

# The Strategy Method Lowers Measured Trustworthy Behavior<sup>\*</sup>

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## Abstract

In a trust game experiment, we elicited choices using either the so-called game or strategy method. While the two methods yield similar rates of trust, the strategy method reveals a significantly lower rate of trustworthiness.

Keywords: Trust; game method; laboratory; experiments; reciprocity

JEL Classification: C90

## 1. Introduction

Experimental economists are increasingly using the *strategy method* for eliciting choices in laboratory and field experiments. Following this method, first subjects state contingent choices for every decision node they may face; then subjects are matched; and, finally, the appropriate choices are carried out for the nodes that are reached, and the other contingent choices are ignored. This contrasts with the more natural *game method*, in which subjects are first matched; then subjects learn when specific decision nodes are reached; and they make a single choice only for realized nodes.

While from a game-theoretic perspective these elicitation methods should not affect behavior, in this paper we show that the two methods yield different behavior in a simplified trust game. Compared to the game method, in the strategy method the fraction of completely selfish subjects who act in an untrustworthy manner increases by 50 percent, and the fraction of egalitarian equal splits of the surplus falls by two-thirds.

Researchers find the strategy method useful for several reasons. First, it allows the researcher to observe behavior at rarely-reached decision nodes. Second, it is convenient for use

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in statistically representative surveys and field experiments, where households may be sampled through the mail or in personal or telephone interviews (e.g., Bellemare and Kröger, 2007; Falk and Zehnder, 2007; Slonim and Garbarino, 2008).<sup>1</sup> Third, because the strategy method requires respondents to think about possible reactions in different situations, it might better reflect their behavior in the field, outside the artificial environment of the laboratory.

Previous comparisons of the strategy and game methods reported little differences in choices for some games (e.g., Brandts and Charness, 2000; Cason and Mui, 1998; Oxoby and McLeish, 2004) although not for all (e.g., Brosig et al., 2003). We provide evidence on the trust game, which has become a “workhorse” game in laboratory and field experiments to measure the degree of trusting and trustworthiness of respondents (Berg et al., 1995). In this game the first mover, or “trustor,” decides how much of her endowment  $x$  to transfer to the second mover, or “trustee.” Any amount sent, denoted  $s$ , is multiplied by a known factor  $m$ , and the trustee determines how much of  $y + ms$  to return to the trustor, where  $y$  is the trustee’s endowment. If the trustee returns  $r$  then final monetary payoffs are  $x - s + r$  for the trustor and  $y + ms - r$  for the trustee. If both agents are strict money-maximizers, then the trustee would return  $r = 0$ ; anticipating this, the trustee would initially send  $s = 0$ . This unique equilibrium has no trust and no gains from exchange. Scores of experiments have shown that both  $s$  and  $r$  are frequently positive, however, even for very large stakes and for completely anonymous strangers.

In the strategy method version of the trust game, the trustee specifies an amount to return  $r(s)$  for every possible amount sent  $s$ . This requires the researcher to restrict the set of possible  $s$ . One common choice is to restrict  $s$  to integer amounts. When  $x$  is some number such as 10 dollars or euro, this yields 11 decision nodes, and the probability that these individual nodes is reached typically is considerably lower than one. Given the same payment scale and a longer decision time, this “dilutes” the financial incentives especially for choices at the less popular nodes. For example, if some amount  $s_o$  is rarely chosen by trustors, and trustees correctly anticipate this, then trustees have little incentive to carefully choose an amount to return for the  $s_o$  amount since this decision has little impact on their expected payoff. In the present experiment, we simplify matters even further by restricting  $s$  to be either 0 or  $x$ , as done in Eckel and Wilson (2004). That is, the trustor either fully trusts or does not trust at all. The trustee

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<sup>1</sup> Fehr et al. (2002) discuss this advantage when developing an alternative “specific response method” for use in surveys. For simple games, such as the trust game studied here, it is possible—although logistically challenging—to collect data using the game method even in a household survey (e.g., Johansson-Stenman et al., 2005).

indicates how much of  $mx$  he will return in the event that the trustor chooses to send all  $x$ . This simplified trust game makes monetary incentives more comparable between game and strategy methods, since this decision node is reached very frequently.

