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The relevance of irrelevant information in the dictator game

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Abstract

We examine the sensitivity of the dictator game to information provided to subjects. We investigate if individuals internalize completely irrelevant information about players when making allocation decisions. Subjects are provided with their score and the scores of recipients on a quiz prior to making decisions in multiple dictator games. Quiz scores have no bearing on the game or on players' endowments and hence represent extraneous information. We find that dictators reward good performance on the quiz. We find that information that is irrelevant for the game might nevertheless be relevant for choices. Our results highlight the extreme sensitivity of the dictator game to information and context.

1. Introduction

The standard dictator game involves two "players" - a dictator and a recipient. There is a predetermined sum of money, S (here \$50), that can be split between the two players. The dictator chooses an amount $0 \leq X \leq S$ that he will allocate to the recipient. The recipient has no say in the split of the pie. The dictator is then paid $S\text{-}X$ and the recipient is paid X. The equilibrium value of X is 0, with the dictator keeping the entire sum S for himself. However, many previous studies of the dictator game have found that dictators typically assign around 20% of the pie to recipients (List 2007). This finding has been interpreted as evidence of agents' altruism.

Further studies have found that dictators' altruism is not constant and that dictators assign significantly more or less than 20% when they are provided with relevant information that alters the game or subjects' perceptions of the game and/or the players. A number of experiments have tested the impact of information on property rights in the dictator game. Hoffman et al. (1994) conduct a dictator experiment where subjects take a current-events quiz prior to the game. The top performers were then assigned the role of dictators. They find that when dictators earn property rights over the pie to be divided, they "behave in a more self-regarding manner" (p. 346). In a dictator experiment by Ruffle (1998) only the recipients took the quiz, performance on which determined the size of the pie to be divided by the dictators; the top performers created a larger pie. Ruffle finds that dictators punish poor performers.

In Cherry et al. (2002), dictators determined the size of the pie by their performance on a quiz prior to the game. They find that when dictators split earned money with a recipient, allocations are significantly lower. In Oxoby and Spraggon (2008), either dictators or recipients take a quiz which determines the size of the pie, with superior performance resulting in a larger pie to be divided by dictators. They find that when the size of the pie is determined by the dictator's performance on the quiz, allocations are close to the theoretical prediction of zero. When the recipients "earned the wealth", dictators allocated more than 50%.

Other experiments have explored the impact of information on the "deservingness" of the recipients in the dictator game, i.e., information on how much the recipients *need* the money or the likely use the money will be put to. Eckel and Grossman (1996) find that dictators allocate more to the Red Cross than they do to anonymous students. In a dictator experiment by Branas-Garza (2006), dictators are provided information about the wealth status of recipients, i.e., whether they are poor or not. He finds that dictators allocate more to poor recipients. A related experiment by Fong (2007) finds that dictators are conditional altruists. She finds that when dictators can allocate money to real welfare recipients, their choices are strongly influenced by their beliefs about the causes (bad luck or lack of effort or both) for the low endowments of recipients.

In our experiment, we examine further the sensitivity of the dictator game to context and information. We investigate the influence on dictator's allocations of information that has no impact on the payoff structure or on the endowments and "deservingness" of players. In our experiment, dictators and recipients first take a non-incentivized quiz which is graded and returned to them. Dictators are provided their own score and the recipients' scores on the quiz. They then make multiple allocation decisions in dictator games that are unrelated to the quiz. Quiz scores do not impact any of the primitives of the game. The structure of interaction and payoffs is independent of performance on the quiz. In particular, subjects are not

assigned the role of dictator or recipient based on their scores. Each dictator makes multiple dictator allocations - one for each other subject in the session. In addition, each dictator is also a recipient in an equal number of decisions - once with each other subject. Further, the size of the pie is independent of quiz scores and is constant in each decision, here $50. Since subjects are not paid for their performance on the quiz, endowments are also the same for all subjects, here zero. Apart from quiz scores, no other information was available to dictators. Further, the experiment was conducted using a "near" double-blind procedure to minimize demand effects. Quiz scores thus represent information that is completely irrelevant for the game. To our knowledge, this is the first study that investigates the impact of such irrelevant information on allocations in the dictator game.

