
Using willingness to pay to measure the strength of altruistic motives

Discussion Paper no. [2023-04](#)**Lata Gangadharan, Philip J. Grossman and Nina Xue****Abstract:**

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Keywords: warm glow, altruism, donation, charitable giving, experiment**JEL Classification:** H4

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Using willingness to pay to measure the strength of altruistic motives*

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Abstract

We introduce a novel experimental procedure to measure altruistic giving along a spectrum, from warm glow to pure altruism, by eliciting willingness to pay to increase the likelihood that a donation is received by a recipient. Whereas previous methods identify pure warm-glow motives, our approach directly measures altruistic preferences and is validated by a survey measure developed by Carpenter (2021). Participants who identify in the survey as altruistic givers are more likely to pay to increase the probability that the donation is implemented and pay more on average than those who identified as mainly motivated by warm glow.

JEL Classification: C9, D9, H4

Keywords: warm glow, altruism, donation, charitable giving, experiment

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1 Introduction

There are many motivations for giving; the two main reasons discussed in the literature are altruism and warm glow (Andreoni, 1989, 1990). A key distinction is that warm-glow utility is independent of benefits to the recipient and is derived as soon as a giving decision is made, whereas altruistic utility is dependent on the outcome for the recipient (Null, 2011; Korenok et al., 2013; Ottoni-Wilhelm et al., 2017; Gangadharan et al., 2018; Andreoni and Serra-Garcia, 2021). Identifying and distinguishing between these two motives is important not only for charitable organizations wishing to better understand and attract more donors but also for governments trying to minimize the crowding out of private donations.

We implement a procedure to directly measure the strength of altruistic motives, or the degree to which participants care about the welfare of the recipient. In the first stage, participants can donate a fixed amount with a high probability that this donation is not implemented, in which case the money is returned to the participant. In the second stage, subjects have the chance to pay to increase the probability that the donation is received by the charity. The amount paid offers a measure of the subject’s altruistic motivation. Previous work has shown that while warm-glow giving is observed for some in the first donation decision, subsequent giving is more likely to be driven by altruism (Tonin and Vlassopoulos, 2013; Gangadharan et al., 2018).

An alternative experimental approach by Crumpler and Grossman (2008) identifies warm-glow motives by giving participants the opportunity to make donations that are fully crowded out by the experimenter. Whereas their method holds altruistic preferences constant in order to measure preferences for warm glow, our procedure instead directly measures the strength of altruistic preferences on top of any initial giving that may be motivated by warm glow. Another advantage of our approach is that participants are not required to “burn” money, unlike previous methods (Crumpler and Grossman, 2008; Tonin and Vlassopoulos, 2013; Luccasen and Grossman, 2017; Gangadharan et al., 2018; Gandullia et al., 2020). Individual donations are not crowded out and depend on both the first stage donation decision as well as on payments to increase the probability of the donation being implemented in the second stage.

We observe a donation rate of 60% and find that 65% of donors in our sample are willing to pay a non-zero amount to increase the probability that the initial donation reaches the recipient, thus demonstrating altruistic motives. We compare our measure against Carpenter’s (2021) survey measure which asks participants to report whether they mainly care

about the total amount donated (altruism), the donation they made personally (warm glow), or some other aspect of giving in their last charitable donation. We find that self-reported altruists are significantly more likely to pay to increase the likelihood of the donation being implemented and pay more on average than self-reported warm-glow givers.

2 Experimental design

The experiment was programmed in oTree (Chen et al., 2016) and was conducted on Amazon Mechanical Turk in 2020 with 692 participants.¹ Participants answer five IQ test questions (Raven and Court, 1938), and receive a fixed endowment of US\$2.50 plus \$0.10 for every correct answer (see Appendix A for the instructions). Participants choose a preferred charity from a list provided and then can donate \$0.40 of their endowment, with a 10% probability that the donation is implemented. The experimenter matches 1:1 any implemented donation. Non-implemented donations are returned to participants and the charity receives nothing. Participants are informed of the outcome immediately after making their decisions. Beliefs about the giving behavior of others are elicited after the initial donation decision, the subject of a related paper by Gangadharan et al. (2022).²

Participants whose donations are not implemented are offered (as a surprise) the opportunity to increase the probability of implementation. For every \$0.03 spent, the probability increases by 10% over the original 10% chance (e.g., spending \$0.12 increases the probability by 40%, resulting in a 50% chance that the initial donation is implemented). This procedure classifies donors based on the amount spent to increase the probability of implementation.

