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Do I care if you know I betrayed you?

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Abstract

In this paper, we report results derived from a laboratory experiment based on a modifed trust game. We introduced a coin flip between decisions of trustors and trustees in the trust game. The realized outcome of the coin flip determines the productivity of trust. By varying trustors' ability to observe the outcome of the coin flip, we allow the trustees to be able to hide betrayal "behind a coin flip." We find that more trustees choose to defect when betrayal is obfuscated than when it is revealed. Our result suggests that subjects who choose to repay trust may just pretend to be cooperative, but do not really value the outcome of cooperation.

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1. Introduction

People often are generous both in everyday life and in experiments. This behavior has been often interpreted a preference for generous outcomes. However, recent literature indicates that people may not really value the social outcome, they may instead, just want to be seen as being generous. In a study by Güth et al. (1996), the authors modify the standard ultimatum game by varying the size of the cake, which can take either a large or a small value. Only the proposer knows the true size of the cake. They find that many proposers with a large cake offer the equal split of a small cake. The authors refer to this behavior as "hiding behind some small cake."

We extend the literature by looking at the decision to cooperate in a trust game. We modified the trust game so that subjects can "hide behind a coin flip." In our modified trust game, the first mover's (or "trustor's") decision to trust the second mover (or "trustee") is "productive" (Deck 2009), which refers to the increase in total money payoff compared with the alternative choice.[1] We introduced a move of nature in between the trustor's decision and the trustee's decision, which randomly determines the productivity level of trust. This move of nature is determined by a coin flip. The trustor does not observe nature's move or the trustee's decision unless they are revealed by his own payoff. The key feature of the modified trust game is that when the trustee repays low-productivity trust, the trustor receives the same payoff as when the trustee betrays high-productivity trust. That is, the trustor cannot infer betrayal of high-productivity trust.

We recruited subjects to participate in two experimental treatments. Subjects play the modified trust game in treatment 1. In treatment 2, different subjects play a game identical to the modified trust game except that the trustor observes nature's move at the end of the game, hence the trustor eventually has perfect information about the trustee's decision. We find that subjects repay high-productivity trust more frequently in treatment 2 than in treatment 1. Results of the experiment show that people are more selfish when they can "hide behide a coin flip." Our findings are consistent with the prior findings that people may not really value the social outcome of cooperation, they may instead, just want to pretend to be cooperative.

The next section of the paper describes some related literature. Section 3 describes the experimental design and protocol. Section 4 reports the results from the experiment. The final section of the paper concludes.

[1]Henceforth, we use the common, although questionable, designation of the first mover as "trustor" and the second mover as "trustee" even though the first mover's motivation may be trust or altruism, or both (Cox 2004).

2. Some related literature

Traditional economic models assume that individuals' actions are exclusively motivated by material self-interest. The narrow material self-interest assumption is quite good at predicting behavior in many contexts. However, in some contexts, this assumption does not work well. Examples include ultimatum games (Güth et al. 1982; Slonim and Roth 1998), dictator games (Forsythe et al. 1994; Andreoni and Miller 2002), and investment games (Berg et al. 1995; Cox 2004; Cox and Deck 2005). Experimental studies of such games show that individuals often behave in a way that is inconsistent with narrow material self-interest.

As a result of these findings, researchers have been motivated to develop models of other-regarding preferences. These models assume individuals have genuine concern for others' material payoffs. This literature broadly falls into two classes: outcome-based models and models of reciprocity. The outcome-based (distributional) models assume that individuals care about their own and others' material payoffs. Examples include inequality aversion models (Fehr and Schmidt 1999; Bolton and Ockenfels 2000), quasi-maximin models (Charness and Rabin 2002; Engelmann and Strobel 2004), convex other-regarding preferences models (Andreoni and Miller 2002), and the egocentric altruism model (Cox and Sadiraj 2007; 2012). Alternatively, models of reciprocity assume that individuals prefer to repay kind actions by others with similar actions themselves and, also, to repay unkind actions with similarly unkind ones. For example, revealed altruism theory (Cox et al. 2008) assumes that one person's generous action may change another person's preferences and trigger a reciprocal response.