We find that the provision of irrelevant information about quiz scores does not have a significant "level" effect on dictators' allocations. Compared to when dictators' make allocations in the absence of any information, there is no significant difference in average allocations. However, we find that a large fraction of dictators in our sample pay attention to the magnitude of quiz scores when making allocation decisions. We find a significant positive relationship between allocations and the recipients' quiz scores. Dictators reward good performance with merit-based financial aid. This is true even though quiz scores convey nothing about the game, the payoffs or the endowments of players. We thus find that information that is irrelevant for the game can nevertheless be relevant for decisions. Our results highlight the extreme sensitivity of the dictator game to information and to context.

2. Experimental Design

All sessions were conducted using paper and pencils. Instructions were handed to each subject and were read aloud by the experimenter. Subjects made multiple decisions with no feedback. Decisions were presented to subjects all at once.

In our control sessions, each subject anonymously played a dictator game with each of the other subjects in his/her session in which he/she had to decide how to split $50 with each recipient. Subjects were given no information about any of the other subjects and simply had to record an allocation in each decision. These sessions were implemented using a double-blind procedure and lasted about 45 minutes each.

In our treatment sessions, subjects first answered a non-incentivised quiz with 20 multiple-choice questions (10 verbal and 10 mathematics) taken, with permission, from the 2007-08 Official SAT Practice Test. Following the return of their graded quizzes each subject anonymously played a dictator game with each other subject, as in the control sessions. Unlike in the control sessions, dictators were provided with their verbal, maths and total scores (one point per correct answer) and the scores of each recipient. The scores were presented in order of subject numbers and were not arranged in any particular manner. Subjects were not told of this and were not given any other information about other subjects. These sessions were conducted using a "near" double-blind procedure. A volunteer returned graded quizzes to subjects in each session. However, the volunteer had no access to quiz scores or experimental data and left the lab immediately after returning the quizzes. Each session lasted about 75 minutes.

At the end of each session, a subject was randomly and anonymously paired with another subject in the session. Since each subject is a dictator and a recipient with each other subject,

any pairing ensured that both had played the roles of dictator and recipient in the pair.[1] One was randomly chosen to be the dictator and the other the recipient. They were then paid according to the decision of the dictator in the pair. Each subject thus had an equal chance of being paid for his decision or for the decision of one other subject in the session. Subjects were informed of this payment scheme before making any decisions.

Here, quiz scores do not alter the incentive or payoff structure of the game. They do not determine who the dictator will be – every subject is both a dictator and a recipient in multiple decisions – or the size of the pie to be divided. Further, they do not affect the endowment or need of players or provide any information about the "deservingness" of the final use of the money by any subject. Quiz scores thus represent completely irrelevant information.

3. Results

All sessions were run at the Interdisciplinary Experimental Laboratory at Indiana University with 92 undergraduate subjects. We ran two control sessions with 14 subjects each. Each subject made 13 decisions leading to a total of 364 observations. We ran five treatment sessions with 10 subjects in one session, 12 in another and 14 each in the remaining three. After dropping three individuals who did not understand the decision task[2], we have 61 treatment subjects and 731 decisions. No subject had participated in a dictator experiment before this. The average earning, including a $5 show-up fee, was $30.

Table 1 summarises dictators' allocations and subjects' quiz performance.

Table 1: Dictators' Allocations and Quiz Scores

	Obs.	Mean	St. dev.	Min.	Max.
			Control		
Allocation (US$)	364	12.912	11.281	0	50
			Treatment		
Allocation (US$)	731	15.578	10.179	0	45
Total Score	61	15.656	2.449	9	20
Maths Score	61	7.803	1.711	4	10
Verbal Score	61	7.853	1.447	4	10

Table 2 summarises information on their demographics – age, proportion of women, international students and experience in at least one experiment.

