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To request or not to request: charitable giving, social information, and spillover

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Abstract

Prosocial behavior is important for a well-functioning society, but many people try to avoid situations where they could act prosocially. This paper studies the avoidance of a prosocial request, how it is affected by social pressure, and whether request avoidance and social pressure generate spillover effects on following prosocial behaviors. To this aim, we conduct an incentivized online experiment (N=1400), where participants play two consecutive dictator games with a charity. In the first game, we vary the type of game and information provided in a 2 x 2 between-subject design: (i) standard dictator game or dictator game with costly opt-out; (ii) with or without social information (mean donation in a previous session). The second game is a standard dictator game for all and aims to capture spillover effects from the first decision. We find that the opt-out option leads to significantly lower donations, especially when social information is present (but this effect is not statistically significant). The negative effect of the opt-out option spills over to the second donation decision. We also observe a negative spillover effect after a standard dictator game. Social information reduces donations in a standard dictator game, but also allows to mitigate the negative spillover effect from the first to the second behavior.

JEL codes: C90, D91, D64, Q50

Keywords: prosocial behavior; opt-out option; social information; spillover; charitable giving; self-image

1 Introduction

Prosocial behavior is a crucial aspect of human social interactions, but research shows that many people avoid situations where they could act generously. For instance, they walk away from solicitors (Andreoni et al., 2017; Trachtman et al., 2015), refuse to open the door to them (DellaVigna et al., 2012), or opt for recycling machines that do not ask to donate the returned deposit to charity (Knutsson et al., 2013). Laboratory studies have also revealed that individuals may choose to quietly exit a dictator game (DG), forgoing an obvious gain (e.g., Broberg et al., 2007; Dana et al., 2006; Klinowski, 2020; Lazear et al., 2012). The motivations underlying this behavior include a desire to avoid disappointing others' expectations (Dana et al., 2006) and to preserve one's self-image (Klinowski, 2020). However, there is a lack of research examining how information about others' prosocial behaviors affects avoidance, or how avoiding such requests impacts subsequent decisions.

The objective of this study is to fill these gaps. In a first step, we explore the effects of social information about what relevant others do (Bicchieri & Dimant, 2019) on the likelihood of avoiding a prosocial request. While social information has been widely used to promote prosocial behavior, such as charitable giving (e.g., Agerström et al., 2016; Frey & Meier, 2004; Shang & Croson, 2009), pro-environmental behavior (Farrow et al., 2017) and energy conservation (Andor & Fels, 2018), recent research suggests that it may generate disutility among non-compliers (Allcott & Kessler, 2019). A pioneer contribution on this topic shows that, depending on the level and timing of the social information, there is a different effect on the decision to freely opt in or out from a charity donation (Klinowski, 2020). In particular, high descriptive norms –signaling a norm of giving a large amount– given before the decision to opt out increases the number of opt-outs, while low descriptive norms have the opposite effect. However, Klinowski (2020) did not investigate what happens if opting out is costly, we do. This study also diverges from that of Klinowski in that we analyze possible spillovers on subsequent prosocial behavior.

So, in a second step, we examine spillover effects from a first prosocial request that can be avoided. This novel approach contrasts with previous literature that focuses on spillover effects from requests that cannot be avoided (e.g., Brañas-Garza et al., 2013; Gneezy et al., 2014; Schmitz, 2019). The effect on one's self-image of avoiding a request may differ from the effect of directly declining it and may therefore generate distinct spillover effects.

While we primarily focus on the act of avoiding a sharing request, we also investigate the impact of social information on spillover effects when the first request cannot be avoided. Specifically, we examine how a first prosocial request, accompanied by social information, affects following prosocial behavior. To the best of our knowledge, only few studies have investigated this question, mainly focusing on spillover across different behaviors (rather than for the same behavior over time), and they report mixed findings (Carlsson et al., 2020; Jessoe et al., 2021; Lasarov et al., 2022).

We conducted a pre-registered, incentivized online experiment ($N = 1400$), where participants played two consecutive DGs with a charity. Before playing the first DG, participants were randomly assigned to one of four experimental conditions, manipulating two factors: (i) standard DG or DG with costly opt-out; (ii) with or without social information. The first factor captures the tendency to avoid the prosocial request, with the DG with the costly opt-out (from here on, we omit “costly”) allowing participants to renounce a fixed part of their endowment to avoid playing the game (Dana et al., 2006). The second factor manipulates the social pressure to give. The second DG is a standard DG for all participants and measures spillover effects from the first to the second decision.

About 9 percent of participants avoid the DG, resulting in lower donations when there is the opt-out option. Opting out tends to increase in the presence of social information, though not significantly so. The initial negative effect of the opt-out option spills over to the second decision. We also observe a significant reduction in giving among those who could not or did not opt out from the first DG, although most participants exhibit consistent behavior over time. Social information reduces donations in the standard DG but allows to mitigate the negative spillover from the first to the second decision.

The remainder of the paper proceeds as follows. In Sections 2 and 3, we describe the pre-registered experimental design and behavioral predictions, respectively. Section 4 presents the results, followed by Section 5, which discusses the main findings and provides avenues for future research.

2 Materials and methods

2.1 Participants and procedure

We conducted the experiment on the online platform Prolific in January 2022. To prevent the description of the study from affecting self-selection into participation, it was presented as a general study on decision-making. First, participants gave consent and were informed that in addition to the

participation payment of £1, they had a 10 percent chance to earn up to £10 as an additional bonus, depending on their decisions during the study. We also informed them that their decisions would remain anonymous. Next, participants chose one out of three charities with which they preferred to be associated for the rest of the experiment. After that, participants were randomly assigned to one of four experimental conditions (stage 1).

