Separating reputation, social influence, and identification effects in a dictator game

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Abstract

This study explores the ways in which information about other individual's action affects one's own behavior in a dictator game. The experimental design discriminates behaviorally between three possible effects of recipient’s within-game reputation on the dictator's decision: Reputation causing indirect reciprocity, social influence, and identification. The separation of motives is an important step in trying to understand how impulses towards selfish or generous behavior arise. The statistical analysis of experimental data reveals that the reputation effects have a stronger impact on dictators' actions than the social influence and identification.

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1. Introduction

This paper examines how information about another person influences subjects’ behavior in a dictator game. More specifically, the experimental design separates three channels through which information about another subject affects dictator’s choices: Recipient’s reputation, social influence, and identifiability. Consider the following situation as an example: Amy observed a generous action of Bev towards a third person. Now suppose that Amy extended the courtesy to Bev. What was Amy’s motivation? Amy could have rewarded Bev for Bev’s reputation of being generous. 1 At the same time, Amy’s behavior could have been motivated by social influence to act in a way Bev did, thus conforming to a social norm for giving. Also, Amy might have been generous due to the mere fact that she was dealing with Bev and not some random stranger because the identification of a person can increase the cognitive attention given to this particular individual and thus result in different behavior towards him or her.

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1 If Amy indeed tried to reward Bev it means that Bev’s reputation has triggered Amy’s indirectly reciprocal behavior. Indirect reciprocity was first defined by Alexander (1987). As he states, indirect reciprocity occurs whenever rewards or punishments come from individuals or groups other than those directly involved in a social interaction involving investment or exploitation. For ease of exposition throughout the paper I will be referring to this situation as to the reputation effect.
Which of the three described types of motivation drives the generous behavior of Amy in the above example? I set out to provide an answer based on an experiment. The objective of the study is to distinguish between the ways in which information about other individual’s action affects one’s own behavior in a game where fairness could be an important consideration, and thus, shed light on how impulses towards selfish or generous behavior can arise.2

This paper builds on earlier work of three types addressing each of the described effects separately: (a) research by Berg et al. (1995), Knez and Camerer (1995), and Cason and Mui (1998), and others that study the effects of social history on behavior in fairness games; (b) research by Small and Loewenstein (2003) and others on identifiability, and (c) research by Servátka (2007) on the influence of within-experiment reputation on paired subject’s generosity in dictator games. Berg et al. (1995) investigate the social history in an investment game where they focus on internalization of social norms. The information about the use of trust within a group of subjects is used as a trust-encouraging factor. The social history treatment identifies conditions that strengthen the relationship between trust and reciprocity through the social influence argument. Knez and Camerer (1995) use a between-respondent comparison treatment in a three-player ultimatum game to explore the effect of outside options and social comparison. Their results show that the offers were affected by how much the other subjects in the experiment offered. Social influence has been studied experimentally by Cason and Mui (1998). They note that a subject’s belief about what corresponds to socially appropriate behavior is based mostly on personal characteristics. However,

For those subjects who care both about their monetary earnings as well as what constitutes socially appropriate behavior, socially relevant information may affect their beliefs and change their behavior. In particular, if subjects believe that the choice made by another subject gives them useful information, then the availability of information regarding choice made by another subject may change their beliefs regarding what constitutes socially appropriate behavior. This can in turn change their choices. (p. 252)

In Cason and Mui’s sequential dictator game, framed as a market exchange, the dictator decides twice on an allocation of $40 between herself and two distinct anonymous and randomly paired recipients. Before making the second allocation the dictator learns about an allocation chosen by another dictator from the subject pool in the relevant information treatment and about a birthday in the irrelevant information treatment. The data show mixed evidence for social influence. The differences in frequency of changes between the first and second decisions are statistically insignificant in the two treatments. However, Cason and Mui observe a statistically significant shift toward self-regarding choice in an irrelevant information treatment compared to no shift in a relevant information treatment, contrary to their expectations.

The mere fact of providing information about someone is a form of identification. Small and Loewenstein (2003) demonstrate that identifiability of a person increases caring. In their laboratory experiment, the subjects compensated others who lost money more when the loser had been identified than when they were not. In a field study, Small and Loewenstein compared altruism among people contributing to a charity. They find that people made bigger donations when their contributions would benefit a family that has been selected from a list than when they were told the family would be selected from a list. In the light of the literature on identifiability and dual-process models from social psychology, information about someone increases the likelihood of cognitive attention and thus deeper consideration.

The last line of research represents the exploration of reputation effects on indirect reciprocity by comparing the behavior towards strangers and towards people with an established reputation. Servátka (2007) uses a setup where the dictator is endowed with $10. The dictator can send some or all of her endowment to an anonymous recipient. All the money sent is tripled by the experimenter. After all of the subjects make their allocations, they are rematched and participate in the next task. The design involves a role reversal in the second task: The recipients become dictators and vice versa. Before the new dictators make an allocation decision they receive information regarding the choice of their currently paired recipient in the first task. Servátka finds that the reputation of recipients triggered what would normally be interpreted as indirectly reciprocal behavior by dictators. As a result, the generosity of first dictators generated more generosity by the new ones.