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[1] Korenok et al. (2010) test for the effects of role reversal and find no significant differences in dictators' choices.

[2] Two subjects only recorded one decision. One subject split $10, instead of $50, between himself and the recipient in every decision. Fortunately, their decisions were not needed for determining payments.

Table 2: Demographic Characteristics of Subjects

	Control	Treatment
Obs.	28	60
Mean Age	20.07 years	19.27 years
Women	32.14% (9/28)	36.67% (22/60)
International	35.71 (10/28)	10% (6/60)
Experience	25% (7/28)	11.67% (7/60)

We only have only 60 observations in the treatment sessions since one subject did not provide demographic information. Figure 1 presents histograms of allocations in the control and in the treatment sessions.

Figure 1: Dictators' Allocations in Control and Treatment Sessions
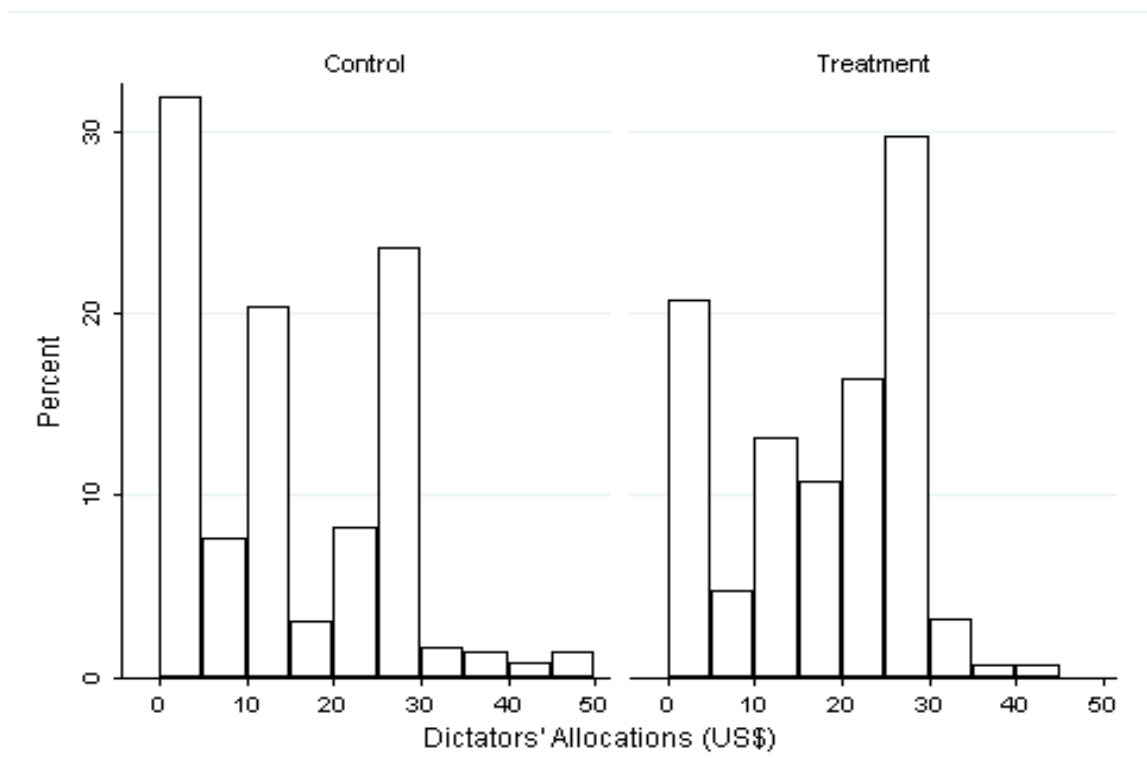
As in earlier studies, dictator allocations are positive. On average, dictators allocated $12.91 (25.82% of the pie) in the control sessions and $15.58 (31.16%) in the treatment sessions. A Wilcoxon test ($z = -1.135$, $p = 0.257$) indicates that there is no significant difference between average dictator allocations in the control and treatment sessions. Regressions (not reported) confirm this finding.