Stage 1 was a DG with the charity chosen by the participant. The type of DG and the information provided varied according to a 2 x 2 between-subjects design. The DG was either a standard DG or a DG with an opt-out option. The DG with opt-out included a preliminary decision where the participant could decide not to play the DG against a cost, which was 10 percent of the endowment (£1). Half of participants in both of these groups were randomly assigned to receive descriptive norms about the mean donation made by participants in a previous session. The primary aims of stage 1 were to investigate (a) how many would “pay” to avoid playing the DG and (b) to what extent doing so is influenced by social information.

In stage 2, all participants played a standard DG with the charity chosen previously. This stage captures whether participants compensate or reinforce their initial behavior. Participants were only informed about the content of stage 2 after stage 1 to avoid strategic compensation behavior – i.e., participants reducing their donations at stage 1 because they knew that they could compensate by increasing it in stage 2 (Gneezy et al., 2014). After the experiment, participants completed a survey about preferences and attitudes.¹ This section also included an attention check to identify participants not paying attention.

In both stages, we included comprehension checks to ensure that participants understood the payment mechanism and the instructions of the games. Participants could not proceed to the following section unless they had answered the questions correctly. The initial endowment was £10 for each stage. We warranted incentive compatibility by paying a random subset of participants for their decisions in either stage 1 or 2. We explained the payment mechanism at the beginning of stage 1 and repeated it at the beginning of stage 2. As long as decisions are incentivized, random lottery payments generally produce results consistent with paying all (Charness et al., 2016; Clot et al., 2018).

¹ More details about survey items and descriptive statistics are available in Supplementary Material, Section 1.

Before conducting the main study, we ran a pilot study on Prolific with 45 participants (not included in the main study) in order to collect data on mean donations for the social information and to test if instructions were clear. The pilot study included both a standard DG and a DG with opt-out with a charity (selected from the same set as the main study). In the standard DG, the mean donation was £5.5. The main study had a total of 1400 participants.² All participants live in the UK and speak English as first language. The mean completion time was 8.5 minutes. Participants received a fixed participation payment of £1 (for a payment of about 7 £/hour). Once data collection was completed, 10 percent of participants were randomly selected to receive the bonus payment according to their decision in either stage 1 or 2, with only one being selected for actual payment. We transferred them the amount corresponding to the payment bonus minus the stated donation, which was sent to the selected charity.³

Preregistration of the experimental design and hypotheses, along with the full experimental instructions, are available at this [link](#).⁴

2.2 Experimental design

2.2.1 Charity selection

Our research project focusing on pro-environmental behavior as instance of prosocial behavior, we asked participants to choose one from a set of three environmental charities, comprising WWF,

² Out of the 1442 participants who started the main study, 1404 participants completed it. We rejected 4 participants; two of them took less than 5 minutes to complete the experiment and failed the attention check; one completed the survey in less than one minute with the wrong completion code; one used a Prolific ID that was not associated to any identifier in the Prolific database. Moreover, at the beginning of data collection, a few participants saw a table in which the payoffs for the charity and the participant were interchanged. To address this issue, we reached out to the 14 participants who may have been affected by this issue and asked them to verify their allocations. Our results remain unchanged whether we include or exclude them in the analyses (related results are available upon request). Participants' characteristics by experimental condition are reported in Supplementary Material, Section 1. Randomization was pretty successful, except for gender, which is significantly different between *Standard-DN* and *Optout* and between *Optout* and *Optout-DN* ($p=0.06$ and $p=0.09$, respectively, corrected for multiple hypothesis testing (List et al., 2019)). We rule out that this unbalance drives our results in Supplementary Material, Section 5.

³ Overall, 146 participants received a bonus, for a total of £798.5, and we donated £460, £78 and £123.5, to WWF, Greenpeace and Friend of the Earth, respectively. We used the same incentive mechanism also for the pilot study. Of the 146 participants receiving a bonus, 4 were drawn from the sample of the pilot study and 142 from the main study.

⁴ We made some minor changes to the hypotheses formulation after having received peer feedback. The new hypotheses better fit the collected data and respond to our research questions. We report these changes in Supplementary Material, Section 2. In the same section we also report testing of the original hypotheses and show that they lead to the same conclusions as the updated formulations.

Greenpeace and Friends of the Earth.⁵ We explained that they would be associated with the selected organization for the rest of the study without saying what decisions they would make in the later parts. Providing a few alternatives is common practice in this type of setting (e.g., Schmitz, 2019) because it reduces the probability that participants do not find an organization that they like while preventing choice overload (Iyengar & Lepper, 2000). We provided a short description of each charity based on information publicly available on the charity's website. We randomized the order of presentation of the charities.

2.2.2 Stage 1: Dictator game, opt-out and social information

At this stage, participants were randomly assigned to one of four experimental conditions with a 2 x 2 between-subject design, where we vary the type of DG (standard or with opt-out) and the provision of social information.

