Reluctant donors and their reactions to social information

DAVID KLINOWSKI*
Department of Economics
University of Pittsburgh
djk59@pitt.edu

October 5, 2015

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.

Keywords: reluctant giving, charitable giving, social information, signaling, motivated reasoning.

*I am indebted to Lise Vesterlund for her valuable supervision of this work. I also gratefully acknowledge funding and support from the Science of Philanthropy Initiative. For helpful discussions I thank Maria Cubel, Jason Dana, David N Danz, Christine Exley, Sera Linardi, Evan Piermont, Luca Rigotti, Roee Teper, Stephanie Wang, Mark Wilhelm, Alistair Wilson, and participants of the University of Pittsburgh Experimental Economics Workshop, the 2014 SABE Conference at Lake Tahoe, the 2014 SPI Conference at the University of Chicago, the 11th. Annual Whitebox Graduate Student Conference at Yale University, and the 2015 SITE Experimental Economics Workshop at Stanford University.

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 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

[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.

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.

An additional finding is that women responded more than men to the social information. Both genders accepted to donate at equal rates when shown no social information. Men did not vary their intent to donate with the information, but women accepted the invitation significantly more when informed of a 50¢ donation, and significantly less when informed of a $5 donation. DellaVigna et al. (2013) find the related phenomenon of women being more likely than men to avoid a door-to-door solicitor (by checking a do-not-disturb box on a flyer). I find that mentioning a $5 donation early induces women to decline the invitation more than men, producing the DellaVigna et al. (2013) result, but that mentioning a 50¢ donation early reverses the gender gap. This makes social information a powerful fundraising tool. As the effect is almost entirely due to women changing their intent to give, this finding supports DellaVigna et al.'s (2013) conclusion that women are more likely to be on the margin of giving.

Women also appeared more (self-)image concerned than men in the reluctance elicitation. When dividing the $10, women were more likely to share evenly and less likely to share $0. This is in line with previous findings that men are more likely to be perfectly selfish and women more likely to prefer equality of payoffs (Andreoni and Vesterlund, 2001; for reviews see Croson and Gneezy, 2009; Niederle, 2015). However, women were also more likely to then move the odds in favor of getting $9-$0, to the extent that sharing became equal across genders once this discreet exit is accounted for. This suggests that the gender difference in the amount shared in the dictator game is due to a higher (self-)image concern of women, rather than due to differences in payoff-related preferences. Though more work is needed on this question, experiments on volunteerism (Jones and Linardi, 2014; Exley, 2014) find that women are more affected by social image concerns, thus it is possible that the difference in image concerns extends to private, anonymous contribution decisions such as those made in this study.

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. An equal number of men and women were recruited for each session.[5] 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.

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 Gill and Prowse's (2012) slider task, 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.

[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).

[5]Some individuals registered for a session but did not attend, thus sessions were not perfectly gender-balanced. Nevertheless, as Section 3 details, the gender composition did not vary statistically across treatments.

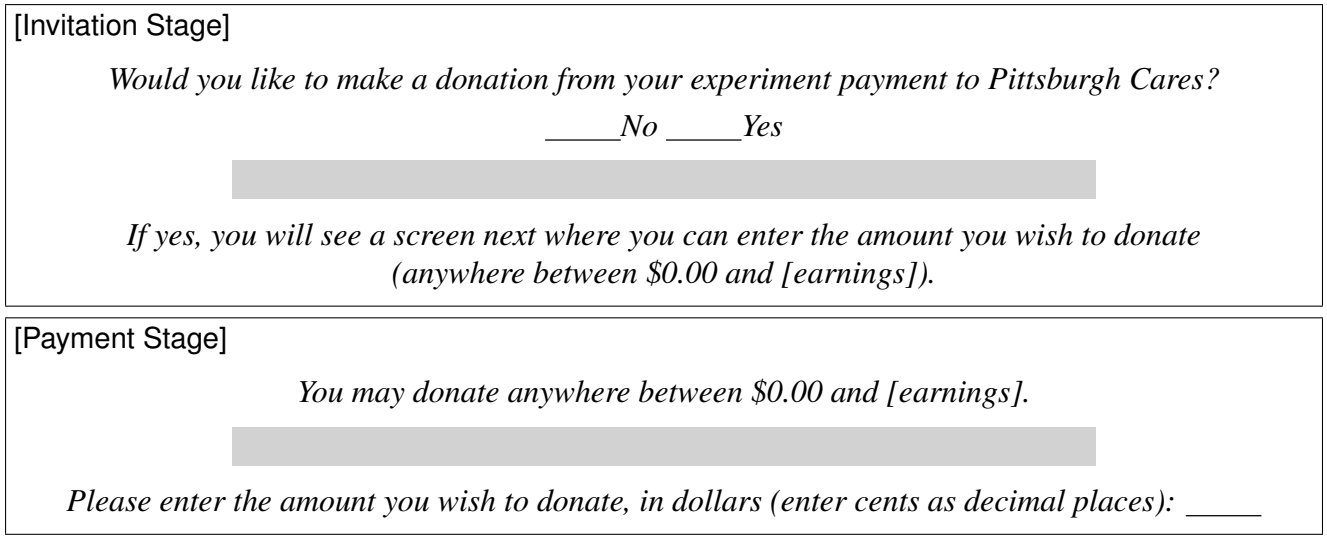


Figure 1: *Two-stage solicitation*

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.[6] The solicitation occurred via the computer. Participants received information 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.[7]

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

[6]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.

[7]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.

	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 $N = 44$	

Table 1: *Treatments and sample sizes*

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.

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.[8]

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 5 and in detail in the Appendix B.

3 Experiment results

One hundred fifty-five women and 153 men participated in the experiment. The average age of the participants was 20.8 years.[9] 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 three 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 to the social information during the solicitation. The third part looks in detail at gender differences in behavior.

3.1 Response to the social information

3.1.1 Extensive margin

Overall, 37% of the participants agreed to donate at the Invitation Stage. The fraction varied significantly depending on the information received. Figure 2 shows the fraction of participants who indicated that they would donate at the Invitation Stage, given the information received in this stage. Relative to receiving no information, 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%.

