Reluctant Donors and Their Reactions to Social Information

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Abstract

Recent work on charitable giving finds that some individuals donate when asked, but prefer to avoid the request. Drawing on this, I investigate how information about others' contributions affects giving, and whether the response is sensitive to the timing of the information. Participants of a laboratory experiment are invited to donate to charity, and receive information about the size of a previous donation either before or after they accept the invitation. Results show that the timing affects behavior, because solicitees respond reluctantly to the information. For example, participants decline the invitation if they learn that others give large amounts, but donate relatively large amounts if they receive the same information only after accepting the invitation. Through a novel elicitation I show that this behavior is correlated with a preference for sharing money reluctantly in a dictator game. I characterize the findings with a model in which donors do not want to appear selfish and create excuses for declining to donate. Informing them of others' donations affects their ability to create such excuses.

JEL codes: C91, D64, D03, D82, J16.

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1. INTRODUCTION

To encourage donations, charities often announce others' contributions during fundraisers. For example, they advertise seed money, or post past donations during crowdfunding campaigns. The effectiveness of providing social information depends on the solicitees' motivations for giving.[1] Altruism under a public good with continuous production predicts a negative relationship between others' donations and subsequent contributions (Bergstrom et al., 1986; Varian, 1994).[2] In contrast, if individuals enjoy status or prestige from giving (Bernheim, 1994; Romano and Yildirim, 2001) or if they infer the quality of the charity from the amount others give (Vesterlund, 2003), then their contributions will be positively related to that of others. Broadly, studies that experimentally manipulate social information find evidence of a positive relationship, and attribute it to a desire to conform to social norms (Frey and Meier, 2004; Martin and Randal, 2008; Shang and Croson, 2009).

More recent work on other-regarding preferences recognizes that a considerable fraction of donors give rather reluctantly, in an effort to not seem selfish or to not disappoint the solicitor. These individuals donate when asked, but prefer not having been asked, and thus avoid the solicitation if they can anticipate it (DellaVigna et al., 2012; Andreoni et al., 2011), retract their gifts if they can do so quietly (Dana et al., 2006; Broberg et al., 2007; Lazear et al., 2012), or stop sharing when the request is framed such that giving $0 is not the most selfish action (Bardsley, 2008; List, 2007).[3] Drawing on this work, I investigate how information about others' contributions affects giving, and in particular whether the response is sensitive to the timing of the information. Fundraisers may provide social information at different stages of the solicitation—for example, early when the opportunity to donate is advertised and individuals are invited to participate, or later in the payment stage when

[1] For reviews of the motivations for charitable giving, see Vesterlund (2006, 2015).

[2] Andreoni (1989, 1990) present a model of "impure" altruism in which others' donations only partially crowd out subsequent giving.

[3] Cain et al. (2014) estimate that 50% of sharing (mostly in the dictator game) is done reluctantly.

individuals are asked to make a contribution. Given that many individuals donate unless they can quietly escape the solicitation, it is possible that they respond differently to the same piece of information depending on whether they can easily decline to give versus if they are already participating in the solicitation at the time they receive the information.

This paper provides experimental evidence that the timing of the information matters, precisely because solicitees react reluctantly to the information. This has direct practical implications for the design of effective charitable fundraising and the optimal provision of social information. The findings may also inform the literature on other-regarding preferences, by providing insights into what drives reluctant giving. To this aim, the paper also includes a theoretical model that formally defines reluctant giving and that demonstrates a possible mechanism by which it arises and it is affected by social information.

I conduct a laboratory experiment in which participants can make a donation from their earnings (approximately \$15) to a charity. They first decide whether to accept an invitation to donate, and only if they do, then indicate how much to give (\$0 is explicitly allowed). Depending on the treatment, they are informed either that a subject in a previous session donated 50¢ or \$5 (relatively small and large amounts), and this information is provided either before or after accepting the invitation to give. In this way, I explore how the content as well as the timing of the information affect giving.

Both affected behavior significantly in the experiment. For instance, relative to receiving no information, 40% fewer participants accepted the invitation to donate if they learned early that another person gave \$5. But if they leaned the same information only after accepting the invitation, solicitees did not give \$0, and in fact increased their donation size. Similarly, learning early that another person gave 50¢ led 60% more participants to accept the invitation, and did not lead to a decrease in the donation size. Thus, informing participants of a 50¢ donation early raised more funds than any other treatment, and exactly 111% more money than never providing social information.

The responses are consistent with individuals not wanting to appear selfish and reacting

reluctantly to the information. To explore the driving mechanism further, I elicit a reluctance measure from each participant using a novel game inspired by Dana et al. (2006). After the solicitation, participants decide how to split $10 with an anonymous subject in the room. Then, without previous notice, they are given a chance to choose the probability with which they would rather implement a different outcome: $9 for themselves and $0 for the other subject. The other subject never learns the probability chosen. This game therefore identifies dictators who split the $10 reluctantly, and quantifies the extent to which they are willing to switch discreetly to $9-$0.

Results show that the dictators identified as reluctant drove the treatment responses. Participants who selected a higher probability of switching to $9-$0 were increasingly likely to have accepted the invitation to give when informed 50¢ donation, and increasingly likely to have rejected the invitation to give when informed of a $5 donation. Reluctant dictators also changed the amounts they donated in response to the information more than other participants. This correlation between the treatment response and the reluctance measure elicited separately supports the idea that participants reacted to the social information for the same reason they shared reluctantly in the dictator game—presumably an attempt to not appear selfish.

The last part of the paper presents a model that explores a mechanism that might drive reluctant giving and its response to social information. By receiving a preliminary invitation to donate, agents in the model are able to seek or avoid the solicitation. They create excuses for avoiding the solicitation in order to keep their money as well as a good image of themselves. This is in line with evidence from psychology and economics of motivated reasoning, whereby humans interpret their own actions self-servingly when doing so can justify selfish behavior (Kunda, 1990; Snyder et al., 1979; Haisley and Weber, 2010; Linardi and McConnell, 2011; Exley, 2015). Providing agents with social information affects their ability to come up with valid excuses for not participating. For example, mentioning that others contribute "even a penny" invalidates excuses such as "I can't afford to give" or "Small

amounts probably don't help" (Cialdini and Schroeder, 1976).[4]

In what remains, Section 2 details the experiment design, Section 3 the results, and Section 4 the theoretical model. Section 5 concludes by discussing practical implications and open questions.

2. EXPERIMENT DESIGN

The experiment was conducted at the Pittsburgh Experimental Economics Laboratory (PEEL) from April to September 2014. In total 308 undergraduate students recruited from the PEEL subject pool participated in 14 sessions, with no one participating in more than one session. Each session had 16 to 30 participants and lasted approximately one hour. The experiment was programmed in z-Tree (Fischbacher, 2007).

The experiment consisted of four parts: (1) Participants earned money by solving effort tasks individually. (2) Everyone was solicited to donate part of their earnings to a charity. The solicitation was not mentioned until this point. (3) After the solicitation, participants played a previously-unannounced game to elicit their reluctant measure. (4) A set of demographic and personality questionnaires was administered and earnings net of any donation were paid. Each part is detailed below.

[4]Related theoretical models of self- or social-image concerns in giving contexts include Bodner and Prelec (2003), Ellingsen and Johannesson (2008), Andreoni and Bernheim (2009), DellaVigna et al. (2012), and Grossman (2015). With this model I intend to contribute to the literature by defining reluctant giving, by showing a way in which it can be sustained in equilibrium, and by examining the role of social information. I provide psychological microfoundations based on the theory of motivated reasoning and excuse-driven behavior. Models of other channels through which social information affects giving, such as altruism, prestige, and drawing inference about the charity's quality are given, respectively, by Varian (1994), Romano and Yildirim (2001), and Vesterlund (2003).

2.1 Effort Tasks

Participants solved two computerized effort tasks for money (Appendix A includes the instructions and screenshots). The first task was a modification of the slider task by Gill and Prowse (2012), in which participants had 90 seconds to slide seven scroll bars to their center positions. For doing this correctly they received \$1.50, and \$0 otherwise. In the second task participants had to click on a button located at the center of the screen precisely when a timer shown next to the button displayed the number '15.' The timer counted the seconds elapsed since the start of the second task; thus, participants had a one-second window, exactly fifteen seconds after the start of the task, to click on the button. For doing this correctly they received \$1.50, and \$0 for clicking at the incorrect time.

The two tasks appeared in succession five times, and thus participants could earn at most \$15 from these tasks. Unbeknown to the participants, the tasks served no purpose in the study other than to endow them with money that they worked for and hence felt entitled to keep. The tasks were not challenging, but required full attention to be completed successfully. As planned, the vast majority (83%) of participants earned the \$15 (more details in Section 3). No additional show-up fee was paid.

2.2 Solicitation

The initial instructions did not mention any part to follow the effort tasks. However, after finishing the effort tasks but before receiving their earnings, participants were informed that the experimenter had allowed the nonprofit organization Pittsburgh Cares to request donations from all experiment participants, and that they could make a donation from their earnings.[5] The solicitation occurred via the computer. Participants received information

[5]Pittsburgh Cares is a Pittsburgh-local nonprofit organization that promotes volunteerism in the region by connecting organizations that seek to enlist the help of volunteers with individuals who seek to volunteer their time. At the time of the study the Organization had been active for over 20 years, and held a database of more than 20,000 potential volunteers and more than 500 opportunities for them to volunteer at. The Organization does not focus on any particular population or issue, which makes it ideal for this study, as it lessens concerns that donations are driven by unobserved characteristics of the participants.

about Pittsburgh Cares, a notification that donations would be matched 1:1 by the sponsor of the study, and a description of how donations would be kept confidential.[6]

The solicitation consisted of two stages, shown in Figure 1. The stages appeared one at a time. In this paper they are called *Invitation Stage* and *Payment Stage*. If the participant indicated 'No' in the Invitation Stage, the solicitation ended immediately. If they indicated 'Yes,' they moved to the Payment Stage. Depending on the treatment assigned to them, participants received information in one of the stages about how much another subject donated in a previous session. The information consisted of the sentence at the bottom of Figure 1, and was shown to the participants on the corresponding shaded area in Figure 1.

X was either 50¢ or \$5, and the sentence was shown either at the Invitation Stage or the Payment Stage, in a 2-by-2 between-subjects design. If shown at the Payment Stage, the information was shown only if the participant advanced to that stage. The values 50¢ and \$5 were determined by first conducting two sessions in which social information was never provided. The minimum non-zero donation made in these sessions was 50¢ and the maximum was \$5; thus the two values represented a relatively small and a relatively large donation.

Table 1 summarizes the design. The size of the donation participants were informed of varies across rows, and the timing of the provision of information varies across columns. Each participant received only one treatment, and all participants in a given session received the same treatment.

[6]Donations were matched to encourage participants to contribute. Karlan and List (2007) find that matching encourages donations, and that match ratios of 2:1 and 3:1 do not have additional impact relative to a 1:1 ratio. To handle donations, all participants received an envelope and a receipt form. Anyone who wished to get in the mail a donation receipt from Pittsburgh Cares had to fill out the form with their name, their donation amount, and their mailing address, and had to place the receipt form in the envelope, seal the envelope, and leave it on their desk upon leaving the laboratory. The envelope was sent to Pittsburgh Cares. To prevent participants from identifying who donated and who did not based on their filling the envelope, all participants were instructed to place the receipt form (even if left blank) in the envelope, seal the envelope, and leave it on their desks.

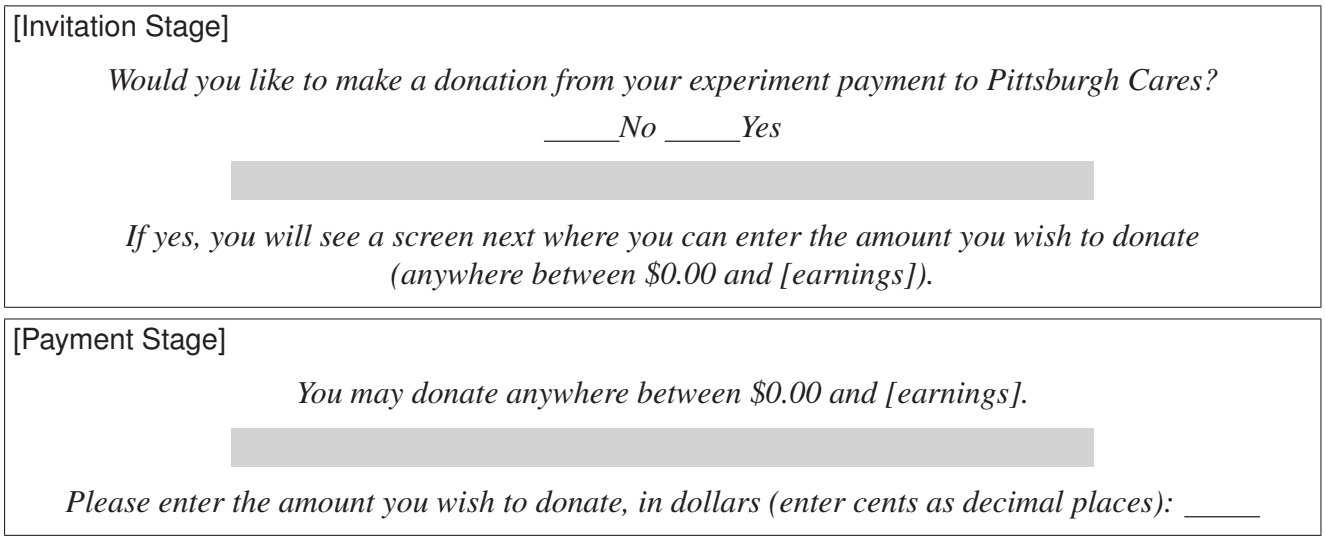

Figure 1: Two-Stage Solicitation

Table 1: Treatments and Sample Sizes

	Invitation Stage	**Payment Stage**
X=50¢	3 sessions $N = 64$	3 sessions $N = 60$
X=$5	3 sessions $N = 74$	3 sessions $N = 66$
No info	2 sessions $N = 44$	

2.3 Reluctance Measure

After the solicitation, participants played a game designed to elicit a reluctance measure, and intended to examine further a possible association between the response to the social information and a tendency to give reluctantly. Participants learned about this game only after responding to the solicitation.