In the standard DG (*Standard*) participants chose how to split an endowment of £10 between themselves and the environmental charity of their choice. In the DG with opt-out (*Optout*), participants could choose to pay £1 to skip the decision on how to split the endowment between themselves and the environmental charity. Opting out is inefficient and Pareto dominated by opting in, as the DG includes two allocations, (£9, £1) and (£10, £0), which dominate the opt-out outcome (£9, £0). We used a procedure similar to that of Dana et al. (2006) (and replicated by, e.g., Broberg et al., 2007; Klinowski, 2020; Lazear et al., 2012) for the DG with opt-out, with two main differences. First, in previous studies, another participant served as recipient but remained uninformed about the DG in case the dictator opted out (Broberg et al., 2007; Dana et al., 2006; Klinowski, 2020; Lazear et al., 2012). Here, we used a charity as beneficiary that would never know about dictators' decisions in any case. Second, Dana et al. (2006) introduced the opt-out option after participants played the DG, whereas we made participants decide whether to opt out before playing the DG (as in Lazear et al. 2012). Participants opting out simply did not see the screen with the DG and went on to the next part of the experiment.⁶

⁵ These organizations are quite popular in the UK and are seen as efficient in their resource use (<https://www.theguardian.com/environment/2013/nov/27/1-in-10-uk-adults-environmental-group>, last accessed on 10/01/2022).

⁶ A possible alternative reason for opting out is to reduce the time required to complete the survey. However, we asked participants whether they wanted to opt out just before the donation decision, making the difference in completion time between those who opt out or not negligible (p-value from Kruskal-Wallis test > .10).

The social information was presented to half of participants playing either the standard DG (*Standard-DN*) or the DG with opt-out (*Optout-DN*). Social information was provided in the form of a descriptive norm. Specifically, participants were informed about the mean donations by participants who played the standard DG in the pilot study, considering also those allocating zero. Hence, as e.g., Allcott (2011) and Frey & Meier (2004), we chose to use information about the mean behavior of the studied sample. Thus, no deception was involved. We used the following text: “For your information, we conducted earlier a similar survey on Prolific: participants gave on average £ 5.5 to the environmental organization”. This information was provided to participants before the sharing decision in *Standard-DN*, and before the decision to opt out in *Optout-DN*.

In all experimental conditions, participants chose how to split the endowment between themselves and the environmental charity by selecting from a list of possible allocations from (£0, £10), to (£10, £0) in steps of £1. In order to force participants to either offer or keep more, the equal split was not an option (as in Bellemare et al. 2008). We randomized the order of presentation of the allocations in the list (ascending versus descending). Our randomization procedure assigned a higher proportion of participants to the experimental conditions with the opt-out option, as follows: 30 percent to each of *Optout* and *Optout-DN*, and 20 percent to each of *Standard* and *Standard-DN*. Our sample size has 0.80 power to detect fairly small effect size of social information and opt-out on donation ($d= 0.24$) and for the effect of social information on opt-out ($d= 0.22$).

2.2.3 Stage 2: Dictator game

All participants played a standard DG with the environmental charity of their choice. The endowment was £10. As in stage 1, the allocation decision was made out of a list of possible allocations that did not include the equal split. The order of presentation of the list was randomized and was kept consistent with the order used in stage 1 for each participant.

3 Behavioral predictions

As in Lazear et al. (2012), we distinguish three types of donors. In Supplementary Material, Section 3, we present a formal description of the types of donors. Here, we briefly present each of them and their behavior at each stage.

Willing sharers. Their behavior is driven by social preferences, such as pure and impure altruism, inequity aversion, or environmental identity. Willing sharers draw utility from charitable giving; thus, they look for opportunities to behave prosocially and share their endowment with the charity.

Non-sharers. They behave as standard economic actors who care about their payoff. They have null willingness to pay to avoid sharing requests because they do not share their endowment in any case.

Reluctant sharers. They give to meet others' expectations (Dana et al., 2006) or to preserve their self-image (Klinowski, 2020), or may also be "sophisticated" altruists, who anticipate they will succumb to the temptation of giving, even when it is not in their best interest (Andreoni et al., 2017). In sum, reluctant sharers give when prompted to do so, but prefer avoiding sharing requests. They are ready to incur some costs to avoid a sharing request, and their willingness to pay tends to increase in the amount they would give when asked to do so (Lazear et al., 2012).

Stage 1

At stage 1, the behavior of willing sharers and non-sharers is not affected by the opt-out option. Both always opt in; the former opt in to give a positive amount, the latter to give nothing. The behavior of reluctant sharers changes according to the presence of the opt-out option. They give a positive amount when they cannot opt out and they seize the opportunity to opt out when they can (as long as their willingness to pay is higher than £1).⁷ As a result, we hypothesize that:

Hypothesis 1. Mean donation is higher in *Standard* than in *Optout*.

Social information can have different effects on the behavior of willing and reluctant sharers in the DG. While social information should increase giving among willing sharers, and polarize prosocial behavior for equity or conformity reasons (Bernheim, 1994; Fischbacher et al., 2001),⁸ it can increase the pressure felt by reluctant sharers to give more to the charity. This leads to two opposite effects on reluctant sharers depending on the presence of the opt-out option. If opting out is not possible,

⁷ Note that by setting the cost to opt out at £1, we are not able to detect reluctant sharers with willingness to pay lower than £1. The decision to fix the price in this way is primarily to compare our results with those from the study by Dana et al. (2006) and replications, and secondly, to ensure comprehension, as a multiple price list mechanisms like the one by Broberg et al. (2007) may be difficult to implement in the online environment, which allows for less control over participants' behavior than the laboratory. Moreover, it is important to set a positive cost because if it were zero, besides reluctant sharers, also some non-sharers may opt out.