[8] 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.

[9] Throughout the analysis I control for gender and age for robustness.

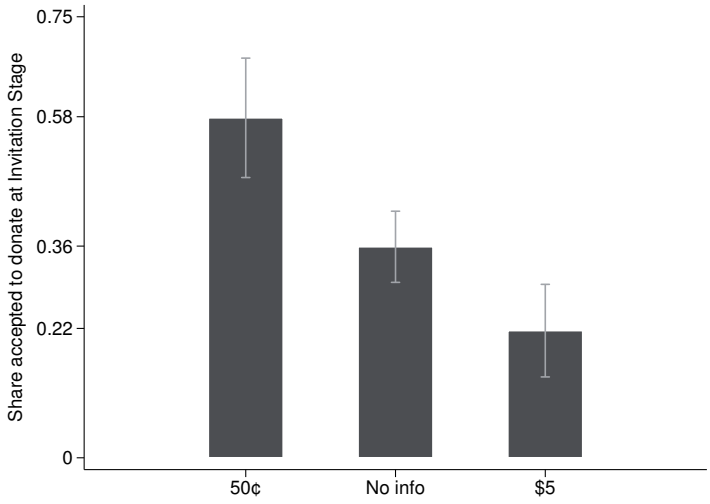


Figure 2: *Intent to donate by information received at Invitation Stage*

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.

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 from Panel A of Table 2, which shows similar treatment effects on the intent to donate and on the share of participants who donated a positive amount.[10]

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.[11]

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 B for uncollapsed distributions).[12]

The social information affected the intensive margin of giving. In the *No-info* treatment, 73% of the

[10] 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 $p < 0.001$.

[11] 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).

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

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

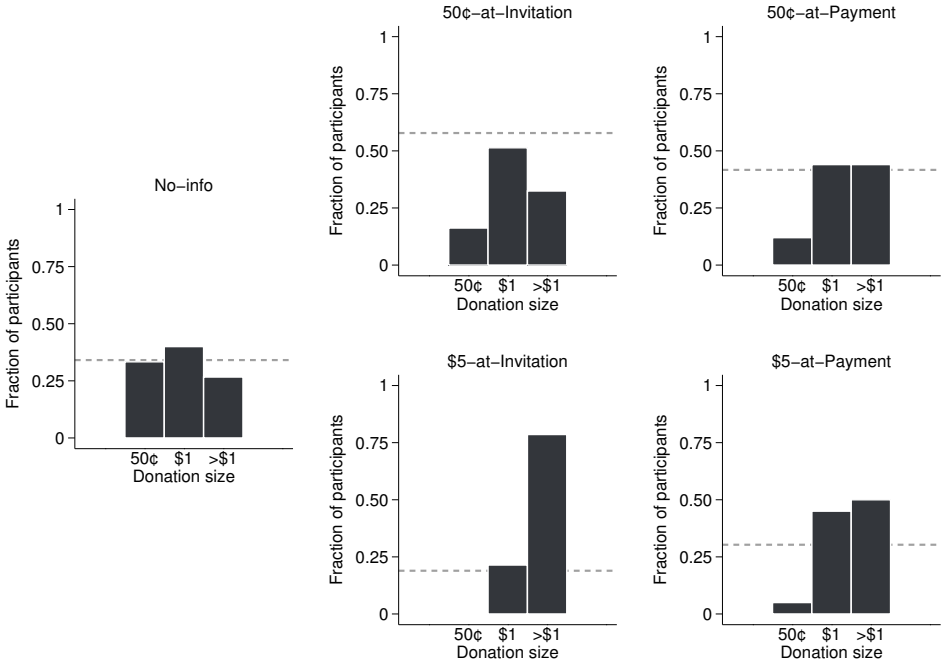


Figure 3: *Distribution of donation sizes conditional on donating, by treatment*

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.

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. The median donation size conditional on donating increased significantly for these two treatments relative to the *No-info* treatment, as Panel B of Table 2 shows.

Panel B of Table 2 also shows treatment effects on the mean and median funds raised when all treatment participants are included (unconditional amount columns). 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.[13] By manipulating the content and the timing one can appreciate and evaluate the possibility that participants respond reluctantly to the information.

[13] 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.

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 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).[14]

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.

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 $p = 0.357$).

[14] 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.

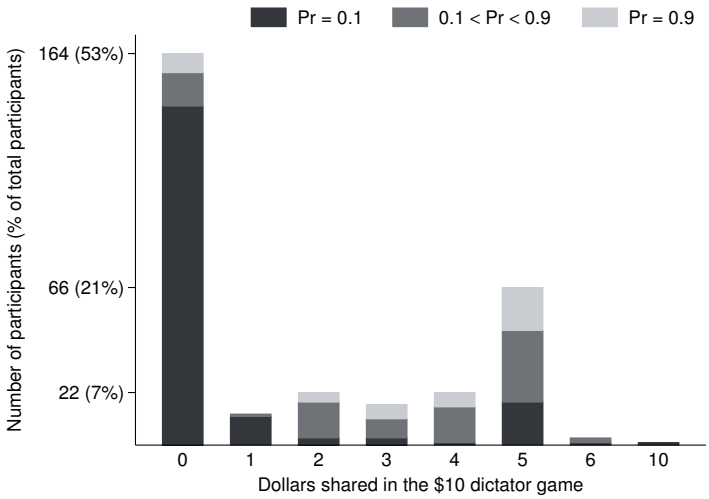


Figure 4: *Histogram of dictator transfer and probability of getting $9-$0*

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.[15]
- *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. 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

[15]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.