Although additional warm-glow benefits from this second decision are possible, both Tonin and Vlassopoulos (2013) and Gangadharan et al. (2018) find that demand for warm glow is satiated with the initial decision: Warm-glow donors are less likely to give a second time. Our classification measures altruism along a spectrum rather than imposing strict categories. In reality, it is likely that donors are driven by a mixture of both warm glow and altruism, and the relative strength of each is context-dependent.

As a comparison against our measure, we include Carpenter’s (2021) question of giving motivations, which he validated using the Crumpler and Grossman (2008) method. The survey question asks respondents whether, in their last charitable donation, they were mo-

¹We restricted participation to individuals located in the United States with a high approval rate and included comprehension questions.

²The main objective in Gangadharan et al. (2022) was to compare the effect of different elicitation mechanisms on beliefs.

tivated more by “the total amount given by everyone” (altruism), “the amount that you personally gave” (warm-glow) or “some other aspect of giving” (other). We also ask several socio-demographic questions after the donation decisions but before subjects are informed about their payoffs.

3 Results

Overall, 60% ($N=417$) of participants chose to donate when given the opportunity and 10% ($N=42$) were implemented. Of the 375 donors whose donations were not initially implemented, 65% ($N=243$) chose to pay to increase the probability of implementation, paying \$0.08 on average. This proportion is consistent with the proportion of impure altruists found in Korenok et al. (2013) (66%) and Crumpler and Grossman (2008), who classify 43% of participants as pure altruists and 57% as impure altruists/pure warm-glow givers.

In Table 1, for the donors in our sample, we examine the relationship between our measure of altruism, and responses to the Carpenter question. On the extensive margin, those who identify as altruists in the survey are significantly more likely to pay a positive amount to increase the probability of the donation being implemented ($p = 0.049$ and $p = 0.046$, columns 1 and 2) than those who identify as warm-glow givers. We find no such effect for those who report being motivated by other considerations.³ Similarly, on the intensive margin, self-reported altruistic givers pay significantly more than warm-glow givers to increase implementation probability ($p = 0.080$ and $p = 0.071$, columns 3 and 4).

Table 2 presents a similar analysis for both donors and non-donors using the total amount paid by participants in both the first (\$0.00 or \$0.40) and second stage (from \$0.00 to \$0.67), as an alternative measure of the strength of altruistic motives. This alternative measure also includes subjects who chose not to donate in the first stage and takes the combined payments from the first and second stage as a measure of altruism. For a participant who chose not to donate in the first stage, this variable is \$0.00, for a participant who made an initial donation but did not pay in the second stage, this variable is \$0.40, and for a participant who paid in both stages, this variable is \$0.40 plus the amount paid to increase the probability. Again, we find that participants who identify as giving due to altruistic reasons in the survey on average pay \$0.06 ($p = 0.013$, column 2) more than warm-glow donors, which is equivalent to raising the donation probability by an additional 20%.

³Probit regression results are consistent, see Appendix Table B.2.

Table 1: Determinants of strength of altruistic motives (donors only)

	Altruism		Altruism amount	
	(1)	(2)	(3)	(4)
Survey: Altruist	0.12** (0.06)	0.12** (0.06)	0.02* (0.01)	0.02* (0.01)
Survey: Other	0.04 (0.06)	0.08 (0.06)	0.01 (0.01)	0.01 (0.01)
Constant	0.60*** (0.04)	0.52*** (0.12)	0.05*** (0.01)	0.03 (0.02)
Controls	No	Yes	No	Yes
R ²	0.01	0.07	0.01	0.02
Adj. R ²	0.01	0.04	0.00	-0.01
Num. obs.	369	369	369	369

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Notes: OLS regression with standard errors in parentheses. Columns 1 and 2: dependent variable =1 if the participant paid a positive amount to increase the probability. Columns 3 and 4: dependent variable = amount paid in Stage 2 (\$0.00 to \$0.67). Baseline survey: Warm-glow. Donors whose initial donations were implemented and subjects who reported other genders are excluded. Control variables: gender, age, education, religiosity, political ideology and income. See Appendix Table B.1 for all variables.