After making this observation it is essential to ask: What caused the new dictators to give more than the first ones? The reputation not only informs about the type of a player but also carries two additional features. It provides information about the paired subject, therefore identifying him. Second, because the subjects are members of a bigger population, reputation can be seen as a signal of beliefs that the population holds regarding socially appropriate behavior, especially when the reputation is represented by a past decision of the subject. In that sense, a design examining reputation effects that takes the behavior towards a natural reference group of strangers as a baseline, tests a compound hypothesis. The compound hypothesis includes the hypotheses that reputation does not convey socially relevant information and that information about one’s actions does not identify that person per se. The central idea of this paper is to discriminate behaviorally between the reputation, social influence, and identification effects and to directly confront their importance in decision making. The results show that outside information about another subject’s choice affects one’s own decision mostly via indirect reciprocity.

2 An example of an impulse towards generous behavior is seeing a beggar on the corner of a street taking care of a small child. Such visual picture could trigger certain cues in one’s mind to make the person more prone to share money with the beggar. On the contrary, otherwise generous person might be repelled by seeing the beggar acting hostile towards the child and not donate anything.
2. Experimental design and procedures

The experimental sessions took place in the Economic Science Laboratory (ESL) at the University of Arizona in 2006 with 138 undergraduate students serving as subjects. The subjects who participated in the experiment were selected randomly from the ESL database. At the time of the experiment there were over 1000 undergraduate students in the database. Therefore, it is unlikely that the students participating in one session knew each other, although it is a possibility. The participants who knew the experimenter as well as those who had previously participated in an experiment involving a scenario with salient fairness considerations were removed from the randomly selected sample before the recruiting email has been sent. The recruited subjects might have participated previously in a different experiment. On average, an experimental session lasted around 40 min including initial instructional period and payment of subjects. The minimum number of participating subjects in a session was 10. The subjects earned on average $8.20. 3,4

In each session, the participants were randomly divided into group X and group Y. One subject was randomly selected to be a monitor. The monitor was in charge of distributing and collecting envelopes with decision forms. 5 All subjects were then seated in cubicles, group X in the front of the room and group Y in the back. In the general instructions, the subjects were told they would participate in a multiple task experiment without specifying the nature of each task up front. They were also informed about the random matching procedures for each task to create an environment where one-shot games are played in an ongoing social interaction. 6 They were told that a single task would be selected randomly for payoffs at the end of the experiment to control for wealth and portfolio effects. Once the experiment started, a new set of individual instructions were provided for each subject upon completion of each task.

The experimental design includes four conditions implemented across-subjects. 7 Their outline along with the mechanisms transmitting information is presented in Table 1. Each condition consists of two tasks and involves a role reversal: The subjects who were dictators in one task act as recipients in the second one and vice versa while always paired with a different participant. Therefore, every subject has made only one decision during the session he or she participated in. In each task, the following game was played between the dictator and the recipient: In the beginning, the dictator was endowed with $10 and could choose to send any whole dollar amount between 0 and 10 to the paired recipient. 8 Any amount sent was tripled by the experimenter. The recipient had no decision to make, thus the final allocation was entirely decided by the dictator. The use of the dictator game was crucial because the dictator did not have to be concerned with any within-game strategic interdependence of her monetary payoffs on the other subject’s decision. The design also included use of a double blind payoff protocol in which a subject’s decisions are never linked with the subject’s identity, thus minimizing possible experimenter demand effects on fairness behavior. 9

The four conditions differ in the informational structure and implementation. In the baseline condition (Base in tables), the dictator had no information about the paired recipient nor about any other subject participating in the experiment. In the reputation condition, R, the dictator was informed about the currently paired recipient’s decision as a dictator in the baseline condition as follows:

You are matched with a different person than in the previous task. The Group X person you are paired with for this task has previously made the following decision:

He/she changed his/her own account balance by ..., therefore, changing the account balance of the paired person by …

Conditions baseline and R took place during the same session, baseline as the first task, called blue and R as the second, called yellow.

On the other hand, all subjects in the social influence condition, SI, participated in the first task as recipients, half in the blue task and half in the yellow task. In the second task of the session they were all dictators (i.e., if they were first assigned to the blue task, they were dictators in the yellow task and vice versa). The dictators were informed about a decision by a randomly chosen subject from the baseline condition in the following way:

Below, you are provided with a decision of a randomly chosen person from group X. This Group X person has previously made the following decision:

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3 At the end of the session the subjects completed a short survey on the experiment and general demographic information for which they were paid $5 instead of a show up fee. This was not announced to the subjects at the start of the experiment. The $5 is not calculated into the average payment.

4 For comparison, the on-campus jobs paid around $7 an hour at the time of the experiment.

5 The main reason for having a monitor is because it is a standard way of conducting an experiment under double-blind social distance protocol (see, for example, Hoffman et al., 1996 or Cox, 2004). It is done to ensure that a subject’s decisions are never linked with the subject’s identity what would not be possible had the experimenter collected the envelopes himself.

6 The multiplicity of tasks involving a strong social context has been explored by Cox (2007).

7 I apply the idea of Cox’s (2004) triadic design discriminating between actions motivated by preferences over the distribution of material outcomes and actions motivated by assignments of the intentions of others.