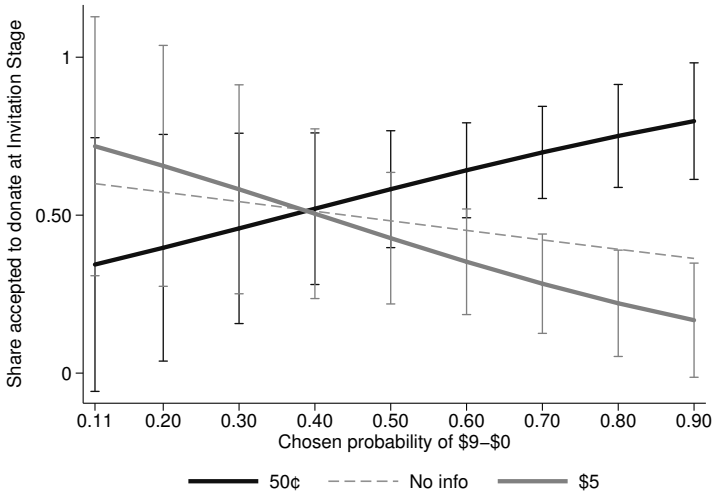


Figure 5: *Intent to donate for Reluctant participants conditional on their selected probability for $9-$0*

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.

between the solicitation and the reluctance measure.[16] 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.

Panel A of Table 3 shows the marginal effects of the information on the intent to donate conditional on the participant's type. 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 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. Figure 5 shows this variation by plotting the effect of the information on the intent to donate for Reluctant participants conditional on their selected probability of getting $9-$0.

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 increas-

[16]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.

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	25th	50th	75th	OLS	25th	50th	75th	OLS	25th	50th	75th
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$.

ingly 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.

Panel B of Table 3 shows marginal treatment effects on the intensive margin of giving conditional on the participant's type. Columns labeled OLS show estimates of the change in the mean donation size conditional on giving, and quantile regression columns show similar estimates for the three quartiles rather than the mean (quartile estimates could not be computed for the Generous type due to lack of observations). Since donations were not normally distributed, looking at treatment effects on different points of the distribution provides a fuller picture than do the OLS estimates alone.

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. Before that, the next part of the analysis explores in detail gender differences in behavior in the experiment.

3.3 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 gender differences in the reaction to the social information and in the reluctance measure. This part finds women to be more sensitive than men to the social information, in the direction consistent with reluctant giving. It also finds women to be more likely than men to share evenly and less likely to share $0 in the dictator game. This has been found previously by Andreoni and Vesterlund (2001), who interpret it as evidence that men and women have different distributional preferences over outcomes. However, I find that it can be entirely explained by women's higher tendency to give reluctantly.

3.3.1 Gender differences in the response to the social information

Figure 6 and Panel A of Table 4 show the intent to donate for each gender separately. 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

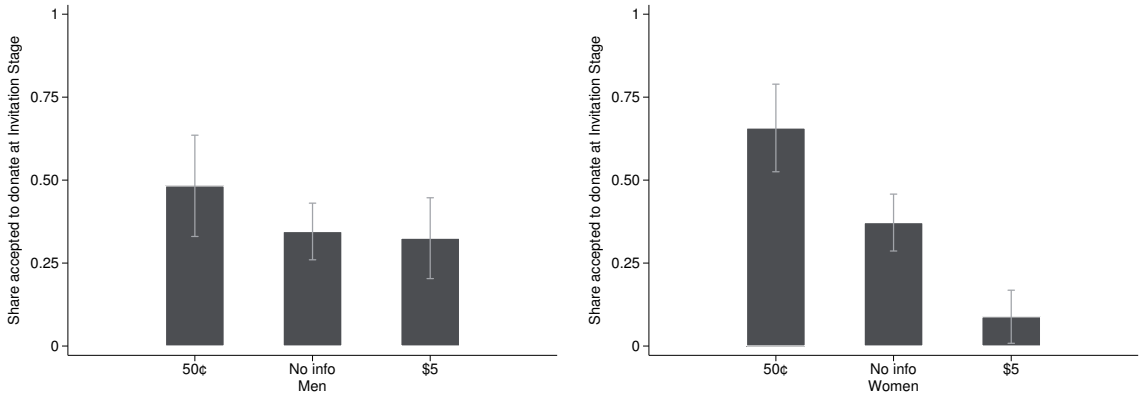


Figure 6: *Intent to donate by information received at Invitation Stage conditional on gender*

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.

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. [17]

In terms of the intensive margin, women were also more responsive than men to the information. Panel B of Table 4 shows marginal treatment effects on the intensive margin of giving conditional on the participant's gender. 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 (Appendix B provides 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 4 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 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.

3.3.2 Gender differences in the reluctance measure

Figure 7 shows results of the reluctance elicitation by gender. Focusing only on how participants split the $10 in the dictator game (i.e., ignoring the colors of the bars) women appeared more generous than men. The mean transfer was $2.00 for women vs. $1.59 for men, and the mass of the distribution of

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

Table 4: *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	25th	50th	OLS	25th	50th	(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. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$.

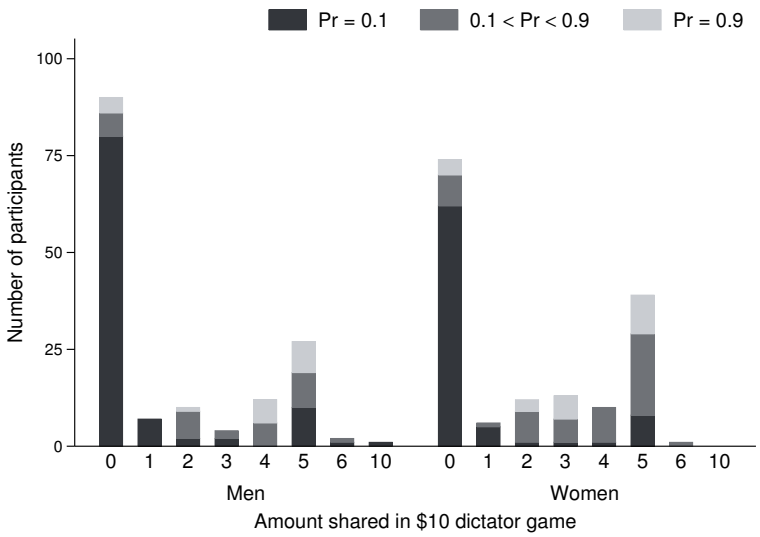


Figure 7: *Histogram of dictator transfer and probability of getting $9-$0 by gender*

transfers fell toward larger amounts for women than it did for men (a Mann-Whitney U test rejects equality of median transfers across genders with $p = 0.065$). Men were significantly more likely than women to share \$0 rather than any other amount (59% vs. 48%; $\chi^2(1)$ test of equality rejected with $p = 0.051$) and marginally significantly less likely to share \$5 rather than any other amount (18% vs. 25%; $\chi^2(1)$ test of equality marginally rejected with $p = 0.108$). This is in line with the literature on gender differences in the dictator game, which finds that men are more likely to be perfectly selfish, while women are more likely to prefer equality of payoffs (Andreoni and Vesterlund, 2001).

