Measuring Altruistic Behavior in Surveys: The All-or-Nothing Dictator Game

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A field study of altruistic behaviour is presented using a modification of the dictator game in a large random sample survey in the Netherlands (n=1,964). In line with laboratory experiments, only 5.7% donated money. In line with other survey research on giving, generosity increased with age, education, income, trust, and prosocial value orientation.

Keywords: Altruism, Dictator game, Field experiments, Philanthropy

Introduction

Respondents in surveys are sometimes compensated for participation with monetary incentives. This practice can be used effectively to study altruistic behaviour. Because altruistic behaviour is socially desirable, self-reports on altruistic behaviour in surveys are prone to self-presentation effects. This paper presents a simple method to study altruistic behaviour in a survey context, based on an experiment commonly used in behavioural economics: the dictator game.

In economics, the dictator game (Eckel and Grossman 1996; Hoffman, McCabe and Smith 1996) has become well known for its results violating predictions based on "rational choice" models of human behavior with orthodox assumptions on self-interest (Camerer 2003). Typically, the dictator game is played as follows. Participants receive a show-up fee (e.g., $5 in Eckel and Grossman 1996 and Hoffman, McCabe and Smith 1996) upon arrival at the laboratory. Then participants unexpectedly receive an endowment (usually $10), to be used in a "decision problem". Participants are assigned either of two roles: of recipient or allocator. A participant in the role of allocator can allocate her endowment to herself or to a randomly chosen anonymous other participant (the recipient). The allocator can allocate any desired amount ($0, $1, ..., $10) to the recipient. Unlike other games (e.g., the ultimatum game), the recipient has no power to refuse the money. When the allocation is made, the game ends. Recipients and allocators are paid and debriefed.

When allocators are assumed to behave as rational egoists, they should keep the entire endowment to themselves. However, a substantial minority of participants in dictator games allocates at least some portion of the endowment to the anonymous other. According to Camerer (2003), the proportion of participants giving away nothing at all from their endowment varies from 0 to 93%, with an average of

33.9%. The mean donation by participants in dictator games in the laboratory is about 20% of the endowment (Camerer 2003).

The result that at least a sizeable minority of participants in dictator games allocates money to recipients seems to suggest that there is some altruism in "human nature". It appears that some people also care about outcomes for others. However, the methodology used in previous dictator game experiments suffers from several problems. Previous studies suffer from experimenter demands, often make unrealistic assumptions on asset legitimacy, and commonly use convenience samples of students as participants. These aspects of the context in which allocation decisions are made clearly influence the results (Harrison and List 2004). Experimenter demands increase generosity in the dictator game. When the experimenters are able to observe the allocation, participants allocate significantly more to recipients than in double-blind conditions (Eckel and Grossman 1996). When participants do not receive a windfall endowment at the beginning of the game but play with money they have earned themselves, they are substantially less generous (Cherry, Frykblom and Shogren 2002). When experiments fail to rule out other motives, contributions may not indicate altruistic concerns for recipients.

The use of convenience samples of students also creates a potential bias (Harrison and List 2004). In our case, this seems likely. It is a well-established finding in research on philanthropy that giving increases with the level of education (Bekkers 2006; Brown 2005; Havens, O'Herlihy and Schervish 2006; Rooney, Mesch, Chin and Steinberg 2005). The higher educated earn higher incomes, have higher verbal ability, larger social networks, and are more trusting of others. Income, verbal ability, size of social networks and trust are associated with higher levels of education and with higher donations to charitable causes (Bekkers 2006; Brown 2005). University students will have higher verbal ability, larger social networks and higher levels of trust, but a lower income because they have not yet entered the labor market. The stronger the effect of verbal ability, networks and trust on charitable giving relative to the effect of income, the more the use of university students in experiments will bias the level of generosity upward.