8 For surveys on dictator games, see Camerer and Thaler (1995), Roth (1997), and Camerer (2003).

9 For a discussion on double blind payoff protocol see Hoffman et al. (1996).
He/she changed his/her own account balance by ..., therefore, changing the account balance of the paired person by ...

You are matched with a different person than in the previous task and with a different person than the one you have received information about.

The subjects were not told that the decisions were made by subjects who participated in the previous session. The fourth condition, called the birthday condition, BD, provided irrelevant information about the birthday of the currently paired recipient to the dictators:

You are matched with a different person than in the previous task. The Group X person you are paired with for this task has a birthday on the ... day of one of the 12 months.

The BD condition controlled for general effects on fairness behavior of personal information about the individual affected by the dictator’s decision and for costs of mental processing of information. The aim of the experiment was to create a stylized laboratory environment in which the effects under study would be present and could be separated. To the best of my knowledge, there is unfortunately no economic theory that would provide guidance as to what particular pieces of information create reputation, social influence, and identification effects in the dictator game. The experiment was designed with an objective to hold the magnitudes of the three respective effects at a comparable level. It has been accomplished by providing subjects with minimal information that was thought to generate the effects: Past action of the recipient, past action of another dictator, and birthday of the recipient. This feature is crucial because a priori the experimental results are likely to be sensitive to the type of information that subjects receive. From the methodological point of view, the experiment is a conservative test for the effects of reputation, social influence, and identification. If evidence for any of the effects is found under such circumstances, one can expect that they will be amplified if more information is provided. Additionally, the current types of information allow for maintaining a comparable level of anonymity between the dictator and the recipient. This would not be true if information such as gender, ethnic background, or even full birthday including the recipient’s year of birth had been used in the identification condition. Moreover, some personal information could cause discriminatory behavior and thus possibly create confounds that would make the experimental findings hard to interpret. Last, but not least, the experimental design controls for the unit at which information about another individual is provided to subjects across conditions and thus allows drawing clear-cut conclusions. Note that this would not be possible had the social influence been represented by a summary statistic such as the average amount given by the dictators in the baseline condition.

3. Separating reputation, social influence, and identification effects in subjects’ behavior

3.1. Confounded and pure reputation effects

To see how knowing the past action of the recipient can generate the three effects under study suppose that the recipient had sent $2 in the baseline condition as a dictator. In the eye of the current dictator, the $2 could represent recipient’s reputation for being generous in the past by sending $2 to a paired person and/or it could represent a signal of how much the other dictators in the experiment send (i.e., a signal that it is socially appropriate to send $2). At the same time, the information about the past action of the recipient might increase the cognitive attention that the dictator gives to the recipient and thus cause her to send more. Therefore, if a dictator observes the recipient’s reputation, her generous action towards the recipient can be motivated by reputation, social influence, identification effects, and/or by distributional other-regarding preferences such as unconditional altruism or inequality aversion. Because distributional other-regarding preferences are a possible explanation of behavior in all four treatments and are not of a direct focus of this paper, they will be excluded from further exposition.

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10 It is important to note the lack of conceptual equivalence between the identification present in the reputation condition and in the birthday condition. In the first case, the identification is achieved through learning about the past behavior of the paired recipient where as in the second case it is something the recipient had no control of. Naturally, the two implemented types of identification could be interpreted in different ways and could possibly cause different effects on the dictator’s decision. Regrettably, the particular type of identification resulting from the past behavior cannot be separated out directly as it will always be confounded with reputation and social influence.

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### Table 1: Experimental conditions

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Provided information</th>
<th>Effects caused by the provided information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reputation</td>
<td>Recipient’s dictator choice</td>
<td>Reputation, social influence, identification</td>
</tr>
<tr>
<td>Social influence</td>
<td>Different dictator’s choice</td>
<td>Social influence, identification</td>
</tr>
<tr>
<td>Birthday</td>
<td>Recipient’s birthday</td>
<td>Identification</td>
</tr>
<tr>
<td>Base</td>
<td>No information</td>
<td>None</td>
</tr>
</tbody>
</table>

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### Table 2
Treatment results

<table>
<thead>
<tr>
<th>Data</th>
<th>Mean amount sent</th>
<th>Median amount sent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>1.70 [1.27]</td>
<td>2</td>
</tr>
<tr>
<td>Condition R</td>
<td>3.03 [2.39]</td>
<td>3</td>
</tr>
<tr>
<td>Condition SI</td>
<td>2.71 [3.12]</td>
<td>1.5</td>
</tr>
<tr>
<td>Condition BD</td>
<td>2.03 [1.95]</td>
<td>2</td>
</tr>
</tbody>
</table>

Standard deviations in brackets. Number of subjects in braces.