A series of recent studies find that people often "pretend to be generous", but do not truely value the generous outcome. In a two-level ultimatum game experiment, Güth et al. (1996) find that subjects are more selfish when they can hide their selfish behavior "behind some small cake." In a dictator experiment by Dana et al. (2007), dictators are more likely to be selfish when they can stay ignorant of the recipients' payoffs. The related work by Dana et al. (2006) also shows that many subjects are willing to pay to avoid the dictator decision. In the study by Hamman et al. (2010), the authors find that subjects are more selfish when they can delegate their selfish actions to agents (a third party).

Our work focuses on people's decision to cooperate in a trust game. We modified the trust game by introducing a random coin flip, which determines the productivity of trust. In one treatment, only trustees can observe the realized outcome of the coin flip, so that they can hide their selfish actions "behind the coin flip." In another treatment, the realized outcome of the coin flip is common knowledge between trustors and trustees. We find that fewer subjects cooperate when betrayal is obfuscated from their partners.

This finding cannot be explained by any of the above-cited outcome-based models. Trustees with preferences consistent with those models should behave consistently across our treatments because the feasible sets of material payoff alternatives are identical across treatments. Also, revealed altruism theory cannot be applied here without modification because opportunity sets in our modified trust game are not exclusively chosen by other (human) players.

In a context of the trust game, trustors can display an aversion to betrayal. The idea of betrayal aversion has been addressed by Bohnet and Zeckhauser (2004). They experiment

with subjects' decision making in paired trust games played either with another person or a computer. They find that individuals are less willing to "trust" when the outcome is determined by another person than when it is determined by random draw by a computer. This result indicates an aversion to being betrayed by another human being, which is referred to as "betrayal aversion" by Bohnet and Zeckhauser. Bohnet et al. (2008) follow the same design to examine whether betrayal aversion is a robust feature beyond the United States. Their results support betrayal aversion as a broad-based phenomenon across countries.

We follow this finding and look inversely at the behavior to repay trust. Since betrayal aversion exists, trustees may feel obliged to cooperate, but may not really value the outcome generated from cooperation. This possibly explains our finding that some subjects only cooperate when their actions are revealed, since they just want to appear to be cooperative, but do not have true concerns for others' payoffs.

Our findings can fit into the literature of the "hiding behind some small cake" – behavior (Güth et al. 1996). This result is consistent with previous findings that people are more selfish when their behavior is not revealed. We are not denying that the behavior to repay trust may be motivated by distributional concerns or reciprocity. However, this possibility may be overstated by results of prior research. Our work suggests a complementary explanation. Our results suggest that sometimes trustees who repay trust may just pretend to be cooperative.

3. Experimental design and protocol

The extensive form of the modified trust game is represented in Figure 1. A first mover (the trustor) can choose a sure option ("exit" the game) that gives both movers a payoff of 10, or he can choose to trust (or "engage" into the game). The productivity level of trust is determined by nature's move. Fifty percent of the time, nature moves left and yields low-productivity trust. In this case, trust increases the total money payoff from 20 to 30. Another fifty percent of the time, nature moves right which selects high-productivity trust that increases the total money payoff from 20 to 50. After observing nature's move, a second

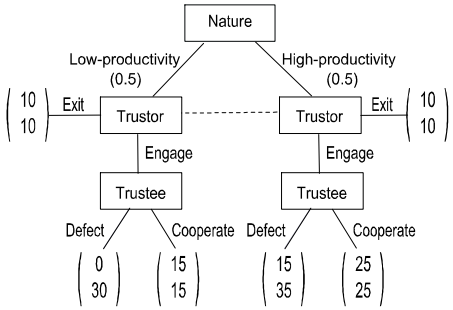

Figure 1: The modified trust game

mover (the trustee) has to choose between cooperate with the trust or defect. Cooperation with low-productivity trust gives both movers a payoff of 15, while defecting results in a payoff of 0 for the trustor and 30 for the trustee. Cooperating with high-productivity trust ends with a payoff of 25 for both movers, while defecting yields a payoff of 15 for the trustor and 35 for the trustee.