⁸ But may have a negative effect on pure altruists who see personal and others' donations as substitutes.

social information should increase charitable giving. If opting out is possible, the willingness to pay to opt out overcomes the fixed cost to opt out for a larger share of reluctant sharers. As a result, social information increases opt out. This leads to the following hypotheses:

Hypothesis 2. In the standard DG, mean donation is higher when social information is displayed (*Standard-DN*) than when it is not displayed (*Standard*).

Hypothesis 3. In the DG with opt-out, more participants opt out when social information is displayed (*Optout-DN*) than when it is not displayed (*Optout*).

Stage 2

The decision in stage 2 is identical for all participants and consists of a standard DG. We hypothesize that opting out in stage 1 changes experienced utility from giving in stage 2 compared to participants who made a donation in stage 1. So, we distinguish between participants who could or would not opt out in stage 1 and those who chose to opt out.

We suppose that non-sharers and willing sharers never opt out. Therefore, the predictions for them are independent of the presence of the opt out in stage 1. Non-sharers give nothing to the charity also at stage 2. Willing sharers, being motivated by either pure or impure altruism, may give the same or a lower amount. This is due to our experimental design in which we incentive only one of the two choices and therefore, utility from giving in the two steps is not additive. Finally, we expect a reduction in giving among reluctant sharers who could not opt out at stage 1. Having established a positive self-image with their first donation, they can give less in stage 2.

Therefore, when participants cannot opt out (*Standard*) or choose not to opt out (*Optout*) in stage 1, we expect a negative spillover (i.e. a decrease in donations at stage 2 compared to stage 1).

Hypothesis 4. Mean donation is lower at stage 2 than stage 1 in *Standard*.

Hypothesis 5. Mean donation among participants opting in is lower at stage 2 than stage 1 in *Optout*.

In case reluctant sharers opted out at stage 1, we expect them to give a positive amount at stage 2, because: (i) they cannot avoid the sharing request; (ii) they have not established a positive self-image by giving at stage 1.

Hypothesis 6. Those who opted out at stage 1 are *reluctant sharers* and therefore give a positive amount at stage 2. Hence, they differ from *non-sharers*, who give nothing also at stage 2.

3.1 Exploratory analysis

In addition to our confirmatory hypothesis testing, we conduct some exploratory analyses regarding spillovers (between experimental conditions) and total giving. These analyses are exploratory in nature, as there is limited prior research on the topic.

First, we look at treatments effect on donations at stage 2. While participants see different versions of the DG at stage 1, they all play the same game at stage 2. We expect treatments to affect behavior at stage 1, with social information having a positive effect, the opt-out having a negative effect, and an interplay between the two potentially leading to higher request avoidance when both are included. However, they may affect subsequent behaviors differently. We thus explore treatments effect on stage 2 by comparing mean donations across experimental conditions. Differences at stage 2 can only be driven by design features of the first decision, since they all play the same game at stage 2.

Second, we analyze treatment effects on total donations to understand the overall implications of the opt-out option, social information and their interplay on charitable giving, considering both direct and spillover effects.

4 Empirical approach

To examine whether mean responses across treatments are significantly different, we perform pairwise comparisons by correcting for multiple hypothesis testing, following List et al. (2019). Unlike a two-by-two comparison of treatments, this statistical technique adjusts for the familywise error rate and provides more reliable significance values comparing all treatments simultaneously. For Hypotheses 4 and 5, we compare mean donations between the two stages using paired t-tests. Next, we test Hypothesis 6 through t-tests for mean donations equal to 0 for reluctant and non-sharers respectively. All our statistical tests have two-tailed alternative hypotheses. We show the robustness of our results to alternative model specifications in Supplementary Material, Section 5.

An overview of the descriptive statistics of the results is reported in Table 1. Distributions of donations at each stage and per experimental conditions are reported in Figure 1 and Figure 2, respectively.

Table 1. Mean donations at stage 1, stage 2, total donations, and opt-out, per experimental condition

Treatment	<i>Standard</i>	<i>Standard-DN</i>	<i>Optout</i>	<i>Optout-DN</i>	P-value ¹
N	291	280	388	441	
Stage 1					
Mean donation	5.48 (2.82)	4.89 (2.81)	4.55 (3.09)	4.22 (2.85)	0.001***
Proportion of opt-out	-	-	0.082 (0.27)	0.100 (0.30)	0.39
Extensive margin	0.92 (0.26)	0.89 (0.31)	0.87 (0.34)	0.85 (0.36)	0.02*
Intensive margin	5.93 (2.44)	5.48 (2.37)	5.25 (2.71)	4.98 (2.40)	< 0.001***
Stage 2					
Mean donation	5.29 (2.89)	4.83 (2.92)	4.66 (2.96)	4.37 (2.74)	0.001***
Extensive margin	0.91 (0.28)	0.89 (0.32)	0.92 (0.27)	0.90 (0.30)	0.47
Intensive margin	5.78 (2.50)	5.45 (2.50)	5.07 (2.73)	4.84 (2.45)	0.001***
Total mean donations	10.64 (5.55)	9.65 (5.56)	9.21 (5.91)	8.59 (5.42)	0.001***

Note: *extensive margin* represents the share of participants donating a positive amount (for stage 1 this variable is 0 also for opt-out); *intensive margin* represents the amount donated conditional on donating a positive amount. Standard deviations in parentheses. ¹P-value from Kruscal-Wallis test. + p < .10, * p < .05, ** p < .01, *** p < .001.

