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Engineering altruism: a theoretical and experimental investigation of anonymity and gift giving

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Abstract

Three double blind treatments of a US$ 10 dictator game are used to examine the role of anonymity and perceptions of anonymity in pro-social behavior. One treatment has dictators viewing pictures of recipients, the second has recipients receiving pictures of dictators and the third is a pictureless control. In each treatment, more than 50 percent of dictators give US$ 0. For those dictators who give positive amounts, the modal gift is US$ 5 in each photograph treatment versus US$ 2 in the control. Twenty-five percent of subjects in each photograph treatment give at least US$ 5 versus 4 percent of subjects in the control.

JEL classification: A13; C72; C91

Keywords: Dictator game; Fairness; Anonymity; Framing

1. Introduction

> . . . no one is willingly just, but only when compelled to be so. Men do not take it to be a good for them in private, since wherever each supposes he can do injustice, he does it (Plato, The Republic 360c–d).

Plato examines the relationship between anonymity and moral action with his "Ring of Gyges", a theoretical construction that cloaks its wearer with impenetrable invisibility. He considers a tale in which the first person to use such a ring murders the king and becomes a cruel tyrant. While Plato believes that unjust actions are bad for the person who performs them, he never refutes the tale-teller's claim that when people are freed from the constraints of observation and punishment, they usually act unjustly.

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This experiment investigates the effect of anonymity in a dictator game. The work has three motivations. First, laboratory subjects in most negotiating and altruism experiments do not know the identity of their counterpart. This contrasts with almost all non-laboratory negotiations where the parties negotiate with full knowledge of their counterparts. This discord is relevant because behavior is significantly altered by anonymity in a number of different settings (for a review of these findings, see Roth (1995); pp. 294–304).

In this study, photographs are used to selectively reduce anonymity within an otherwise highly private setting. Photographs are a precise step from total anonymity towards the rich and uncontrolled communication of non-laboratory settings. Photographs reduce anonymity but do not allow any verbal messages or cues through facial movement or body language.

The second motivation is the disagreement on the effect of shielding subjects' decisions from the experimenter. Hoffman et al. (1996) (HMS hereafter) find that self-interest is increased when experimenters cannot know the individual decisions of subjects. In contrast, Bolton and Zwick (1995) determine that punishment, not anonymity, is the key to altruistic behavior concluding that, "the punishment hypothesis explains much more of the deviation from perfect equilibrium than does the anonymity hypothesis" (p. 95).

The debate on other-regarding preferences provides the third and final motivation for this work. Guth et al. (1982) began the modern discussion by showing that ultimatum game behavior deviates significantly from that predicted for rational, materially self-regarding players.

The ultimatum game has such a simple design that Bolton (1991), Rabin (1993), Fehr and Schmidt (in press) and Bolton and Ockenfels (2000) have focused on other-regarding preference structures as explanations for subjects' behavior and not on deviations from rationality. Subjects with other-regarding preferences attain the selfish goal of maximal happiness by giving money away in some situations (e.g. positive contributions in dictator games) and by foregoing money to hurt others in different situations (e.g. rejections in ultimatum games).

These other-regarding preference structures do not predict any behavioral change due to either subject–subject anonymity or experimenter–subject anonymity. The impact of anonymity on behavior thus remains outside the power of these models. More generally, anonymity can be subsumed under the concept of framing effects of Kahneman and Tversky (1984) as one of a long list of factors beyond game structure and information that alter behavior. For those who take framing effects seriously, the challenge is to build models that are both parsimonious and predictive. To be predictive, preference structures should include all the factors that significantly influence behavior, but this works against parsimony.

Biology has confronted similar challenges in understanding and modeling the behavior of non-human animals. Specifically, biologists seek to build predictive models that are tractable yet consistent with behavior that varies due to myriad factors. Rather than attempt to directly incorporate all the surface inputs to behavior, biologists have found it productive to hypothesize a limited number of underlying goals that are then implemented by specific mechanisms.