Interestingly, when the trustee chooses to cooperate with low-productivity trust, the trustor receives the same payoff – a payoff of 15 – as when trust is highly-productive but the trustee defects. The trustor knows neither the choice nor the payoff of the trustee, unless they are revealed by his own payoff. The trustor also cannot observe nature's move. Imagine you are the trustor who receives a payoff of 15. You may want to believe that the trustee chose to cooperate and encountered an unlucky move of nature. However, it is also possible that you faced a greedy partner who relied on the presence of nature's move for obfuscation. Consequently, the trustee's action is not revealed.

We experiment with two treatments: (1) the modified trust game; (2) a game identical to the modified trust game except that the trustor observes nature's move at the end of the game. We compare data from these two treatments to capture the effect of the concern for betrayal costs. Compared with treatment 2, the trustee in treatment 1 is able to hide betrayal when trust is highly-productive. Since betrayal is not revealed, the trustee may believe that the trustor does not experience betrayal costs. This belief may allow the trustee to justify the choice to defect, and thereby lead to more self-interested actions.

Before the experiment started, the experimenter read the instructions out loud to the subjects. Whether or not betrayal would be revealed was made clear to all subjects. After the experiment began, subjects were reminded of whether betrayal would be revealed again on the decision screen. The actual decision screen for trustees in treatment 2 is shown below in Figure 2.

In both treatments, we implemented the strategy method. This method allows us to observe trustees' choices for both possible moves of nature even when the trustor chooses the sure option. In each treatment, trustors had to decide whether to trust. At the same time, trustees chose to cooperate or defect for each of the possible moves of nature. The earnings of each pair of subjects were determined by choices of both parties and nature's move. Trustees were informed that their choices were only determinative for the final payoff if their paired trustors chose to trust.

After subjects finished making decisions in each treatment, the experimenter flipped a coin to determine nature's move in the presence of all of the subjects. The difference between the two treatments in the information provided to the subjects was as follows. In treatment 2, *all subjects* were informed whether "Heads" on the coin flip meant that nature moved left or right. In treatment 1, only trustees were informed whether Heads corresponded to left or right for nature's move.

We used a double-blind subject payment protocol in which subjects' choices are anonymous to both other subjects and the experimenter. This protocol is implemented by first asking each subject to select one from a box full of identical, sealed envelopes. Each envelope contains a key with a unique number. Subjects are asked to use these numbers as