The game consisted of two parts. Participants were randomly and anonymously matched in pairs, and remained with the same partner for the entire game. In each part, each member

of the pair decided on an allocation of money between himself and his partner. One allocation from one member of the pair was randomly selected for payment at the end of the game, and the money was added to the previous earnings net of any donation made. The instructions for the second part were given only after the end of the first part (Appendix A includes the instructions).

For the first part, each participant privately selected how to split \$10 among the pair. That is, each participant played a dictator game in the role of dictator and recipient ex ante. They then continued to the second part without being informed of how the partner split the \$10. At the end of the game, if the first part was selected for payment, the split dictated by the randomly-chosen member of the pair was revealed to the partner and paid accordingly.

For the second part, each participant was randomly assigned one of two possible allocations of money between himself and the partner: either the \$10 split he dictated in the first part, or \$9 for himself and \$0 for the partner. Before being assigned one of these two allocations, the participant had to indicate the probability with which he wanted to get the \$9-\$0 option. Only a probability between 10% and 90% was allowed, and the remaining probability to 100% was his chance of being assigned the \$10 dictator split. Once the participant indicated a probability, an allocation was assigned to him at random based on these weights, and the second part concluded. The probability indicated was never disclosed to the partner. If at the end of the game the second part was selected for payment, the allocation assigned to the randomly-chosen member of the pair was revealed to the partner and paid accordingly.

This game provides a measure from \$0 to \$10 of the participants' willingness to share money in a dictator game, and a measure from 0.10 to 0.90 of the extent to which they would rather get \$9 and leave the other with \$0 discreetly. Since the probability of the \$9-\$0 allocation is forced to be between 0.10 and 0.90, there is always at least a 10% chance that this allocation gets assigned. Therefore the partner cannot infer what probability the participant indicated, even if \$9-\$0 is revealed for payment. Individuals who share in the

dictator game out of image concerns and who would prefer not to have to share their money have an incentive to move the odds in favor of \$9-\$0, since the outcome does not reveal their choice. In contrast, participants who share in the dictator game because they care about the recipient's payoff should indicate a probability equal to 0.10.[7]

2.4 Questionnaires

After the reluctance elicitation, participants filled out a Big Five personality questionnaire (John et al., 1991, 2008), a Principle of Care questionnaire (Wilhelm and Bekkers, 2010), and a demographics questionnaire. These measures were administered to investigate whether behavior in the experiment correlates with personality characteristics, and whether reluctant giving is a stable type that can be predicted. The analysis of the results of these questionnaires is discussed briefly in Section 3 and in detail in the Appendix A.

3. EXPERIMENT RESULTS

Eighty-two percent of the participants made no mistake in the effort tasks (i.e, earned \$15) and 98% of the participants made one or no mistake (i.e., earned \$13.5 or \$15). Pre-solicitation earnings were therefore homogeneous across subjects, and had no significant impact on the responses to the solicitation.

The data analysis is divided in two parts. The response to the social information during the solicitation is explored first, in terms of the extensive and intensive margins of giving. This part reveals that both the content and the timing of the information matter, and that the behavior observed is consistent with reluctant giving. The second part supports the view of reluctant giving by finding a correlation between the reluctance measure and the response

[7]This game was inspired by Dana et al's (2006) experiment, in which participants play a \$10 dictator game with dictators and recipients in separate rooms, and dictators choose whether to take \$9 and leave the recipient with \$0 and unaware that a dictator game was to be played.

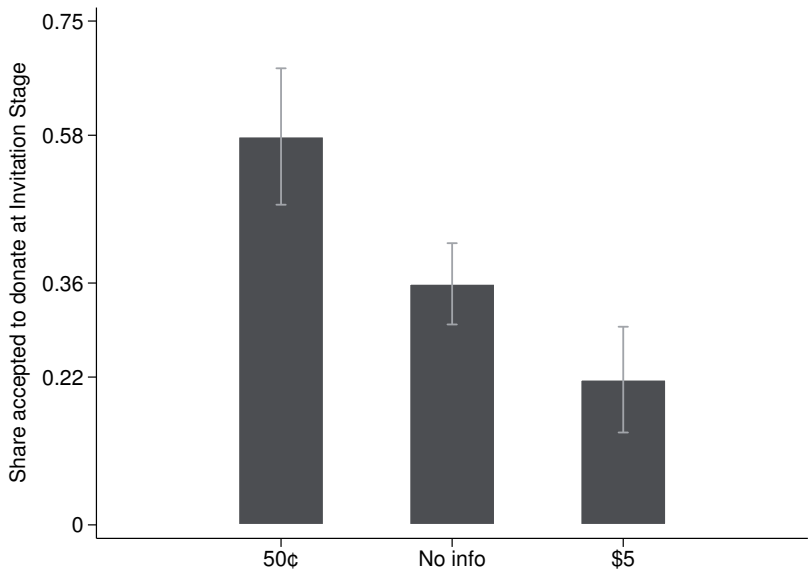

Figure 2: Intent to Donate by Information Received at Invitation Stage

Notes: This figure shows the fraction of participants who accepted to donate at the Invitation Stage, given the information received at this stage. Estimates based on a probit regression of the binary decision to accept to donate at the Invitation Stage, regressed on the information received at the Invitation Stage (results do not vary significantly when controlling for age and gender). Observations from treatments *50¢-at-Payment, $5-at-Payment,* and *No-info* are combined and labeled 'No info', since these treatments did not provide information about a previous donation at the Invitation Stage. Error bars indicate 90% confidence intervals.

to the social information during the solicitation.

3.1 Response to the Social Information

3.1.1 Extensive Margin To evaluate the effect of the information received at the Invitation Stage on the extensive margin of giving, I estimate the equation

$$\Pr(y_i = 1|x_i) = \Phi(\alpha + \beta_1 50¢_i + \beta_2 \$5_i)$$

where $y_i \in \{0, 1\}$ is participant i's binary decision to donate at the Invitation Stage, and the indicator variables $50¢_i$ and $\$5_i$ denote respectively whether the participant was informed of a previous donation of 50¢ or \$5 at this stage. The estimates from a probit regression are plotted in Figure 2. Notice that I pool together observations from treatments *No-info*, *50¢-*

at-Payment, and *$5-at-Payment* into a single *No-info* category, since these three treatments are identical to each other at the Invitation Stage (participants received no information then). For robustness, I also estimate separate effects for treatments *No-info*, *50¢-at-Payment*, and *$5-at-Payment*, confirming that their sizes are statistically indistinguishable from each other. These estimates are shown in Panel A of Table 2.

Figure 2 shows that the information had a considerable effect on the intent to donate. When they received no information, 37% of the participants agreed to donate at the Invitation Stage. Relative to this value, being informed of a 50¢ donation raised the intent to donate by 61%, and being informed of a $5 donation depressed the intent to donate by 40%.

Intent to donate does not necessarily imply a donation, because participants could have indicated that they would give at the Invitation Stage and then donate $0 at the Payment Stage. But this happened very rarely—once in the *No-info* treatment and twice in the *$5-at-Invitation*. Therefore, intent to donate reflects almost perfectly the donation rate, and one may speak interchangeably of intent and actual donation in these data. This can be seen by comparing the 'Intent to Donate' and 'Donation Rate' columns in Panel A of Table 2, which show very similar treatment effects across.[8]

No participant decided to donate $0 upon learning in the Payment Stage that someone donated $5. On the other hand, participants declined to donate when they learned the same information in the Invitation Stage. Possible explanations will be discussed once the information's effect on the intensive margin of giving is presented, since this finding in isolation is not conclusive.[9]

[8] As expected given the lack of $0 donations, donation rates are statistically similar across the treatments that provided no information at the Invitation Stage. A $\chi^2(2)$ test fails to reject equality of donation rates across the treatments *No-info*, *50¢-at-Payment*, and *$5-at-Payment* with $p = 0.404$. When the *$5-at-Invitation* treatment is also included, a $\chi^2(3)$ test rejects equality of donation rates across treatments with $p = 0.037$, and when all treatments are considered, a $\chi^2(4)$ rejects the equality of donation rates across treatments with $p < 0.001$.

[9] When the intent to donate in the *$5-at-Invitation* treatment (0.216) is compared to the donation rate in the *$5-at-Payment* treatment alone (0.303), the two are not statistically different from each other at standard levels ($p = 0.164$ for a one-sided Fisher's exact test of equality of these proportions).

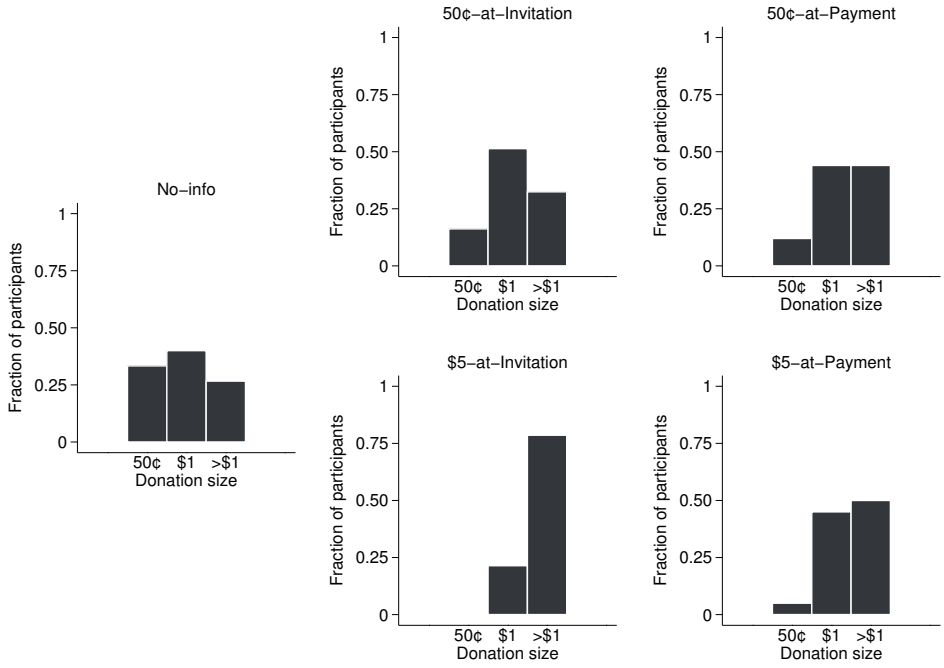

Figure 3: Distribution of Donation Sizes Conditional on Donating, by Treatment

Notes: This figure shows the fraction of participants who donated 50¢, $1, and more than $1 among all the participants who donated a positive amount in the treatment. Dashed lines mark the fraction of participants who donated a positive amount in the treatment.

3.1.2 Intensive Margin All donations happened to be multiples of 50¢. Figure 3 shows for each treatment the distribution of donations among subjects who made a contribution, with amounts larger than $1 collapsed together for clearer exposition (see the Appendix A for uncollapsed distributions).[10]

The social information affected the intensive margin of giving. In the *No-info* treatment, 73% of the mass of donations concentrated on amounts of 50¢ and $1, and 27% of the mass on amounts greater than $1. This distribution shifted up for all information treatments, especially for treatments informing of a $5 donation, as seen in Figure 3. No one donated 50¢ in the *$5-at-Invitation* treatment, and only rarely did someone do so in the *$5-at-Payment* treatment.

[10]The 50¢/$1/+$1 division was selected so that each bin contains roughly a third of the observations in the *No-info* treatment.

To estimate the treatment effects on the intensive margin of giving, I use the equation

$$E(g_i|x_i) = \alpha + \beta_1 50¢\text{-Inv}_i + \beta_2 50¢\text{-Pay}_i + \beta_3 \$5\text{-Inv}_i + \beta_4 \$5\text{-Pay}_i$$

where g_i is the size of individual i's donation, and the regressors are indicator variables for the treatment the individual was exposed to. OLS estimates of this equation are shown in Panel B of Table 2. Columns (1) and (2) under 'Conditional amount' are estimates when I include observations only from participants who made a donation; columns (1) and (2) under 'Unconditional amount' are estimates considering all participants. Finally, as a robustness check against possible influence of outliers and non-normality, I also conduct nonparametric pairwise comparisons (Mann-Whitney U tests) between each information treatment and the *No-info* treatment. These test statistics are shown on the MWU columns.

The MWU test statistics in the 'Conditional amount' column show that the median donation size conditional on donating increased significantly both for the *$5-at-Invitation* and *$5-at-Payment* treatments relative to the *No-info* treatment. Comparing the conditional donation size between *$5-at-Payment* and *No-info* will be particularly important when we discuss in the next section the possible explanations for the results, as the participants in these two groups received identical information prior to advancing to the Payment Stage.

Table 2: Treatment Effects on the Extensive and Intensive Margin of Giving

Panel A: Extensive margin

	Intent to donate		Donation rate	
	(1)	(2)	(1)	(2)
50¢-at-Invitation	0.214**	0.204**	0.237**	0.229**
	(0.095)	(0.097)	(0.094)	(0.096)
50¢-at-Payment	0.053	0.047	0.076	0.071
	(0.096)	(0.097)	(0.097)	(0.096)
$5-at-Invitation	-0.147*	-0.151*	-0.152*	-0.154*
	(0.087)	(0.088)	(0.085)	(0.085)
$5-at-Payment	-0.061	-0.067	-0.038	-0.043
	(0.092)	(0.093)	(0.091)	(0.092)
constant (No-info mean)	0.363***	0.369***	0.341***	0.345***
	(0.075)	(0.073)	(0.071)	(0.072)
Age-gender controls	No	Yes	No	Yes
Sample size	308	308	308	308

Panel B: Intensive margin

	Conditional amount			Unconditional amount		
	(1)	(2)	MWU	(1)	(2)	MWU
50¢-at-Invitation	0.336	0.327	1.024	0.518**	0.508**	2.592***
	(0.436)	(0.440)	(0.306)	(0.238)	(0.242)	(0.009)
50¢-at-Payment	0.193	0.225	1.273	0.184	0.177	1.082
	(0.465)	(0.472)	(0.203)	(0.241)	(0.243)	(0.279)
$5-at-Invitation	1.312**	1.398**	2.835***	0.041	0.036	-1.352
	(0.529)	(0.555)	(0.005)	(0.231)	(0.232)	(0.176)
$5-at-Payment	0.533	0.538	1.901*	0.110	0.102	-0.004
	(0.486)	(0.490)	(0.057)	(0.236)	(0.239)	(0.997)
constant (No-info mean)	1.367***	1.351***	-	0.466**	0.472**	-
	(0.367)	(0.372)		(0.183)	(0.185)	
Age-gender controls	No	Yes	No	No	Yes	No
Sample size	111	111	-	308	308	-

Notes: Panel A shows marginal treatment effects from probit regressions where the dependent variables are a binary indicator for acceptance to donate at the Invitation Stage (Intent to donate) and a binary indicator for a positive donation (Donation rate). Panel B shows marginal treatment effects from OLS regressions where the dependent variables are the size of the donation conditional on making a donation (Conditional amount) and the size of the donation among all participants in the treatment (Unconditional amount). For both panels, model (1) includes treatments as the only regressors, and model (2) adds age and gender controls. Panel B also shows the Mann-Whitney U test statistic (MWU) that the median donation in the corresponding treatment is equal to the median donation in the *No-info* treatment. Standard errors in parentheses except for MWU columns, which show two-sided p values. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

The 'Unconditional amount' columns show that informing participants of a 50¢ donation in the Invitation Stage raised more funds per participant than any other treatment. It raised on average \$0.98 per participant, or 111% more than when no information was provided. This was both because participants in the *50¢-at-Invitation* treatment accepted to donate in greater numbers, and because their contribution size did not go down, relative to receiving no information. Providing the same information in the Payment Stage was not nearly as profitable, because it missed the ability to increase the intent to donate. Hence the timing of the information mattered.