What could explain the loss of trustworthiness caused by the strategy method? Although the use of the strategy method does not affect the game-theoretic predictions that are based on standard, money-maximizing preferences, insights from behavioral economics suggest that the strategy method could affect behavior. Considerable evidence has accumulated indicating that humans behave reciprocally, and as noted by Fehr et al. (2002) the strategy method is less emotionally arousing than the game method. Learning that one is trusted by another person, and then being given an opportunity to reciprocate, may be different from specifying a contingent strategy to be carried out in the event that one is trusted. Intentions of the trustor may be important (McCabe et al., 2003).

## 2. Experimental Design and Procedures

Each session included three parts: (1) risk attitude elicitation using a multiple price list design; (2) an ultimatum game; (3) a trust game. The trust game was implemented with the strategy method in one treatment, while in the other with the game method. Parts 1 and 2 were identical in both treatments. In the ultimatum game of part 2 the responder chose with the strategy method. Participants learned the results of parts 1 and 2 only at the end of the session.<sup>2</sup>

In the trust game endowments were  $x=y=10$  experimental francs and the multiplier  $m=5$ . The trustor faced a binary choice between sending either 10 or nothing to the trustee. If she sent 10, the trustee received 50 francs. In the *game method treatment*, the trustee learnt the trustor's choice. The trustee had to state an amount in  $[0, 60]$  she wanted to return to the trustor. If the trustor sent nothing, the game ended with each subject earning 10. In the *strategy method treatment*, the trustee did not know the trustor's choice and had to state an amount in  $[0, 60]$  she wanted to return to the trustor. This choice was implemented when the trustor had sent her 10.

We ran ten sessions with 24 subjects in each session: 72 subject pairs in the strategy method treatment and 48 subject pairs in the game method treatment. Participants were recruited from the undergraduate population of Purdue University (USA). No subject participated in more than one session, and no communication among subjects was allowed. Each 10 experimental

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<sup>2</sup> For the design details of parts 1 and 2 see Casari and Cason (2007).

francs earned was worth \$1. On average a game method session lasted 40 minutes and paid \$11.72.<sup>3</sup>

### 3. Results

As in other studies, in both treatments many trustors send and many trustees return money. The key difference, however, is that trustees do not return as much when they respond using the strategy method. Table 1 reports the frequency distribution of amounts returned by the trustee in the two treatments. Figure 1 displays the cumulative frequency distributions. Recall that these amounts are statistically independent because subjects received no feedback until the trust game. The data reject the null hypothesis of equal distributions (Wilcoxon rank-sum  $z=2.22$ , two-tailed  $p$ -value $<0.05$ ). The proportion of trustees who return nothing is 50 percent higher in the strategy method (Fisher's exact test  $p$ -value=0.043), and the proportion who return half of the available surplus is three times higher in the game method (Fisher's exact test  $p$ -value=0.019).