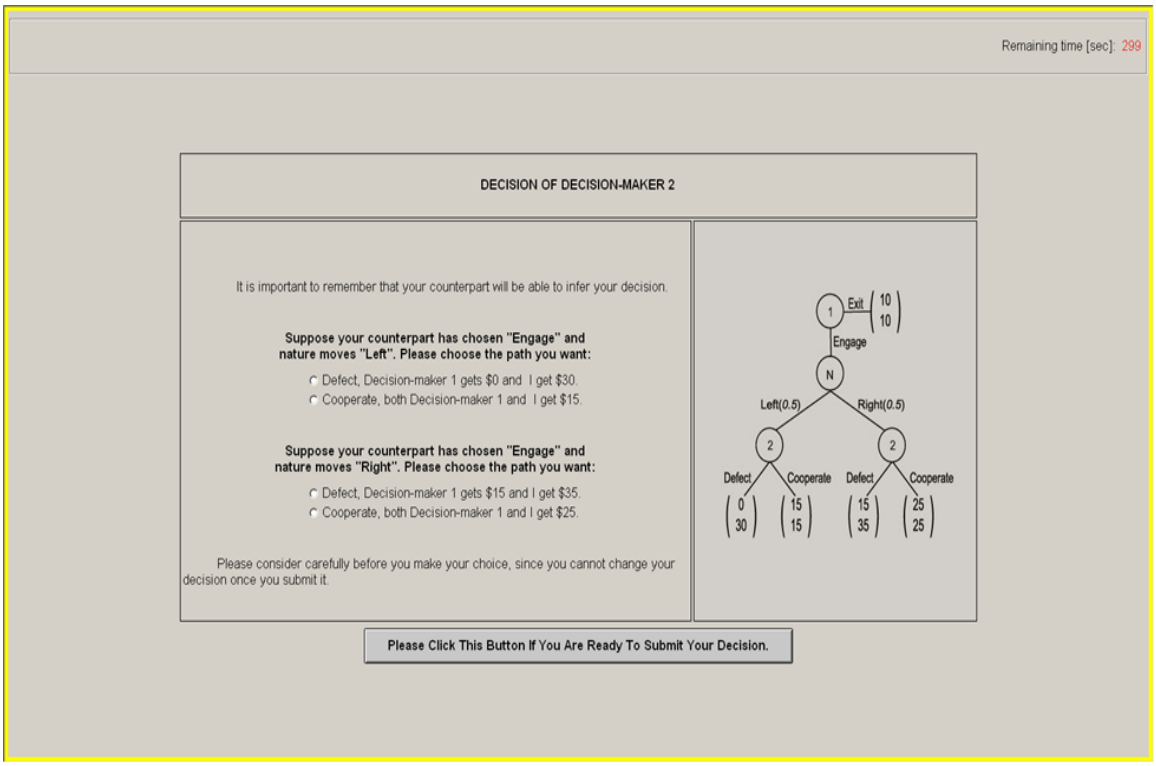

Figure 2: Decision screen for trustees in treatment 2

their (only) identifiers in the experiment. At the end of the experiment, subjects exit the lab individually and collect their earnings in private from a mailbox with a number that corresponds to their key number. Payoffs are contained in sealed envelopes. Subjects are asked to exit the building before opening their envelopes. While waiting for pay envelopes to be filled with money and put in the mailboxes, subjects are asked to complete a questionnaire on demographic characteristics. Subjects' questionnaire responses are linked with their decisions by their mailbox key numbers.

4. Results

Subjects who participated in the experiment were recruited from undergraduate students at Georgia State University. A total of 142 subjects participated in the experiment, 72 in treatment 1 and 70 in treatment 2. Subjects earned on average $22.61 (including a $5 show-up fee). There were 2 sessions in each treatment. The treatments were implemented with a between-subjects design. Subjects were randomly assigned to one role, either the trustor or the trustee. Each trustor was randomly paired with a trustee. In each session, subjects played the game only once. Results from the experiment are as follows.

Table 1 reports the frequency of the choice to defect for each treatment. The results are consistent with our hypothesis that subjects choose to defect more frequently when

Table 1 Frequencies of the choice to defect by treatment

	Sample Size	Low-productivity trust			High-productivity trust		
		Obs	Percent	SD	Obs	Percent	SD
Treatment 1	36	20	55.56%	50.40	29	80.56%	40.14
Treatment 2	35	22	62.86%	49.02	23	65.71%	48.16
Proportion test across treatments: z-test (p-value)							
Total		-0.6258(0.7343)			1.4122(0.0789)		

Notes: The null hypothesis: difference in behavior across two treatments=0; the alternative hyphothesis: difference in behavior across two treatments > 0.

betrayal is not revealed. When nature led to high-productivity trust, 29 out of 36 trustees in treatment 1 chose to defect, while 23 out of 35 trustees chose to defect in treatment 2. This difference across treatments is weakly significant ($z = 1.4122$, p-value $= 0.0789$). The observed difference across treatments provides some support for the conjecture that concern for others' betrayal costs is a motivation for choosing cooperation.