Timing also mattered because, when providing information in the Invitation Stage, mentioning a 50¢ donation raised more funds than mentioning a \$5 donation. Yet the opposite was true when providing information in the Payment Stage, since the conditional donation size was greater for *\$5-at-Payment* than *50¢-at-Invitation*. An experiment that provided information only at the later stage would have concluded the latter.[11] By manipulating the content and the timing one can appreciate and evaluate the possibility that participants respond reluctantly to the information.

3.1.3 Possible Explanations The response to the social information is consistent with participants not wanting to appear selfish. Of participants who donated when they learned in the Payment Stage that others gave \$5, an estimated 40% would have declined to donate had they learned the same information in the Invitation Stage. This corresponds to a reluctant reaction to the information, where the person donates enough to not appear selfish if the information arrives late, but prefers to receive the information earlier, in which case he declines the invitation.

The reactions to the 50¢ treatments are also consistent with giving reluctantly. Refusing to give when others are willing to donate 50¢ appears ungenerous, therefore mentioning a

[11] As in Shang and Croson (2009), who find that informing solicitees of a larger donation leads to larger donations. Their sample comprises individuals who call to a radio station in response to a fundraising campaign, and thus all participants express an intent to donate before being treated. It is telling that in their sample no participant declined to donate.

50¢ donation early increases the intent to donate. At the same time, if 50¢ is such a low donation, contributing such an amount may still reflect badly on one's generosity, and thus participants often donated more than 50¢ in response to this information (see Figure 3).[12]

It is difficult to reconcile these findings with other motivations for giving. The classical model of altruism with continuous production (Bergstrom et al., 1986) assumes that participants care about the aggregate donation to the charity, and thus predicts that they give more when informed of a 50¢ donation than when informed of a $5 donation. This matches the observed treatment effects on the extensive margin, but not those on the intensive margin. It is hard to see why altruistic participants declined to donate when informed of a $5 donation at the Invitation Stage, but donated significantly more than any other treatment when given the same information at the Payment Stage. It is equally difficult to reconcile the findings with the idea that participants inferred the worthiness of Pittsburgh Cares from the social information received. If participants deduced that the charity was meritorious when others gave larger amounts, then it makes sense that they gave larger amounts when informed of a $5 donation in the Payment Stage, but not that they declined to donate when the same information was provided in the Invitation Stage. Neither do participants seem to have been *seeking* to conform to social norms. If they donated more to follow what others did when informed of a $5 donation in the Payment Stage, then why did they decline to donate upon receiving the same information in the Invitation Stage?

To explore further the possibility that participants reacted to the social information reluctantly, the next part of the analysis investigates whether the reluctance measure elicited from participants helps to explain their behavior in the solicitation.

[12]This is consistent with Cialdini and Schroeder (1976), who find that by mentioning that "even a penny helps," the solicitor makes it difficult for the solicitee to decline to help and at the same time makes it unlikely that he contributes a small amount.

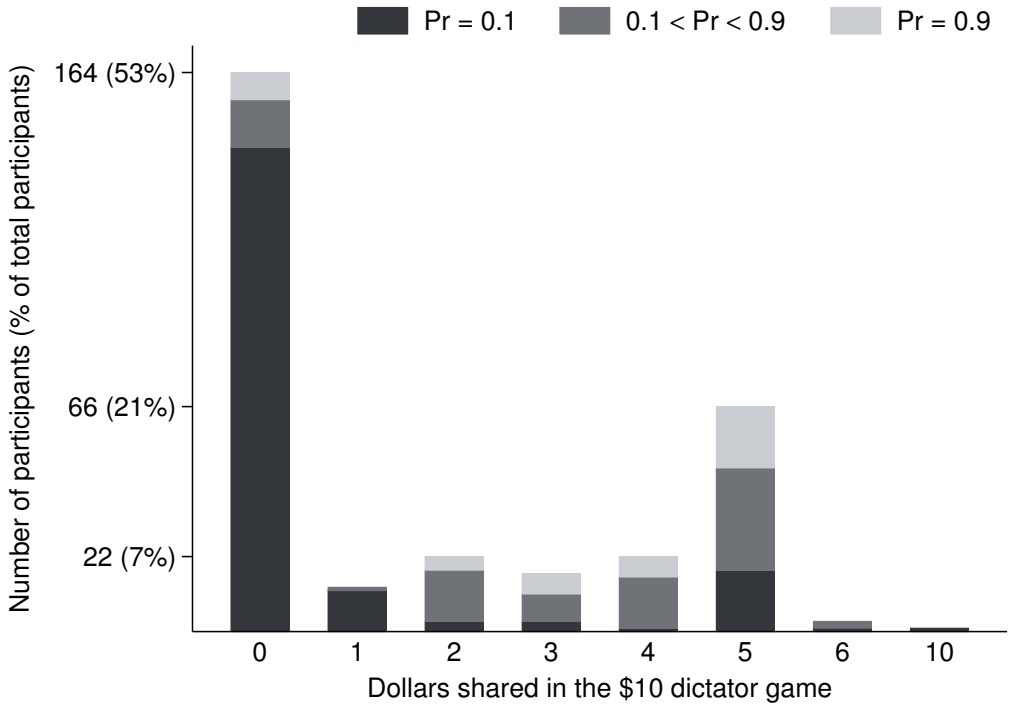

Figure 4: Histogram of Dictator Transfer and Probability of Getting \$9-\$0

3.2 Correlation with the Reluctance Measure

The reluctance measure was elicited by having participants first decide how to split \$10 in a dictator game, and then quietly indicate their preferred probability (between 0.10 and 0.90) of getting \$9 and leaving the partner with \$0 instead of implementing their dictator-game split. Figure 4 shows how many participants shared a given amount in the dictator game and how many selected a given probability of obtaining the \$9-\$0 outcome.

In the dictator game, 47% of the participants shared more than \$0. The mean transfer was \$1.80. The distribution of transfers matches standard behavior in the dictator game (Camerer, 2003) although the few overly generous transfers (three of \$6 and one of \$10) are atypical. The distribution did not vary significantly by treatment (when regressing the amount shared on the treatments alone, an F-test fails to reject the hypothesis that all the regression coefficients are equal to zero with $p = 0.357$).

When later offered the chance to discreetly get \$9-\$0, most apparently-generous dictators moved the odds in favor of \$9-\$0: 79% of the participants who shared \$2 or more selected a probability greater than 0.10 (21% selected a probability equal to 0.50 and 26% selected a probability equal to 0.90). In contrast, the most selfish dictators tended to adhere to their split: 87% of the participants who shared \$0 or \$1 selected a probability equal to 0.10.

Forty-one percent of all the participants selected a probability larger than 0.10. Their behavior is consistent with the idea that giving in the dictator game does not necessarily reflect generosity, because some share reluctantly when asked to split \$10 in order to not appear selfish, but prefer not having been asked to share the money to begin with. The degree to which they prefer to keep the money discreetly is presumably captured by their indicated probability of obtaining \$9-\$0.

To investigate whether this behavior correlates with the response to the social information observed earlier, I classify participants into three types based on the reluctance measure, and look for systematically different treatment effects across types. Types are constructed as follows:

- *Selfish*: participants who shared \$0 or \$1 in the dictator game and subsequently indicated a probability equal to 0.10.
- *Reluctant (i.e., image concerned)*: participants who, independently of the amount shared in the dictator game, indicated a probability greater than 0.10.[13]
- *Generous*: participants who shared \$2 or more in the dictator game and subsequently indicated a probability equal to 0.10.

The proportion of types in the sample is 50% Selfish, 41% Reluctant, and 9% Generous.

[13]Individuals who shared \$0 in the dictator game and then selected a probability greater than 0.10 are included in this category. They were willing to pay \$1 to make it unclear that they selected the most selfish split in the dictator game, and thus appear to be image concerned. Twenty-two participants indicated a probability greater than 0.10 after sharing \$0. One individual, also included in this category, indicated a probability greater than 0.10 after sharing \$1. This behavior is difficult to understand. Results are largely insensitive to excluding all these individuals from the sample; the sensitivity of the results is reported when appropriate.

The proportion did not vary significantly across treatments (a Fisher's exact test fails to reject equality of proportions across treatments with $p = 0.15$, and with $p = 0.13$ when the Generous type is excluded from the sample). In particular, the results to come find no evidence of moral compensation in either direction between the solicitation and the reluctance measure.[14] It is important to note that the low frequency of the Generous type in the sample presents a limitation to the analysis to come, and some tests are underpowered or infeasible for this group.

To estimate the effect of the social information on the extensive margin of giving conditional on the participant's type, I estimate the equation

$$\begin{aligned}\Pr(y_i = 1|x_i) = \quad & \Phi(\alpha + \beta_1 50¢_i + \beta_2 \$5_i + \beta_3 reluc_i + \beta_4 gener_i + \beta_5 50¢_i * reluc_i \\ & + \beta_6 50¢_i * gener_i + \beta_7 \$5_i * reluc_i + \beta_8 \$5_i * gener_i)\end{aligned}$$

where $y_i \in \{0, 1\}$ is participant i's binary decision to donate at the Invitation Stage, the indicator variables $50¢_i$ and $\$5_i$ denote respectively whether the participant was informed of a previous donation of 50¢ or \$5 at this stage, and the indicator variables $reluc_i$ and $gener_i$ denote respectively whether the participant is classified as a Reluctant or Generous type. Panel A of Table 3 shows the estimated marginal effects from this probit regression. As robustness checks, model (2) includes gender-age controls, and model (3) excludes from the sample individuals in the Reluctant type who shared \$0 or \$1 in the dictator game, since they did not retract a positive DG transfer and thus their motivations for moving the odds in favor of \$9-\$0 could have been different from those of the other Reluctant participants.

The coefficients for the constant term in Panel A of Table 3 show that when no information was provided at the Invitation Stage, Generous participants were most likely to accept to donate, followed by the Reluctant, and lastly the Selfish (a $\chi^2(2)$ joint test of model (1)'s estimates for the no-information condition rejects equality of intent to donate across

[14] That is, no evidence of 'moral licensing' (Zhong and Liljenquist, 2006; Merritt et al., 2010) whereby participants felt entitled to act selfishly in the reluctance measure elicitation because they donated to the Organization, or 'moral cleansing' (Sachdeva et al., 2009) whereby participants acted generously in the elicitation to redeem themselves after not donating to the Organization.

types with $p = 0.0012$). This natural progression is a first indication that types responded differently to the solicitation.

Panel A of Table 3 also shows that, relative to receiving no information at the Invitation Stage, all types raised their intent to donate when informed of a 50¢ donation, and decreased it when informed of a \$5 donation (though only significantly so for the Reluctant type on the 50¢ condition). However, within the Reluctant category, the magnitude of the effect varied according to the participant's indicated probability of getting \$9-\$0, something not captured by Table 3's estimates. To see this, I estimate the equation

$$\begin{aligned}\Pr(y_i = 1|x_i) = \quad & \Phi[\alpha + \beta_1 50¢_i + \beta_2 \$5_i + \beta_3 \Pr(\$9\$0)_i \\ & + \beta_4 50¢_i * \Pr(\$9\$0)_i + \beta_5 \$5_i * \Pr(\$9\$0)_i]\end{aligned}$$

only on the Reluctant sample, and where $\Pr(\$9\$0)_i$ is the probability for \$9-\$0 that the individual chooses, which by definition is 0.11 or larger. Figure 5 plots the estimated intent to donate from this probit regression.

On average participants who selected a higher probability changed their intent to donate more in response to the social information, in the direction consistent with reluctant giving. They were increasingly less likely to accept to donate when informed of a \$5 donation, and increasingly more likely to accept to donate when informed of a 50¢ donation. This correlation between intent to donate and the reluctance measure presents additional evidence that reluctant giving drives the reactions to the social information.

