subject questions. Third, the experimenter from the United States met with the lead experimenters in each country prior to each experiment to brief them on the protocol and to run through a practice (no subjects) session with them. Finally, the American experimenter was present in the data recording room while each experiment was being conducted.

5. *Controlling for Comprehension of Experimental Task.* To be certain that subjects in each country understand the experimental task, after reading through the instructions but prior to engaging in the actual task, subjects completed a series of comprehension checks. Experiment monitors checked the answers of each student before the experiment was allowed to proceed.

#### **IV. Results**

The dependent variables in our analysis are the amount sent by the sender to the responder and the proportion returned by the responder. We calculate the proportion returned as the amount responders returned divided by their total wealth (three times the amount the sender



sent plus the endowment). This proportion is the proportion of the pie that responders are returning to senders in dictator-fashion.

For purposes of analysis, monetary amounts across the four countries have been standardized on a scale from 0 to 1,000 units. Figure 1 graphs the resulting data from this experiment. The data are presented in descending order of amount sent, shown as the thin bars. For example, 25 of 92 subjects sent their entire endowment for the experiment (1,000 units). The data are further sorted by the proportion returned (shown as a black triangle) as the secondary axis on the right. For example, of the 25 responders who were sent the sender's full endowment of 1000 units, 11 responders returned 50% of their total wealth.

-----Insert Figure 1 about here-----

Comparison of our results to those of Berg, Dickhaut and McCabe [1995] demonstrates many similarities. In their experiment run in the United States, the mean amount sent is \$5.16 (out of \$10.00), and the mean proportion returned is 18%. In our data from the United States in the impersonal communication treatment the mean amount sent is 495 units (out of 1000 units), and the mean proportion returned, 22%; quite close to the Berg, Dickhaut and McCabe results.

*Amount Sent*

Across all countries subjects largely ignored the equilibrium of sending no money and instead opted to trust, consistent with previous results from the Trust Game in the US (Berg et al., 1995). The mean amount sent across all 92 senders was 671.91 units (out of 1,000 units), and only three of the 92 senders sent nothing to their partners.

Table 1 shows the results of regressions of amount sent on country, social distance (operationalized as ingroup or outgroup membership) and communication (personal or impersonal). In addition, gender and level of economics education were both entered as controls, neither however proved to have a significant influence on amount sent.

-----Insert Table 1 about here-----

First, we find limited support for country-level difference in trusting behavior. The results from regressions (ii) and (iii) on amount sent in Table 1 show a weakly significant effect in all regressions for China ( $p < .10$ ), indicating that Chinese subjects sent more to their partners than did American subjects (the omitted country in the regression); the lack of a significant effect for either Korea or Japan indicate that subjects in those countries did not exhibit significantly different levels of trust than subjects in the United States. Mean amounts sent and proportions returned across countries are graphed on Figure 2.

These results support neither the theories of Fukuyama (who believed the US and Japan to be more trusting than China and Korea), nor the theories of Ouchi or Yamagishi (who were at odds regarding whether Japan or the US was more trusting).

-----Insert Figure 2 about here-----

Our results regarding social distance show patterns that differ in the four countries studied, lending support for our hypotheses. With the effects of the omitted variables (the United

States and outgroup) captured in the model intercept, we find negative coefficients for the China x Ingroup ( $p < .05$ ) and Japan x Ingroup ( $p < .10$ ) interactions.

This effect is illustrated in the graphs of amount sent by country in Figure 3, Americans sent more to ingroup partners than to outgroup partners, consistent with previous work in the US using group membership to manipulate social distance [e.g. Orbell, van de Kragt, and Dawes 1988; Frey and Bohnet 1997]. However, in China and Japan, in contrast, more is being sent to outgroup members than to ingroup members. These results indicate that while the manipulation of social distance in the United States was effective in increasing trust, that effect was not consistent internationally.

-----Insert Figure 3 about here-----

Finally, we proposed two hypotheses concerning the influence of communication on trusting behavior. The influence of communication on amount sent is depicted in Figure 3. First, we hypothesized that amounts sent would be higher among personal communication (ingroup) pairs of subjects, than among impersonal or no communication pairs of subjects. This hypothesis (Personal Communication x Ingroup interaction) is rejected by the insignificant coefficient in the regressions. Our second hypothesis was that the influence of personal communication would carryover from personal communication partners to partners with whom the sender had not communicated. This hypothesis is supported by a significant positive coefficient for personal communication in the amount sent regression ( $p < .05$ ). The mean amount sent by subjects in the personal discussion condition was 765.74 units, versus 596.89 units in the

impersonal discussion condition. Thus we conclude that personal communication has a powerful (carryover) effect on trusting behavior.