### Table 3
Individual subject’s behavior in reputation and social influence conditions based on the observed information (baseline condition)

<table>
<thead>
<tr>
<th>Observed information (condition base)</th>
<th>Condition R</th>
<th>Condition SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0$: 7 dictators</td>
<td>$0$: 2 (dictators)</td>
<td>$0$: 2 (dictators)</td>
</tr>
<tr>
<td></td>
<td>$2$: 3</td>
<td>$1$: 1</td>
</tr>
<tr>
<td></td>
<td>$4$: 1</td>
<td>$4$: 1</td>
</tr>
<tr>
<td></td>
<td>$5$: 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10$: 3</td>
</tr>
<tr>
<td>$1$: 7 dictators</td>
<td>$0$: 2</td>
<td>$0$: 1</td>
</tr>
<tr>
<td></td>
<td>$1$: 1</td>
<td>$1$: 5</td>
</tr>
<tr>
<td></td>
<td>$3$: 3</td>
<td>$2$: 1</td>
</tr>
<tr>
<td></td>
<td>$4$: 1</td>
<td></td>
</tr>
<tr>
<td>$2$: 13 dictators</td>
<td>$0$: 1</td>
<td>$0$: 3</td>
</tr>
<tr>
<td></td>
<td>$1$: 1</td>
<td>$1$: 3</td>
</tr>
<tr>
<td></td>
<td>$2$: 2</td>
<td>$2$: 3</td>
</tr>
<tr>
<td></td>
<td>$3$: 5</td>
<td>$3$: 1</td>
</tr>
<tr>
<td></td>
<td>$4$: 1</td>
<td>$4$: 1</td>
</tr>
<tr>
<td></td>
<td>$5$: 3</td>
<td>$5$: 1</td>
</tr>
<tr>
<td></td>
<td>$6$: 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10$: 1</td>
</tr>
<tr>
<td>$3$: 4 dictators</td>
<td>$2$: 1</td>
<td>$3$: 1</td>
</tr>
<tr>
<td></td>
<td>$3$: 1</td>
<td>$4$: 1</td>
</tr>
<tr>
<td></td>
<td>$4$: 1</td>
<td>$5$: 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10$: 1</td>
</tr>
<tr>
<td>$4$: 2 dictators</td>
<td>$0$: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$1$: 1</td>
<td>$0$: 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10$: 1</td>
</tr>
<tr>
<td>$5$: 1 dictator</td>
<td>$3$: 1</td>
<td>$2$: 1</td>
</tr>
</tbody>
</table>
condition SI responded to this information. The SI dictators after learning an allocation made by somebody else sent on the person they were dealing with) as the population of dictators in R did. Table 3 presents in detail how the subjects in the baseline. As stated earlier, in that sense the population of dictators in SI has seen the same information (but not about be additive and so the observed behavior could be caused by their interaction.

reciprocity. However, it is important to note that neither the reputation effect nor the other considered effects are known to behaves more generously in condition R, the change in behavior can be attributed to a reputation effect causing indirect made. A dictator’s action in condition SI can be motivated by social influence, and/or identification. Thus, if a dictator amounts, with an average being $3.67.

reputation was $3.26. Three out of the 27 (11.1%) subjects did not send anything. The other 24 subjects sent positive (28.6%) did not send any money to their paired players, while the other five sent positive amounts; on average $2.14.

that choices in baseline and R are independent. Seven subjects in condition R observed a reputation of zero. Two of them themselves, three dictators who sent $2, one who sent $4, and one who sent $5. Column 3 presents the behavior of dictators in the social influence condition in a similar manner: There were two dictators who sent zero, one dictator who sent $1, one who sent $4, and three who sent $10 after having observed another dictator sending zero.

The results from baseline and reputation conditions will be discussed together because they took place during the same session. There were a total of 68 subjects participating in the two conditions; 34 subjects in the baseline condition and 34 subjects in condition R. The dictators in the baseline condition and condition R sent on average $1.70 and $3.03, respectively.

Table 4 summarizes the tested hypotheses and explains how pair-wise comparisons of the experimental conditions separate joint (rows 1, 2, and 4) and individual effects (rows 3, 6, and 7) of reputation, social influence, and identification on subjects’ behavior. For each row, the first column of the table lists the effects responsible for different behavior between two compared conditions.

Parametric and nonparametric statistical tests in the first row of Table 4 test the joint effect of reputation, social influence, and identification effects. All of them report a statistically significant difference between the baseline and reputation conditions (p < 0.01). Further analysis examines which of the three effects (or their combination) is responsible for this difference.

The correlation coefficient between amounts sent by dictators in condition R and the choices of their paired recipients that they observed prior to making a decision is equal to 0.36 (Table 4). The Spearman’s rank correlation test rejects the null that choices in baseline and R are independent. Seven subjects in condition R observed a reputation of zero. Two of them (28.6%) did not send any money to their paired players, while the other five sent positive amounts; on average $2.14. Twenty-seven subjects in the same condition observed a reputation strictly greater than zero. The average positive reputation was $3.26. Three out of the 27 (11.1%) subjects did not send anything. The other 24 subjects sent positive amounts, with an average being $3.67.

To separate out the pure reputation effect, a comparison between dictators’ behavior in conditions R and SI has to be made. A dictator’s action in condition SI can be motivated by social influence, and/or identification. Thus, if a dictator behaves more generously in condition R, the change in behavior can be attributed to a reputation effect causing indirect reciprocity. However, it is important to note that neither the reputation effect nor the other considered effects are known to be additive and so the observed behavior could be caused by their interaction.