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This paper presents a method to conduct field experiments with charitable giving that does not suffer from the problems in laboratory experiments and that can be used easily in household surveys. A large, representative sample of the Dutch population (n=1,964) played an "All-or-Nothing" version of the dictator game, after they completed an online survey. Participants did not receive a windfall endowment, but played with earnings obtained by participating in the survey (on average €9, $11). The money offered by dictators benefited charities. There was no experimenter present, and choices were made anonymously. The results come close to the prediction of orthodox rational choice: only 5.7% of the sample donated money. Donations increase with age, education, income, and prosocial value orientation.

Data and Methods

The participants in this study were 1,964 respondents of the first wave of the Giving in the Netherlands Panel Survey (GINPS), collected in May 2002 (for details on design, sampling and questionnaires, see Schuyt 2003:225-228). Respondents were drawn from a pool of 72,000 respondents who were invited to participate in the present survey through the Internet. Because there was no interviewer present when the respondents completed the GINPS-questionnaire and decided about donating their earnings, experimenter demands are unlikely. The sample was representative for the Dutch population on key characteristics such as age, gender, and geographic region (Schuyt 2003).

By participating in the GINPS, respondents earned a reward, proportional to the amount of time it took them to complete the questionnaire. After the questionnaire was completed, respondents were given several options for payment of their earnings: (a) in the form of vouchers, to be used in national chains of department stores; (b) in the form of "Air miles"; (c) in the form of a donation to one of three charitable causes: "Médecins Sans Frontières" (Doctors Without Borders, providing emergency health care in developing countries), the Aids Fund (fighting HIV/Aids, mainly through research) or the Queen Wilhelmina Fund (fighting cancer, mainly through medical research). In contrast to the ordinary dictator game, the participants did not have the option of distributing the reward between themselves and the recipient. The possibility of giving away a proportion of the reward was not offered in order to test a procedure that is also feasible in personal interviews. In the standard dictator game, this option is provided, and a larger minority donates at least something to charity. The donation decision parallels the choice between offering either 100% or 0%. Thus, the present experiment constitutes a natural field experiment (Harrison and List 2004:1014) with an "All-or-Nothing" dictator game in which charities are identified as recipients.

On average, the respondents earned €9 ($11) for spending 35 minutes filling out the questionnaire. Because the game was completed after a questionnaire on philanthropy, it is possible to investigate the relation of donations in the game with self-reports on philanthropy and variables that have been found to predict philanthropy in prior research (e.g., Bekkers

2006; Havens, O'Herlihy and Schervish 2006; Rooney, Mesch, Chin and Steinberg 2005). Included in the present study are the following measures of socio–demographic characteristics: dummy variables for gender (female=1), age group (40–64, 65 and over; 18–39 was the reference category), the level of education (bachelor degree=1), whether respondents are currently students, the natural logarithm of gross yearly household income (midpoint values were used of 24 categories, ranging from €2,000 to €300,000; higher incomes were truncated), and the number of church visits per year. Also included in the analysis are measures of generalized social trust and social value orientation. Generalized social trust is a dummy variable (above median=1) for two statements about human nature ("You can't be too careful in dealing with other people" and "Most people can be trusted", ranging from 1 – disagree completely – to 5 – completely agree). A dummy variable for trust is included instead of a mean score because the effect of trust on charitable giving is non-linear (Bekkers 2003). Social value orientation is commonly used in social psychology to measure the concern for joint outcomes and equality in social dilemmas (Van Lange 1999). Social value orientation predicts self-reported donations (Bekkers 2006), as well as donations in dictator games in laboratory experiments (Buckley et al. 2001). Our measure for prosocial value orientation is a count of the number of prosocial allocations of hypothetical endowments in a series of nine single-shot "decomposed games" (Van Lange et al. 1997). Finally, the amount of money earned with survey participation was included as a measure of the stakes in the donation decision. Stakes varied from €6 to €11 ($7.5 to $13.75), and were €9 ($11) on average.