-----Insert Table 2 about here-----

### *Proportion Returned*

We define proportion returned as the amount responders returned divided by their total wealth (three times the amount the sender sent plus the endowment). Thus the proportion returned (% of total wealth) measure can be compared with the amounts sent in dictator games. The average proportion returned in our trust game was 37%, and only ten of 92 responders (11%) returned nothing to their partner (of who three had received nothing). For comparison, in a double-blind dictator game conducted by Hoffman et al. al. [1994], 64% of dictators took all their endowment and returned nothing to their partners, and 90% of dictators took at least 80% of the endowment. We believe these differences in behavior can be attributed to the differences in the structures of the trust and dictator games, and that the higher amounts returned in the trust game are a reflection of the influence of the norm of reciprocity.

Table 2 presents the analysis of proportion returned as a function of the independent variables above as well as the control variables. As in the previous subsection, economics education did not significantly impact behavior. However, the effect of gender was highly significant, ( $p < .01$ ). The average proportion returned by women is 37.4 percent, and the corresponding proportion for men is 28.6 percent. The influence of gender on behavior in this game is discussed in Croson and Buchan [1999]; in this analysis we control for gender.

Proportions returned across countries are graphed in Figure 2. The results concerning the effect of country show that Chinese subjects are more reciprocal than subjects from the US ( $p < .05$ ). Together with the results on amount sent, our data suggest a pattern of the Chinese subjects being both more trusting and more reciprocal than their American counterparts.

Consistent with results regarding amounts sent, we find significant differences between countries in how social distance influenced the proportion returned as demonstrated by significant coefficients in the country  $\times$  ingroup independent variable in Table 2. The results are graphed in Figure 4. The significant negative coefficient for the China  $\times$  Ingroup interaction ( $p < .05$ ) reveals that Chinese subjects reciprocated more to outgroup members than to ingroup members, while American subjects reciprocated more to ingroup members than to members of the outgroup. As with the results for amount sent, these results expose the differential effectiveness and influence of social distance across national groups.

-----Insert Figure 4 about here-----

We proposed two hypotheses for the relationship between communication and proportion returned, both are significant as shown in Table 2. The significant coefficient for the personal communication by ingroup interaction ( $p < .05$ ) reveals little effect of social distance among those who'd engaged in personal communication (reciprocation levels are nearly even among ingroups and outgroups), but that there are significant differences in reciprocation across in and outgroups among those who had engaged in impersonal communication. This result is depicted in Figure 4. Consistent with results for amount sent, and as further evidence of the carryover effect of personal communication, the coefficient for personal communication is significant and positive ( $p < .05$ ); the mean proportion returned by someone who had engaged in personal communication is 34% versus 28% for those who'd engaged in impersonal communication.

## V. Discussion and Conclusion

The importance of trust to economic growth as highlighted by Arrow and Greenspan at the beginning of this paper, and as demonstrated empirically by Knack and Keefer [1997], along with the integral nature of trust and reciprocation in perpetuating cooperative relationships among groups and individuals [Hoffman, McCabe, and Smith 1998], suggests that the issue of national differences in trust and reciprocation is one we as economists need to better understand. In this study we investigate the contexts in which trust and reciprocation are likely to arise. Specifically, we examine the extent to which trust and reciprocation vary across countries and also the influence of social distance and of communication on the propensity to trust and reciprocate.

We find some evidence of national differences in trusting and reciprocal behavior. Specifically, Chinese subjects in this experiment are more trusting and more reciprocal than their US counterparts.<sup>5</sup> This finding injects new insight into the debate about the influence of country-of-origin on trust and reciprocation, because it does not line up neatly with any existing theory (e.g. Fukuyama, Ouchi, Yamagishi).