Figure 1. Distribution of donations at stage 1 per experimental condition

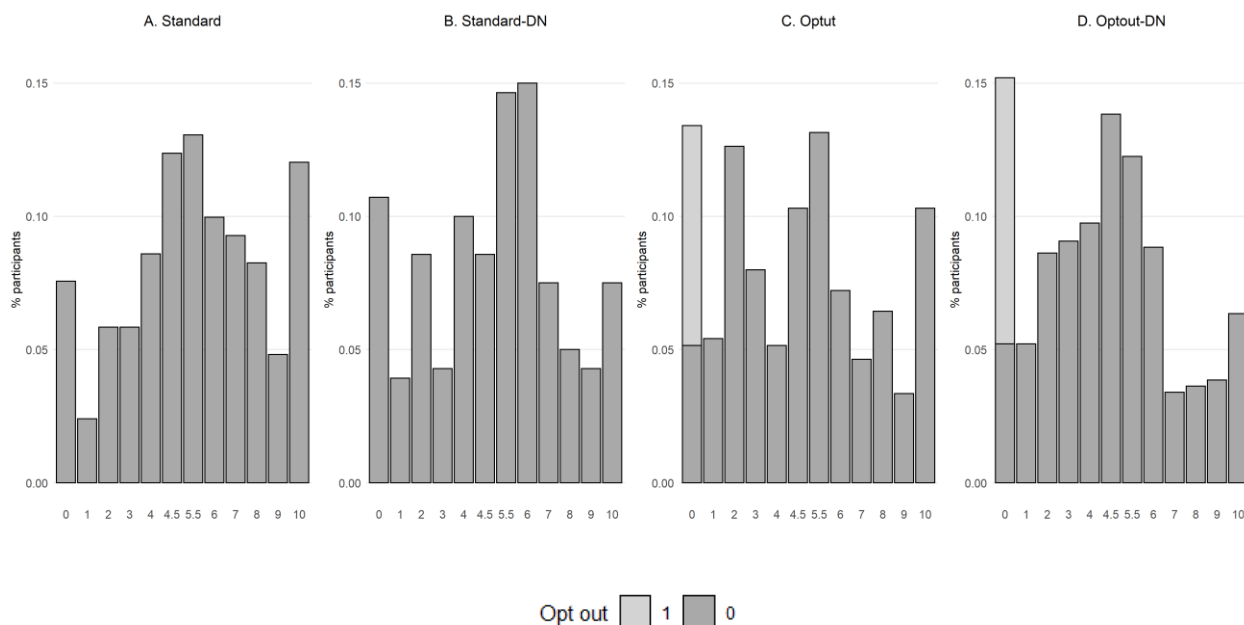
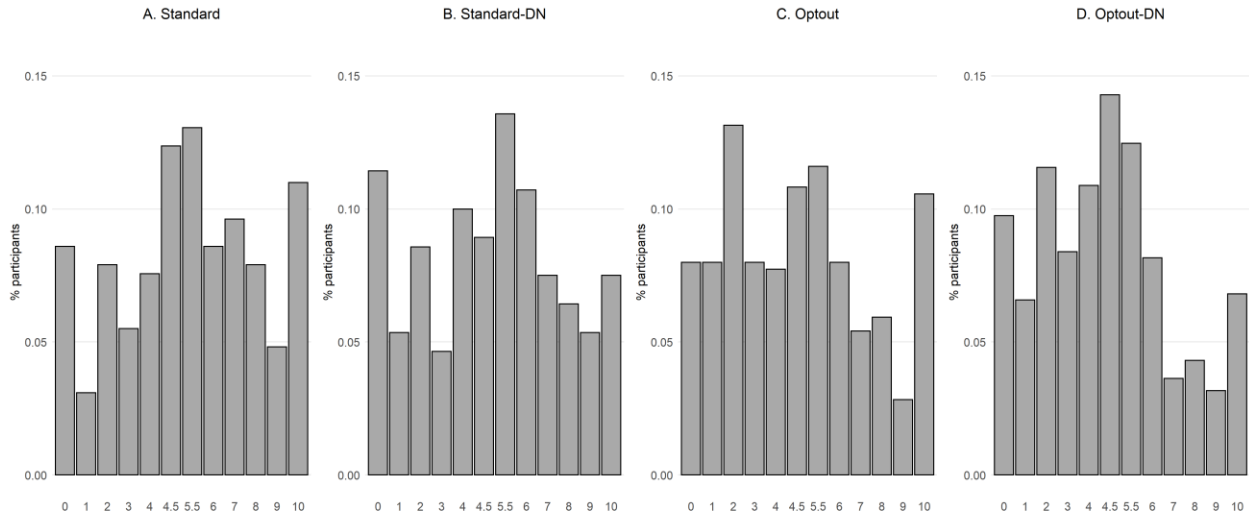


Figure 2. Distribution of donations at stage 2 per experimental condition



5 Results

5.1 Hypothesis testing

5.1.1 Behavior at stage 1

Results from pairwise mean comparisons are reported in Table 2. In line with Hypothesis 1, the opt-out option reduces donation. The difference in donations between *Standard* and *Optout* is statistically significant at $p < 0.001$. The opt-out option reduces giving by about £0.9 which represents almost of 10 percent of the initial endowment. This result appears to be driven by reluctant sharers, who represent 8 percent of participants in *Optout* and prefer to renounce part of their endowment to avoid the donation request.