Table 2: Determinants of strength of altruistic motives (donors and non-donors)

	(1)	(2)
Survey: Altruist	0.05** (0.02)	0.06** (0.02)
Survey: Other	-0.03 (0.02)	-0.02 (0.02)
Constant	0.26*** (0.01)	0.13*** (0.04)
Controls	No	Yes
R ²	0.02	0.09
Adj. R ²	0.02	0.07
Num. obs.	639	639

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Notes: Ordinary least squares regression with standard errors in parentheses. The dependent variable is the total amount paid in Stages 1 (\$0.40) and 2 (\$0.00 to \$0.67). Baseline survey: Warm-glow. Donors whose initial donations were implemented and subjects who reported other genders are excluded. Control variables: gender, age, education, religiosity, political ideology and income. See Appendix Table B.3 for all variables.

4 Discussion

While previous methods use money “burning” to identify warm-glow giving, altruistic preferences have been harder to isolate. We offer an experimental procedure that directly measures

the strength of altruistic motives in an incentive-compatible way. Our research also provides support for the use of survey questions (Carpenter, 2021) where experimental methods are not possible.

Since giving motivations can vary across individuals, it is important for charities and fundraisers to better understand what drives donors and whether certain types of donors can be identified using other characteristics. For instance, a greater understanding of donor motives can help focus fundraising campaigns around the tangible benefits of a donation on a recipient’s welfare, or alternatively highlight and strengthen the “warm fuzzy feeling from giving” (Lifeblood, 2020). Our method could be adapted by future researchers to test the effectiveness of different fundraising strategies and whether warm-glow donors respond differently to altruistic givers. The procedure could also be used to explore other potential differences between warm-glow and altruistic donors, such as social-image concerns and information acquisition and avoidance.

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A Instructions

Welcome

This HIT consists of 3 Stages in total and will take approximately 10 minutes to complete. You are asked to answer some questions and make some decisions.

You will receive **\$2.50** for completing all 3 Stages. You also have the opportunity to earn additional payments. This will depend on the choices you make and luck. Payments will be made via the **bonus function** on MTurk.

The question below is for quality control purposes.

What is one plus two?

Next

Stage 1

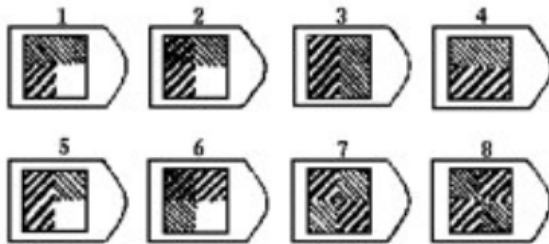
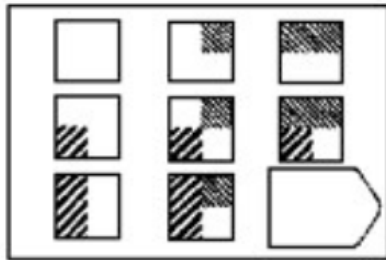
Time left to complete this page: **4:54**

Question 2 of 5

Instructions

In Stage 1, you will be presented with **5 problems**, each showing a pattern with a bit cut out of it. Look at the pattern, think what piece is needed to complete the pattern correctly both along the rows and down the columns, **BUT NOT THE DIAGONALS**.

For every correct answer, you will earn **\$0.10**. You will find out the number of problems you correctly solved at the end of the survey. You have **5 minutes** to answer all 5 questions.



Please choose an item that best fits the pattern:

 ▼

Next

Stage 1

Please select the charity you believe to be most worthy of receiving donations from the list below. A short description of each charity is also provided.

I believe the following charity is most worthy of donations:

Charity	Description
Against Malaria Foundation	Provides insecticide-treated nets to prevent malaria in sub-Saharan Africa
COVID Response Fund for WHO	Donations support WHO's work to track and understand the spread of the virus; to ensure frontline workers get essential supplies; and to accelerate research and development of a vaccine and treatments
Doctors without Borders	International humanitarian medical organisation with projects in conflict zones and in countries affected by endemic diseases
Feeding America	Non-profit organization that aims to feed people through food pantries, soup kitchens, shelters, and other community-based agencies
Johns Hopkins Centre for Health Security	Explores how new policy approaches, scientific advances, and technological innovations can stop pandemics, strengthen health security, and save lives
No Kid Hungry	Non-profit organization focused on alleviating childhood hunger in chaotic and stressful times
The Salvation Army	A Protestant christian church with charity shops, shelters for the homeless and offers disaster relief and humanitarian aid to developing countries
World Wildlife Fund	International organization working in the field of wilderness preservation, and the reduction of human impact on the environment

Next

Stage 1

You have the option of donating **\$0.40** from your completion fee of **\$2.50** to your chosen charity, Johns Hopkins Centre for Health Security.