According to Akerlof [1997], social distance is another factor that must be taken account of if we are to undertake a rational choice analysis of economic decisions that have social consequences. Our results demonstrate persistent differences between countries of the effect of social distance for both amounts sent and proportions returned. For example, in the US,

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<sup>5</sup> We are compelled to comment on the nature of the samples used in this experiment. It is clear that our use of business or economics college students do not represent any well-defined population within each society, and as such, we must exercise caution in overgeneralizing our findings regarding country of origin. This is a problem common to cross-national experiments because of the near impossibility of bringing a random sample drawn from a large population into the laboratory. For a lucid discussion of this issue, refer to Yamagishi, Cook and Watabe [1998].

consistent with previous research in other domains (Orbell, van de Kragt, and Dawes [1988], Frey and Bohnet [1997]), trusting behavior increased when the sender was paired with a member of his ingroup, however in China and Japan it did not. These results challenge our understanding of the influence of social distance on cooperation. This research thus indicates where and in what contexts a relationship between social distance and cooperation is likely to be evident.

Perhaps our most exciting result, however, is that even non-strategy-relevant discussion has an extremely powerful influence on trusting and reciprocal behavior. We demonstrate that personal communication produces significantly greater trust and reciprocation, regardless of the partner's group membership, than does impersonal communication. We propose three possible explanations for this result. Each is premised upon the fact that in the personal communication treatments more information concerning subjects was communicated than in the impersonal communication cells.

First is a social distance explanation put forth by Hoffman, McCabe and Smith [1996, 1999] and Bohnet and Frey [1999a]. We can imagine that social distance was less in the personal communication treatment than in the impersonal communication treatment because of the greater amount of information shared. However, if this social distance theory were to be supported, we would expect to see subjects sending and returning more to members of their *ingroup* with whom they have personally communicated than to any others. However, this was not observed, as reflected in Figures 3 and 4. Levels of trust and reciprocation did not differ significantly across ingroups and outgroups among players who had engaged in personal communication.

Next is a social identity argument. Group identity might increase trust, for example, because it increases expectations that other ingroup members will reciprocate [Brewer 1991;

Tyler and Dawes 1993]. However, had this argument been correct we would expect subjects who engaged in personal communication to have greater identity with their own group members and thus again send more to members of their discussion group than to nonmembers. This is not what we observed.

The final explanation, and the one our data favor, was suggested by Bohnet and Frey (1999b). Personal communication prompts greater “otherregardingness” than does impersonal communication. The mere act of communicating more about themselves on a personal topic prompted subjects to be significantly more concerned with others and thus led to behavior both more trusting and reciprocal, regardless of the partner’s group membership. Our results are consistent with those found in previous experiments [Frey and Bohnet 1997; Orbell, van de Kragt and Dawes 1988;], and seem to indicate that the carryover effect is a real influence on trusting and reciprocal behavior, rather than an experimental artifact.

A final contribution of our experiment is to resolve the debate over the influence of irrelevant communication presented in the Section II of this paper. Roth [1995] found that irrelevant personal communication significantly increased cooperation in bargaining games. Conversely, Dawes, McTavish and Shaklee [1977] found that irrelevant factual communication had no significant influence on the levels of cooperation. In light of our results, we believe that it was the personal content of the Roth [1995] communication and our own communication treatments, that was the key to higher levels of cooperation.<sup>6</sup>

A final insight that our data can provide is the extent to which trusters prosper in this setting. Knack and Keefer [1997] demonstrated empirically that economies with higher levels of trust produced greater economic performance; this is also the case in our experiment at the

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<sup>6</sup> Our results are also in agreement with those of Bohnet and Frey [1999b] who find that with one-sided visual identification of a partner, cooperative behavior is more pronounced if dictators are provided with some information



individual level. Figure 5 illustrates the relationship between the amount a subject sent and their earnings in the experiment. As shown on the graph, subjects who sent above average amounts to their partners, took home greater wealth than did subjects who sent only average amounts or less. A t-test reveals that these differences are significant at the  $p < .01$  level.<sup>7</sup>

-----Insert Figure 5 about here-----

As the quotes in the beginning of this paper suggest, trust is an important element in creating economic growth and development at the macro level as well as in sustaining economic transactions at the micro level. We believe our experiment demonstrates some of the factors needed to create trust and reciprocity and the contexts in which it arises and is sustained. We show that trust and reciprocation varies with a person's country-of-origin; and that Chinese subjects in particular are more trusting and reciprocal than are subjects from other countries involved in this experiment. Most interesting, however, is the finding that country-of-origin interacts with other factors, such as social distance, which influence cooperative behavior. These findings suggest that our current understanding of the influence of social distance on behavior may not be complete; in some parts of the world, the definition of social distance and its implications on behavior are quite different from those in the United States. Finally, we demonstrate that even irrelevant personal communication has a powerful influence on levels of cooperativeness. Our results regarding trust and reciprocation concur with Schelling [1968] who suggested, the more we know, the more likely we are to care.