Table 2. Pairwise comparisons of mean donations at stage 1

Mean donations comparison	Difference in means	P-value ¹
Standard vs Standard-DN	0.587	0.030*
Standard vs Optout	0.933	0.001***
Standard vs Optout-DN	1.254	0.001***
Standard-DN vs Optout	0.346	0.127
Standard-DN vs Optout-DN	0.667	0.003**
Optout vs Optout-DN	0.322	0.205

Note: ¹P-values from pairwise mean comparison corrected with Theorem 3.1 in List et al. (2019). * $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

We do not find any proof for social information to increase mean donations (in contrast to Hypothesis 2). Surprisingly, social information reduces mean donations, and the effect is significant at the 0.05 level. Social information appears to have acted as reference point. First, it anchored participants' donations to £5.5 in *Standard-DN*, being the extensive margin equal to the social information in this condition (cfr. Table 1). Second, it caused a shift in the distribution of giving (albeit not statistically significant): fewer participants give more than the norm in *Standard-DN* than in *Standard* (-5 percentage points), while more participants give the social information amount (+1.5 percentage points) or less (+3.5 percentage points). The higher effect among participants who would have given more than the norm is consistent with loss aversion (Kahneman & Tversky, 1979). We further discuss this result in Section 6.

Next, we find directional evidence that social information increases opt out: Ten percent of participants decide to opt out when they are informed about mean donations in a previous session compared to only eight percent when this information is not reported. Although the difference goes in the direction stated in Hypothesis 3, it is not statistically significant (cfr. Table 1). The difference is equivalent to 1.7 percentage points, which is rather small, and the effect size might have been too small to be detected with our sample size (type 2 error). Yet, it is to notice that even if the absolute difference is small, the relative increase in opting out of 20.7 percent is non-negligible. For a large population, the effect of social information on request avoidance may therefore be tangible.

Finally, we can identify the composition of our sample in terms of willing sharers, non-sharers and reluctant sharers. Among participants playing the DG with the opt-out option, 85.6 are willing sharers, 5.2 percent are non-sharers and 9.2 percent are reluctant sharers. Supplementary Material, Section 4 relates participants' types and characteristics.

5.1.2 Spillover effect

Hypothesis 4 posits a reduction in giving in the second decision among participants initially exposed to the standard DG. Accordingly, Table 3 shows that we can reject the null hypothesis that donations are equal across the two stages for *Standard*. We also observe a reduction in giving, among participants who could (but did not) opt out in *Optout*, in line with Hypothesis 5.

Note that the reduction in giving in *Standard* is more than double than in *Optout*. In *Standard*, both willing sharers (motivated by impure altruism) and reluctant sharers, who have already established their self-image by giving at stage 1, contribute to the decrease. In *Optout*, the negative spillover effect

is driven only by willing sharers (and by reluctant sharers with a willingness to pay lower than the opt-out price). This suggests that the commonly observed moral licensing is driven by both types of sharers.

Table 3. Test on equality of mean donations between stage 1 and stage 2

Treatment	Difference in means, stage 2-stage 1	P-value ¹
<i>Standard</i>	-0.192	0.021*
<i>Standard-DN</i>	-0.064	0.435
<i>Optout</i> ^a	-0.084	0.080+
<i>Optout-DN</i> ^a	-0.053	0.279

Note: ^a Participants opting out are excluded. ¹P-value from two-tailed paired t-test. + p < .10, * p < .05, ** p < .01, *** p < .001.

Interestingly, giving does not significantly reduce over time when social information is displayed, for both types of DG. This may be due to different reasons: for example, the motivation to give in relation to the outcome for the charity may be reinforced and thus giving does not reduce over time. Alternatively, warm glow feelings from giving to comply with others' behavior rather than with intrinsic motivation may be lower, thereby mitigating the negative spillover. Finally, social information may have anchored donations also at stage 2 (as suggested by Table 1, which shows that the intensive margin is close to the descriptive norm also at stage 2 in *Standard-DN*).

Finally, Hypothesis 6 differentiates behavior in the second decision among reluctant sharers and non-sharers. Participants opting out at stage 1 are reluctant sharers, who share when in the sharing environment, as the one they face at stage 2. By contrast, non-sharers should give zero at both stages, independently from the DG played at stage 1. Consistent with these assumptions, 68.4 percent of reluctant sharers give a positive amount at stage 2. By contrast, only 4.6 percent of non-sharers give a positive amount at stage 2. In addition, we test whether the mean donations by each type is equal to zero (Table 4). For reluctant sharers we can reject the null hypothesis at p < 0.001 for both *Optout* and *Optout-DN*. All non-sharers give 0 at stage 2 in *Optout*, and although a few non-sharers give a positive amount in *Optout-DN*, we cannot reject the null hypothesis that mean donation is equal to 0 for this treatment. Taken together, these results show that reluctant sharers and non-sharers behave differently, as expected.

Table 4. Test on mean donations at stage 2 equal to 0, for reluctant and non-sharers

Type	Treatment	N	Mean donations stage 2	P-value ¹
Reluctant shares (opt out at stage 1)	<i>Optout</i>	32	2.344	0.001***
	<i>Optout-DN</i>	44	1.920	0.001***
Non-sharers (do not opt out and donate zero at stage 1)	<i>Optout</i>	20	0	-
	<i>Optout-DN</i>	23	0.478	0.283

Note: ¹P-value from two-tailed t-test for mean equal to 0. * p < .10, * p < .05, ** p < .01, *** p < .001.