However, women no longer appear more generous than men after one accounts for their decisions to obtain \$9-\$0. Women were more likely than men to indicate a probability greater than 0.10; 50% of women did so, compared to 33% of men (a $\chi^2(1)$ test rejects equality of proportions with $p = 0.002$).[18] Among those who selected a probability greater than 0.10, the expected value of the transfer to the recipient (adjusting for the probability of \$9-\$0) did not vary by gender. The mean expected transfer was \$1.26 for women and \$1.15 for men, and their medians were statistically equal (a Mann-Whitney U test fails to reject equality of the median expected transfer across genders for this group with $p = 0.521$). Gender equality of transfers was also observed among the participants who selected a probability equal to 0.10. The mean transfer was \$0.69 for women and \$0.81 for men, and the median was indistinguishable across genders (a Mann-Whitney U test fails to reject equality of median transfers across genders for this group with $p = 0.742$).

Thus men and women did not vary in their expected transfer to the recipient, once the quiet exit is considered. This suggests that the gender difference in the original dictator game, interpreted in the literature as arising from different preferences for selfishness and equality of payoffs, may be the result of a higher (self-)image concern of women, rather than of differences in payoff-related preferences. More work is needed to evaluate this possibility, though experimental research in the context of volunteering (Jones and Linardi, 2014; Exley, 2014) finds women to be more affected than men by social image concerns, hence it is possible that this gender difference extends to private, anonymous contribution decisions such as those made in this study.

[18]The exact value of the probability above 0.10 did not vary by gender (see Appendix B).

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.[19] 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 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

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

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.[20] 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 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

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

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

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

[20] 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.

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

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

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.[21] Note that $g^*(v)$ is increasing in v, and $g^*(0) = 0$, as Figure 8 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

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

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 8 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.

[21] 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).

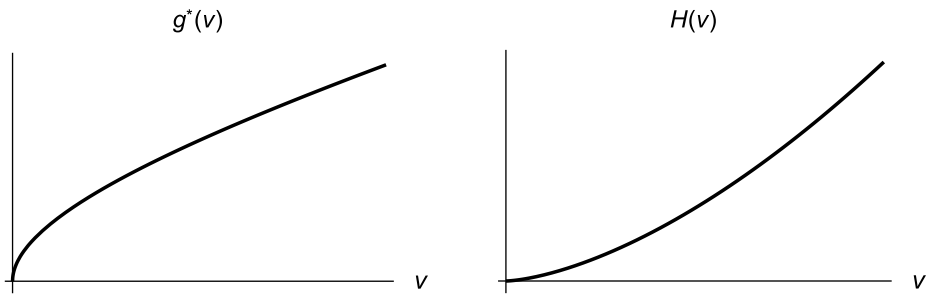


Figure 8: *Functions $g^*(v)$ and $U^*(v)$ for arbitrary values of k and γ*

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.)

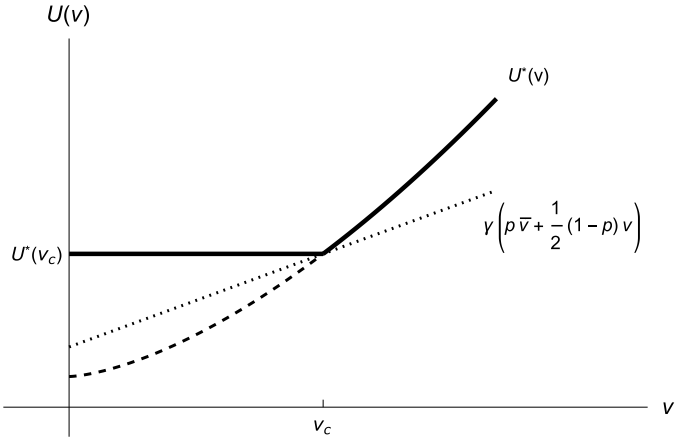


Figure 9: *Equilibrium: partial pooling at non-participation*

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 $g^*(v_c)$.

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 C.

The behavior of donors is illustrated in Figure 9. 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.

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 C.

4.4 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.[22] 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.

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.

[22] 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.

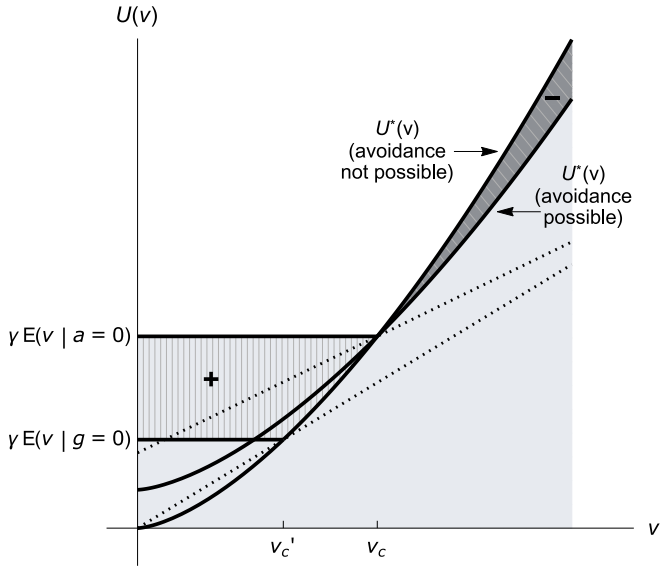


Figure 10: *The value of the Invitation Stage*

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.