Thirty-four subjects who participated in condition SI were given information about the decisions made by dictators in the baseline. As stated earlier, in that sense the population of dictators in SI has seen the same information (but not about the person they were dealing with) as the population of dictators in R did. Table 3 presents in detail how the subjects in condition SI responded to this information. The SI dictators after learning an allocation made by somebody else sent on

11 Thus, the behavior of 20.5% subjects in the baseline condition was consistent with the predictions for the self-regarding preferences model.
average $2.71. Fig. 1 compares the number of dictators in conditions R and SI that sent amounts varying from $0 to $10. The condition R data are portrayed by the patterned bar and data from condition SI by a solid black bar.

Is there a clear evidence for pure reputation effects? Row 3 of Table 4 reports that the mean amount sent in conditions R and SI are not statistically significantly different. This is mainly due to the fact that there were four subjects in condition SI who gave $10, compared to only two in condition R. However, the Mann–Whitney, median and Fisher’s exact tests presented in the same row report that the presence of reputation effect in condition R made a weakly significant difference on dictators’ behavior.

The correlation between amounts sent by dictators in condition SI and the social influence information that they observed prior to making a decision is equal to $C_0^{0.20}$ (row 4 of Table 4). The Spearman’s rank correlation test does not reject the null that choices in the baseline and SI are independent. The information about social influence came from the same sample as the reputation in condition R. For that reason also seven subjects in condition SI observed a social influence of zero. Two of them (28.6%) did not send any money to their recipients. The other five (71.4%) sent positive amounts that were on average equal to $5.00. Also 27 subjects in condition SI observed amounts strictly greater than zero. The average positive social influence information was $3.26. Three out of the 27 subjects did not send anything. The other 24 subjects sent positive amounts, with an average of $2.11. The correlation between the positive social influence information and the amounts sent by dictators who observed this positive social influence information was equal to $0.13$. However, the Spearman’s rank correlation test again does not reject the null that these two samples are independent.

The tobit analysis of pooled dictators’ choices, based on the condition they participated in, has the form $13$:

$$\text{Choice}_t = \alpha + \beta_R T_R + \beta_SI T_SI + \beta_BD T_BD + \epsilon_t$$

(1)

where $T_R$, $T_SI$, and $T_BD$ represent dummies for respective conditions. The bounds for the tobit estimation were imposed by the experimental design:

$$\text{Choice}_t \in [0, 10]$$

(2)

The estimated coefficients are presented in the first row of Table 5. The estimated $\beta_R$ is positive (1.55) and significant ($p = 0.037$). Note that the marginal effect of $T_R$ is reported in a line below $\beta_R$. The marginal effect of participating in the

---

**Table 5**

<table>
<thead>
<tr>
<th>Data</th>
<th>$\hat{\alpha}$</th>
<th>$\hat{\beta}_R$</th>
<th>$\hat{\beta}_SI$</th>
<th>$\hat{\beta}_BD$</th>
<th>LR test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummies</td>
<td>1.31 (0.014)</td>
<td>1.55 (0.037)</td>
<td>1.12 (0.132)</td>
<td>0.06 (0.932)</td>
<td>6.51 (0.099)</td>
</tr>
<tr>
<td>Marginals</td>
<td>0.98</td>
<td>1.16</td>
<td>0.84</td>
<td>0.05</td>
<td>5.37 (0.020)</td>
</tr>
<tr>
<td>R</td>
<td>1.33 (0.109)</td>
<td>0.89 (0.025)</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marginals</td>
<td>1.14</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>3.68 (0.009)</td>
<td>−0.04 (0.968)</td>
<td>0.922 (0.025)</td>
<td>2.29 (0.024)</td>
<td>1.69 (0.193)</td>
</tr>
<tr>
<td>Marginals</td>
<td>2.57</td>
<td>−0.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pooled</td>
<td>1.32 (0.010)</td>
<td>−0.03 (0.968)</td>
<td>0.69</td>
<td>1.73</td>
<td>14.33 (0.014)</td>
</tr>
<tr>
<td>Marginals</td>
<td>1.00</td>
<td>−0.03 (0.968)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marginal effects are reported in a row below the estimated coefficients, $p$-values in parentheses.

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12 At one of the conferences where this paper was presented a question was raised why these dictators sent such high amounts. Unfortunately, the current experiment was not designed to answer this specific question and the sample size is too small to draw trends; hence I do not offer an explanation here. Further research aimed at the psychological forces behind the decisions is needed.

13 Tobit is used here as an estimation technique dealing with restrictions on choices imposed by the experimental design, rather than a classical tobit model with a censored data, as for example, household income reported at some limit value. The controlled laboratory setting does not allow for possibilities such as that a subject gave $15 but the experimenters only observed $10. A proof that the likelihood technique yields consistent and asymptotically normal distributed estimates can be found in Schnedler (2005).
reputation condition is equal to 1.16. Table 5 in the seventh row also reports tobit estimates of the parameters for the
pooled data of the following relation between amounts sent by dictators to recipients, Choice, treatment dummies, and the
received information in condition R, InformationRt, and in condition SI, InformationSI:

\[
\text{Choice}_i = \alpha + (\beta_{Rt} \times \text{Information}_{Rt}) \times T_{Rt} + (\beta_{SI} \times \text{Information}_{SI}) \times T_{SI} + \beta_{BD} T_{BD} + e_i
\]  
  (3)

The estimated \( \hat{\beta}_R \) for the pooled data from the above relation is also positive (0.92) and significant (\( p = 0.025 \)). The
marginal effect estimating the influence of reputation information on amounts sent by dictators is equal to 0.69. The third
and fourth row of Table 5 reports the tobit estimates and the marginal of reputation effect for 34 subjects participating in
condition R. The individual treatment data yield a similar result. Hence, the tobit estimation supports the conclusion that
the reputation triggered indirect reciprocity.