When trust was lowly productive, the choice to defect was revealed in both treatments. We did not observe a statistically significant difference in choice of defect across treatments. In treatment 1, 20 out of 36 trustees chose to defect. In treatment 2, 22 out of 35 trustees chose to defect. The difference across treatments is not statistically significant ($z = -0.6258$, p-value $= 0.7343$). This finding of *insignificant* difference for the (trustor-revealing) choices with low-productivity trust, together with the *significant* difference for the (trustor-obscuring) choices with high-productivity trust, provides further support for our conjecture that it is trustees' concern for betrayal costs that explains differences between behaviors across treatments.

Table 2 presents a series of probit regressions on trustees' decisions to defect. In regressions (1) and (2), we analyze trustees' decisions when trust is lowly productive, while regressions (3) and (4) produce the anaylsis of trustees' decisions with high-productivity trust. The right-hand side of the regressions first includes a dummy variable "Treatment", which is equal to one in treatment 2. Since trustees made simultaneous decisions for each possible outcome of nature with the strategy method, regressions under low-productivity trust have controls on trustees' decisions for high-productivity trust and vice versa.

Regressions (1) and (3) indicate that trustees only behave differently across treatments when trust is highly productive (variable "Treatment"). Trustees are 17.6% less likely to defect in treatment 2 when trust is highly productive and the result is statistically significant at 10% level. However, the treatment does not affect the likelihood to defect when betrayal is revealed in both treatment (p-value $= 0.284$).

Regressions (2) and (4) include additional subject characteristic variables such as "Gender" (female=1), "Race" (black=1), and "Experience" (having previous experience in other experiments=1). Again, we only see behavioral difference across treatments when trust is highly-productive. The coeffient on variable "Treatment" in regression (4) is negative and

Table 2 Probit regressions of the choice to defect

	Dependent variable: choice to defect			
	Low-productivity trust		High-productivity trust	
	(1)	(2)	(3)	(4)
Treatment	0.131	0.098	-0.176*	-0.224**
	(0.121)	(0.128)	(0.105)	(0.109)
Defect with high-productivity trust	0.333**	0.299**		
	(0.130)	(0.138)		
Defect with low-productivity trust			0.267**	0.240**
			(0.109)	(0.114)
Gender		-0.052		-0.009
		(0.121)		(0.106)
Race		-0.211*		-0.119
		(0.120)		(0.109)
Experience		-0.033		-0.172
		(0.148)		(0.140)
Log likelihood	-44.788	-43.230	-37.206	-35.984
Pseudo R2	0.0672	0.0997	0.0979	0.1275
N	71	71	71	71

Notes: The base treatment is treatment 1. Reporting marginal effects. Standard error in parentheses.
*** significant at 1% level, ** significant at the 5% level, * significant at the 10% level.

significant at 5% level, suggesting that trustees are 22% less likely to defect in treatment 2. However, regression (2) indicates that when trust is lowly productive, there is no treatment effect.

5. Conclusion

In this paper, we report results derived from a laboratory experiment based on a modified trust game design. This design allows us to examine whether subjects are more selfish when they can hide their selfish actions "behind a coin flip." In the modified trust game, we introduce a random coin flip between decisions of trustors and trustees. The realized outcome of coin flip determines the productivity of trust. By varying trustors' ability to observe the realized outcome of coin flip, we allow trustees to be able to hide betrayal in one treatment. We find a significant increase in the choice to defect when trustees can hide betrayal, but no significant behavioral change when betrayal is revealed in both treatments. This result supports our hypothesis that subjects may just pretend to be cooperative but do not really value the outcome from cooperation. Our finding suggests that concern for betrayal costs influences not only the decision to trust, but also the decision to repay trust.

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