To estimate the effect of the social information on the intensive margin of giving conditional on the participant's type, I estimate two equations. One is the conditional mean

$$\begin{aligned}E(g_i|x_i) = \quad & \alpha + \beta_1 50¢\text{-Inv}_i + \beta_2 50¢\text{-Pay}_i + \beta_3 \$5\text{-Inv}_i + \beta_4 \$5\text{-Pay}_i \\ & + \beta_5 reluc_i + \beta_6 gener_i + \beta_7 50¢\text{-Inv}_i * reluc_i + \beta_8 50¢\text{-Inv}_i * gener_i \\ & + \beta_9 50¢\text{-Pay}_i * reluc_i + \beta_{10} 50¢\text{-Pay}_i + gener_i + \beta_{11} \$5\text{-Inv}_i * reluc_i \\ & + \beta_{12} \$5\text{-Inv}_i * gener_i + \beta_{13} \$5\text{-Pay}_i * reluc_i + \beta_{14} \$5\text{-Pay}_i * gener_i\end{aligned}$$

Table 3: Treatment Effects on the Extensive and Intensive Margin of Giving Conditional on Type

Panel A: Extensive margin (intent to donate)

	Selfish			Reluctant			Generous		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
50¢	0.140	0.133	0.140	0.208**	0.203*	0.173	0.185	0.179	0.185
	(0.109)	(0.109)	(0.109)	(0.104)	(0.104)	(0.119)	(0.185)	(0.189)	(0.185)
$5	-0.080	-0.081	-0.080	-0.138	-0.133	-0.161	-0.365	-0.356	-0.365
	(0.071)	(0.070)	(0.071)	(0.110)	(0.112)	(0.119)	(0.255)	(0.259)	(0.255)
constant	0.235***	0.234***	0.235***	0.458***	0.463***	0.508***	0.615***	0.611***	0.615***
	(0.046)	(0.046)	(0.046)	(0.059)	(0.059)	(0.065)	(0.135)	(0.136)	(0.135)
Age-gender controls	No	Yes	No	No	Yes	No	No	Yes	No
Sample size	308	308	285	308	308	285	308	308	285

Panel B: Intensive margin (donation size conditional on making a donation)

	Selfish				Reluctant				Generous			
		Quantile regression				Quantile regression				Quantile regression		
	OLS	25^{th}	50^{th}	75^{th}	OLS	25^{th}	50^{th}	75^{th}	OLS	25^{th}	50^{th}	75^{th}
50¢-at-Invitation	1.22	0	0	3.00*	0.19	0.50*	0	0	-0.44	-	-	-
	(0.812)	(0.388)	(0.606)	(1.529)	(0.565)	(0.270)	(0.422)	(1.065)	(0.914)			
50¢-at-Payment	0.33	0	0	0	0.83	0.50*	1.00**	1.00	-1.67	-	-	-
	(0.812)	(0.388)	(0.606)	(1.529)	(0.607)	(0.290)	(0.453)	(1.143)	(1.103)			
$5-at-Invitation	2.80***	2.00***	2.00***	2.00	1.25*	1.00***	1.00**	1.00	-2.00	-	-	-
	(0.906)	(0.433)	(0.676)	(1.707)	(0.675)	(0.323)	(0.504)	(1.272)	(1.560)			
$5-at-Payment	0.75	0	1.00	1.50	1.19*	0.50*	0.50	2.00*	-2.00	-	-	-
	(0.872)	(0.417)	(0.651)	(1.643)	(0.616)	(0.295)	(0.460)	(1.161)	(1.233)			
constant	1.00	1.00***	1.00**	1.00	0.94*	0.50**	1.00***	1.00	3.00**	-	-	-
	(0.675)	(0.323)	(0.504)	(1.272)	(0.478)	(0.228)	(0.356)	(0.900)	(0.780)			
Sample size	111	94	94	94	111	94	94	94	111	-	-	-

Notes: Panel A shows marginal effects of the information received at the Invitation Stage on the intent to donate, from probit regressions where the dependent variable is a binary indicator for acceptance to donate at the Invitation Stage. Regressors for model (1) are the information received at the Invitation Stage, the participant's type, and their interaction. Model (2) adds age and gender controls. Model (3) includes the same regressors as model (1) but excludes from the sample individuals in the Reluctant type who shared $0 or $1 in the dictator game. Panel B shows marginal treatment effects from an OLS regression and quantile regressions, where the regressors are the treatment received, the participant's type, and the interaction of the two. OLS computes estimates of effects on the mean size of the donation conditional on making a donation. Quantile regressions compute estimates of effects on the first quartile, median, and third quartile donation size conditional on making a donation. Quantile regression estimates could not be computed for Generous participants due to their low frequency. Standard errors in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

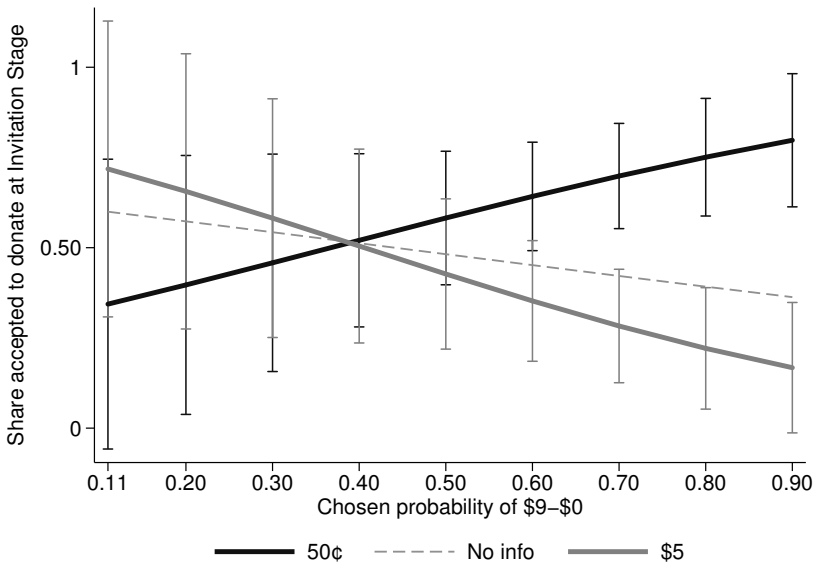

Figure 5: Intent to Donate for Reluctant Participants Conditional on Their Selected Probability of $9-$0

Notes: This figure shows the estimated fraction of participants who accepted to donate at the Invitation Stage, given the information received at this stage, and conditional on their selected probability of getting $9-$0. Sample limited to Reluctant participants. The x-axis starts at 0.11 since by definition Reluctant participants indicated a probability of $9-$0 greater than 0.10. Estimates based on a probit regression of a binary indicator for acceptance to donate at the Invitation Stage regressed on the information received at this stage, the probability of getting $9-$0, and their interaction (estimates do not vary significantly when controlling for age and gender or when excluding from the sample Reluctant participants who shared $0 or $1 in the dictator game). Observations from treatments *50¢-at-Payment, $5-at-Payment,* and *No-info* are combined and labeled 'No info', since these treatments did not provide information about a previous donation at the Invitation Stage. Error bars indicate 90% confidence intervals, omitted for the 'No info' condition for improved visibility.

where g_i is the size of individual i's donation and the regressors are the indicator variables previously defined. I estimate this equation on the sample of participants who made a donation. The marginal effects for each type are shown in the OLS columns of Panel B Table 3.

These OLS estimates capture only the effect of the information on the mean of the distribution of the donation size. But as we saw in Figure 3, much of the effect on the intensive margin appears at the lower end of the distribution. To capture the effect of the information on the intensive margin of giving at the lower part of the distribution, I estimate a quantile regression on the first quartile, and for completeness also estimate the median and

third quartile, with the equation

$$\begin{aligned} Q_g(\tau|x_i) = \quad & \alpha_\tau + \beta_{\tau 1}\text{50¢-Inv}_i + \beta_{\tau 2}\text{50¢-Pay}_i + \beta_{\tau 3}\text{\$5-Inv}_i + \beta_{\tau 4}\text{\$5-Pay}_i \\ & + \beta_{\tau 5} reluc_i + \beta_{\tau 6} gener_i + \beta_{\tau 7}\text{50¢-Inv}_i * reluc_i + \beta_{\tau 8}\text{50¢-Inv}_i * gener_i \\ & + \beta_{\tau 9}\text{50¢-Pay}_i * reluc_i + \beta_{\tau 10}\text{50¢-Pay}_i + gener_i + \beta_{\tau 11}\text{\$5-Inv}_i * reluc_i \\ & + \beta_{\tau 12}\text{\$5-Inv}_i * gener_i + \beta_{\tau 13}\text{\$5-Pay}_i * reluc_i + \beta_{\tau 14}\text{\$5-Pay}_i * gener_i \end{aligned}$$

where $Q_g(\tau) = \inf\{g : F(g) \geq \tau\}$, $F(g)$ is the pdf of g, and $\tau \in \{0.25, 0.5, 0.75\}$ is the specific quantile estimated. Least absolute deviation (LAD) estimates for each type of participant and each quantile are shown in the Quantile regression columns of Panel B Table 3. These estimates could not be computed for the Generous type due to the small number of observations for this type. Therefore I dropped from this estimation the Generous participants, which decreased the sample size from 111 to 94.

The Reluctant participants were the most sensitive to the social information, especially with respect to the smaller amounts they donated. Without receiving information, 75% of the Reluctant donors contributed at least 50¢. In all information treatments, this statistic went up significantly to \$1 or even \$1.50 (in the *\$5-at-Invitation* treatment). Selfish participants, in contrast, were largely insensitive to the information, as their contribution size did not change relative to *No-info* except for the *\$5-at-Invitation* treatment.

In summary, the participants classified as Reluctant based on the elicitation measure drove the treatment responses. This strengthens the idea that the motivation behind the changes in the extensive and intensive margins of giving caused by the social information is the same as the motivation for sharing reluctantly in the dictator game—likely an effort to not appear selfish. If this is so, it remains unclear whether the participants were trying to impress themselves or an imagined audience. It is also unclear why they found it acceptable to decline to donate in the Invitation Stage when they learned that others gave \$5, and to quietly retract their dictator transfer, since both are deliberate selfish actions. These questions cannot be addressed with the current experimental design. Section 4 proposes a

mechanism based on self-serving rationalization.

4. THEORY: A MODEL OF RELUCTANT GIVING

This section presents a model of reluctant giving and its response to information about others' donations. Its purpose is to demonstrate a mechanism that might drive reluctant giving, and to contribute to the literature in the following ways. First, by modeling the action of avoiding the solicitation as distinct from the action of explicitly donating \$0, which makes it possible to formally define reluctant giving (as donating more than \$0 if asked, but otherwise avoiding the solicitation). Second, by showing that reluctant giving can be sustained in equilibrium. Finally, by examining how the equilibrium may change when social information is introduced. The model is premised on the psychological concepts of motivated reasoning (Kunda, 1990) and excuse-driven behavior, which, as detailed below, have found recent support in experimental economics.

The model is an extension of Benabou and Tirole (2006), where a donor decides how much to give to charity, and her decision is seen by an observer. The donor cares intrinsically about contributing, but also wishes to signal generosity to the observer.[15] I extend this model by (1) adding a previous Invitation Stage in which the donor decides whether to participate or avoid the solicitation, and (2) by endowing the donor with the ability to excuse herself for not participating in the solicitation for reasons other than lack of generosity. Finally, I consider that providing the donor with information about others' donations affects her ability to excuse herself, and explore the equilibrium implications of this proposition.

For ease of exposition, Section 4.1 introduces the game as if the donor and the observer are two different individuals. This is the more typical and natural construction of signaling

[15]Since the donor derives utility from the updated beliefs of the observer, this is a dynamic psychological game (Battigalli and Dufwenberg, 2009).

problems. Section 4.2 describes the players' preferences, and Section 4.3 derives an equilibrium. Section 4.4 defines reluctant giving based on the equilibrium. Section 4.5 reinterprets the model as one of self-signaling, where the donor is her own observer. This is the more pertinent interpretation when decisions are private, as in our experiment. Finally, Section 4.6 discusses a possible mechanism through which social information affects reluctant donors in light of this reinterpretation.

4.1 Two-Stage Solicitation Game

Consider a game between a donor and an observer. To avoid confusion I often refer to the donor as she and the observer as he.

The donor comes from a population of donors with heterogeneous levels of generosity. Let the donor's generosity, v, be a random draw from a uniform distribution on $[0, 2\bar{v}]$, $\bar{v} > 0$. v is private information to the donor, and unknown to the observer.

The donor decides to make a donation to a charity in two stages: the Invitation Stage and the Payment Stage. In the Invitation Stage the donor chooses whether to participate in the Payment Stage. Denote this binary choice by $d \in \{0, 1\}$, where $d = 1$ means the donor chose to participate. If the donor participates in the Payment Stage, she then selects the amount $g \geq 0$ of money to donate. If she does not participate, the Payment Stage does not take place and she does not donate. This setup corresponds to the experimental design as well as to natural situations where solicitees can anticipate an opportunity to give (for example by being invited to attend a fundraising event, or by noticing a solicitor in the distance) and can decide whether to pursue the opportunity.

Independently of the value of v, there is a commonly-known probability $p \in (0, 1)$ that the donor fails to participate in the Payment Stage due to circumstances outside her control. This captures the fact that anyone may find herself unable to help despite her intentions, rather than due to a deliberate choice. Hence $p \in (0, 1)$ is constant and independent of the donor's level of generosity. As a preview of the results, one may imagine that this fact can

be used strategically to cover up one's lack of generosity, and this will occur in equilibrium in the model. But this equilibrium will arise endogenously—the model does not assume that ungenerous individuals are more likely to experience obstacles to their participation in prosocial activities.

Since the donor may not participate despite choosing to, it is useful to denote actual participation separately from the choice d. Let $a \in \{0, 1\}$ denote whether the donor actually participates in the Payment Stage, where $a = 1$ means that the donor participated.

The observer sees the intensive and extensive margins of giving, but not the donor's intentions. He observes a but not d—namely, he sees whether the donor fails to participate in the Payment Stage, but not whether she does so deliberately or involuntarily. He also observes g if $a = 1$. From the observables he forms a belief about the donor's level of generosity, as described below.

4.2 Preferences

Following Benabou and Tirole (2006), when the donor donates g, she derives intrinsic utility gv and incurs in cost $kg^2/2$, where $k > 0$ is fixed and commonly known. The donor also derives image utility from what the observer thinks of her. This utility depends on the observer's expectation of v conditional on the actions a and g observed. When she donates g, her image utility is equal to $\gamma E(v|g)$, where $\gamma > 0$ is fixed and commonly known and reflects the donor's intensity of her image concern. $E(v|g)$ is the observer's expectation of the donor's level generosity given the observed donation g.[16] When she does not participate in the Payment Stage, the donor derives image utility equal to $\gamma E(v|a = 0)$.

Note that if the donor donates nothing—whether by not participating in the Payment Stage, or by participating and choosing $g = 0$—she derives no intrinsic utility and incurs in no cost, but still derives image utility as given by the observer's beliefs conditional on what

[16]Strictly speaking, the donor's image utility is not a function of $E(v|g)$ but of the donor's expected value of $E(v|g)$, since the observer's beliefs are not known to the donor. But in equilibrium beliefs are assumed to be accurate, and so formulating the donor's preferences in terms of the observer's beliefs is without problem and avoids the more cumbersome notation of second-order beliefs.

he observes. That is, she derives $\gamma E(v|a=0)$ or $\gamma E(v|g=0)$, whose values are to be derived in equilibrium.