One non-human example may serve to illustrate the technique. Holldobler (1977) investigates ants that both tolerate and feed a wide variety of insect parasites, including sometimes preferentially feeding the larvae of beetles over their own siblings. The behavior of these ants would fit a standard definition of altruism as the ant hosts voluntarily help beetles at high cost to themselves.

One approach to understanding ant altruism would be to build other-regarding preference structures where ants derive joy from beetle prosperity. Biologists have instead assumed narrow self-interest and sought to understand the exact mechanics of altruism.

In the case of ants and beetles, the puzzle of altruism has been solved. Holldobler showed that although beetle larvae are much larger than ant larvae and to the human eye look nothing like their hosts, they mimic the relevant signals of ant larvae. Specifically, ant feeding behavior is conditioned upon a precise set of chemical cues and anything that produces those cues will be fed, regardless of other characteristics.

The ant goal of unfettered selfishness is accomplished by mechanisms that use signals to implement behavioral strategies. Accordingly, these mechanisms can be co-opted by other individuals (even from another species) to accomplish different goals.

A similar approach is used to understand the behavior of animals much more complicated than ants (see Smith (1978), for a discussion). For example, primates search for food (forage) using contingent strategies that vary based upon a large number of factors including terrain, weather and the location of predators. Optimal foraging models posit a small number of underlying goals including maximizing net energy intake and avoiding predation. All factors that influence behavior are rationalized by their impact on these goals. Thus, the number of surface manifestations is potentially infinite, yet simple and predictive models are possible (and widely used).

As compared with other animals, humans have a greater capacity for analytic thought and for overriding instinctual responses. The extent to which the standard toolkit for other species will be useful for human behavior remains to be seen, but the approach has several merits. First, human perceptual systems function identically to those of non-humans in the translation of external information into a limited set of internal signals. Second, the approach retains optimization at its core, but also predicts persistent framing effects. Finally, it has the potential to forecast and explain behavior that systematically deviates from material maximization and equilibrium.

As Plato implies, human behavior is affected by considerations of rewards and punishments, which in turn are affected by conditions of privacy. If human behavioral algorithms have continuity with those of non-humans, then the perception of anonymity is performed by mechanisms that use a finite set of signals to estimate the level of privacy. This experiment manipulates those posited anonymity-estimating mechanisms.

2. Design

The three goals of the experiment are: (i) replicate HMS's experimenter–subject anonymity treatment; (ii) decrease anonymity in a precise fashion; (iii) manipulate perceptions of anonymity in an attempt to induce altruism.

The dictator game is the setting for accomplishing these goals. In the dictator game, pairs of subjects share a fixed amount of money (US$ 10 in this case). One of the subjects (the "dictator") determines the division and that decision is imposed upon the second subject (the "recipient") (Kahneman et al., 1986; Forsythe et al., 1994).

Three variants of HMS double blind 1 (DB1) dictator design were run. DB1 can be thought of as implementing Plato's "Ring of Gyges" wherein dictators' decisions are known only

to themselves. In DB1, dictators act in private and seal their decisions in opaque envelopes. The subjects do not know the identity of their counterpart, no one knows the pairings and the experimenter never learns the individual decisions of the dictators (see Appendix A for full instructions).

This experiment's 'no photo' treatment is a replication of HMS DB1 treatment and serves as the control. In a second treatment, labeled 'dictator photo', an instant photograph of the dictator is enclosed along with her or his decision and given to the recipient. Experimenter–subject anonymity is retained as the photograph is viewed by the recipient in private and then immediately shredded.

In the third treatment, labeled 'recipient photo', dictators view an instant photograph of the recipient prior to their decision. As with the other two treatments, experimenter–subject anonymity is maintained. An obvious candidate for a fourth treatment with photos of both recipient and dictator is interesting, but was not included simply because of financial constraints.

There is no previous work on the effect of photographs in dictator games or similar settings. In a related study, Bohnet and Frey (1999a,b) report that face-to-face identification, without verbal communication, increases dictators' giving and increases cooperation in a prisoner's dilemma. Bohnet and Frey differ from this experiment along three important dimensions: a range on non-verbal communication is allowed, their experiment is run within a university course with subjects who know each other, and dictators and counterparts are in the same room during the experiment.