5.2 Exploratory analyses

This section focuses on the impact of our treatments on donations at stage 2, and on total donations (results reported in Table 5). First, an opt-out option at stage 1 negatively impacts giving at stage 2: for an identical DG at stage 2, donations are statistically lower for those who played a previous DG with the opt-out option. The decrease is even more pronounced if, in addition to the opt-out option, social information is displayed at stage 1. This suggests that providing individuals with the possibility to avoid a prosocial request, independently from whether they use it or not, licenses them to give less in a subsequent request.

Second, we find additional evidence that social information reduces the negative spillover effect occurring when participants play two standard DGs: The difference in donations between *Standard* and *Standard-DN* that was present at stage 1 is no longer significant at stage 2 (for some robustness tests, this difference remains statistically significant at the 0.10 level, see Supplementary Material, Section 5).

Finally, we consider direct and spillover effects by evaluating treatment effects on total donations. Total donations are highest when participants play two standard DGs. For *Standard-DN*, the positive effect of social information on spillover almost cancels out its negative effect at stage 1, leading to slightly lower donations in *Standard-DN* than *Standard*. The negative effect of the opt-out option persists in both stages, resulting in the lowest total donations in *Optout* and *Optout-DN*.

Table 5. Pairwise comparisons of donations at stage 2 and total donations

Mean donations comparison	Stage 2		Total	
	Difference in means	P-value ¹	Difference in means	P-value ¹
Standard vs Standard-DN	0.458	0.155	0.989	0.071 ⁺
Standard vs Optout	0.624	0.021 [*]	1.430	0.002 ^{**}
Standard vs Optout-DN	0.918	0.001 ^{***}	2.045	0.001 ^{***}
Standard-DN vs Optout	0.166	0.467	0.440	0.323
Standard-DN vs Optout-DN	0.459	0.112	1.056	0.029 [*]
Optout vs Optout-DN	0.294	0.235	0.615	0.117

Note: ¹P-value from pairwise mean comparison corrected with Theorem 3.1 in List et al. (2019). ⁺ $p < .10$, ^{*} $p < .05$, ^{**} $p < .01$, ^{***} $p < .001$.

On a side note, we find that donation in stage 1 is generally followed by a donation in stage 2 of the same size. This result differs from prior literature that shows a tendency to compensate after a first moral behavior, especially when there is short time lapse between the two behaviors (e.g., Brañas-Garza et al., 2013; Brosig-Koch et al., 2017; Schmitz, 2019). Among participants playing the standard DG twice, 77.7 percent give the same amount at both stages, 14.8 percent reduce their giving, and 7.5 percent increase their giving. Further results are reported in Supplementary Material, Section 5, and show that: (i) donations at stage 1 explain almost 70 percent of the variability of donations at stage 2; (ii) given the tendency to be consistent, conditions with lower initial donations lead to lower giving also in the second decision.

6 Discussion and conclusions

The proportion of participants who used the opt-out option to avoid the prosocial request (i.e., give reluctantly) in our study is 9.2 percent. This share is lower compared to previous studies with similar settings (e.g., Dana et al., 2006; Klinowski, 2020; Lazear et al., 2012). For example, with a payment scheme similar to ours, approximately 28 and 43 percent of the sample opted out in Study 1 and Study 2 (*replication* condition) in Dana et al. (2006). While we cannot directly test the reasons for the difference in results, we can speculate that it may be driven by the type of recipient.

In particular, in our study decisions were made privately, which is different from previous studies where decisions were observable to recipients if the dictator did not opt out (Broberg et al., 2007; Dana et al., 2006; Klinowski, 2020; Lazear et al., 2012). In these studies, the fear of falling short of others' expectations may have encouraged participants to opt out (Dana et al., 2006), whereas in our study, the main motivation for opting out may have been to protect one's self-image – as in Klinowski

(2020) and Knutsson et al. (2013). Alternatively, it could be that participants are more willing to share with charities than with another participant (Umer et al., 2022), as supported by the fact that donations in our study are on the higher end of the range found in previous DGs (Engel, 2011). Future research is needed to further investigate the underlying drivers of the smaller share of reluctant sharers in a setting similar to ours.

In line with our expectations, social information increases the tendency to avoid the DG, although this effect is not statistically significant. D'Adda et al. (2018) also find no significant effect of social pressure alone on demand for information about the emissions caused by air conditioning. Yet, when social pressure is combined with other treatments that generate a feeling of moral obligation to act pro-environmentally, it causes significant information avoidance. Similarly, Klinowski (2020) shows that the effect of social information on avoidance of a prosocial request depends on the level of the descriptive norm. Collectively, these results suggest that perceived social pressure can lead to avoidance, but only when the pressure is sufficiently high. Possibly, in our case social pressure was not high enough to make participants opt out. Further research should systematically test the relationship between perceived social pressure and request avoidance.

Interestingly, the opt-out option appears to license less prosocial behavior, independently from whether it is used or not, also in subsequent decisions. Participants exposed to the first DG with opt-out option donated less in the second stage compared to those who saw a standard DG since the beginning. It may be that seeing the opt-out option may reduce feeling of guilt for giving less in subsequent behaviors. So from a policy point of view, we hold that when giving individuals the opportunity to avoid a request, this leads to a decrease in prosocial behavior not only in the short run, but also in the long run.