The amount received by your chosen charity depends on the color of the card drawn. If you draw a GREEN card, your donation will be implemented and the amount you give will be doubled by the experimenter. If you draw a RED card, your donation will not be implemented - this means your donation will be returned to you and your chosen charity will not receive a donation.

If you choose to donate **\$0.40** and draw a:

- **GREEN** card, your chosen charity will receive **\$0.80** and you are left with **\$2.10** in earnings
- **RED** card, your chosen charity will receive **\$0.00** and you are left with **\$2.50** in earnings

There is 1 GREEN card for every 9 RED cards which means there is a **1 in 10 chance** your donation will be implemented and a **9 in 10 chance** your donation will not be implemented. You may contact the researchers following the completion of the project to request a copy of the donation receipt.

Before proceeding with your decision, please answer the following understanding questions. You will be asked to make your decision on the next screen.

1) What are your chances of drawing a **RED** card?

- 1 in 10
- 5 in 10
- 9 in 10

2) If you choose to donate and a **RED** card is drawn, how much will your chosen charity receive?

- \$0.00
- \$0.40
- \$0.80

3) If you choose to donate and a **RED** card is drawn, how much of your completion fee is remaining?

- \$2.00
- \$2.10
- \$2.50

4) If you choose to donate and a **GREEN** card is drawn, how much will your chosen charity receive?

- \$0.00
- \$0.40
- \$0.80

5) If you choose to donate and a **GREEN** card is drawn, how much of your completion fee is remaining?

- \$2.00
- \$2.10
- \$2.50

6) If you choose not to donate, how much of your completion fee is remaining?

- \$2.00
- \$2.10
- \$2.50

Next

Stage 1

As a reminder, if you choose to donate **\$0.40** and draw a:

- **GREEN** card, your chosen charity will receive **\$0.80** and you are left with **\$2.10** in earnings
- **RED** card, your chosen charity will receive **\$0.00** and you are left with **\$2.50** in earnings

There is 1 GREEN card for every 9 RED cards which means there is a **1 in 10 chance** that your donation will be implemented.

On the next page, you will find out the color of the randomly drawn card.

I choose to donate \$0.40:

- Yes
- No

Next

Stage 1

The card that was drawn at random was **RED**.

Your donation will not be implemented. The charity you have selected, Johns Hopkins Centre for Health Security, will receive **\$0.00**.

You have **\$2.50** left in earnings.

Next

Stage 3

You now have the opportunity to draw another card to determine again whether your donation of **\$0.40** will be implemented. As a reminder, the experimenter will double this amount so your chosen charity will receive **\$0.80** if it is implemented. This time, you can increase the chances that the donation is implemented by replacing **RED** cards with **GREEN** cards for a small payment.

For every \$0.03 you spend, you can replace 1 RED card with 1 GREEN card (there are currently 9 RED cards & 1 GREEN card).

For example, if you spend \$0.09 then you will replace 3 RED cards with 3 GREEN cards which means in total there are now 4 GREEN cards and 6 RED cards and there is a 4 in 10 chance that the donation will be implemented. You will find out the color of the card that was drawn at the end of the study.

Before proceeding with your decision, please answer the following understanding questions.

7) If you spend \$0.03, how many GREEN cards and RED cards will there be?

- 2 GREEN cards, 8 RED cards
- 3 GREEN cards, 7 RED cards
- 4 GREEN cards, 6 RED cards

8) If you do not draw another card, what are the chances that the donation will be implemented again?

- 0 in 10 chance
- 1 in 10 chance
- 10 in 10 chance

Next

Stage 3

Please indicate whether you would like to draw another card. If you choose to do so, you will be asked on the next page how much you'd like to spend to increase the chances of the donation being implemented.

For every \$0.03 you spend, you can replace 1 RED card with 1 GREEN card (originally 9 RED cards and 1 GREEN card).

Do you wish to draw another card?

- Yes
- No

Next

Stage 3 - Survey

Please answer the following questions.

What is your age?

What is your gender?

What is your ethnicity?

What is your highest level of education obtained?

What is your political orientation?

- Left Center-Left Center-Right Right Other

What is your average household income per year?

How satisfied are you with the financial situation of your household?