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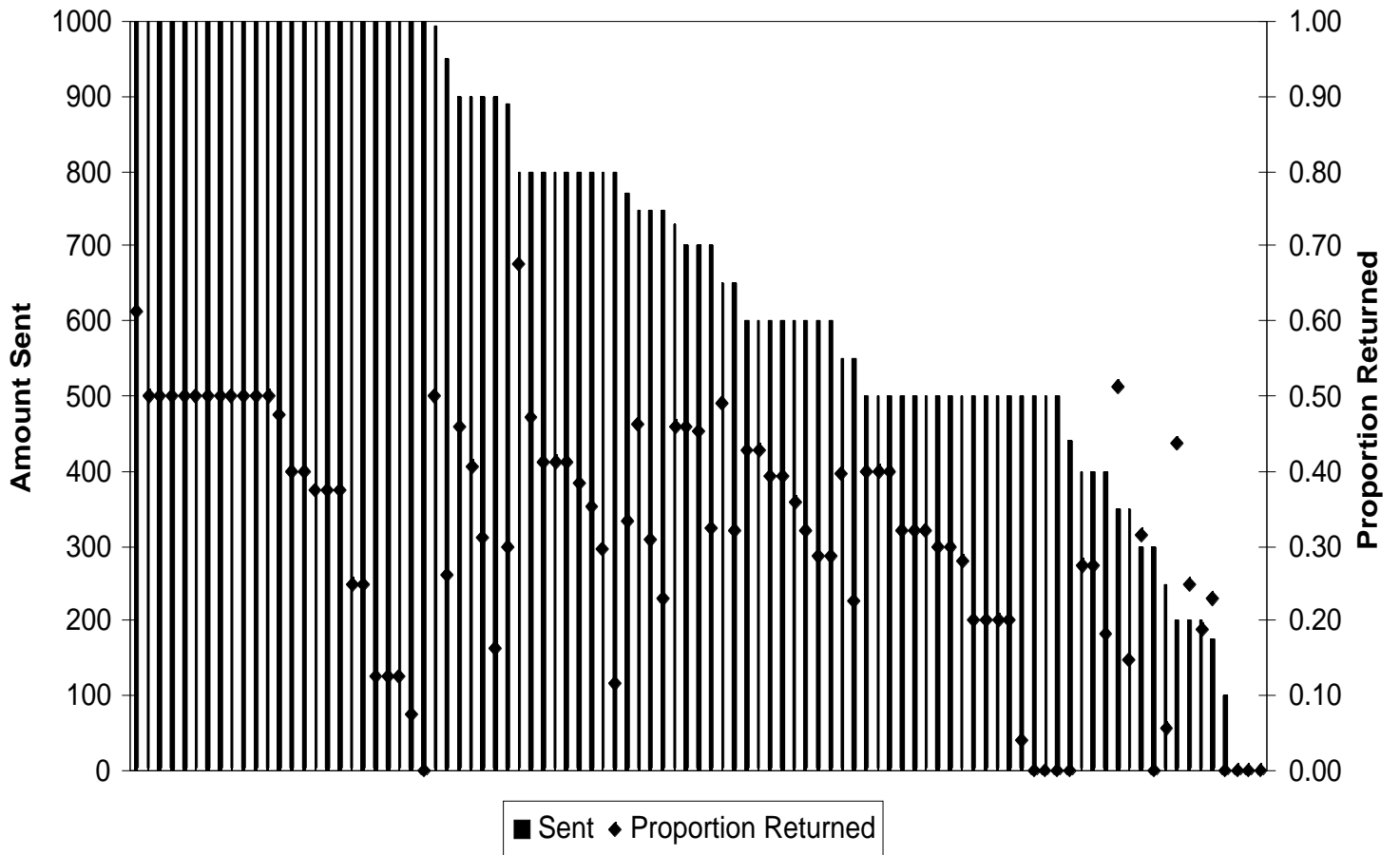
on who their recipient is.