I compare the correlates of observed donations in the game with correlates of self-reported philanthropy in the past year. If the game is a valid way to measure altruistic behavior, it should be correlated not only with other measures of prosocial behavior like philanthropy, but should also be related to a similar set of determinants. Philanthropy in the past year was measured with a so-called "Method-Area" module (Rooney, Steinberg and Schervish 2004). Respondents were first given a list of 25 methods that they may have used to donate money. Respondents indicated whether they donated any money to charities using each of these methods. Next, they were given a list of 9 subsectors in which charities and nonprofits are active, and a category "other". For each of these subsectors, respondents indicated whether their household had donated money to charities in those sectors, and if so, how much. Respondents who reported at least one positive amount donated to these sectors were considered as donors. Compared to other measurement instruments, the Method-Area module leads to higher, and more accurate estimates of the volume of philanthropy by households (Rooney, Steinberg and Schervish 2004), mainly because it increases recall of small donations (Bekkers and Wiepking 2006).

Correlates of donations in the game are analyzed with a maximum likelihood probit model. Correlates of self-reported philanthropy are analyzed with a regression model with selection ("Heckman Two Stage regression"), which is a more appropriate model than either OLS or tobit (Smith, Kehoe and

Cremer 1995). Predictor variables in the first stage that also appeared in the second stage equation were: female, bachelor degree, church attendance (model 1) and income, trust and prosocial value orientation (model 2). The dummy variables for age groups and current students were eliminated from the selection equation because they were not significant. Because identification of the Heckman Two Stage regression model requires at least one variable in the selection stage that is not included in the second stage (Smith, Kehoe and Cremer 1995), a dummy variable was included for an experimental condition randomly assigned to the respondents.

Results

An overwhelming majority of 1.852 subjects (94.3%) kept the reward earned by participation in the GINPS for themselves. Only 112 subjects (5.7%) decided to give away the reward. The Queen Wilhelmina Cancer Fund received 63 donations (3.2%); the Médecins Sans Frontières received 39 donations (2.0%) and the Aids Fund received 10 donations (0.5%). The result that only 5.7% chose to donate their earnings is considerably less than the 10.4% in Eckel and Grossman (1996) who donated their entire endowment in an experiment among students with the Red Cross identified as the sole recipient. While the results of the Eckel and Grossman (1996) experiment are not strictly comparable because the participants were allowed to divide their endowment between themselves and the Red Cross, one would expect that the participants who decided to donate their entire endowment would also have donated their earnings in an all-or-nothing version of the game.

As argued above, asset legitimacy, and anonymity of decisions will have lowered generosity in the present study. First, the present study used earnings instead of the customary windfall endowment. Cherry, Frykblom and Shogren (2002) show that "legitimising" wealth by giving rewards to dictators in proportion to the number of questions answered correctly in a quiz strongly decreases generosity. While the participants in the present study did not compete with each other, they did earn the money they played with, which will have made them feel entitled to keep their earnings.

Second, donation decisions were made anonymously, which lowers generosity (Eckel and Grossman 1996). The participants could not receive approval for donating from an experimenter or the selected charity because the donation decision was made through the Internet, without the presence of an experimenter, and without receiving a "Thank you" letter from or on behalf of the charities.

Third, the multivariate analysis (see column 1 of table 1) reveals that the use of a random sample of the Dutch population rather than a convenience sample of university students has not decreased giving. Students are not more likely to donate their earnings than non-students. However, in line with studies of self-reported donations (Bekkers 2006; Brown 2005; Rooney et al. 2005), those holding a bachelor degree or higher are more likely to make donations than those with lower levels of education. Compared to the base rate of 5.2%, the difference is substantial: those with a bachelor degree have a 4.8% higher chance of donating the reward to charity than those with lower levels of education. The fact that current students are not more generous but university graduates are indicates that the effect of education on charitable giving becomes apparent only *after* graduation.

In model 2, where income, prosocial value orientation and generalized social trust are included, the difference is smaller (3.5%). This finding indicates that a higher level of income, a more prosocial value orientation and a higher level of trust are partly responsible for the higher likelihood of donating earnings to charity among persons with a university degree. Stepwise addition of trust, social value orientation, and income reveals that income and trust contribute equally to the relationship of education with donations, and that social value orientation plays a minor role (results available upon request). The fact that a significant relationship with university degree remains in model 2 suggests that there are still other differences between those with a university degree and those without such a degree that explain why university graduates are more likely to donate their earnings. The more extensive social networks of the higher educated may be an important part of these differences (Brown 2005), or the higher verbal ability of the higher educated (Bekkers 2006).