For completeness, the observer's utility is $\bar{c}$, some constant across all outcomes of the game.

4.3 Equilibrium

I solve for a Bayesian equilibrium whose outcome corresponds to reluctant giving, and that is reasonable in the sense that it survives Cho and Kreps' (1987) equilibrium domination test.

Given preferences, the donor's problem can be written as

$$\max_{d\in\{0,1\},\, g\geq 0} d\left\{p\gamma E(v|a=0) + (1-p)\left[vg - \frac{kg^2}{2} + \gamma E(v|g)\right]\right\} + (1-d)\left\{\gamma E(v|a=0)\right\} \quad (1)$$

Letting $R(g) \equiv E(v|g)$ and assuming that $R(g)$ is differentiable, then conditional on agreeing to participate in the Payment Stage, the donor chooses to donate the amount $g^*(v)$ given by the first-order condition

$$v - kg^*(v) + \gamma \frac{dR\left(g^*(v)\right)}{dg} = 0 \quad (2)$$

The function $R(g)$ will result endogenously in equilibrium, but is taken as given by the donor when solving her problem. If $R(g)$ is weakly increasing in g, then equation (2) implies that the donor's level of generosity is perfectly revealed from the amount she donates, as there is a unique optimum g different for each v. It follows that, under rational expectations, beliefs in equilibrium pin v perfectly when $g^*(v)$ is observed; namely

$$R\left(g^*(v)\right) = g^{*-1}\left(g^*(v)\right) = v \quad (3)$$

Substituting (3) into (2) obtains the differential equation

$$R\left(g^*(v)\right) - kg^*(v) + \gamma \frac{dR\left(g^*(v)\right)}{dg} = 0 \tag{4}$$

The solution to this equation is the belief rule that maps the observed donation g to the posterior expected level of generosity the observer infers in equilibrium. This function is

$$R(g) = k\left[g - \gamma\left(1 - e^{-g/\gamma}\right)\right] \tag{5}$$

where the initial condition has been set to $R(0) = 0$. This initial condition states that the observer identifies the minimum possible donation amount ($g = 0$) as coming from a donor with the lowest possible level of generosity ($v = 0$). This condition also guarantees that $R(g)$ is increasing in g for any $k > 0$ and $\gamma > 0$.

The donor's optimal donation as a function of her generosity, conditional on participating in the Payment Stage and given the beliefs $R(g)$, is given by $g^*(v)$, found by taking the derivative of the belief rule and substituting it into equation (2), obtaining

$$g^*(v) = \frac{v}{k} + \gamma\left[1 + \mathcal{W}_0\left(-e^{-1-\frac{v}{k\gamma}}\right)\right] \tag{6}$$

where $\mathcal{W}_0$ is the principal branch of the Lambert W function.[17] Note that $g^*(v)$ is increasing in v, and $g^*(0) = 0$, as Figure 6 shows.

Given $R(g)$ and $g^*(v)$, the payoff that the donor expects to get on agreeing to participate in the Payment Stage is the value function

$$U^*(v) \equiv p\gamma E(v|a = 0) + (1 - p)H(v) \tag{7}$$

[17]The Lambert W function is defined as the solution to $x = \mathcal{W}(x)e^{\mathcal{W}(x)}$. Its principal branch, $\mathcal{W}_0(x)$, is real-valued and increasing for $x \geq -\frac{1}{e}$, with $\mathcal{W}_0(-\frac{1}{e}) = -1$, which implies that in our problem $g^*(v)$ is real-valued and increasing in v for any $v \geq 0$, given that $k > 0$ and $\gamma > 0$. For a discussion on the Lambert W function, see Corless et al. (1996).

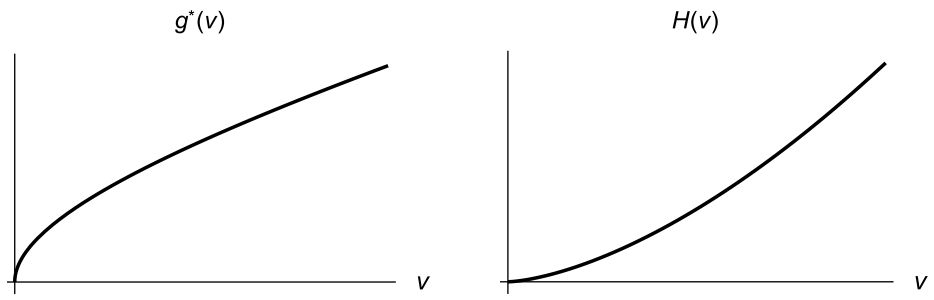

Figure 6: Functions $g^*(v)$ and $U^*(v)$ for arbitrary values of k and γ

where $H(v) \equiv \gamma v + \frac{1}{2k}\left(v^2 - k^2\gamma^2\Psi^2(v)\right)$ and $\Psi(v) \equiv 1 + \mathcal{W}_0\left(-e^{-1-\frac{v}{k\gamma}}\right)$. Note that $H(v)$ is increasing in v for any $k > 0$ and $\gamma > 0$, is continuous, and $H(0) = 0$. Figure 6 shows the general shape of H.

The value of $E(v|a = 0)$ remains to be solved for. It also must be proved that the obtained solution is an equilibrium, by checking that the donor has no incentives to deviate. I start by describing a situation that is not an equilibrium, but that is instructive and serves to introduce the subsequent discussion.

4.3.1 An Equilibrium That Fails: Full Participation Consider a candidate equilibrium in which no donor deliberately avoids participating, and the donor of generosity level v chooses $g^*(v)$. Then, any donation $g \in [0, g^*(2\bar{v})]$ is observed in equilibrium with probability $(1-p)/2\bar{v}$, and the observer's beliefs are such that, when g is observed, they place full weight on the donor having generosity level $R(g)$. Failure to participate in the Payment Stage is observed only when it happens unintentionally, which occurs with equal probability p to a donor of any level of generosity. Beliefs about the generosity of a donor who fails to participate are therefore uniform over $[0, 2\bar{v}]$, so that $E(v|a = 0) = \bar{v}$.

But this cannot be an equilibrium, since a donor with low enough level of generosity has an incentive to deviate to deliberately opting out of the Payment Stage. Take for instance the least generous donor ($v = 0$). In this candidate equilibrium she gives $g^*(0) = 0$, and derives expected utility $p\gamma\bar{v} + (1-p)0 = p\gamma\bar{v}$. If instead she decided not to participate in

the Payment Stage, she would obtain utility $\gamma\bar{v}$, which is clearly greater than $p\gamma\bar{v}$ for any valid p. Therefore she prefers the deviation, breaking the equilibrium. This incentive to avoid participating holds not only for the least generous donor, but also for any donor with generosity level low enough such that $H(v) < \gamma\bar{v}$.

Full participation fails because the observer interprets non-participation as an unintended occurrence. The observer's ingenuousness can be exploited by a donor who prefers to avoid participating and be mistaken for the average type over donating $g^*(v)$ and revealing her low generosity. This raises the possibility of another candidate equilibrium—our actual equilibrium—where donors of certain level of generosity deliberately opt out of the Payment Stage, and the observer correctly incorporates such behavior into his beliefs.

4.3.2 Equilibrium: partial pooling at non-participation Consider a candidate equilibrium in which there exists a generosity level $0 < v_c < 2\bar{v}$ such that a donor with $v < v_c$ deliberately chooses to opt out of the Payment Stage, and a donor with $v > v_c$ opts in and donates $g^*(v)$. Hence, any donation $g \in (g^*(v_c), g^*(2\bar{v})]$ is observed in equilibrium with probability $(1-p)/(2\bar{v}-v_c)$. The observer's beliefs are such that, when g is observed, they place full weight on the donor having generosity level $R(g)$ and zero weight elsewhere. Failure to participate occurs either unintentionally (for donor of any v) or intentionally (for a donor of $v < v_c$). Therefore, when non-participation is observed, beliefs about the donor's generosity are uniform over $[0, 2\bar{v}]$ with probability p, and uniform over $[0, v_c]$ with probability $1-p$. The expected value of this mixture is $E(v|a=0) = p\bar{v} + (1-p)^{v_c}/_2$. Donations of $\tilde{g} \in [0, g^*(v_c))$ are never observed in equilibrium, and as such beliefs upon observing them must be specified outside Bayes rule. I assume that if $\tilde{g}$ is observed, beliefs place full weight on $R(\tilde{g})$. (Below I check that the equilibrium with these beliefs survives Cho and Kreps' (1987) equilibrium domination test.)

For this equilibrium to exist, any donor who deliberately opts out must not prefer to deviate to opting in and giving $g^*(v)$, and any donor who donates $g^*(v)$ must not prefer

to deviate to opting out. Since $H(v)$ is increasing in v, these conditions hold if the donor with cutoff generosity v_c is indifferent between deliberately avoiding the Payment Stage and participating with a donation of $g^*(v_c)$; that is, if

$$p\gamma\left[p\bar{v}+(1-p)\frac{v_c}{2}\right]+(1-p)H(v_c)=\gamma\left[p\bar{v}+(1-p)\frac{v_c}{2}\right] \tag{8}$$

Equation (8) is always satisfied by a unique and positive v_c. Moreover, as the following proposition states, v_c is strictly in $(0,2\bar{v})$ for appropriately chosen values of k, γ, and $\bar{v}$.

Proposition 1. The equilibrium with partial pooling at non-participation exists if and only if $k\gamma<\frac{\bar{v}\left(1+\sqrt{1+4\Psi^2(2\bar{v})}\right)}{\Psi^2(2\bar{v})}$.

Proof: See Appendix B.

The behavior of donors is illustrated in Figure 7. Generous-enough donors ($v>v_c$) decide to contribute their optimal gifts, their generosity is perfectly revealed from their gifts, and they obtain expected utility $U^*(v)$. Not-so-generous donors ($v<v_c$) all deliberately avoid the Payment Stage, all are considered $v_c/2$ by the observer in expectation, and all receive expected utility $U^*(v_c)$.

The ability to opt out at the Invitation Stage allows donors to contribute nothing and not entirely tarnish their image. They cover their lack of generosity behind the possibility that their failure to participate was unintentional. But their cover-up is partial, as the observer correctly expects non-participation to be more likely among ungenerous donors.

Beliefs off the equilibrium path were determined arbitrarily. To ensure that they are reasonable, I derive an additional restriction on the parameter values that guarantees that the equilibrium survives the equilibrium domination test of Cho and Kreps (1987). This is one of several equilibrium refinement concepts created to eliminate equilibria in signaling games that are sustained by "illogical" beliefs off equilibrium.

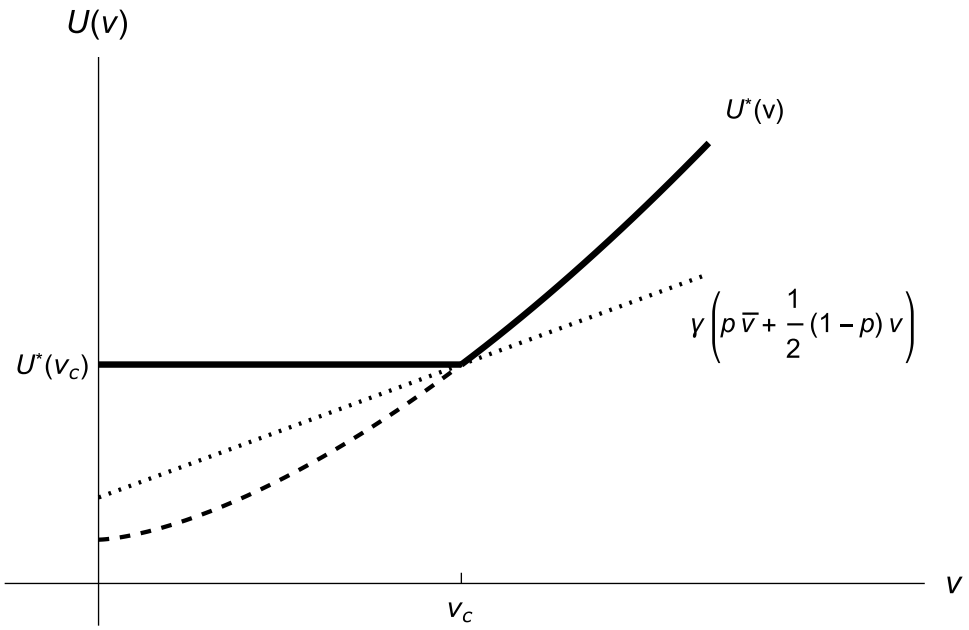

Figure 7: Equilibrium: Partial Pooling at Non-Participation

Notes: The solid line traces the donor's expected utility in equilibrium given her generosity v. Donors below v_c choose not to participate in the Payment Stage and obtain $U^*(v_c)$. Donors above v_c choose to participate with a donation of $g^*(v)$ and obtain $U^*(v)$. Donor v_c is indifferent between not participating and donating $g^*(v_c)$.

Proposition 2. If $k\gamma < \frac{2e\bar{v}}{e-2}$, then the equilibrium with partial pooling at non-participation survives Cho and Kreps' (1987) equilibrium domination test.

Proof: See Appendix B.

4.3.3 Defining Reluctance: Avoid the Payment Stage if Possible, but Otherwise Donate

In the game above, the donor foresees the Payment Stage and can decide not to participate in it, just as donors in practice sometimes anticipate that someone will ask them for money and can decide whether to seek or steer away from the solicitor. Other times the request cannot be anticipated, and donors must reply directly. Reluctant donors are individuals whose image concern compels them to donate in the latter case, but avoid the Payment Stage in the former case.