<sup>7</sup> A first, very noticeable result comes from comparing the wealth of senders and responders. Responders take home on average 1.5 times the wealth senders acquire. In the trust game it seems, it better to receive than to give. The obvious related question is whether it pays to be reciprocal. Unsurprisingly, since responders were playing a dictator game, the wealthiest responders are those who returned little.



Figure 1

### Distribution of Amount Sent and Proportion Returned (N=92)



**Table 1**

## Regression of Amount Sent

Independent Variable	Regression		
	(i)	(ii)	(iii)
Intercept	538.20**	392.59**	457.45**
Personal Communication	166.34**	262.81*	278.23*
Ingroup	33.62	204.81	221.61
China	82.64	253.45 <sup>^</sup>	278.67 <sup>^</sup>
Japan	44.83	212.65	237.19
Korea	40.31	165.57	69.96
Personal Communication x Ingroup		33.07	29.76
China x Personal Communication		-142.67	-108.99
Japan x Personal Communication		-176.9	-142.45
Korea x Personal Communication		-37.05	-3.51
China x Ingroup		-313.01*	-328.16*
Japan x Ingroup		-292.19 <sup>^</sup>	-309.03 <sup>^</sup>
Korea x Ingroup		-122.28	-137.41
Female			-81.4
Economics education			41.20
Adjusted R <sup>2</sup>	0.054	0.059	0.058
Number of Observations	92	92	92

<sup>^</sup> p<.10   \* p<.05   \*\* p<.01

Figure 2

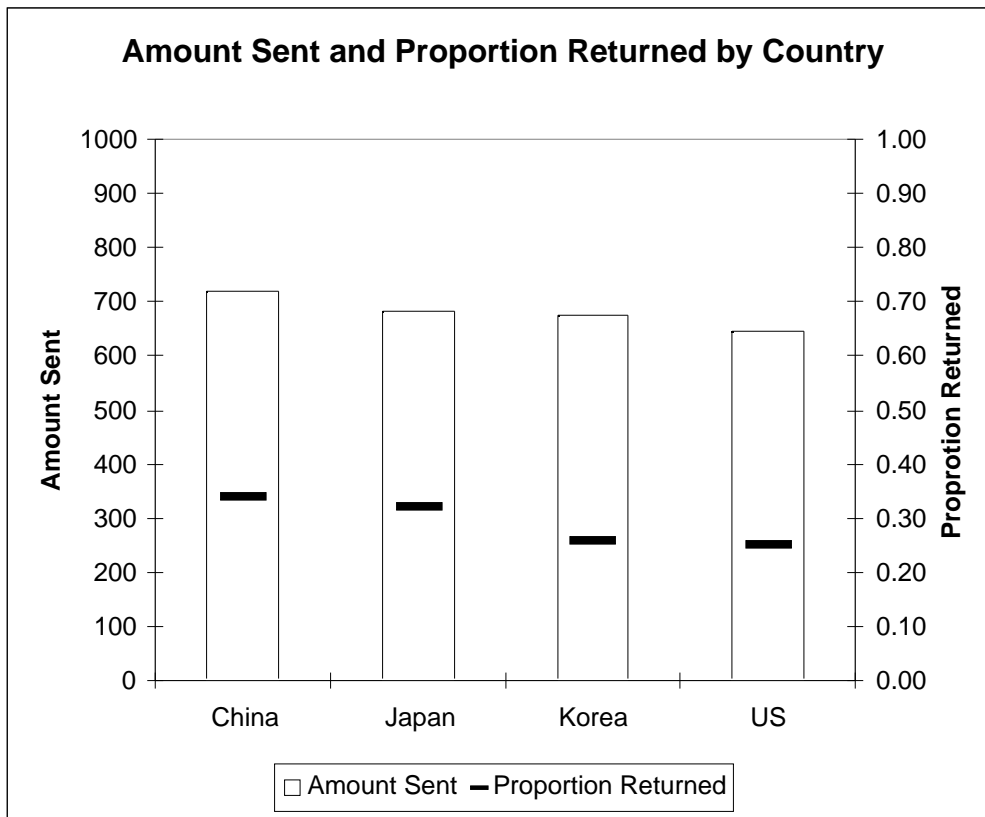
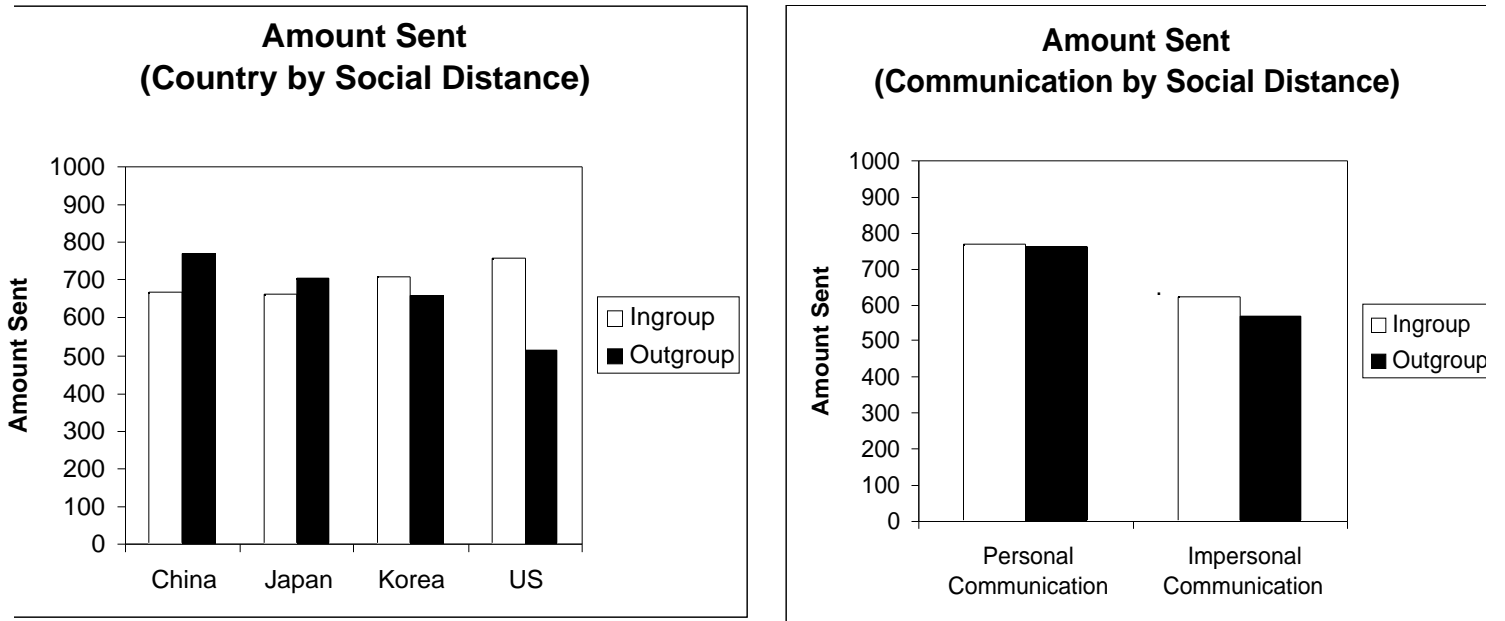