- Not satisfied at all Not satisfied Neutral Satisfied Very satisfied

My religion is very important to me:

- Strongly Disagree Disagree Neutral Agree Strongly Agree

In the past month, how many times have you volunteered your time or made donations of money or other items to a charitable cause?

My chosen charity supports a worthy cause:

- Strongly Disagree Disagree Neutral Agree Strongly Agree

Think about the last time you gave to a charity before today. What was more important to you:

- The total amount given by everyone
 The amount that you personally gave
 Some other aspect of giving

B Regressions

Table B.1: Determinants of altruism (donors only)

	Altruism		Altruism amount	
	(1)	(2)	(3)	(4)
Survey: Altruist	0.12** (0.06)	0.12** (0.06)	0.02* (0.01)	0.02* (0.01)
Survey: Other	0.04 (0.06)	0.08 (0.06)	0.01 (0.01)	0.01 (0.01)
Raven's score		-0.02 (0.02)		0.00 (0.00)
Age		-0.00 (0.00)		0.00 (0.00)
Male		0.03 (0.05)		0.01 (0.01)
Education: Low		-0.06 (0.06)		-0.00 (0.01)
Religious: Agree		0.18*** (0.06)		0.01 (0.01)
Religious: Neutral		0.15* (0.08)		0.00 (0.01)
Politics: Right		0.02 (0.06)		0.00 (0.01)
Politics: Other		-0.18 (0.12)		-0.00 (0.02)
Income: High		-0.03 (0.06)		0.00 (0.01)
Income: Neutral		0.03 (0.07)		-0.00 (0.01)
Constant	0.60*** (0.04)	0.52*** (0.12)	0.05*** (0.01)	0.03 (0.02)
Controls	No	Yes	No	Yes
R ²	0.01	0.07	0.01	0.02
Adj. R ²	0.01	0.04	0.00	-0.01
Num. obs.	369	369	369	369

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Notes: OLS regression with standard errors in parentheses. Columns 1 and 2: dependent variable =1 if the participant paid a positive amount to increase the probability. Columns 3 and 4: dependent variable = amount paid in Stage 2 (\$0.00 to \$0.67). Baseline survey: Warm-glow. Donors whose initial donations were implemented and subjects who reported other genders are excluded.

Table B.2: Determinants of altruism (donors only) - probit regression

	(1)	(2)
Survey: Altruist	0.33** (0.17)	0.35** (0.17)
Survey: Other	0.11 (0.16)	0.22 (0.17)
Raven's score		-0.06 (0.05)
Age		-0.00 (0.01)
Male		0.09 (0.14)
Education: Low		-0.18 (0.17)
Religious: Agree		0.49*** (0.18)
Religious: Neutral		0.41* (0.22)
Politics: Right		0.05 (0.16)
Politics: Other		-0.49 (0.33)
Income: High		-0.09 (0.18)
Income: Neutral		0.08 (0.19)
Constant	0.25** (0.10)	0.05 (0.34)
Controls	No	Yes
AIC	482.10	480.71
BIC	493.84	531.55
Log Likelihood	-238.05	-227.35
Deviance	476.10	454.71
Num. obs.	369	369

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Notes: Probit regression with standard errors in parentheses. Baseline survey: Warm-glow. Donors whose initial donations were implemented and subjects who reported other genders are excluded.

Table B.3: Determinants of strength of altruistic motives (donors and non-donors)

	(1)	(2)
Survey: Altruist	0.05**	0.06**
	(0.02)	(0.02)
Survey: Other	-0.03	-0.02
	(0.02)	(0.02)
Raven's score		0.00
		(0.01)
Age		0.00
		(0.00)
Male		-0.00
		(0.02)
Education: Low		0.00
		(0.02)
Religious: Agree		0.12***
		(0.02)
Religious: Neutral		0.06**
		(0.03)
Politics: Right		0.02
		(0.02)
Politics: Other		0.04
		(0.04)
Income: High		0.01
		(0.02)
Income: Neutral		0.03
		(0.02)
Constant	0.26***	0.13***
	(0.01)	(0.04)
Controls	No	Yes
R ²	0.02	0.09
Adj. R ²	0.02	0.07
Num. obs.	639	639

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Notes: OLS regression with standard errors in parentheses. Dependent variable = total amount paid in Stages 1 (\$0.40) and 2 (\$0.00 to \$0.67). Baseline survey: Warm-glow. Donors whose initial donations were implemented and subjects who reported other genders are excluded.