We next investigate if information influenced dictators' choices in the treatment sessions. Figure 2 shows a plot of dictators' allocations against recipients' quiz scores.

Figure 2: Dictators' Allocations vs. Recipients' Quiz Scores
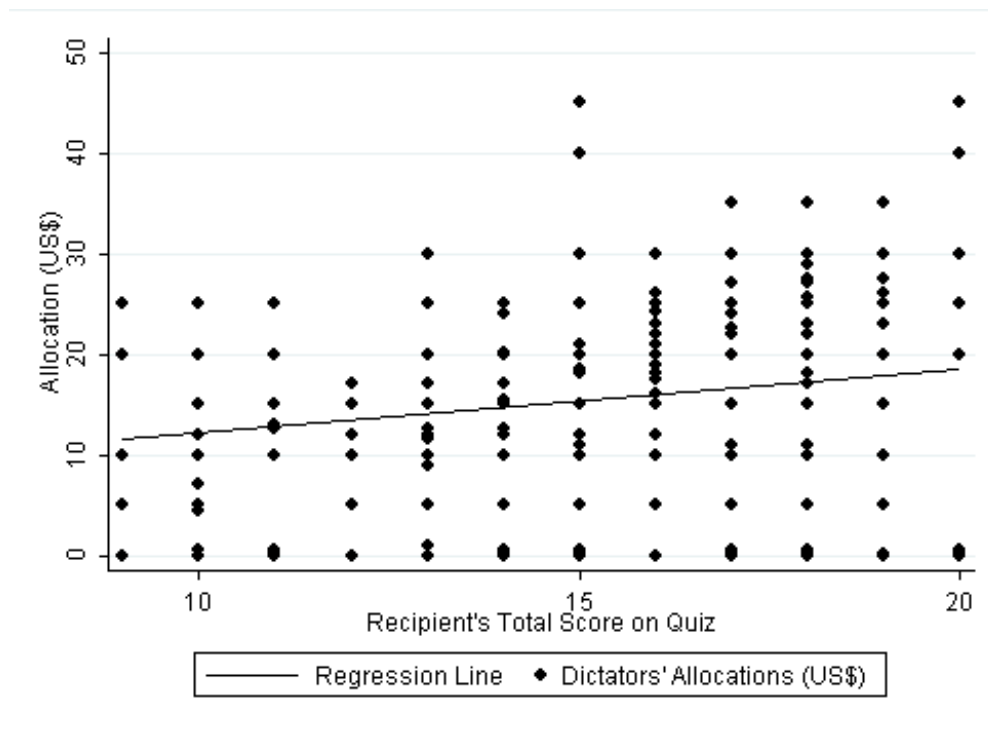
The figure suggests a positive relationship between allocations and recipients' quiz scores. We estimate regressions of individual dictators' allocations on the scores of the recipient for the decision[3] and demographic controls. Table 3 presents individual random effects (RE-ID) and tobit estimates of the regression (equations 1 and 2). We calculate robust standard errors clustered on individuals. To test for robustness, we also estimated pooled OLS and ordered probit (to account for clustering in the data - see Figure 1) models. The results are similar and we do not report these estimates.

Table 3: The Effect of Quiz Scores on Dictators' Allocations

	Dependent variable: Allocation (US$)			
	(1)	(2)	(3)	(4)
	RE-ID	Tobit	RE-ID	Tobit
Recipient's Quiz Score	0.7799***	0.7517***	0.7794***	0.7311***
	(0.1649)	(0.1965)	(0.1649)	(0.1939)
	[0.000]	[0.000]	[0.000]	[0.000]
Own Quiz Score	-	-	-0.6461	-0.8439
			(0.5079)	(0.544)
			[0.203]	[0.121]

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[3] Maths and verbal scores are highly correlated with the total scores and using them in the regressions does not change the results.