The relevance of indirect reciprocity is supported by other studies as well. Nowak and Sigmund (1998) examined an
evolutionary process based on simulations of a repeated helping game where a donor can help the recipient at a cost
smaller than the benefit. Based on previous behavior, the recipient is awarded with an image score to which the donors
respond. They find that the discriminating types are evolutionary stable. Also Seinen and Schram (2006) experimentally
study the helping game and observe that indirect reciprocity is important because many donors base their actions on the
image score of the recipient and on their own score as well. Engelmann and Fischbacher (2004) introduce two types of
players— with and — without the image score and separate pure indirect reciprocity from incentives for strategic
reputation building on the helping rate. They find that pure indirect reciprocity is relevant but also that the helping choice
seems to be influenced by strategic considerations. In their setting the strategic players do better than non-strategic ones
and non-reciprocal players do better than reciprocal players. Several other papers examine indirect reciprocity in different
experimental settings. For example, Fehr and Gächter’s (2002) study demonstrates its presence in altruistic punishment in
a public good game. Dufwenberg et al. (2001) compare the effects of direct vs. indirect reciprocity in the investment game
and find that receivers are more rewarding in the indirect reciprocity treatment.

3.2. Social influence effect

Does the statistical analysis support the existence of social influence effects in the data? To make that claim, one needs
to compare the results from conditions SI and BD. In condition SI, each dictator was given information about another
dictator’s past behavior. Such information could represent a signal of how much the other dictators in the experiment send
and/or might increase the cognitive attention that the dictator gives to the recipient. Therefore, the behavior of dictators in
this condition could be motivated by social influence and/or identification effects.\(^{14}\) On the other hand, in condition BD only
the identification effect is present. Thus, the difference in subjects’ behavior between these two treatments could be
attributed to social influence.

Thirty-six subjects participated in condition BD. One subject marked two answers and was excluded from the data
analysis. However, this person still served as a recipient in the other task, therefore allowing for an observation made by the
paired player. Because the birthday is irrelevant information, I only present the distribution of choices in this condition.
Twelve subjects out of 35 sent zero, 3 subjects sent $1, 7 sent $2, 5 sent $3, 3 sent $4, 4 sent $5, and 1 subject sent $7. The
behavior of dictators in conditions SI and BD is graphically compared in Fig. 2. It shows the number of subjects in
conditions SI and BD that sent amounts between $0 and $10. On average the subjects in condition BD sent $2.03. This
amount is by $0.68 lower than the average amount in condition SI. The statistical analysis of data provides mixed evidence

\(^{14}\) Note that this is a weak form of identification as only a behavior of different person from the other group is identified. An alternative design would
include information about a different dictator’s previous choice and birthday information of the paired person. The downside of such procedure is the
increased number of various types of information revealed to dictators in comparison to other conditions.
of social influence effects. The means test reported in Table 4 in row 6 does not detect a statistically significant difference and neither do the nonparametric tests. On the other hand, tobit estimate for social influence effect of information is negative and statistically significant for the pooled data but insignificant for the dummy equation and individual SI condition data as presented in Table 5 in rows seven, one, and five, respectively. The marginal effects of social influence are again reported in a line below the estimated coefficients.

There have been some previous studies investigating the effects of social influence in the laboratory. In the Berg et al. (1995) investment game, the subjects in the social history condition are given a report summarizing the decisions of participants from the no history condition. For each possible decision within the strategy space, the report details the number of times the decision was chosen, the average amount sent, and the average response. As a result, the data in the social history condition is more dispersed than in the no history one, yielding a similar finding as the comparison of social influence condition with baseline in the current experiment. Berg et al. find that the change in correlation between the social history and no history amounts sent by the first movers and returned by the second movers was significant. However, their design does not permit a conclusion as to what piece of information from the report the subjects directly responded to.

On the other hand, Cason and Mui (1998) provide merely a signal about what the socially appropriate behavior could be, a feature adopted in this study as well. In both cases the evidence for social influence is mixed, thus suggesting that observation of only one decision by another participant is probably insufficient to signal what the social norm is or possibly not enough for the norm to be internalized. Nevertheless, what type of informational structure is necessary to cause social influence remains an open question.