To describe this behavior, consider now a version of the game in which the solicitation consists only of the Payment Stage. In this new game, donors cannot fail to participate in

the Payment Stage (involuntarily or by choice), and must make a donation of $g \geq 0$. Though a and p are no longer part of the problem, monetarily this game is no more restrictive than the original, as donors can choose $g = 0$. If the donor has the same preferences as before, her problem is now

$$\max_{g \geq 0} \left\{ vg - \frac{kg^2}{2} + \gamma E(v|g) \right\}$$

By following the previous derivation steps, one finds that there now exists a full-participation equilibrium in which donor of type v donates $g^*(v)$ as defined above. More importantly, there is also a partial-pooling equilibrium, with pooling at $g = 0$. Donors below the cutoff v_c' give $g = 0$ and donors above v_c' give $g = g^*(v)$, where v_c' is such that $H(v_c') = \gamma \frac{v_c'}{2}$. For off-equilibrium donations $\tilde{g}'$, beliefs place full weight on $R(\tilde{g}')$. As before, the fact that a whole subset of donors pools at $g = 0$ makes it impossible for the observer to perfectly identify the level of generosity of a donor who gives nothing. This yields enough image utility for the least generous individuals to prefer giving zero over perfectly revealing their type by giving $g^*(v)$.

Partial pooling at $g = 0$ is not an equilibrium of the original, two-stage game.[18] The reason is that in that game, the observer interprets failure to participate more favorably than a \$0 donation, due to the chance p that anyone fails to participate despite their intentions. As long as $p > 0$, some donors prefer to opt out over explicitly donating \$0, and therefore the partial-pooling equilibrium at non-participation in the original game comprises all individuals who pool at $g = 0$ in the equilibrium of the new game plus an additional group of individuals. This additional group are the reluctant givers: individuals who donate a positive amount when they are unable to avoid the Payment Stage, but who opt out when there is an Invitation Stage. This result is guaranteed by the following condition.

[18] To see this, suppose it was an equilibrium. Failure to participate in the Payment Stage would only be observed when it occurred involuntarily, making $E(v|a = 0) = \bar{v}$. Then anyone pooling at $g = 0$ in this candidate equilibrium would prefer to deviate to deliberately opting out of the Payment Stage, since $\gamma \bar{v}$ is necessarily larger than $\gamma \frac{v_c'}{2}$, and this breaks the equilibrium.

Proposition 3. In the two-stage game, $v_c(p)$ increases in $p \in (0,1)$ in the equilibrium with partial pooling at non-participation if and only if $k\gamma < \frac{2v_c(0)}{\frac{2}{\sqrt{e}}-1}$. This condition can always be satisfied while satisfying conditions for Proposition 1 and Proposition 2.

Proof: See Appendix B.

Figure 8 illustrates this result. In the game where the Payment Stage is the only stage, all donors below v_c' pool at $g = 0$ and obtain utility $\gamma E(v|g = 0)$, whereas in the game with the Invitation Stage, a larger set of donors (all donors below v_c) opt out, all of whom obtain a larger level of utility equal to $\gamma E(v|a = 0)$. Individuals between v_c' and v_c are the reluctant donors. They donate if they cannot avoid the Payment Stage, but opt out if there is an Invitation Stage. The least generous individuals in the population (donors below v_c') give in neither game, and the most generous (higher than v_c) give in both games. The reluctant donors are those who change their behavior with the Invitation Stage.

4.3.4 Reinterpreting the Model as Self-Signaling Individuals give reluctantly even when donations are private and anonymous, as this and other experiments show. The behavior may therefore be driven in part by a self-image concern—an attempt to satisfy one's own judgement. Self-image is often characterized with a dual-self model, whereby an agent with limited self-insight infers her moral identity from her actions. A dual-self reinterpretation of our model considers the donor and the observer as different sides of the same agent, who decides whether and how much to donate but also lacks awareness of what motivates her actions and thus forms an impression of her generosity from the observables a and g.[19]

To sustain reluctant giving in equilibrium, two elements are essential in the model: (1) a probability p that any donor fails to participate in the Payment Stage independently of her generosity, and (2) that the observer not see the donor's participation choice d. With them, the observer can legitimately excuse the donor for not participating. The excuse is objective in the model, and given by p. Reinterpreted in a dual-self light, these elements

[19]For more on the self-image interpretation of signaling models see Benabou and Tirole (2006).

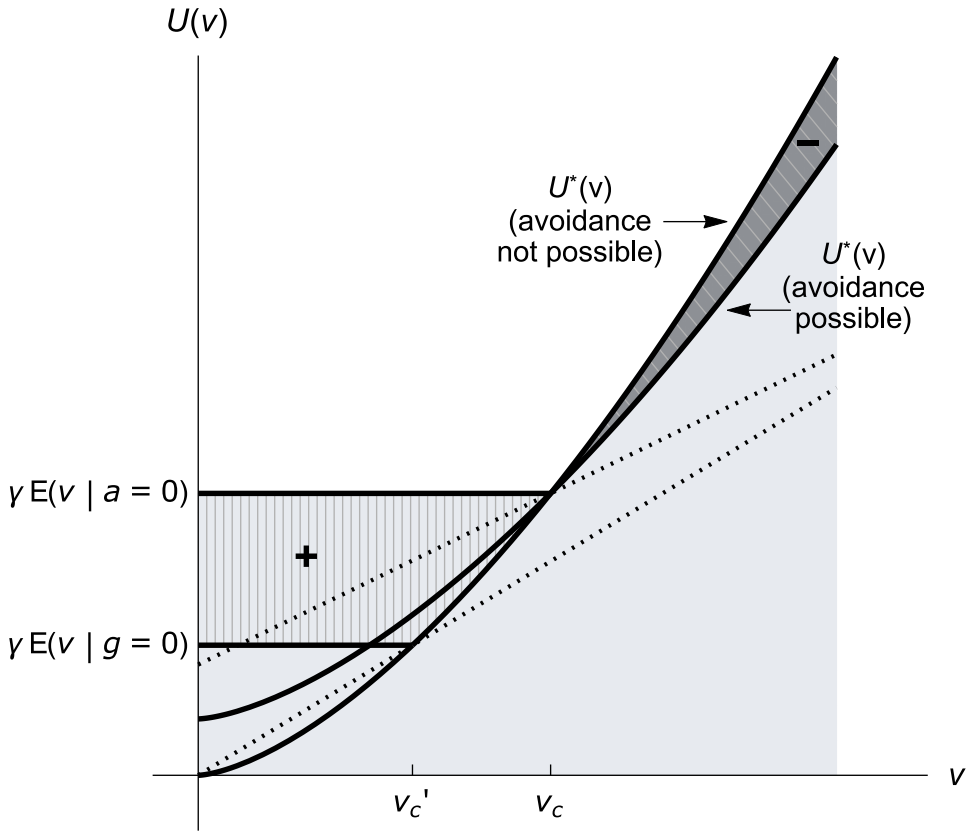

Figure 8: The Value of the Invitation Stage

Notes: Solid lines trace the donor's expected utility in equilibrium given her generosity v. Avoidance is not possible in the game with only a Payment Stage, and avoidance is possible in the two-stage game. With only a Payment Stage, donors below v_c' donate \$0 and obtain $\gamma E(v|g=0)$, and donors above v_c' donate $g^*(v)$ and obtain the corresponding $U^*(v)$. With an Invitation Stage, donors below v_c choose not to participate in the Payment Stage and obtain $\gamma E(v|a=0)$, and donors above v_c donate $g^*(v)$ and obtain the corresponding $U^*(v)$. Donors between v_c' and v_c are the reluctant donors, who donate a positive amount if they cannot avoid the Payment Stage, but do not participate if there is an Invitation Stage.

describe a donor who, when she does not participate, is unaware of what motivated her (i.e., cannot access d) and has a tendency (of magnitude p) to find excuses or justifications for not participating. Now p is a trait of the agent rather than a feature of the environment. As long as p is common knowledge, the model is otherwise unchanged and the equilibrium remains.[20]

Work in psychology and economics provides ample reason to adopt this dual-self interpre-

[20]The donor has limited self-insight of her decision to participate, but is fully aware of what motivates her to donate a specific amount g. One may imagine another model where she is also unaware of what motivates g, and has a tendency to excuse herself, especially for donating g close or equal to zero. For simplicity I do not pursue this. In this more general model p would be the donor's tendency to rationalize the action $a=0$ in excess of her tendency to rationalize g.

tation. There is considerable evidence that individuals interpret events and actions—including their own actions—in self-serving ways.[21] In the words of Kunda (1990), "people may bias their self-characterizations when motivated to do so." A donor motivated to keep both her money and a good impression of herself is more likely to decline to donate at the Invitation Stage than to more explicitly donate \$0 at the Payment Stage insofar as she finds it easier to rationalize to herself the former. In situations outside the lab, individuals may avoid the solicitor and offer to themselves reasons such as "I may be asked to provide contact information that I am not willing to share," or "the solicitation may take too much time." These excuses are plausible, but their objectivity is illusory, as Kunda (1990) puts it. p captures this self-serving rationalization.

4.3.5 How May Social Information Affect Reluctant Donors? Less Room to Rationalize The economics literature considers a number of ways in which information about past donations affects solicitees. Altruists care about the sum of money the charity receives, and donate to compensate for others' low donations (Varian, 1994). Individuals who derive prestige from giving seek to exceed others' donations (Romano and Yildirim, 2001). Solicitees who are unsure about the merits of the charity infer merit from others' donations, securing a positive correlation between their donations and that of others (Vesterlund, 2003).

As discussed in Section 3, these theories have trouble explaining reluctant giving. If reluctant donors avail themselves of opportunities to decline to donate to the extent that they can come up with self-serving rationales for doing so, it is reasonable to conjecture that social information affects their ability to find excuses for not participating. Donors may find it harder to rationalize their unwillingness to help if others are willing to contribute small amounts. Excuses such as "I decline to donate because I really need the money," or "I

[21] Kunda (1990) reviews evidence that motivation biases strategies for accessing, constructing, and evaluating beliefs. In another, relevant experiment in psychology Snyder et al. (1979) show that people are more likely to avoid interacting with a handicapped person if they can appear to be doing so on some other basis. In experimental economics, Haisley and Weber (2010) demonstrate that people interpret ambiguity self-servingly when doing so provides a justification for unfair behavior, and Exley (2015) finds similar bias in the domain of risk. For a decision-theory model of agents who are constrained to make choices that they can rationalize or justify, see Cherepanov et al. (2013).

decline to donate because small amounts probably don't help," seem valid if others donate large amounts, but are not convincing if others donate as low as 50¢.[22]

This can be captured in the model by letting p be positively related to the donation size the donor is informed of. That is, the set of justifications for not participating available to the donor shrinks as she learns that other individuals contribute smaller amounts. If p is related to the information in this way, it is easy to see that in the equilibrium of the model donors respond to the information as follows.

RESULT 1. Donors are more likely to choose to participate in the Payment Stage as the amount they are informed of in the Invitation Stage decreases.

RESULT 2. When information is provided only in the Payment Stage, no donor who participates in this stage donates \$0.

As donors are informed of a smaller amount in the Invitation Stage, more excuses are defeated, and more reluctant givers are induced to participate. Information in this stage thus acts as a screening mechanism. On the other hand, the same information that causes reluctant donors to opt out in the Invitation Stage does not cause them to donate \$0 if received only in the Payment Stage, because donating \$0 would bring an unacceptably high cost on the self-image. Note that the information causes no change in the donation size (other than in the size conditional on participating through the screening mechanism) because, as pointed before, a tendency to rationalize g is not captured in the model to maintain tractability.

[22]The idea that the solicitor invalidates excuses for noncompliance by referring to small donations is proposed by Cialdini and Schroeder (1976), who write: "When the most minimal of monetary donations is said to be acceptable, excuses for failing to help that might ordinarily be offered (e.g., 'I can't afford to give to all the various charities'; 'We're too low on money this week,' etc.) become inapplicable. Further, the refusal to provide 'even a penny' of aid might cause one to feel guilty or ashamed or might jeopardize one's image as a helpful, socially responsible person." Notice that the latter mechanism for increasing compliance—the jeopardizing of one's image—results endogenously in the equilibrium of our model, because as p drops—that is, as excuses become inapplicable—fewer donors pool at $d = 0$ in equilibrium, and therefore the inferred generosity of those who fail to participate goes down.

5. DISCUSSION AND CONCLUSION

To encourage donations, fundraisers often inform solicitees of how much others contribute. The effectiveness of this technique depends on the solicitees' motivations for giving. This paper focuses on the reaction to social information of a particular class of donors: individuals who donate to not appear selfish, but avoid the solicitation when possible.

Such individuals were fairly prevalent in the study—they constituted 41% of the participants according to a novel elicitation employed. They were also highly responsive to social information, in directions that suggest that they responded reluctantly. Their intent to donate went up to 0.79 when informed that another participant donated 50¢, and down to 0.17 when informed of a $5 donation. However, if shown the same information only after accepting the invitation to give, they all gave, and donated on average 88% and 127% more (when informed of a 50¢ and $5 donation, respectively) than they did without any information. This behavior correlated with the individual's willingness to quietly retract a dictator-game contribution, supporting the idea that the reaction was associated with a tendency to give reluctantly. Women were more prone than men to give reluctantly, and this tendency explained the observed gender differences in the reactions to the social information and in the amounts shared in the dictator game. Finally, a model is presented, based on the theory of motivated reasoning, to demonstrate how reluctant giving can be formally defined, how it can be sustained in equilibrium, and how it may be affected by social information.

The findings demonstrate that the profitability of announcing others' donations depends not only on what amount is announced, but also on when the amount is announced. Charities soliciting for funds may gain from mentioning a relatively modest previous donation early, when they seek to notify and attract donors to the fundraiser. This can increase participation and not decrease the size of the donations, as the experiment shows. The typical fundraising practice of employing phrases such as "every penny counts," or "spare change is good" may be capitalizing on reluctant givers. At the same time, charities may find it more effective to

optimize the content and timing of the provision of social information than to employ other common strategies such as offering subsidies to solicitees, which has been found to increase participation but also to decrease the average amount shared among entrants (Lazear et al., 2012). Of course, the assumption here is that the solicitees are individuals who donate out of image concerns. Individuals with other motivations for giving may react differently to the social information, as work reviewed in this paper suggests.

Future research may help determine whether reluctant giving is a stable type that can be predicted.[23] Appendix B includes evidence that reluctant donors are no more or less empathetic than outright selfish participants. They do report a higher sense of responsibility toward helping others, and score higher on the personality trait of neuroticism. A much premature take on these findings is that reluctant donors give not because they empathize with the cause, but rather because they feel they must give, and possibly experience negative emotions from the solicitation. More work may inform this question.