Figure 3



**Table 2**

## Regression of Proportion Returned

Independent Variable	Regression		
	(i)	(ii)	(iii)
Intercept	0.2372**	0.1393**	0.1053
Personal Communication	0.0650*	0.1915**	0.1331*
Ingroup	0.0219	0.1438^	0.1512^
China	0.0657^	0.2162*	0.2140*
Japan	0.0385	0.0887	0.1155
Korea	0.0174	0.0396	0.0587
Personal Communication x Ingroup		-0.1476*	-0.1345*
China x Personal Communication		-0.1095	-0.0544
Japan x Personal Communication		-0.0302	-0.0030
Korea x Personal Communication		-0.0761	-0.0162
China x Ingroup		-0.1813*	-0.1821*
Japan x Ingroup		-0.0532	-0.0638
Korea x Ingroup		0.0560	0.0481
Female			0.0985**
Economics Education			0.0004
Adjusted R <sup>2</sup>	0.0065	0.0801	0.1337
Number of Observations	92	92	92

^ p<.10   \* p<.05   \*\* p<.01

Figure 4

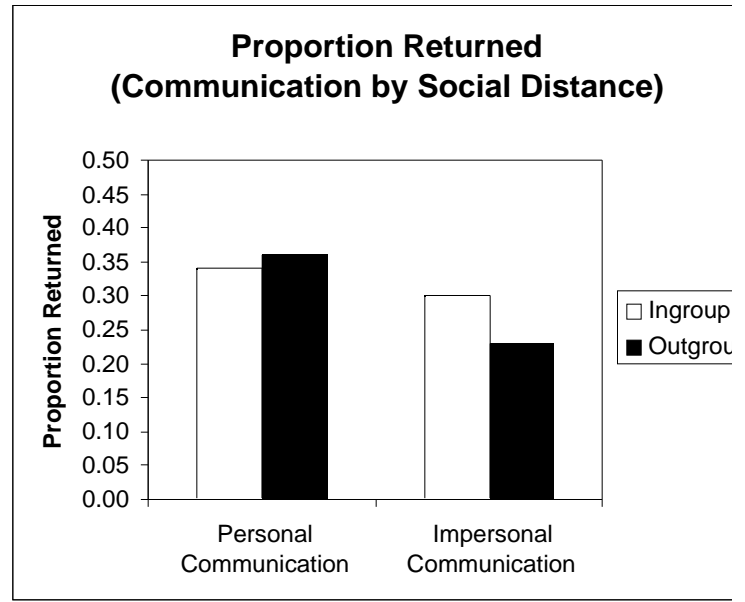
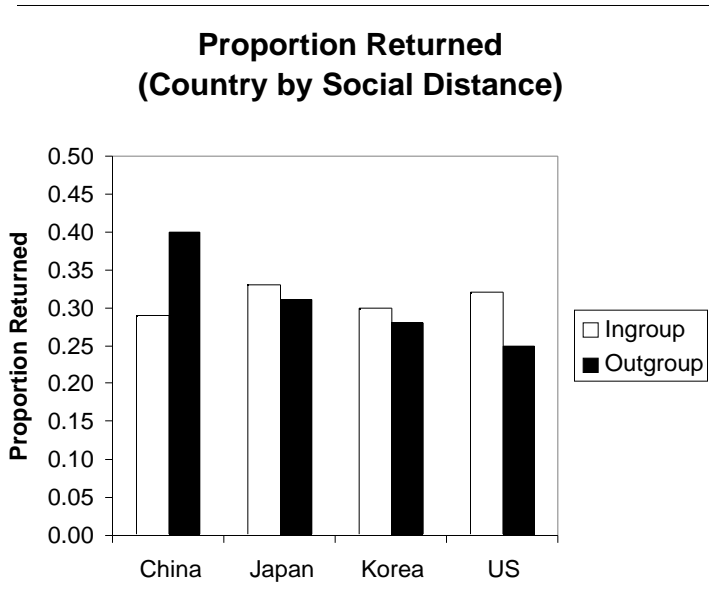
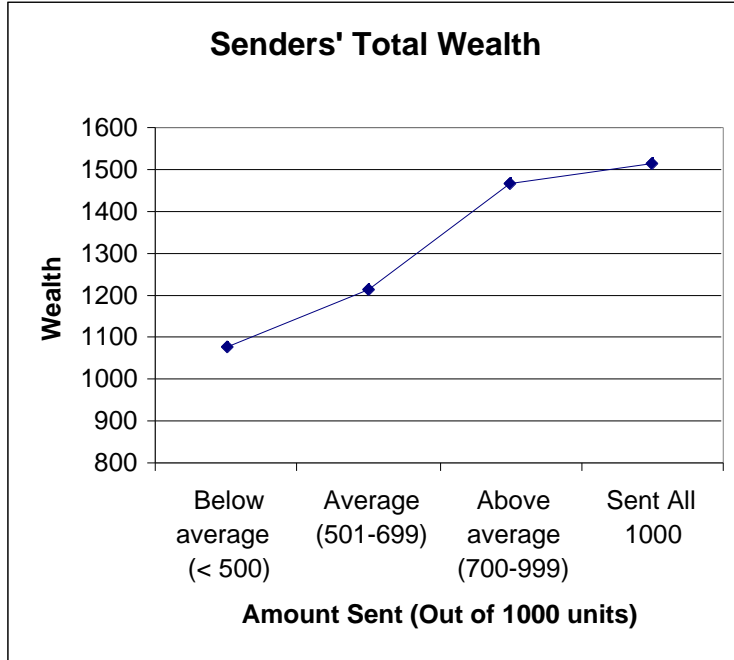




Figure 5

Sender's Total Wealth = f (Amount Sent)



Mean amount sent= 676.32

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