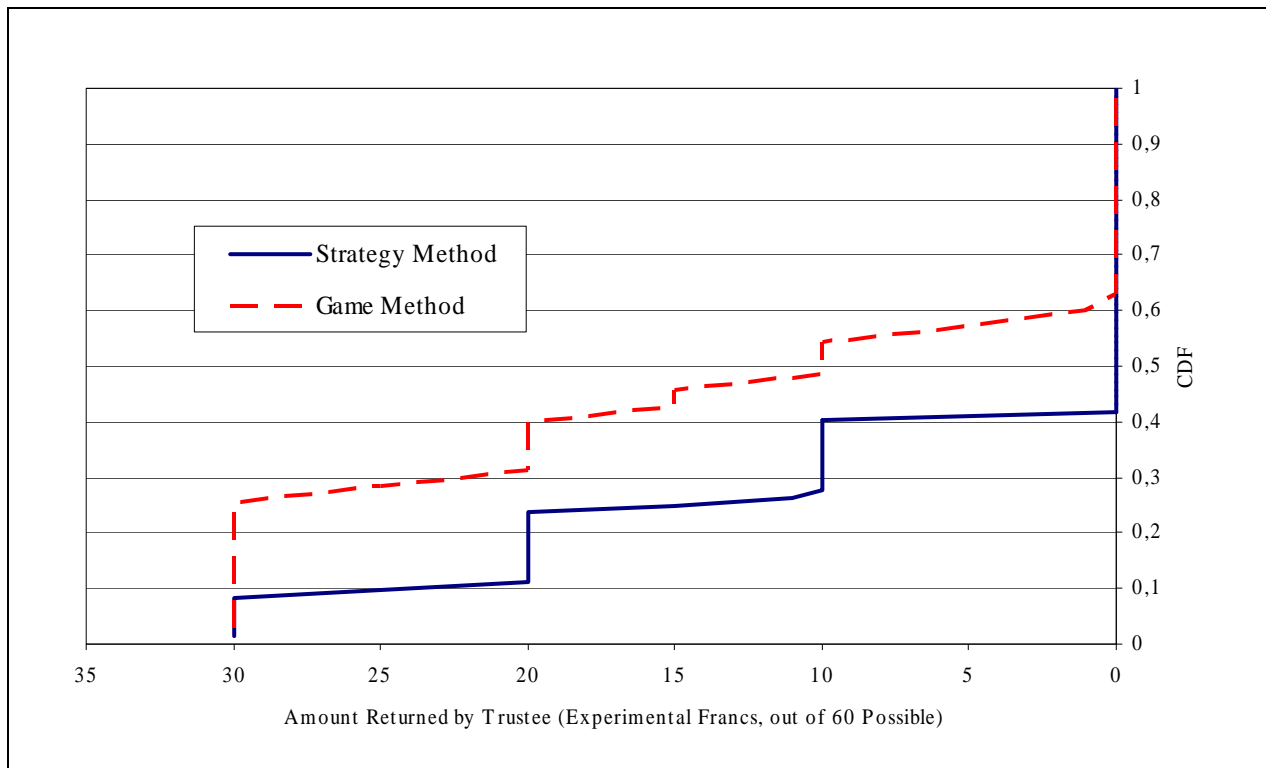
**Table 1: Trust game results**

Amount returned by trustee out of 60	Game method <i>N</i> =48 pairs		Strategy method <i>N</i> =72 pairs		
	Trustor choice		Trustor choice		
	Trust (% of observations)	Not trust	Trust	Not trust	Totals (% of observations)
30	9 (25.7%)				6 (8.3%)
25	1 (2.9%)				1 (1.4%)
20	4 (11.4%)				10 (13.9%)
15	2 (5.7%)				1 (1.4%)
11	0 (0%)				1 (1.4%)
10	3 (8.6%)				10 (13.9%)
5	1 (2.9%)				0 (0%)
1	1 (2.9%)				0 (0%)
0	14 (40%)				43 (59.7%)
Total	35 (72.9%)	13 (27.1%)	45 (63.5%)	27 (37.5%)	72 (100%)
Mean returned	12.6/60				7.4/60
Median returned	10/60				0/60

<sup>3</sup> The strategy method sessions included a fourth part, and on average also lasted less than one hour and paid \$11.63 (Casari and Cason, 2007).

The mean amount returned in the trust game was less than the 10 francs invested in the strategy method treatment, but it exceeded the 10 francs invested in the game method treatment. Perhaps anticipating this, the rate that trustors trusted was higher in the game method (72.9%) than in the strategy method (63.5%). This difference is not statistically significant, however (Fisher's exact test  $p$ -value=0.162).

**Figure 1: Cumulative Distribution of Amounts Returned by Trustees**



#### 4. Conclusion

In our experimental data the method to elicit choices in a trust game affects the amount of trustworthiness measured. Although our result may or may not generalize to other situations beyond this simplified trust game that has a binary trust choice, it discourages quantitative comparisons across experiments carried out with different elicitation methods. In general, this also suggests that the strategy method may generate lower levels of measured trustworthiness. It also indicates that the amount returned in the trust game, like the amount transferred in a dictator game, is sensitive to framing.

We put forward two possible interpretations for the differences observed for the two elicitation methods. First, the game method may be more conducive to understanding the task than the strategy method. Other methods that may increase understanding, such as using easy-to-read payoff tables, have been shown to decrease trustworthiness (Charness et al., 2004). Moreover, if raising the stakes increases subject attention, the differences in understanding should decrease. This interpretation can reconcile Solnick's (2007) results with ours.<sup>4</sup> Solnick concludes that the strategy method does not change behavior in the trust game, but her study is different from ours in several ways. First, she used higher stakes. Second, her study featured 11 decision nodes for the trustee while ours had 2.<sup>5</sup> Third, she employed a lower multiplier  $m=3$  versus  $m=5$  in the current study. Fourth, her data have less statistical power since she employed only 15 subject pairs in each treatment, while our experiment employs 72 and 48 pairs in the two treatments.