The validity of the game as a measure of altruistic behaviour can be evaluated with a comparison of observed donations in the game and self-reported donations to charitable organizations in the past year. Those who donated their rewards in the game to charity reported higher donations to charity in the past year (€376) than those who kept their reward (€237). This difference is significant in an Anova (F=8.038, df=1, p< .005). Thus, donations of earnings for survey participation to charity resemble donations to charity at other occasions.

Further support for the validity of the game is found in multivariate analyses of observed donations in the game and self-reported philanthropy in the past year (see table 2). Donations in the game are correlated with a similar set of determinants as self-reported donations in the past year. In both cases, donations increase with age, education, income, prosocial value orientation and generalized social trust. The increase of donations with age is in line with previous research on charitable giving in the Netherlands (Bekkers 2006) as well as in the US (Havens, O'Herlihy and Schervish 2006; Rooney et al. 2005). The increase of generosity with prosocial value orientation is in line with results from laboratory games (Buckley et al. 2001) and surveys (Bekkers 2006). The increase of generosity with trust is in line with previous research on charitable giving in the Netherlands (Bekkers 2003) as well as in the US (Uslaner 2002).

The frequency of church attendance is not correlated with observed donations in the game. This finding seems to be at odds with the well-known finding that religious involvement is strongly related to philanthropy (Bekkers 2006; Havens, O'Herlihy and Schervish 2006). Also in the present analysis, the frequency of church attendance is strongly related to self-reported donations in the past year. However, this finding is not surprising since donations to religious organizations were also included in the total amount donated. An other study of donations in experimental games with secular charitable

Table 1: Probit regression analysis of observed donations (source: GINPS, n=1.964; 339 censored)

	Model 1			Model 2		
	Coefficient	se	p	Coefficient	se	p
Female (0-1)[*]	-.020	.010	< 0.05	-.019	.010	< 0.05
Age 40-65 (0-1)	.034	.013	< 0.01	.028	.012	< 0.05
Age 65 and over (0-1)	.046	.020	< 0.01	.042	.019	< 0.05
University degree (0-1)	.048	.014	< 0.001	.035	.013	< 0.01
Student (0-1)	.013	.037		.026	.041	
Church attendance	-.000	.002		-.000	.002	
Gross household income				.020	.009	< 0.05
Prosocial value orientation				.005	.002	< 0.05
Generalized social trust				.018	.010	< 0.10
Stakes	.008	.006		.004	.006	
Predicted p	.052			.050		
Pseudo R-Square	.034			.048		
Log Likelihood	-415.165			-408.897		
Likelihood Ratio of Chi Square (df)	28.75 (8)		< 0.001	41.28 (9)		< 0.001

[*] (0-1) indicates variable is dichotomous

Table 2: Heckman Two Stage regression analysis of total amount donated (source: GINPS, n=1.964)

	Model 1			Model 2		
	Coefficient	se	p	Coefficient	se	p
Female (0-1)[*]	.022	.071		-.006	.066	
Age 40-65 (0-1)	.669	.075	< 0.001	.603	.074	< 0.001
Age 65 and over (0-1)	1.047	.099	< 0.001	1.023	.097	< 0.001
University degree (0-1)	.471	.081	< 0.001	.408	.076	< 0.001
Student (0-1)	-.158	.223		-.116	.220	
Church attendance	.029	.002	< 0.001	.032	.002	< 0.001
Gross household income				.371	.062	< 0.001
Prosocial value orientation				.059	.014	< 0.001
Generalized social trust				.211	.084	< 0.05
Constant	3.936	.096	< 0.001	2.309	.271	< 0.001
Log Likelihood	-3666.199			-3616.348		
LR Chi Square (df)	466.84 (6)		< 0.001	508.92 (9)		< 0.001
LR independent equations	3.02 (1)		< 0.10	0.01 (1)		

[*] (0-1) indicates variable is dichotomous

organizations as recipients also failed to find correlations of church attendance with giving in dictator games (Eckel and Grossman 2004).