The final goal of this experiment is to manipulate anonymity and perceptions of anonymity. In the 'dictator photo' treatment, recipients learn the identity of their dictator. This raises the possibility of interactions outside the laboratory in either a positive or negative manner. Dictators and recipients exist within the same community and they know this at the time of the experiment. Dictators who are generous in the laboratory might be rewarded on the street and dictators who are stingy might be punished.

A variety of models predict increased giving when recipients know the dictator's identity. Because dictators may encounter recipients in a larger game, giving in the 'dictator photo' treatment could be motivated by narrow self-interest.

This logic does not apply to the 'recipient photo' treatment where dictators see a picture of their recipients, but not vice-versa. With this structure, there is no possible retaliation on the part of recipients. Additionally, because all the treatments are run under double blind conditions, the experimenter cannot condition any future rewards on behavior.

The 'recipient photo' treatment is motivated by the view that people are more likely to be altruistic when they believe their actions are public. It is designed to manipulate the human mechanisms built to discriminate between public and private situations. The important factor is the perception of privacy, not on the actual level of privacy.

This difference between perceptions and reality is a crucial prediction. For example, subjects in the DB1 condition are lead to believe that their decisions are private via instructions and procedures. It would be possible to create exactly the same perceptions of privacy, but surreptitiously videotape the subjects or record the serial numbers of the money they are given.

Conversely, it is possible to construct situations in which subjects perceive their actions to be public, when they are actually private. In the paper, where Bolton and Zwick argue

against the importance of an anonymity effect, they carefully avoid situations where subjects acting in private would feel as if they are in public, writing:

> "The use of computers was ruled out on the ground that assurances of anonymity must be apparent to subjects (footnote 8). . . . Use of secret computer i.d.'s would probably not resolve this problem since subjects could not be sure about what information the computer is recording."

If privacy plays an important role in human behavior, the conclusion drawn from the biological literature is that it is only the perceptions of privacy that matter. Recall that ants feed anything that they perceive to be a hungry nest mate, even if that perception is generated by a parasitic beetle larvae. Similarly, this view predicts that humans will exhibit more pro-social behavior when they perceive themselves to be in public.

The 'recipient photo' treatment is designed to have subjects make decisions under conditions that are private, but may not be perceived as private. Until the advent of cameras, the ability to see a person, particularly her or his eyes, meant that those eyes could see you. As the dictators stare at their recipient's pictures inside their double blind "Ring of Gyges" they will "know" that their actions are private, but they may not "feel" as though the acts are private or at least not as private as without the picture.

2.1. Design details

The experiment was run with 178 subjects at the University of Arizona's Economic Science Laboratory (ESL). The dictators had not been in any previous ESL experiments. Subjects were recruited from undergraduate classes in finance, accounting and economics. To avoid having friends playing opposing roles, dictators and recipients for an experiment were never drawn from the same classroom.

Subjects appeared to be representative of the University of Arizona undergraduate population. Overall, half the subjects were women and within each group of 14 dictators there were 6–8 women. Because of the double blind nature of the experiment, it was not possible to know the pairings so there is no information on gender or race effects.

Each subject was paid a US$ 5 show-up fee and all dictator–recipient pairs were paid. Photographs were taken by the author using a Polaroid instant camera and color film.

Pictures were head shots, taken at close range (2–3 ft). The photographs were taken as the subjects arrived and before they had any idea of the nature of the experiment.

3. Results

The outcome of the experiment is summarized in Table 1 and Fig. 1. Because of the particulars of this double blind design, 12 out of 86 dictators were given no money to distribute. All analyses are on the 74 dictators who had US$ 10 to distribute.