According to a second conjecture, emotions influence choices more in the game method than in the strategy method. Across treatments, one notices little differences in first mover choices but large differences in second mover choices. If the "emotional" conjecture is correct, the "hot" (game) versus "cold" (strategy) state influences the shape of the utility function itself, and so this debate between the most appropriate elicitation method is not just a methodological question for experimental economics. There could be both hot and cold measures of trustworthiness.

Future experiments could explore the "understanding" versus "emotional" conjectures. For instance, a design with the game method but where a long waiting time is placed between the first and second decision could manipulate the emotional response of trustees.

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<sup>4</sup> Johansson-Stenman et al. (2005), however, do not find differences in the proportions returned by trustees in a game method trust game as stakes are systematically varied.

<sup>5</sup> Experimental designs that employ the strategy method must determine the order in which decision nodes are presented to subjects, which could also influence results.

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## Instructions Appendix (not intended for publication)

### Instructions – Part three

This part of the experiment consists of one decision making period. The participants in this part of the experiment will be randomly placed into two-person groups. The person currently placed in your group is different from the previous one. Remember, you will never interact again with this new person in the remainder of today's experiment.

#### Your Choices

In each group, one of you has been randomly selected to be the allocator. The other is the non-allocator. Each person will make one decision. First, the non-allocator chooses either **X** or **Y**. As the payoff table in Figure 1 indicates:

If the non-allocator chooses **Y**: there is a sum of 20 francs available; both individuals earn **10** francs.

If the non-allocator chooses **X**: there is a sum of 60 francs available. The person selected to be the **allocator** in the group will determine how many francs to allocate to himself/herself and how many to the other person in his/her group (the non-allocator). The allocator must choose numbers from zero to 60.

The screenshot shows a web-based interface for a decision task. At the top left, it says "Period" and "1 out of 1". At the top right, it says "Remaining time [sec]: 36". Below this, there is a box labeled "Participant ID: 1". The main area contains two options, X and Y, under the heading "Your Choice". Option X is represented by a box containing "... , ..." and "(Total = 60)". Option Y is represented by a box containing "You earn 10.00, Other earns 10.00" and "(Total = 20)". Below these options, a message states "The other agent has been randomly selected to be the allocator." At the bottom, there is a prompt "Please enter your choice" with radio buttons for X and Y. A red "Submit" button is located at the bottom center.

**Figure 1: Initial Choice X or Y Decision Screen for the non-Allocator**

You will learn which person in the group is the **allocator** at the start of the period, as shown in Figure 1 above. [STRATEGY: An example allocation screen is shown in Figure 2 below.

Period

1 out of 1

Remaining time [sec]: 39

Participant ID: 4

You are the allocator.

If the other agent chooses X, how much do you wish to allocate to you and the other agent?  
(Total must add up to 60)

Your final allocation      The other agent's final allocation

|

Submit

**Figure 2: Decision Screen for the Allocator]**

[GAME: If the non-allocator has chosen **Y**, no decision is required by the allocator and the allocator's earnings are going to be 10 francs. An example allocation screen is shown in Figure 2 below. If the non-allocator has chosen **X**, the allocator decision will determine the earnings of both persons as illustrated by Figure 2 below:

Period

1 out of 1

Remaining time [sec]: 0

Participant ID: 13

You are the allocator.

The other agent has chosen **X**.

How much do you wish to allocate to you and the other agent?  
(Total must add up to 60)

Your final allocation      The other agent's final allocation

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**Figure 2: Decision Screen for the Allocator]**

[STRATEGY: The allocator will make a decision without knowing if the non-allocator has chosen **X** or **Y**. If the non-allocator has chosen **Y**, the allocator decision will be ignored and her/his earnings are going to be 10 francs. If the non-allocator has chosen **X**, the allocator decision will determine the earnings of both persons. The results and earnings for this part will be communicated at the end of the experiment.] [GAME: Following the allocators' decisions, everyone will learn his/her earnings and the earnings of the other person in the group. If you have any question, please raise your hand and somebody will assist you.]

#### Questionnaire

1. The first decision is made by the allocator (circle one): TRUE FALSE
2. If the non-allocator chooses Y, does the allocator [STRATEGY: decision influence the earnings] [METHOD: make a decision]? (circle one): YES NO
3. How much does the allocator earn if the non-allocator chooses Y? \_\_\_\_\_
4. How much does the non-allocator earn if the non-allocator chooses Y? \_\_\_\_\_