Age	-0.4909	-0.9978	-0.6211	-1.1896
	(0.9138)	(1.1832)	(0.9191)	(1.1947)
	[0.591]	[0.399]	[0.499]	[0.319]
Female	4.9652**	6.1999**	4.3662*	5.3804*
	(2.2726)	(2.8042)	(2.3347)	(2.7908)
	[0.029]	[0.027]	[0.061]	[0.054]
International	2.5681	2.3738	1.8011	1.3774
	(3.1048)	(3.9619)	(3.1237)	(3.9194)
	[0.408]	[0.549]	[0.564]	[0.725]
Experience	-2.0883	-3.3181	-1.8766	-3.0033
	(3.8401)	(5.0499)	(3.9835)	(5.1929)
	[0.587]	[0.511]	[0.638]	[0.563]
Constant	10.9711	19.9882	23.9226	37.6653
	(17.4183)	(22.1698)	(19.2609)	(24.4928)
	[0.529]	[0.367]	[0.214]	[0.124]

Obs. 718	No. of dictators/clusters = 60

Figures in parentheses are robust standard errors clustered on individuals

Figures in brackets are p-values for the two-sided tests of significance

*** Sig. At 1%, ** Sig. At 5%, * Sig. At 10%

We find that recipients' scores have a significant positive impact on dictators' allocations. Dictators' allocate between $0.75 and $0.80 more for each additional point the recipient has scored. On aggregate, dictators reward better performance on the quiz.[4]

To test if dictators pay attention to *differences* in quiz scores, we estimate regressions of allocations on recipients' quiz scores, a dictator's own quiz score and demographic controls (equations 3 and 4 in Table 3). Dictators' own scores have no significant impact on their allocations; dictators do not look at relative performance on the quiz.

We also test for individual variation among dictators. Eleven dictators (out of 28 − 39.29%) in the control sessions and 23 dictators (out of 61 - 37.70%) in the treatment sessions allocated the same amount to every recipient. Thus, approximately 60% of the dictators varied their allocations in both information conditions.

We estimated OLS regressions (not reported) of allocations on a constant and the recipient's quiz score for each of the 38 dictators in the treatment sessions that varied their allocations across decisions. The allocations of 25 of these dictators are positively and significantly

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[4] As is usual in dictator experiments (see Eckel and Grossman 1998), women allocated more than men did.

related to recipient scores: 22 at the 1% level, 1 at the 5% level and 2 at the 10% level. One dictator's allocations were negatively related to recipient scores at the 5% level. We thus find individual variation among dictators. However, a significant positive relationship between allocations and recipient scores holds true for a substantial fraction of dictators (25 of 61, i.e., 40.98%). Further, the relationship holds despite the fact that quiz scores represent information that is irrelevant for the game. Our results thus indicate that information that is completely irrelevant to the game might nevertheless be relevant for decision making.

4. Conclusion

We used a modified dictator game experiment to test the influence of completely irrelevant information on allocations in a dictator game. Subjects took a SAT based quiz prior to the experiment. All subjects played in the role of dictator and recipient in multiple and simultaneous decisions. In each decision, the size of the pie was held constant at $50. Prior to making decisions, dictators were provided with his/her own quiz score and the score of the recipient for that decision.

Like earlier studies, we find that dictators allocate significantly more than the equilibrium allocation of zero. We also find evidence for previous findings that women dictators are more generous than are men dictators. Our main finding, however, is that a substantial fraction of dictators do pay attention to recipients' quiz scores when making decisions. In particular, they reward good performance by recipients, awarding them merit-based financial aid. Quiz scores do not affect any aspect of the game or players and thus represent completely irrelevant information. We thus find that information that is irrelevant for the game might still be relevant for decisions. Our results highlight the extreme sensitivity of the dictator game to information and to context.

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