An important goal of this experiment is replication of HMS. In particular, the 'no photo' treatment in this experiment copies the DB1 treatment of HMS. The other relevant treatment of HMS is their replication of the dictator game run by Forsythe et al. (1994), labeled by HMS as FHSS-R where dictators must reveal their decision to the experimenter in order to

Table 1
Distribution of amounts given by dictators with US$ 10 to distribute across three treatments

	N	US$ 0	US$ 1	US$ 2	US$ 3	US$ 4	US$ 5+	Average (US$)
No photo	26	14	3	4	1	3	1	1.19
Recipient photo	24	14	0	1	2	1	6	1.96
Dictator photo	24	13	3	0	0	2	6	1.71

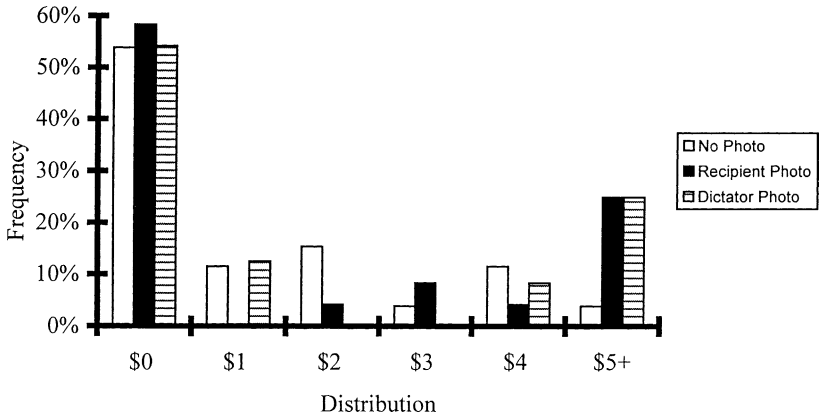

Fig. 1. Dictator behavior with US$ 10 to give across three treatments.

get paid. Thus, FHSS-R has a more public dictator decision than those made under double blind treatments.

Overall five treatments are compared, three from this experiment and two from HMS. The replication of FHSS was chosen over the original data because HMS ran under the exact same conditions as this experiment. That is, with the same University of Arizona subject pool, the same facilities and protocols that differ across treatments by just a few key design features. The relevant data from HMS are contained in Table 2.

Behavior is significantly different between some of the five treatments. Table 3 summarizes pairwise comparisons of the distributions.

The 'no photo' treatment of this experiment replicates HMS. Specifically the behavior of dictators in the 'no photo' condition is significantly more self-regarding than under FHSS-R ($P = 0.016$). There is no significant difference between the 'no photo' distribution and HMS DB1 ($P = 0.313$).

Table 2
Distribution by dictators with US$ 10 to distribute in HMS

	N	US$ 0	US$ 1	US$ 2	US$ 3	US$ 4	US$ 5+	Average (US$)
HMS DB1	36	23	7	2	1	0	3	0.81
HMS FHSS-R	24	5	4	3	7	0	5	2.33

Table 3
Pairwise difference in distributions using Mann–Whitney test

	HMS DB1	No photo	Recipient photo	Dictator photo
HMS FHSS-R	<0.001**	0.016**	0.190	0.149
HMS DB1	–	0.313	0.250	0.231
No photo	–	–	0.592	0.588
Recipient	–	–	–	0.945

** Significant at 0.05 level.

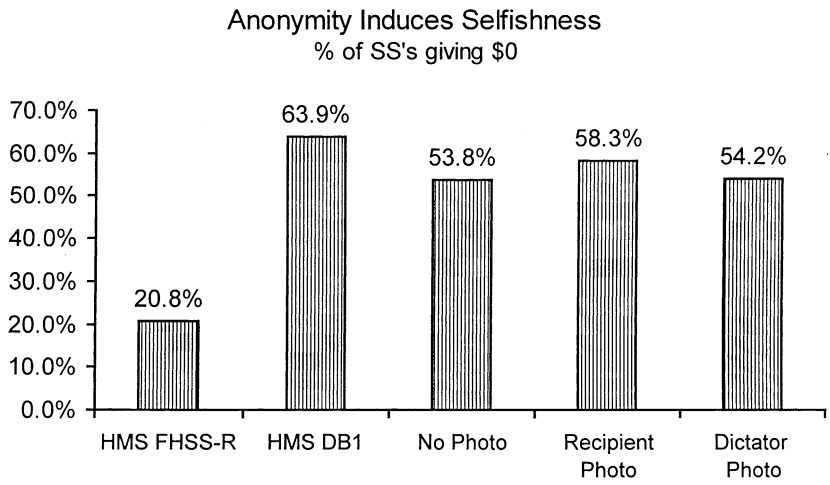

Fig. 2. Percentage of subjects giving US$ 0 out of US$ 10.