Given the interest of charitable organizations in maintaining a pool of donors from which to draw funds repeatedly, another open question is whether reluctant donors become less responsive to social information after multiple requests, and whether they are likely to become part of a donor "warm list." It is possible that reluctant donors learn from experience to be comfortable with rejecting the solicitor. The findings may also inform charities on how to solicit from a warm list. Repeat donors, by having donated previously, have already expressed an intention to give, and thus soliciting from them corresponds more closely to a game involving only a Payment Stage, where mentioning a higher donation is more profitable. Therefore, it may be revealing to investigate how effective it is to adapt the content and timing of the provision of social information depending on whether the goal is to build a donor pool vs. to raise the most funds immediately, and depending on whether the pool of solicitees constitutes fresh vs. past donors.

[23] On this, Lotz et al. (2013) find that individuals who score low on justice sensitivity—the importance placed on justice in everyday life—tend to avoid giving and become selfish when circumstances give them an excuse to do so.

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APPENDIX A. SUPPLEMENTARY ANALYSIS

Response to the Social Information

Intensive Margin Figure A.1 shows the distribution of donations among subjects who made a donation.

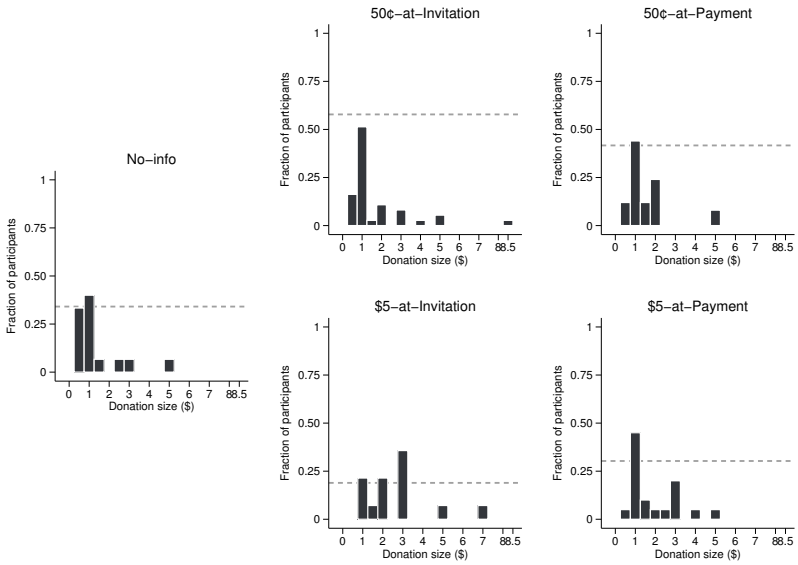

Figure A.1: Uncollapsed Distribution of Donation Sizes Conditional on Donating by Treatment

Notes: This figure shows the fraction of participants who donated a given amount among all participants who donated a positive amount in the treatment. Dashed lines mark the fraction of participants who donated a positive amount in the treatment.

Reluctance Measure Table A.1 shows the number of participants classified as Selfish, Reluctant, and Generous for each treatment.

Gender Differences

Previous work finds that men and women respond differently to the social context in economics experiments (Croson and Gneezy, 2009), and that women are more likely than men to avoid a door-to-door solicitor (DellaVigna et al., 2013). In light of this, I now explore

Table A.1: Frequency of Types by Treatment

	No-info	50¢-at-Invitation	50¢-at-Payment	$5-at-Invitation	$5-at-Payment	**Total**
Selfish	18	45	24	33	34	**154**
Reluctant	22	25	30	28	22	**127**
Generous	4	4	10	5	4	**27**
Total	**44**	**74**	**64**	**66**	**60**	**308**

gender differences in the reaction to the social information. This part finds women to be more sensitive than men to the social information, in the direction consistent with reluctant giving.

Figure A.2 and Panel A of Table A.2 show the intent to donate for each gender separately, estimated from equations similar to those presented earlier, but now including an indicator variable for the participant's gender and its interaction with the other regressors. Men and women accepted to donate at equal rates (0.35 for men and 0.37 for women) when no information was provided in the Invitation Stage. Men were largely insensitive to the information in this stage; their intent to donate did not change significantly when informed of a donation of 50¢ or $5. Women's reactions, on the other hand, were large and significant; their intent to donate went up to 0.66 when informed of a 50¢ donation and down to 0.09 when informed of a $5 donation. The findings remain after controlling for age. While this gender difference is in line with economics experiments that find women to be more sensitive than men to the social context of the experiment, social susceptibility by itself does not explain the specific directions in which women responded to being informed of a 50¢ or a $5 donation. [24]

In terms of the intensive margin, women were also more responsive than men to the information. Panel B of Table A.2 shows marginal treatment effects on the intensive margin of giving conditional on the participant's gender. As before, these effects are estimated from an equation similar to the one employed earlier, but now including an indicator variable for

[24]Croson and Gneezy (2009) review economics experiments that find gender differences in responses to the social context.

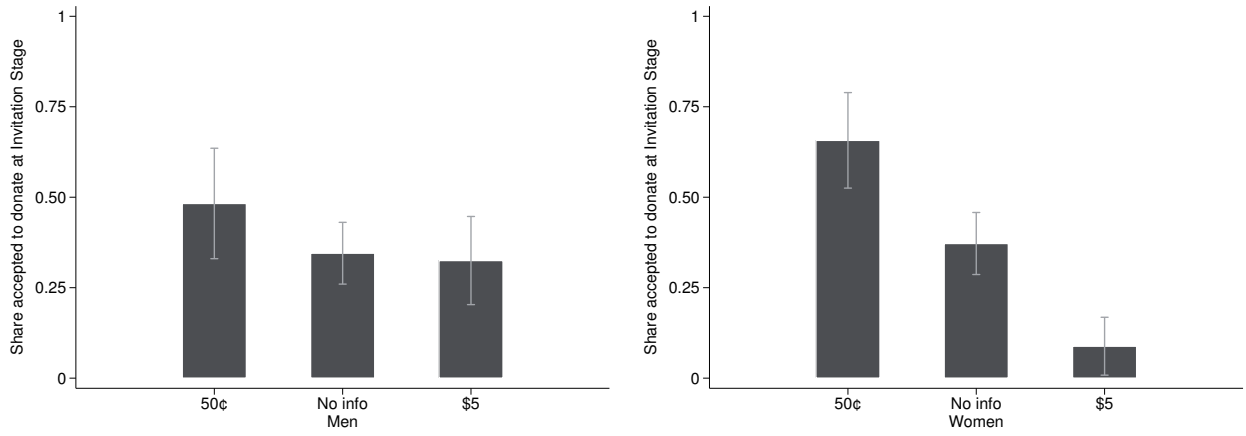

Figure A.2: Intent to Donate by Information Received at Invitation Stage Conditional on Gender

Notes: This figure shows the fraction of participants who accepted to donate at the Invitation Stage, given the information received at this stage and the participant's gender. Estimates based on a probit regression of the binary decision to accept to donate at the Invitation Stage, regressed on the information received at the Invitation Stage, the participant's gender, and their interaction (results are insensitive to controlling for age). Observations from treatments *50¢-at-Payment, $5-at-Payment,* and *No-info* are combined and labeled 'No info', since these treatments did not provide information about a previous donation at the Invitation Stage. Error bars indicate 90% confidence intervals.

the participant's gender and its interaction with the other regressors. Male donors did not give significantly different amounts when informed of a previous donation than when not informed, except for the $5-at-Invitation treatment, which induced larger donations. On the other hand, all information treatments caused female donors to give significantly more than when not informed. This was particularly the case for the lower end of the distribution, meaning that receiving any information caused women donors to become unwilling to donate just 50¢.

Hence it was mostly women that responded to the social information, and their reactions corresponded to that of reluctant giving (see below for evidence that the reluctance measure retains explanatory power within gender, especially for women). The sensitivity of women to the information led to the average revenue being much more different across treatments for women than for men. Panel B of Table A.2 shows the marginal treatment effects on the unconditional donation size; namely, on the average revenue raised per participant. For men, the revenue did not vary significantly across treatments. For women, the difference

Table A.2: Treatment Effects on the Extensive and Intensive Margin of Giving Conditional on Gender

Panel A: Extensive margin (intent to donate)

	Men		Women	
	(1)	(2)	(1)	(2)
50¢	0.138	0.130	0.285***	0.280***
	(0.106)	(0.107)	(0.096)	(0.096)
$5	-0.020	-0.018	-0.284***	-0.283***
	(0.090)	(0.091)	(0.071)	(0.071)
constant	0.345***	0.347***	0.372***	0.371***
	(0.052)	(0.052)	(0.052)	(0.052)
Age control	No	Yes	No	Yes
Sample size	308	308	308	308

Panel B: Intensive margin

	Conditional amount						Unconditional amount			
	Men			Women			Men		Women	
		Quantile regression			Quantile regression		OLS		OLS	
	OLS	25^{th}	50^{th}	OLS	25^{th}	50^{th}	(1)	(2)	(1)	(2)
50¢-at-Invitation	-0.36	0	0	0.78	0.50**	0.50	0.23	0.21	0.74**	0.74**
	(0.700)	(0.272)	(0.481)	(0.565)	(0.219)	(0.388)	(0.331)	(0.338)	(0.337)	(0.337)
50¢-at-Payment	-0.36	0	0	0.66	0.50**	1.00**	0.19	0.17	0.17	0.17
	(0.700)	(0.272)	(0.481)	(0.645)	(0.250)	(0.443)	(0.327)	(0.331)	(0.349)	(0.350)
$5-at-Invitation	1.08	1.00***	2.00***	0.64	1.00**	1.50*	0.41	0.40	-0.40	-0.39
	(0.717)	(0.279)	(0.493)	(1.122)	(0.436)	(0.771)	(0.310)	(0.312)	(0.338)	(0.339)
$5-at-Payment	0	0	0.50	0.89	0.50**	1.00	0.05	0.03	0.15	0.15
	(0.775)	(0.301)	(0.532)	(0.633)	(0.246)	(0.435)	(0.331)	(0.336)	(0.333)	(0.334)
constant	1.75***	1.00***	1.00**	1.11**	0.50***	0.50	0.44*	0.45*	0.50*	0.50*
	(0.586)	(0.227)	(0.403)	(0.478)	(0.186)	(0.329)	(0.245)	(0.250)	(0.269)	(0.269)
Sample size	111	111	111	111	111	111	308	308	308	308

Notes: Panel A shows marginal effects of the information received at the Invitation Stage on the intent to donate conditional on the participant's gender, from probit regressions where the dependent variable is a binary indicator for acceptance to donate at the Invitation Stage. Regressors for model (1) are the information received at the Invitation Stage, the participant's gender, and their interaction. Model (2) adds age as control. Panel B shows marginal treatment effects on the size of the donation conditional on making a donation (Conditional amount) and the size of the donation among all participants in the treatment (Unconditional amount). OLS computes estimates of effects on the mean size, and quantile regressions compute estimates of effects on the first quartile and the median size. For the conditional amount, regressors are the treatment received, the participant's gender, and their interaction. For the unconditional amount, regressors for models (1) and (2) are as in Panel A. Standard errors in parentheses. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table A.3: Intent to Donate Conditional on Information at Invitation Stage, Type, and Gender

	Men			Women		
	Selfish	Reluctant	Generous	Selfish	Reluctant	Generous
50¢	-0.143	0.097	-	0.379**	0.272**	-
	(0.106)	(0.176)		(0.152)	(0.126)	
$5	-0.027	0.151	-	-0.174*	-0.332***	-
	(0.097)	(0.180)		(0.092)	(0.116)	
constant	0.234***	0.448***	0.625***	0.237***	0.465***	0.600***
	(0.062)	(0.092)	(0.171)	(0.069)	(0.076)	(0.219)
Sample size	308	308	308	308	308	308

Notes: The table reports the fraction of participants who accepted to donate at the Invitation stage, as coefficients from a gender-specific logistic regressions with amount announced in the Invitation stage, type, and the interaction of the two as regressors, and the 'No info' condition as the reference condition. The treatments *50¢-at-Payment* and *$5-at-Payment* are merged together with the *No info* treatment and labeled 'No info' in this table, since in none of these treatments was a previous donation announced at the Invitation stage. Standard errors in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

in revenue between the least profitable treatment (*$5-at-Invitation*, which raised $0.10 per participant) and the most profitable treatment (*50¢-at-Invitation*, which raised $1.24 per participant) was more than twelve-fold.

Table A.3 and Figure A.3 provide evidence that the reluctance measure retains some ability to explain behavior in the solicitation within gender, especially for women. Table A.3 shows that the progressive increase in intent to donate from Selfish to Reluctant to Generous holds for both men and women. Figure A.3 shows that for women identified as Reluctant, the probability chosen for $9-$0 continues to have a positive relation with the gap in intent to donate between information seen in the Invitation Stage. For Reluctant men, the differences across information conditions are statistically nil; yet, an upward trend for the 50¢ condition and a downward trend for the $5 condition are discernible.

Personality Traits and the Principle of Care

After completing the reluctance-measure game, participants filled out a Big Five personality questionnaire, a Principle of Care questionnaire, and a demographics questionnaire.

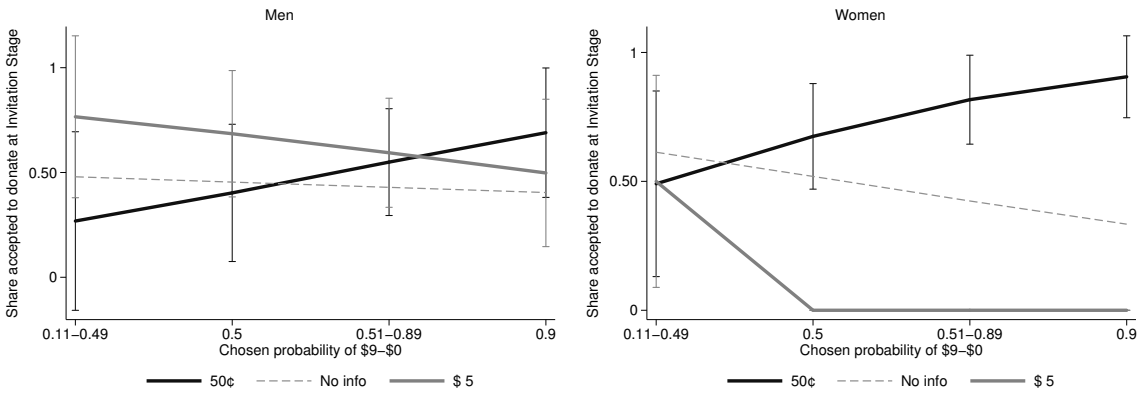

Figure A.3: Intent to Donate for Reluctant Type by Probability for $9-$0 and Gender

Notes: This figure shows the estimated fraction of participants who accepted to donate at the Invitation Stage, given the information received at this stage, and conditional on their selected probability of getting $9-$0. Sample limited to Reluctant participants. The x-axis starts at 0.11 since by definition Reluctant participants indicated a probability of $9-$0 greater than 0.10. Estimates based on gender-specific probit regressions of a binary indicator for acceptance to donate at the Invitation Stage regressed on the information received at this stage, the probability of getting $9-$0, and their interaction. Observations from treatments *50¢-at-Payment, $5-at-Payment,* and *No-info* are combined and labeled 'No info', since these treatments did not provide information about a previous donation at the Invitation Stage. Error bars indicate 90% confidence intervals, omitted for the 'No info' condition for improved visibility.