Proof: See Appendix C.

Figure 10 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.

4.5 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.[23]

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 describe a donor who, when she does not participate, is unaware

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

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.[24]

Work in psychology and economics provides ample reason to adopt this dual-self interpretation. There is considerable evidence that individuals interpret events and actions—including their own actions—in self-serving ways.[25] 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.

4.6 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 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¢.[26]

This can be captured in the model by letting p be positively related to the donation size the donor is

[24]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.

[25]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).

[26]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.

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.

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.[27] 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.

References

Andreoni, J. (1989). Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence. *Journal of Political Economy*, 97(6):1447–1458.

Andreoni, J. (1990). Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving. *The Economic Journal*, 100(401):464–477.

Andreoni, J. and Bernheim, D. B. (2009). Social Image and the 50-50 Norm: A Theoretical and Experimental Analysis of Audience Effects. *Econometrica*, 77(5):1607–1636.

Andreoni, J., Rao, J. M., and Trachtman, H. (2011). Avoiding the Ask: A Field Experiment on Altruism, Empathy, and Charitable Giving. NBER Working Paper Series 17648.

Andreoni, J. and Vesterlund, L. (2001). Which is the Fair Sex: Gender Differences in Altruism. *Quarterly Journal of Economics*, 116(1):293–312.

Bardsley, N. (2008). Dictator Game Giving: Altruism or Artefact? *Experimental Economics*, 11(2):122–133.

Battigalli, P. and Dufwenberg, M. (2009). Dynamic Psychological Games. *Journal of Economic Theory*, 144(1):1–35.

Baumeister, R. F. and Vohs, K. D. (2007). *Encyclopedia of Social Psychology*. Sage Publications.

[27] 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.

Benabou, R. and Tirole, J. (2006). Incentives and Prosocial Behavior. *American Economic Review*, 96(5):1652–1678.

Bergstrom, T., Blume, L., and Varian, H. R. (1986). On the Private Provision of Public Goods. *Journal of Public Economics*, 29:25–49.

Bernheim, D. B. (1994). A Theory of Conformity. *Journal of Political Economy*, 102(5):841–877.

Bodner, R. and Prelec, D. (2003). Self-Signaling and Diagnostic Utility in Everyday Decision Making. In Brocas, I. and Carrillo, J. D., editors, *The Psychology of Economic Decisions, vol 1*. Oxford University Press.

Broberg, T., Ellingsen, T., and Johannesson, M. (2007). Is Generosity Involuntary? *Economics Letters*, 94(1):32–37.

Cain, D. M., Dana, J., and Newman, G. E. (2014). Giving versus Giving In. *The Academy of Management Annals*, 8(1):505–533.

Camerer, C. (2003). *Behavioral Game Theory*. Princeton University Press.

Cherepanov, V., Feddersen, T., and Sandroni, A. (2013). Rationalization. *Theoretical Economics*, 8(3):775–800.

Cho, I.-K. and Kreps, D. M. (1987). Signaling Games and Stable Equilibria. *Quarterly Journal of Economics*, 102(2):179–221.

Cialdini, R. B. and Schroeder, D. A. (1976). Increasing Compliance by Legitimizing Paltry Contributions: When Even a Penny Helps. *Journal of Personality and Social Psychology*, 34(4):599–604.

Corless, R. M., Gonnet, G. H., Hare, D. E. G., Jeffrey, D. J., and Knuth, D. E. (1996). On the Lambert W Function. *Advances in Computational Mathematics*, 5(1):329–359.

Croson, R. and Gneezy, U. (2009). Gender Differences in Preferences. *Journal of Economic Literature*, 47:448–474.

Dana, J., Cain, D. M., and Dawes, R. M. (2006). What You Don't Know Won't Hurt Me: Costly (but Quiet) Exit in Dictator Games. *Organizational Behavior and Human Decision Processes*, 100(2):193–201.

DellaVigna, S., List, J. A., and Malmendier, U. (2012). Testing for Altruism and Social Pressure in Charitable Giving. *The Quarterly Journal of Economics*, 127(1):1–56.

DellaVigna, S., List, J. A., Malmendier, U., and Rao, G. (2013). The Importance of Being Marginal: Gender Differences in Generosity. *American Economic Review*, 103(3):596–590.

Ellingsen, T. and Johannesson, M. (2008). Pride and Prejudice: The Human Side of Incentive Theory. *American Economic Review*, 98(3):990–1008.

Exley, C. L. (2014). Incentives for Prosocial Behavior: The Role of Reputations. Working Paper.

Exley, C. L. (2015). Excusing Selfishness in Charitable Giving: The Role of Risk. Working Paper.

Fischbacher, U. (2007). Z-Tree: Zurich Toolbox for Ready-Made Economic Experiments. *Experimental Economics*, 10(2):171–178.

Frey, B. S. and Meier, S. (2004). Social Comparisons and Pro-Social Behavior: Testing "Conditional Cooperation" in a Field Experiment. *American Economic Review*, 94(5):1717–1722.

Gill, D. and Prowse, V. (2012). A Structural Analysis of Disappointment Aversion in a Real Effort Competition. *American Economic Review*, 102(1):469–503.

Grossman, Z. J. (2015). Self-Signaling and Social-Signaling in Giving. *Journal of Economic Behavior and Organization*, 117:26–39.

Haisley, E. C. and Weber, R. A. (2010). Self-Serving Interpretations of Ambiguity in Other-Regarding Behavior. *Games and Economic Behavior*, 68(2):614–625.

John, O. P., Donahue, E. M., and Kentle, R. L. (1991). The Big Five Inventory–Versions 4a and 54. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.

John, O. P., Naumann, L. P., and Soto, C. J. (2008). Paradigm Shift to the Integrative Big Five Trait Taxonomy: History, Measurement, and Conceptual Issues. *Handbook of Personality: Theory and Research*, 3:114–158.