The double blind treatment has a strong effect on behavior. In the 'no photo', 'recipient photo' and 'dictator photo' treatments, 54, 58 and 54 percent of dictators, respectively, keep all the money. Fig. 2 summarizes these data.

The differences in the likelihood of giving US$ 0 between the double blind treatments and FHSS-R in Fig. 2 are all significant. Table 4 summarizes the statistical analysis.

Table 4
The decision to gibe US$ 0

	Percentage	Number/total	HMS DB1	No photo	Recipient	Dictator
HMS FHSS-R	20.8	5/24	3.27**	2.40**	2.66**	2.39**
HMS DB1	62.2	23/36	–	0.80	0.43	0.75
No photo	53.8	14/26	–	–	0.32	0.02
Recipient	58.3	14/24	–	–	–	0.29
Dictator	54.2	13/24	–	–	–	–

Summary and *t*-stats for binomial test.
** Significant at 0.05 level.

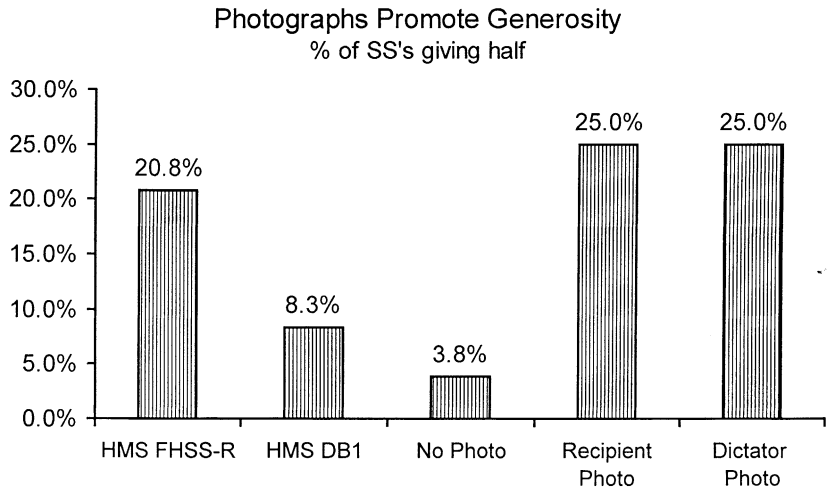

Fig. 3. Percentage of dictators giving half.

Table 5
The decision to give half

	Percentage	Number/total	HMS DB1	No photo	Recipient	Dictator
HMS FHSS-R	20.8	5/24	1.40	1.85	0.34	0.34
HMS DB1	8.3	3/37	–	0.71	1.77	1.77
No photo	3.8	1/26	–	–	2.15**	2.15**
Recipient	25	6/24	–	–	–	0.00
Dictator	25	6/24	–	–	–	–

Summary and *t*-stats for binomial test.
** Significant at 0.05 level.

Both the photograph treatments significantly increase the likelihood of giving half of the US$ 10. Fully 25 percent of the subjects in each of these two treatments give half compared to just 3.8 percent in the 'no photo' treatment. Dictator giving behavior in the two photo treatments is significantly different ($P < 0.05$) from the 'no photo' and HMS DB1. Fig. 3 and Table 5 summarize these data.

4. Discussion

Plato posited that anonymity causes selfishness and the double blind treatments in this experiment produce high levels of self-regarding behavior. The 'no photo' treatment replicates HMS and does not support Bolton and Zwick's conclusion that anonymity is unimportant.