3.3. Identification effect

The identification effect can be separated from the data by comparing the behavior of subjects in condition BD with the baseline. In BD the dictator’s actions can be motivated by identification, whereas in the baseline there is no such effect because the dictators do not receive any type of information. Fig. 3 shows the number of dictators in condition BD and in the baseline that sent amounts between $0 and $10. Providing irrelevant information about the recipients' birthday increased the amounts sent by dictators on average by $0.33. This result does not support Cason and Mui’s finding that irrelevant information causes subjects to behave in a more self-regarding way. All tests presented in the last row of Table 4 reveal that the difference in behavior between conditions BD and the baseline is statistically insignificant, unlike in Small and Loewenstein’s study. The conclusion that identification effect increased the generosity of dictators is not supported by the estimates of the above tobit models either. The estimated coefficients on participation in condition BD reported in rows one and seven of Table 5 are small and highly insignificant.

4. Discussion

This paper reports an experiment that separates the effects of reputation, social influence, and identification across four dictator games. Arguably, the distributional models of social preferences (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002 and others) could be considered a natural way of trying to explain subjects’ behavior in the dictator game. None of those models, however, allow for the possibility that the predictions vary with different types of information about the recipient. This opens up a question of how to model the behavior of agents in a non-strategic environment with salient fairness considerations that would be consistent with the empirical evidence. In order to successfully tackle this problem one ought to explore possible alternative motivations behind subject’s behavior and the mechanisms through which they operate. It is this literature to which the paper contributes by studying how information about others influences dictator’s decision.

The experimental data support the previous findings that reputation information triggers indirect reciprocity. The statistical analysis also reveals that reputation has stronger effects on dictators than does social influence and
identification. Based on the current experimental results one can conjecture that an active participation in social norm creation and their enforcement governs people’s behavior in the present environment to a higher degree than does conformism. However, to verify this conjecture a different design is needed and additional evidence is required to conclude whether the finding is robust across different experimental settings. Finally, it is important to note that reputation, social influence, and identification in the current form are just proxies for what these terms represent in the outside-the-lab world. Thus a call for more research, specifically aimed at trying to abridge the experimental results from various fairness games with the data in the field seems appropriate.

Acknowledgments

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Appendix

Instructions

General instructions—All conditions

No talking allowed. Now that the experiment has begun, we ask that you do not talk or communicate any longer with each other. Because we will not be available to assist you, it will not be possible for you to ask questions. In case there is still something that you do not understand, you are kindly requested to read the instructions again.

Monitors and two groups. A monitor has been selected randomly from among those of you who came here today. The rest of you have been divided randomly into two groups, called Group X and Group Y. Group X people are seated in the front row A. Group Y people are asked to sit at the back of the room (row D).

Multiple tasks. You will be asked to participate in multiple tasks during the experiment. The instructions for each task will be given to you after finishing the previous one. The end of the experiment will be announced to you after completing certain number of tasks.

Anonymity. Each person in Group X will be randomly matched with a person in Group Y. No one will learn the identity of the person she/he is matched with. In each task a person in Group X will be matched to a different person in Group Y. There is no chance of being matched with the same person more than once during the entire experiment.

Money payoffs. The information about final account balances in each task will be recorded by the experimenters. At the end of the experiment a die will be rolled in front of you to decide the task for which you will be paid in cash. The remaining balance in your dollar account from the randomly selected task will be paid to you in cash at the rate of 1 US dollar per 1 experimental dollar.

Complete privacy. This experiment is structured so that no one, neither the experimenters nor the other subjects nor anyone else will ever know the personal decision of anyone in the experiment. This is accomplished by the following procedure. You will collect your money payoff contained in a sealed envelope, from a mailbox that only you can open (with your key). Your privacy is guaranteed because neither your name nor your student ID number will appear on any form that records your decisions in this experiment. The only identifying mark in all records will be your seat number and the number engraved on your key which is known only by you. However, although the experimenters will not know your identity, they have a way to map your decisions into your own payoff correctly. At the end of the experiment, you will walk one by one to the waiting room where the mailboxes are to collect your money payoff envelope. The key and mailbox are labeled with the same number. But you will be the only person in possession of that key and the only one who knows your key number. When collecting the envelope from your mailbox, you are kindly requested not to open it immediately. You
should wait until you leave the building. After collecting the envelope, you must return your key by throwing it in a key-
return box next to the waiting room door.

Your private label. At the end of the experiment you will be given a key in a sealed envelope. There will be a 5-digit number
engraved on your key. The entered number will be used to select the box that your key can open, which will contain a
sealed envelope with your earnings inside.

The role of the monitor. A monitor was randomly chosen from among the students who volunteered for today’s experiment.
The monitor will be in charge of distributing and collecting the envelopes with decision form sheets inside little boxes that
contain the envelopes containing mailbox keys. The monitor will also be asked to watch and make sure that the experi-
menters actually follow the procedures that have been explained here.

Decision forms. Prior to each task you will be given a decision form on a colored paper. After completing the task, please put
the decision form in the enclosed envelope, seal it and give it to the monitor. If you did not get a decision form, you are not
making a decision in that task. In such case, please return the empty envelope.

Please, read the instructions for each task very carefully.

Blue task instructions—Baseline condition

Initial account balances. Each person in Group Y is credited with 0 (zero) experimental dollars. Each person in Group X is
credited with 10 (ten) experimental dollars. As explained below, each Group X person will have a decision to make about
what to do with her/his blue task endowment.