Jones, D. and Linardi, S. (2014). Wallflowers: Experimental Evidence of an Aversion to Standing Out. *Management Science*, 60(7):1757–1771.

Karlan, D. and List, J. a. (2007). Does Price Matter in Charitable Giving? Evidence from a Large-Scale Natural Field Experiment. *American Economic Review*, 97(5):1774–1793.

Kunda, Z. (1990). The Case for Motivated Reasoning. *Psychological bulletin*, 108(3):480–498.

Lazear, E. P., Malmendier, U., and Weber, R. A. (2012). Sorting in Experiments with Application to Social Preferences. *American Economic Journal: Applied Economics*, 4(1):136–163.

Linardi, S. and McConnell, M. A. (2011). No Excuses for Good Behavior: Volunteering and the Social Environment. *Journal of Public Economics*, 95:445–454.

List, J. A. (2007). On the Interpretation of Giving in Dictator Games. *Journal of Political Economy*, 115(3):482–493.

Lotz, S., Schlösser, T., Cain, D. M., and Fetchenhauer, D. (2013). The (In)stability of Social Preferences: Using Justice Sensitivity to Predict When Altruism Collapses. *Journal of Economic Behavior and Organization*, 93:141–148.

Martin, R. and Randal, J. (2008). How Is Donation Behaviour Affected by the Donations of Others? *Journal of Economic Behavior and Organization*, 67(1):228–238.

Merritt, A. C., Effron, D. a., and Monin, B. (2010). Moral Self-Licensing: When Being Good Frees Us to Be Bad. *Social and Personality Psychology Compass*, 4(5):344–357.

Niederle, M. (2015). Gender. To appear in the Handbook of Experimental Economics, vol. 2, John H Kagel and Alvin Roth, eds.

Romano, R. and Yildirim, H. (2001). Why Charities Announce Donations: A Positive Perspective. *Journal of Public Economics*, 81(3):423–447.

Sachdeva, S., Iliev, R., and Medin, D. L. (2009). Sinning Saints and Saintly Sinners: The Paradox of Moral Self-Regulation. *Psychological Science*, 20(4):523–528.

Shang, J. and Croson, R. (2009). A Field Experiment in Charitable Contribution: The Impact of Social Information on the Voluntary Provision of Public Goods. *The Economic Journal*, 119(540):1422–1439.

Snyder, M. L., Kleck, R. E., Strenta, A., and Mentzer, S. J. (1979). Avoidance of the Handicapped: An Attributional Ambiguity Analysis. *Journal of Personality and Social Psychology*, 37(12):2297–2306.

Varian, H. R. (1994). Sequential Contributions to Public Goods. *Journal of Public Economics*, 53(2):165–186.

Vesterlund, L. (2003). The Informational Value of Sequential Fundraising. *Journal of Public Economics*, 87(3):627–657.

Vesterlund, L. (2006). Why Do People Give? In Powell, W. W. and Steinberg, R., editors, *The Nonprofit Sector: A Research Handbookd, 2nd Edition*, pages 568–587. Yale University Press.

Vesterlund, L. (2015). Voluntary Giving to Public Goods: Moving Beyond the Linear VCM. To appear in the Handbook of Experimental Economics, vol. 2, John H Kagel and Alvin Roth, eds.

Wilhelm, M. O. and Bekkers, R. (2010). Helping Behavior, Dispositional Empathic Concern, and the Principle of Care. *Social Psychology Quarterly*, 73(1):11–32.

Zhong, C. and Liljenquist, K. (2006). Washing Away Your Sins: Threatened Morality and Physical Cleansing. *Science*, 313(5792):1451–1452.

Appendix A: Experiment instructions and screenshots

Welcome to this experiment on decision making. The other people in this room are also participating in the experiment. Please refrain from talking with them during the session. If you have any questions, please raise your hand and the experimenter will come to where you are to answer it in private.

In this experiment you will be able to earn money by completing two tasks in the computer for five rounds. You will receive the money that you earn in private and in cash at the end of the experiment.

All your actions in this experiment are anonymous, and are made through the computer. No other participant will see your actions.

Task 1

For Task 1 you will have 90 seconds to slide seven scroll bars to their center positions. An example of one scroll bar at two different positions is shown below.

Initial position Center position

The number to the right of the scroll bar indicates the current position of the scroll bar. This number goes from 0 to 100. As you slide the scroll bar this number changes. You have successfully positioned the scroll bar at the center when the number becomes 50.

For Task 1 you have 90 seconds to slide seven scroll bars to their center positions. You earn $1.50 if you successfully slide the seven scroll bars to their center, and $0 otherwise.

After the 90 seconds are up, you will move to Task 2.

Task 2

For Task 2 you will be asked to click a button at a precise second. On the screen you will see a timer displaying the seconds elapsed since the start of Task 2, and next to the timer you will see a button labeled with the number '15.' You must press this button precisely when the timer reads '15'—not before, nor after. You earn $1.50 if you successfully press the button exactly when the timer reads 15, and $0 otherwise.

Rounds

After finishing Task 1 and Task 2, the round ends, and a new round begins. The experiment consists of five identical rounds. For every task that you complete successfully you earn $1.50, so that you can earn up to $3 in a round. Your total earnings are the sum of your earnings from each of the five rounds.

Instructions - Extra round

At the beginning of this round, the computer will randomly assign you either the color BLUE or the color GREEN, and will randomly pair you with a participant in this room of the other color to form a BLUE-GREEN pair.

For this round both you and the participant paired with you will make 2 decisions: Decision 1 and Decision 2. Your payment in this round will depend on the decisions made by you or by the participant paired with you.

Only one decision from only one member of the pair will count for payment. After everyone makes the two decisions, the experimenter will randomly select a color (BLUE or GREEN) and a decision (1 or 2) to be the decision that counts.

Your payment from this round will be added to the money you have already earned from the previous rounds.

Instructions for Decision 1 appear on the next screen. Instructions for Decision 2 will be given once everybody completes Decision 1.

Press OK to move to the instructions for Decision 1.