The lower generosity of women compared to men in the dictator game is a somewhat odd finding. Previous laboratory experiments with dictator games in the US reveal more generosity by females than males (Eckel and Grossman 1998). In the analysis of the amount donated, however, females and males do not differ significantly, as in other research (Andreoni, Brown and Rischall 2003; Havens, O'Herlihy, and Schervish 2006). It is not clear what caused males to be more generous than females in the dictator game. Perhaps the vouchers offered as a reward for survey participation appealed more to females than to males. The vouchers could be used at a national chain of department stores selling domestic appli-

ances and cleaning products. The alternative reward of "Air miles" are also a popular means to obtain domestic products. The hypothesis that women are less likely to donate the reward because the vouchers were more attractive to them than to males can be tested in future research by paying the reward for participation in the form of money instead of vouchers.

Finally, differences in stakes do not influence donation decisions in the game. This result is in line with results of previous laboratory studies (Carpenter, Verhoogen, and Burks 2005; Diekmann 2004).

Conclusion

Dictator games and charitable giving have been studied by economists interested in the role of altruism in human behavior (Andreoni 1990; Eckel and Grossman 1996; Ribar

and Wilhelm 2002). The present field study among a random sample of the Dutch population reinforces conclusions from previous research that altruistic behavior is rather uncommon when allocations are made anonymously of earned wealth (Cherry, Frykblom and Shogren 2002), even when the recipient is an (allegedly "deserving") charity to be chosen by participants. Ninety four percent of the allocations of earned wealth in the present study are self-interested.

Combining the strengths of experimental games and household surveys offers many advantages in the study of altruistic behavior. Using a random sample of participants allows generalizations beyond the population of university students. It is comforting to know that students are equally likely to donate as non-students. It seems that the level of generosity observed in dictator game experiments is not systematically biased when only university students participate.

The obvious advantage of random sampling is that socio-demographic groups can be studied which would be difficult to draw into the laboratory. Studies relying on students as participants have often failed to detect relations of game behaviour with socio-demographic characteristics (Carpenter, Verhoogen and Burks 2005). This is no surprise given the relatively small variance in socio-demographic characteristics among students (Harrison and List 2004:1018). The present study showed that university graduates are more likely to donate their earnings than those with lower levels of education, in part because they earn higher incomes, because they have more prosocial value orientations and because they are more trusting. However, even controlling for income, social value orientation and trust a positive effect of education remains. Future research is needed to show which other factors make higher educated persons more generous.

The larger number of participants in surveys enables experimental designs with a higher number of conditions than lab experiments. While the present study did not include any manipulations, the game can be modified easily to test theories on motivations for altruistic behaviour. Future experiments could manipulate features of the request itself (including pictures of recipients, information on the impact of a donation on recipients, contributions of others) and features of the context in which the donation decision is made (e.g., before or after the interview, characteristics of the solicitor like gender). The social context deserves special attention. One would expect that reducing the level of anonymity of decisions by participants increases the level of giving (Eckel and Grossman 1996). Anonymity can be manipulated easily in survey contexts. For instance, in personal interviews the interviewer could solicit a contribution and collect responses in more or less visible ways. This would make the decision situation more realistic because the majority of donations are made in response to direct solicitations (Bryant et al. 2003). In online surveys, donations could be made public.

A limitation of the present study is that participants did not have the option to split the reward between themselves and a charity. The "split rewards" option is difficult to implement in personal interviews, where participants are often compensated with a voucher worth a fixed amount of money (e.g., €10). To split the reward would require an action by the interviewer, which would easily compromise the anonymity of the respondents in their donation decisions. However, in online surveys like the present study, an obvious extension would be to allow a split of the reward between oneself and a recipient.

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