Decisions. Each Group X person has a single decision to make. He/she can decide to change or not the dollar account
balances of both people. The Group Y person has no decision to make. Hence, after the Group X person makes his/her
decision, the task ends and the account balance of both persons for this task cannot be changed any more.

The group X decision task. Every dollar given by a person in Group X to a person in Group Y will be tripled by the
experimenters. If Person X decides to increase the Y Person’s account balance by $3 then the X person’s account balance
decreases by $1. The Group X person cannot increase the other person’s account balance by more than $30. Table A1 shows
how this works.

Group Y has no decision to make. The Group Y people do not have any decision to make in blue task. This means that they
will keep all of the tripled amount sent to them by individuals in Group X.

Examples

- If Person X decides to change his/her account balance by −6, person Y’s account changes by +18. The payoffs for this task
  will yield 4 dollars for Person X and 18 dollars for Person Y.
- If Person X decides to change his/her account balance by 0, person Y’s account does not change. The payoffs for this task
  will yield 10 dollars for Person X and 0 dollars for Person Y.

Blue task decision form for a person from group X—Baseline condition

My initial account balance is $10. The paired person from group Y initial account balance is $0. Each dollar I give to the
paired person is multiplied by 3 by the experimenter.
My decision is to give the following amount to the paired person. (Please circle one.)

$0  $1  $2  $3  $4  $5  $6  $7  $8  $9  $10

Yellow task instructions—Conditions R, SI, and BD

Initial account balances. Each person in Group X is credited with 0 (zero) experimental dollars. Each person in Group Y is credited with 10 (ten) experimental dollars. As explained below, each Group Y person will have a decision to make about what to do with her/his yellow task endowment.

Decisions. Each Group Y person has a single decision to make. He/she can decide to change or not the dollar account balances of both people. The Group X person has no decision to make. Hence, after the Group Y person makes his/her decision, the task ends and the account balance of both persons for this task cannot be changed any more.

The group Y decision task. Every dollar given by a person in Group Y to a person in Group X will be tripled by the experimenters. If Person Y decides to increase the X Person’s account balance by $3 then the Y person’s account balance decreases by $1. The Group Y person cannot increase the other person’s account balance by more than $30. Table A2 shows how this works.

Group X has no decision to make. The Group X people do not have any decision to make in yellow task. This means that they will keep all of the tripled amount sent to them by individuals in Group Y.

Examples

• If Person Y decides to change his/her account balance by –6, person X’s account changes by +18. The payoffs for this task will yield 4 dollars for Person Y and 18 dollars for Person X.

• If Person Y decides to change his/her account balance by 0, person X’s account does not change. The payoffs for this task will yield 10 dollars for Person Y and 0 dollars for Person X.

Yellow task decision form for a person from group Y—Condition R

Information. You are matched with a different person than in the previous task. The Group X person you are paired with for this task has previously made the following decision:

He/she changed his/her own account balance by ..., therefore, changing the account balance of the paired person by ...

Decision. My initial account balance is $10. The paired person from group X initial account balance is $0. Each dollar I give to the paired person is multiplied by 3 by the experimenter.

My decision is to give the following amount to the paired person. (Please circle one.)

$0  $1  $2  $3  $4  $5  $6  $7  $8  $9  $10

Yellow task decision form for a person from group Y—Condition SI

Information. Below, you are provided with a decision of a randomly chosen person from group X. This Group Y person has previously made the following decision:

He/she changed his/her own account balance by ..., therefore, changing the account balance of the paired person by ...

Decision. My initial account balance is $10. The paired person from group X initial account balance is $0. Each dollar I give to the paired person is multiplied by 3 by the experimenter.

My decision is to give the following amount to the paired person. (Please circle one.)

$0  $1  $2  $3  $4  $5  $6  $7  $8  $9  $10

Table A2

<table>
<thead>
<tr>
<th>If the Group Y person gives</th>
<th>The experimenters triple the amount</th>
<th>And the Group X person total payoff is</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3 \times 0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3 \times 1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3 \times 2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>3 \times 3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>3 \times 4</td>
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<td>3 \times 5</td>
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</tr>
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<td>6</td>
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</tr>
<tr>
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<td>3 \times 9</td>
<td>27</td>
</tr>
<tr>
<td>10</td>
<td>3 \times 10</td>
<td>30</td>
</tr>
</tbody>
</table>
You are matched with a different person than in the previous task and a different person than the one you have received information about.

**Decision.** My initial account balance is $10. The currently paired person from group X initial account balance is $0. Each dollar I give to the paired person is multiplied by 3 by the experimenter.

My decision is to give the following amount to the paired person. (Please circle one.)

$0  $1  $2  $3  $4  $5  $6  $7  $8  $9  $10

**Yellow task decision form for a person from group Y—Condition BD**

**Information.** You are matched with a different person than in the previous task. The Group X person you are paired with for this task has a birthday on the ... day of one of the 12 months.

**Decision.** My initial account balance is $10. The paired person from group X initial account balance is $0. Each dollar I give to the paired person is multiplied by 3 by the experimenter.

My decision is to give the following amount to the paired person. (Please circle one.)

$0  $1  $2  $3  $4  $5  $6  $7  $8  $9  $10

**References**