Decision 1
For this decision you must choose how to allocate $10 between you and the participant paired with you. You may choose any allocation that sums to $10 and that consists of whole numbers. In other words, you may choose any of the following allocations:

You:	$10	$9	$8	$7	$6	$5	$4	$3	$2	$1	$0
Other participant:	$0	$1	$2	$3	$4	$5	$6	$7	$8	$9	$10

As you privately make this decision, the participant paired with you will also privately make a decision by choosing from the same set of allocations.

Payment
If Decision 1 is randomly chosen as the decision that counts for payment, and your color is randomly chosen, then the allocation that you select in Decision 1 will be implemented. The money that you allocate to yourself will be paid to you, and the money that you allocate to the participant paired with you will be paid to that participant.

On the other hand, if Decision 1 is randomly chosen as the decision that counts for payment, and your color is not the one randomly chosen, then the allocation that the participant paired with you selects in Decision 1 will be implemented. The money that that participant allocates to you will be paid to you, and the money that that participant allocates to him or herself will be paid to that participant.

Remember that all decisions are private, and will never be linked to your identity.

Press OK to see what color you've been assigned, and then move to Decision 1.

Decision 2

Decision 2 involves two possible allocations of money between you and the participant paired with you. Allocation A is the allocation that you selected in Decision 1. Allocation B is $9 for you and $0 for the participant paired with you. Below you see these two allocations.

	You	Participant paired with you	
A	$$	$$	←Your Decision 1
B	$9	$0	

The computer will choose one of these two allocations as your allocation for Decision 2. It will make the choice based partly on chance, and partly on a number that you must indicate. The rule that the computer will use when choosing between A and B can be illustrated as follows.

The computer will place 100 balls in a bag, and will randomly draw one ball from the bag. Balls are labeled either A or B. The letter on the ball drawn by the computer determines whether allocation A or allocation B is chosen.

Your task in Decision 2 is to indicate to the computer how many of the 100 balls in the bag you want to be "B" balls. You can indicate any number between 10 and 90.

Once you indicate the number of B balls you want in the bag, the computer will place the desired number of B balls in the bag, and the remaining as A balls to complete 100 balls. It will then draw one ball, and the letter on the ball drawn will be your allocation for Decision 2.

Of course the computer will not literally use balls and a bag, but the algorithm is the same. The number that you indicate is therefore the probability with which the computer chooses allocation B. 100 minus the number that you indicate is the probability with which the computer chooses allocation A.

Notice that because the number that you indicate must be between 10 and 90, there are always at least 10 balls of each letter in the bag, and therefore there is always some chance that the computer chooses either allocation regardless of what number you indicate.

Payment

After the computer chooses between allocation A and allocation B for Decision 2, you will learn which allocation the computer chose.

If Decision 2 is randomly chosen as the decision that counts for payment, and your color is randomly chosen, then your allocation for Decision 2 will be implemented. The money allocated to yourself will be paid to you, and the money allocated to the participant paired with you will be paid to that person.

On the other hand, if Decision 2 is randomly chosen as the decision that counts, and your color is not the one randomly chosen, then the allocation for Decision 2 of the participant paired with you will be implemented. The money allocated to you will be paid to you, and the money allocated that participant will be paid to that participant.

Remember that all decisions are private, and will never be linked to your identity.

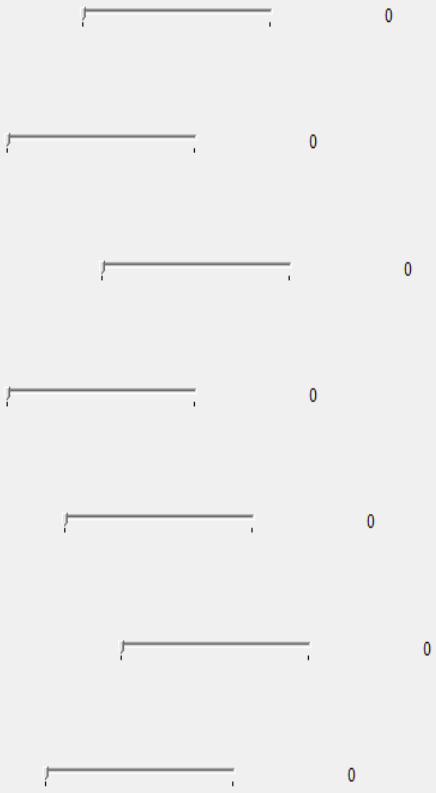
Round

1 of 1

Remaining time (sec): 89

TASK 1 : move all 7 scroll bars to the middle of the lines to earn $1.50.

Number of scroll bars currently at the center: 0



Round

1 of 1

TASK 2: click the button precisely when the timer reads '15.'

TIMER: 7

15

The researcher of this study has allowed **Pittsburgh Cares** , a local nonprofit organization, to request donations from participants of today's experiment.
You may make a donation from your experiment payment. For every one cent that you donate today, the sponsor of this research study will match your contribution and also donate one cent to **Pittsburgh Cares.**
Your donation is anonymous, unless you request that **Pittsburgh Cares** mails you a receipt for your donation.
University of Pittsburgh personnel will ensure that all donations are properly sent to **Pittsburgh Cares** , and will post proof of delivery at www.pitt.edu/~djk59.

Pittsburgh Cares works to advance a culture of volunteerism and widespread civic engagement in the Pittsburgh region. We believe that the collective efforts of volunteers can transform an entire city, and we provide opportunities for adults, youths, businesses and nonprofit organizations to connect and volunteer together to address pressing social needs. We help to connect a 20,000+ volunteer network with over 500 opportunities at any given time.

pittsburgh
cares

Would you like to make a donation from your experiment payment to **Pittsburgh Cares**?

NO ○ ○ YES

If yes, you will see a screen next where you can enter the amount you wish to donate (anywhere from $0.00 to $0.00.)

OK

Your experiment payment: $0.00

You may donate anywhere between $0.00 and $0.00.

Please enter the amount you wish to donate, in dollars (enter cents as decimal places):

OK

Appendix B: Supplementary analysis

Response to the social information

Intensive margin

Figure 11 shows the distribution of donations among subjects who made a donation.