More than half the dictators in both photograph treatments of this experiment keep all the money, but they are also significantly more likely to divide the money equally than are subjects in the anonymous control condition. Among dictators who give any money in the photograph treatments, the most common division is an even split of the US$ 10. This is

interesting as Hoffman and Spitzer (1982) report that face-to-face negotiations uniformly produce 50–50 splits even when one party must accept a payoff lower than her or his outside option. So photographs do not change the percentage of subjects who give, but those who do give, act more like people in face-to-face situations.

The two photograph treatments produce behavior that is almost identical. In the case of the 'dictator photo' treatment, the increased likelihood of giving half must be driven by the decrease in anonymity. The only difference relative to the control treatment is the inclusion of the dictator's photo along with her or his decision.

The 'recipient photo' treatment produces the same behavior as the 'dictator photo' treatment. This generosity in the 'recipient photo' treatment is consistent with Schelling's "identifiable victim" concept where he observes that people give more when they know particulars about the recipient (Schelling, 1968). Using the language of psychology, one might say that dictators feel more empathy towards photographed, identifiable recipients. At one level these explanations are sufficient, but a deeper question asks why humans have evolved these behaviors.

This experiment provides a clue to a source of Schelling's identifiable victim effect. When people make decisions in public, they face social sanctions that increase the benefits to pro-social behavior and decrease the payoffs to anti-social behavior. To the extent that 50–50 splits are deemed to be a social norm or a fair outcome, even selfish humans are more likely to act fairly when in public.

Frohlich et al. (in press) argue that that in double blind experiments dictators often seem not to believe that there is another player in the game. Because no data on beliefs were collected in this experiment it is impossible to know whether this hypothesis explains the results, but one can speculate. It seems reasonable that the recipient photograph increases the belief that a counterpart truly exists. In contrast, there is no obvious reason why including the dictator's photograph would increase the likelihood of an actual recipient.

Human altruism is driven, at least in part, by selfish mechanisms with imperfect information about the state of the world. This suggests that people use cues to the likelihood that their actions are observable. As such, human behavior should be importantly altered by perceptions of anonymity, which at least in principle, can be orthogonal to actual anonymity.

In certain settings, the ability to identify a recipient (or victim) is an effective proxy for a close relationship. For ancestral humans, who lived in small, stable communities, detailed knowledge of another individual was likely to be correlated with a high number of future interactions. The more knowledge of an individual, the more likely that an altruistic act would redound to the benefit of the giver. This correlation does not necessarily exist in the modern world where it is possible to gain detailed information about people with whom one will never interact, but our brains evolved for a world where social information and social interaction were tightly linked.

This evolutionary view can resolve an ongoing debate over the role of social distance and reciprocity in altruism. HMS argue that reciprocal heuristics underlie human altruism. In direct opposition, Bohnet and Frey (1999a,b) point to one-way identification of recipients as an example where reciprocation is impossible and therefore, not the cause of altruism. These two views are not at odds if the human brain evolved in a world where one-way identification was rare. In such environments, one-way identification implies two-way identification and may call for pro-social behavior.

Indirect support for this view comes from an interesting study. Woodcutters in the forests of the Sundarbans in India are preyed upon by tigers. Noting that tigers always attack people from behind, a study was conducted where some woodcutters wore masks of human faces on the back of their heads. The study was halted in 1987 after 30 men without masks were eaten by tigers, versus zero in the control group. Note, that the study was halted because all men began wearing self-made masks (and still do).

So the behavior of tigers is modified by perceptions that differ from reality. Similarly, all ants are altruistic toward beetle recipients—there are none that decide to keep all the pie for themselves. If humans were as constrained by their instinctual systems as these ants and if the photographs induce a feeling that an even split is the most profitable (when social sanctions for highly self-regarding behavior are included), then 100 percent of the subjects in the photograph treatments would give US$ 5.

In fact, only 25 percent of subjects in the photograph treatments gave US$ 5, so clearly the source of human altruism is more nuanced than that of ants. One interpretation is that the photographs make subjects feel as though they are in public and that the fair division is half. Because people are not lumbering robots constrained to follow their gut feeling, some subjects use their abstract reasoning ability to understand the double blind conditions and override the instinctual response. This would also explain why over 80 percent of dictators in both photograph treatments give either zero or half.