The Big Five questionnaire is a set of forty-four statements. The participant indicates his level of agreement (from 1 to 5) with each statement, and answers from specific questions are added to produce a score for each of the five fundamental traits that are commonly used to characterize personality (extraversion, agreeableness, openness, neuroticism, and conscientiousness).

The Principle of Care questionnaire is a set of three questions intended to capture whether a person who engages in helping behavior does so because he has internalized a value that one should help others, rather than because he empathizes with the recipient of his help. Participants indicate their agreement (from 1 to 5) with each of the following statements: "*people should be willing to help others who are less fortunate*" (principle of care 1), "*these days people need to look after themselves and not overly worry about others*" (principle of care 2), and "*personally assisting people in trouble is very important to me*" (principle of care 3). Note that a higher agreement score with the second statement implies weaker endorsement of a principle that one should help. Wilhelm and Bekkers (2010) show that responses to

these questions correlate with various kinds of helping behavior, and are better predictors of generosity toward impersonal, abstract recipients such as charities and anonymous observers than measures of empathy. The authors argue that the principle of care mediates the relationship between empathy and generosity in these cases. It was therefore hypothesized that an internalization of a principle that one should help when help is needed correlates with behavior in the experiment.

Finally, the demographics questionnaire asks for the participant's gender, age, race, and college major.

To investigate a correlation between personality and a tendency to give reluctantly, Table A.4 shows estimates from a multinomial logistic regression of the likelihood that the participant is classified as a given type rather than another type on gender and the Big Five personality trait scores for model (1). Model (2) adds principle of care scores as regressors. Note, as before, that comparisons involving the Generous type are underpowered due to few participants falling into this category.

For model (1), agreeableness and neuroticism are associated with higher odds of being classified as Reluctant relative to the odds of being classified as Selfish.[25] This could be interpreted as Reluctant donors sharing initially in the dictator game due to empathy toward the recipient and a concern about negative consequences of not sharing. But when the principles of care scores are added to the regression, agreeableness becomes an insignificant explanatory variable. Moreover, principles of care 1 and 2 significantly predict the likelihood of being classified as Reluctant relative to being classified as Selfish. This suggests that it is not empathy toward the recipient that led reluctant donors to share in the dictator game, but rather a sense of responsibility that they should give. Also, the association with neuroticism

[25]Agreeableness "is most concerned with how individuals differ in their orientation toward interpersonal relationships[...] Agreeableness is related to dispositional empathy[...] One might expect persons high in agreeableness to offer more help and aid to others, even to strangers, than do their peers." (Baumeister and Vohs, 2007.) Neuroticism "[represents] the degree to which a person experiences the world as distressing, threatening, and unsafe[...] Neurotic individuals[...] tend to feel dissatisfied with themselves and their lives[... and] are more prone to negative emotions (e.g., anxiety, depression, anger, guilt)." (Ibid.)

may indicate that reluctant donors experience negative emotions from the solicitation.[26]

The right-most column of Table A.4 shows estimates from a regression of the value of the probability of getting \$9-\$0 chosen by Reluctant participants. No regressor helps to explain the extent to which reluctant donors favored the \$9-\$0 option, except for openness, which appears positively correlated with the probability (openness is linked to curiosity and embrace of unconventional ideas). I cannot offer an account for this relationship.

[26]The fact that agreeableness became insignificant when the principle of care is added to the model is consistent with Wilhelm and Bekkers (2010), who find that different kinds of helping behavior, particularly abstract and impersonal assistance such as giving money to charity, are more strongly associated with an "internalization of a value that one should help" rather than an empathetic reaction toward the recipient, and that empathy is mediated by the principle of care and thus loses its explanatory power when the principle of care is accounted for.

Table A.4: Personality and Principle of Care as Predictors of Type and $9-$0 Choice

	Reluctant vs. Selfish		Reluctant vs. Generous		Generous vs. Selfish		OLS on
	(1)	(2)	(1)	(2)	(1)	(2)	$9-$0 choice
Woman	1.704**	1.649*	2.078	2.049	0.820	0.805	2.234
	(0.453)	(0.455)	(0.958)	(0.950)	(0.376)	(0.374)	(4.933)
Extraversion	0.967	0.966	1.032	1.026	0.937*	0.942	0.166
	(0.020)	(0.021)	(0.038)	(0.037)	(0.034)	(0.035)	(0.357)
Agreeableness	1.067**	1.026	0.953	0.946	1.120**	1.084	-0.110
	(0.029)	(0.030)	(0.046)	(0.048)	(0.054)	(0.056)	(0.529)
Conscientiousness	0.989	0.981	1.012	1.012	0.978	0.970	0.477
	(0.025)	(0.026)	(0.043)	(0.043)	(0.041)	(0.041)	(0.460)
Neuroticism	1.063**	1.054*	1.021	1.018	1.042	1.035	-0.098
	(0.028)	(0.029)	(0.044)	(0.043)	(0.045)	(0.045)	(0.441)
Openness	1.035	1.016	1.014	1.004	1.020	1.012	0.692*
	(0.023)	(0.024)	(0.038)	(0.039)	(0.037)	(0.039)	(0.406)
Principle of care 1		1.472**		1.411		1.043	-1.645
		(0.284)		(0.456)		(0.328)	(3.383)
Principle of care 2		0.766**		1.452		0.528***	2.361
		(0.097)		(0.360)		(0.130)	(2.169)
Principle of care 3		1.182		1.248		0.947	4.043
		(0.206)		(0.337)		(0.254)	(3.056)
Constant	0.018**	0.049	1.924	0.185	0.010*	0.265	6.755
	(0.031)	(0.093)	(5.474)	(0.598)	(0.027)	(0.851)	(32.044)
Sample size	308	308	308	308	308	308	127
R^2	0.045	0.092	0.045	0.092	0.045	0.092	0.074

Notes: Estimates on all except the right-most column from a multinomial logistic regression on the likelihood that the participant is classified as a given type vs. another type, reported as relative risk ratios with the second type listed in the comparison as the reference category. Model (1) includes as regressors gender and the Big Five personality scores. Model (2) adds principle of care scores. A coefficient greater (smaller) than 1 implies that the regressor is associated with an increase (decrease) in the risk ratio. The right-most column shows estimates from an OLS regression on the probability of $9-$0 selected by the participants, with observations only from Reluctant participants. R^2 refers to pseudo R^2 for the multinomial regression. Standard errors in parentheses. $^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

APPENDIX B. PROOFS OF THEORETICAL PROPOSITIONS

Proposition 1. The equilibrium with partial pooling at non-participation exists if and only if $k\gamma < \frac{\bar{v}\left(1+\sqrt{1+4\Psi^2(2\bar{v})}\right)}{\Psi^2(2\bar{v})}$.

Proof. Let $L(v) \equiv \gamma\left[p\bar{v} + (1-p)v/2\right]$. Notice that $L(v)$ increases in v at a constant rate of $\frac{\gamma(1-p)}{2}$, while $H(v)$ increases in v at an increasing rate of $\frac{v}{k} + \gamma\Psi(v)$. Then, since $L(0) > H(0)$, v_c exists in $(0, 2\bar{v})$ if and only if $L(2\bar{v}) < H(2\bar{v})$; namely, if and only if $L(v)$ and $H(v)$ cross each other over the pertinent domain. Working algebraically the last inequality obtains the necessary and sufficient condition on the parameter values for the equilibrium to exist: $k\gamma < \frac{\bar{v}\left(1+\sqrt{1+4\Psi^2(2\bar{v})}\right)}{\Psi^2(2\bar{v})}$.

Proposition 2. If $k\gamma < \frac{2e\bar{v}}{e-2}$, then the equilibrium with partial pooling at non-participation survives Cho and Kreps' (1987) equilibrium domination test.

Proof. An equilibrium survives the equilibrium domination test if, for all off-equilibrium actions, beliefs assign no positive weight to the action having been made by a type of player who could never obtain from that action a payoff larger than her equilibrium payoff. For the purposes of this model, this means that the equilibrium with partial pooling at non-participation survives the test if, for all $\tilde{g} \in [0, g^*(v_c))$, the maximum expected utility that donor $\tilde{v} \equiv R(\tilde{g})$ could aspire to get by choosing $\tilde{g}$ is larger than her equilibrium payoff, which is equal to $U^*(v_c)$.

The maximum expected utility donor $\tilde{v}$ could obtain by making donation $\tilde{g}$ occurs if $\tilde{g}$ is believed to have been made by the most generous donor—that with, by a donor with $v = 2\bar{v}$. Hence the equilibrium passes the test if

$$p\gamma\left[p\bar{v} + (1-p)\frac{v_c}{2}\right] + (1-p)\left[\tilde{v}g^*(\tilde{v}) - \frac{kg^{*2}(\tilde{v})}{2} + \gamma 2\bar{v}\right] > U^*(v_c)$$

for all $\tilde{v} \in [0, v_c)$. The previous expression is equivalent to

$$\left[\tilde{v}g^*(\tilde{v}) - \frac{kg^{*2}(\tilde{v})}{2} + \gamma 2\bar{v}\right] > H(v_c) \tag{9}$$

for all $\tilde{v} \in [0, v_c)$. Notice that the left-hand side of this expression is U-shaped in $\tilde{v}$ with minimum at $\tilde{v} = \frac{k\gamma}{e}$. In general—that is, regardless of whether v_c is above or below $\frac{k\gamma}{e}$—the inequality is guaranteed to hold if it holds at $\tilde{v} = \frac{k\gamma}{e}$ and $\tilde{v} = v_c$.

It is easy to see by simple substitution that equation (9) is satisfied for $\tilde{v} = v_c$, since $H(v_c) + \gamma(2\bar{v} - v_c) > H(v_c)$. Similarly, letting $\tilde{v} = \frac{k\gamma}{e}$ and noting that $g^*(\frac{k\gamma}{e}) = \gamma$, equation (9) becomes

$$\frac{k\gamma^2(2-e)}{2e} + \gamma 2\bar{v} > \gamma\left[p\bar{v} + (1-p)\frac{v_c}{2}\right]$$

which is satisfied if $v_c < \frac{k\gamma(2-e)+(2-p)e2\bar{v}}{(1-p)e}$.

Unfortunately, since there is no explicit solution for v_c, one cannot express this restriction purely in terms of the parameter values. However, since existence of the equilibrium requires that $v_c < 2\bar{v}$, it follows that a sufficient condition for the previous inequality to hold is that $\frac{k\gamma(2-e)+(2-p)e2\bar{v}}{(1-p)e} > 2\bar{v}$, or more simply $k\gamma < \frac{2e\bar{v}}{e-2}$, which is expressed in terms of parameter values only.

Proposition 3. $v_c(p)$ increases in $p \in (0,1)$ in the equilibrium with partial pooling at non-participation if and only if $k\gamma < \frac{2v_c(0)}{\frac{2}{\sqrt{e}}-1}$. This condition can always be satisfied while satisfying conditions for Proposition 1 and Proposition 2.

Proof. Restate the indifference condition that determines v_c in equilibrium as

$$F(v_c, p) \equiv H(v_c(p)) - \gamma\left[p\bar{v} + (1-p)\frac{v_c(p)}{2}\right] = 0$$

By the Implicit Function Theorem

$$\frac{dv_c}{dp} = -\frac{\frac{\partial F}{\partial p}}{\frac{\partial F}{\partial v_c}} = -\frac{k\gamma(v_c(p) - 2\bar{v})}{2v_c(p) + k\gamma(1+p) + 2k\gamma\mathcal{W}_0\left(-e^{-1-\frac{v_c(p)}{k\gamma}}\right)}$$

This expression is positive if the denominator is positive; therefore, $v_c(p)$ increases in $p \in (0,1)$ if and only if $v_c(p) > \frac{1}{2}k\gamma\left(-1-p+2e^{\frac{-1+p}{2}}\right)$ for all $p \in (0,1)$. The right-hand side of the inequality is decreasing in $p \in [0,1]$, therefore the inequality holds for all $p \in (0,1)$ if and only if it holds for $p = 0$; namely, if and only if $k\gamma < \frac{2V_c(0)}{\frac{2}{\sqrt{e}}-1}$.

To see that this condition can always be satisfied while satisfying conditions for Proposition 1 and Proposition 2, notice that the indifference equation that defines v_c (Equation (8)) can be rewritten as

$$Vc(p) = \frac{1}{2}\left[-k\gamma(1+p) + \sqrt{k\gamma\left[8p\bar{v} + k\gamma\left((1+p)^2 + 4\Psi^2(v_c(p))\right)\right]}\right]$$

which for $p = 0$ becomes

$$v_c(0) = \frac{1}{2}k\gamma\left[-1 + \sqrt{1 + 4\Psi^2(v_c(0))}\right]$$

$v_c(0)$ does not depend on $\bar{v}$. Therefore, one can choose k, γ appropriately to satisfy $k\gamma < \frac{2V_c(0)}{\frac{2}{\sqrt{e}}-1}$, and then, since $\frac{\bar{v}\left(1+\sqrt{1+4\Psi^2(2\bar{v})}\right)}{\Psi^2(2\bar{v})}$ and $\frac{2e\bar{v}}{e-2}$ both increase in $\bar{v}$, choose a large enough $\bar{v}$ to guarantee that Proposition 1 and Proposition 2 hold.