Reluctance measure

Table 5 shows the number of participants classified as Selfish, Reluctant, and Generous for each treatment.

Gender differences

Table 6 and Figure 12 provide evidence that the reluctance measure retains some ability to explain behavior in the solicitation within gender, especially for women. Table 6 shows that the progressive increase in intent to donate from Selfish to Reluctant to Generous holds for both men and women. Figure 12 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.

Figure 13 shows that Reluctant participants chose probabilities for \$9-\$0 across the entire range of $[0.11, 0.90]$, with large mass points at 0.50 and 0.90. Moreover, the choices of probabilities are very similar between men and women.

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.

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 7 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.[27] 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 may indicate that reluctant donors experience negative emotions from the solicitation.[28]

The right-most column of Table 7 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.

[27] 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.)

[28] 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.

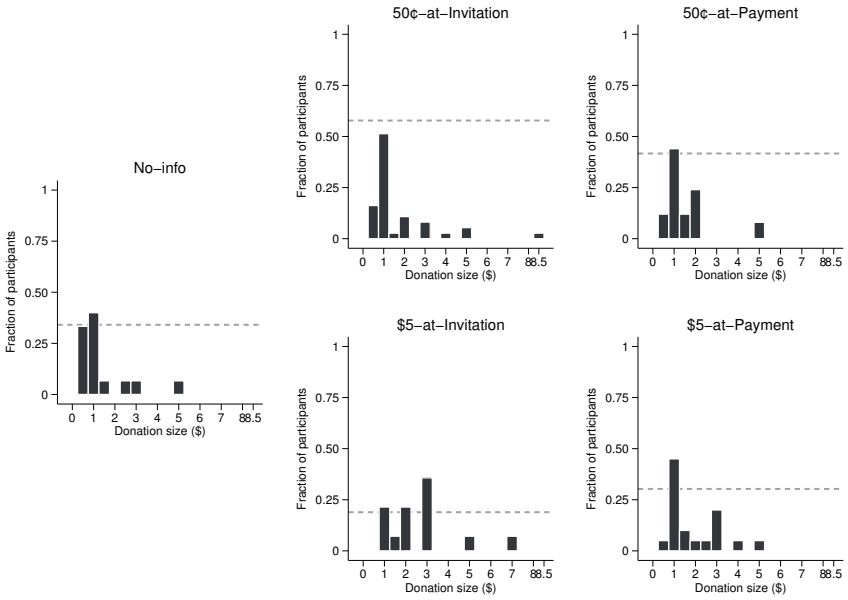


Figure 11: *Uncollapsed distribution of donation sizes conditional on donating, by treatment*
Notes: This figure shows the fraction of participants who donated a given amount among all the participants who donated a positive amount in the treatment. Dashed lines mark the fraction of participants who donated a positive amount in the treatment.

Table 5: *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**

Table 6: *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. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$.

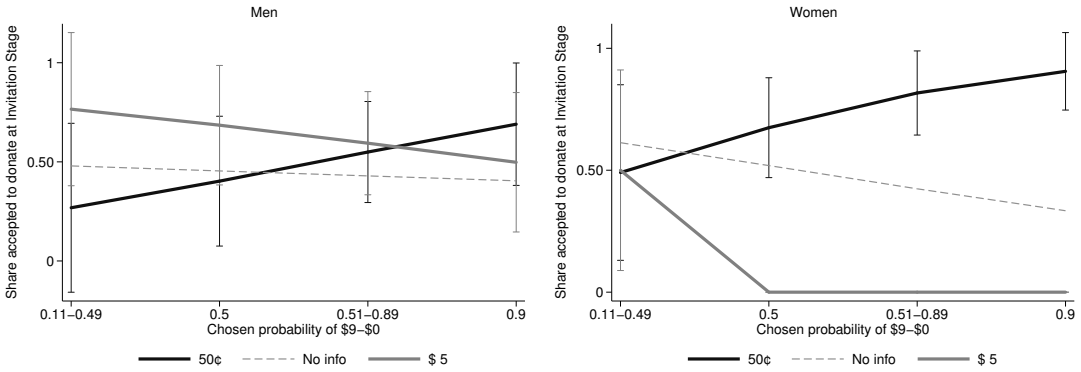


Figure 12: *Intent to donate for Reluctant participants conditional on the probability for $9-$0, by gender*

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.

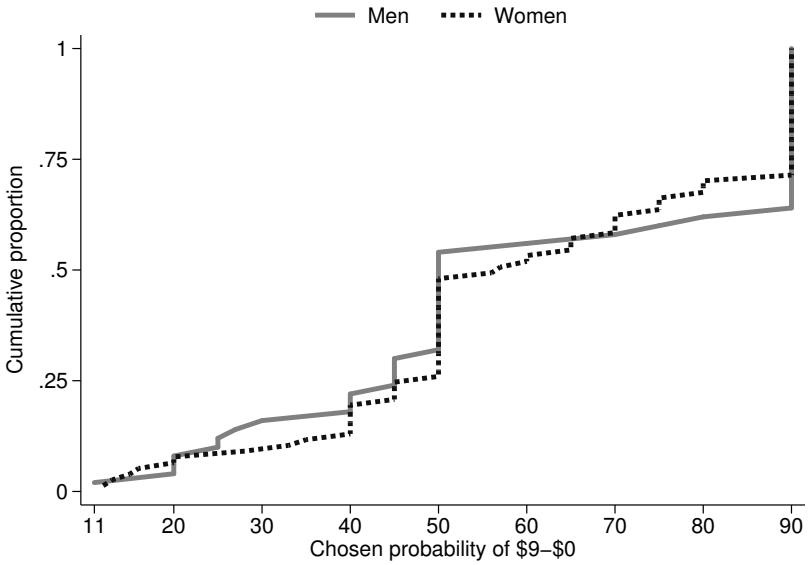


Figure 13: *Cumulative proportion of choices for $9-$0 for Reluctant participants, by gender*

Table 7: *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 C: 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. ■