The preference structures discussed in the introduction do not predict behavioral changes based on manipulations of anonymity. This experiment adds to the evidence that anonymity is a significant influence on human behavior and merits attention by those who favor the other-regarding preference approach.

On a more fundamental level, the impact of anonymity on pro-social behavior supports the notion that economic models can be improved by using the standard approach for non-human behavior. This approach assumes a goal of individual maximization, but implementation via mechanisms that produce anomalous behavior in some situations.

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Appendix A. Instructions to subjects

You have been asked to participate in an economics experiment. For your participation today we have paid you US$ 5 in cash. You may earn an additional amount of money, which will also be paid to you in cash at the end of the experiment.

In this experiment, each of you will be paired with a different person who is in another room. You will not be told who these people are either during or after the experiment. This is room A.

('Dictator photo' treatment: The person you have been paired with will receive a photograph of you. No one else will see the photograph of you and the photograph will be destroyed after the experiment.)

You will notice that there are other people in the same room with you who are also participating in the experiment. You will not be paired with any of these people.

One of the persons in room A will be chosen to be the monitor for today's experiment. The monitor will be paid US$ 10 in addition to the US$ 5 already paid. The monitor will be in charge of the envelopes as explained below. In addition, the monitor will verify that the instructions have been followed as they appear here.

The experiment is conducted as follows: 14 unmarked envelopes have been placed in a box. Twelve of these envelopes contain 10 US$ 1 bills and 10 blank slips of paper. The remaining two envelopes contain 20 blank slips of paper. The monitor will be given a list of names of people in their room. He or she will call one person at a time to the back of the room and hand each person an envelope from the box. The person who was called will then go to one of the seats, with a large box on top, in the back of the room. The envelope will then be opened privately inside the box. Only the person who was given the envelope will know what the envelope contains.

When you open your envelope you will see a page with some text and a set of questions. Answer the questions and place the page in the return envelope.

('Recipient photo' treatment: When you open your envelope you will see a photograph attached to a set of questions. The photograph is of the person you have been paired with in the other room. Note, that although you will see this photograph, neither the experimenter nor the person you are paired with will learn your identity either during or after the experiment. Answer the questions on the paper attached to the photograph and place the page and photograph into the return envelope.)

Each person in room A must then decide how many dollar bills (if any) and how many slips of paper (if any) to put in the return envelope. The number of dollar bills plus the number of slips of paper must add up to 10. The person then pockets the remaining dollar bills and slips of paper. Examples: (1) put US$ 2 and eight slips in the envelope, pocket US$ 8 and two slips; (2) put US$ 9 and one slip in the envelope, pocket US$ 1 and nine slips. These are examples only, the actual decision is up to each person. If the envelope has 20 blank slips, put 10 blank slips in the envelope and pocket the other 10. This is done in private and we ask that you tell no one of your decision. Notice that each envelope returned will look exactly the same. Also note that no one else, including the experimenter will know the personal decision of people in room A.

Once you have made your decision you will seal your envelope and place it in the box marked return envelopes. ('Dictator photo' treatment: The monitor will seal your photograph in a separate envelope and tape it to your return envelope. Your return envelope will then be placed it in the box marked return envelopes.) You may then leave the room.

After all 14 envelopes have been returned, the monitor will take the box to room B. There are 14 people in room B. Each of these persons will be paid US$ 5 to participate. The monitor will be given a list of names of people in room B. The monitor will then call up the

people in room B. The monitor will choose an envelope from the box, open the envelope, record its contents and give the contents of the envelope to the person called up. ('Recipient photo' treatment: Give the contents to the person in the photograph.) They are then free to leave. The monitor will continue until all the envelopes have been handed out and everyone else has left the room. The experiment is then over.

('Dictator photo' treatment: The person will examine the photograph in private and return the photograph sealed in a new envelope. They are then free to leave. The monitor will continue until all the envelopes have been handed out and everyone else has left the room. The experiment is then over. The photographs will not be removed from the second sealed envelope and will be destroyed.)

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