Finally, we observed an unexpected negative effect of social information on donations when it was not possible to avoid the DG. When descriptive norms are close to or lower than the “common” (or average) behavior, they may have no or negative effect (although it is not always the case, e.g., Allcott, 2011 and Krupka & Weber, 2009). High norms tend to have a positive effect (Frey & Meier, 2004; Klinowski, 2020; Shang & Croson, 2009). However, a high descriptive norm is not always easy to achieve because it may require manipulating the reference sample used as basis for the norm (e.g., Bicchieri & Xiao, 2009) or the norm itself (e.g., Agerström et al., 2016), or else, communicating the contribution of a single, high-performing participant (e.g., Klinowski, 2020; Shang & Croson, 2009). If using random draws from the population, it may be more effective to inform about the extensive

margin (as in Frey & Meier 2004 and Krupka & Weber 2009), than the intensive margin (as we did). Future research should systematically investigate this aspect to better understand the impact of different frames of social information on prosocial behavior.

Be that as it may, social information appears to mitigate the negative spillover that we observe in the standard DG. A few studies have pointed to a positive spillover by social information across pro-environmental behaviors (Carlsson et al., 2020; Jessoe et al., 2021); here we show that the same effect applies to a repeated behavior over time. This calls to further investigations, notably whether negative spillovers remain mitigated in case social information is effective in a first stage.

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Supplementary Material for “To request or not to request: charitable giving, social information and spillovers”

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1 Descriptive statistics and survey items

Table S1. Descriptive statistics per experimental condition

	<i>Standard</i>	<i>Standard-DN</i>	<i>Optout</i>	<i>Optout-DN</i>	P-value ¹
N	291	280	388	441	
female	0.62	0.55	0.57	0.65	0.03
age (years)	38.8 (13)	39.6 (12.8)	39.8 (13)	39.8 (13)	0.74
graduate degree	0.57	0.58	0.57	0.57	0.98
student	0.13	0.1	0.14	0.13	0.52
income (k€)	22.7 (16.4)	23.8 (15.4)	23 (14.8)	23 (15.7)	0.34
envID	3.66 (0.89)	3.64 (0.87)	3.67 (0.81)	3.65 (0.80)	0.91
donating frequency	2.51 (1.19)	2.6 (1.19)	2.6 (1.18)	2.51 (1.16)	0.59
volunteering habit	2.32 (1.39)	2.31 (1.39)	2.17 (1.36)	2.28 (1.36)	0.50
support WWF	4.18 (0.73)	4.23 (0.69)	4.21 (0.69)	4.18 (0.68)	0.63
support FriendsEarth	3.28 (0.94)	3.37 (0.93)	3.40 (0.96)	3.38 (0.90)	0.39
support Greenpeace	3.54 (0.81)	3.57 (0.84)	3.64 (0.80)	3.59 (0.81)	0.38
Charity selection					
WWF	0.63	0.65	0.63	0.65	0.87
Friends of the Earth	0.21	0.20	0.20	0.22	0.88
Greenpeace	0.16	0.15	0.18	0.13	0.35

Note: *envID* is measured as unweighted mean response to the following items (Panzone et al., 2018): “Being environmentally responsible is an important part of who I am”; “I view myself as an environmentally responsible person”; “Being environmentally responsible is not really important to me” (R); “I strongly aspire to be environmentally responsible”. *donating frequency* and *volunteering frequency* represent how often participants donate money and volunteer for environmental organizations, respectively (Zhang & Thøgersen, 2020). Support for each environmental charity is measured as unweighted mean response to the following items: “I am familiar with the association”; “I trust the association”; “I support their actions”. All responses are given on 5-point Likert scale. ¹P-value from Kruskal-Wallis test.

2 Changes compared to the pre-registration and test of pre-registered hypotheses

We pre-registered six hypotheses. In the manuscript, Hypotheses 2, 3 and 6 remain unchanged, while we made minor changes to Hypotheses 1, 4 and 5, as explained in Table S2. The revised hypotheses refer to the effect of the opt-out option in the absence of social information. Indeed, we anticipate that social information will affect why and how much people donate. Failing to distinguish for the presence of social information may cause it to confound the results. Testing the original set of hypotheses (reported in Table S3) yields the same conclusions as the revised hypothesis testing discussed in the main text.

Table S2. Original and updated hypotheses

HP	Original	Updated	Explanation
1	At stage 1, mean donation is higher in <i>Standard&Standard-DN</i> than in <i>Optout&Optout-DN</i>	At stage 1, mean donation is higher in <i>Standard</i> than in <i>Optout</i> .	By isolating the impact of the opt-out option and excluding the influence of social information, we can examine the effect of the opt-out option on a standard DG with a charity.
4	Mean donation is lower at stage 2 than stage 1 in <i>Standard&Standard-DN</i> .	Mean donation is lower at stage 2 than stage 1 in <i>Standard</i> .	We anticipate that social information affects decisions at stage 1, thereby potentially influencing also behavior at stage 2. The standard DG tests whether behavior in the stage 2 compensates or reinforces behavior in stage 1 when no additional stimuli are present (Hypothesis 4). The same logic applies where opt out is possible (Hypotheses 5).
5	The amount donated among agents opting in is lower at stage 2 than stage 1 for <i>Optout&Optout-DN</i> .	The amount donated among agents opting in is lower at stage 2 than stage 1 for <i>Optout</i> .	

Note: *Standard&Standard-DN* refers to the combination of *Standard* and *Standard-DN*. *Optout&Optout-DN* refers to the combination of *Optout* and *Optout-DN*.

Table S3. Test of the hypotheses included in the pre-registration

HP	Test	P-value	Interpretation
1	Two-sided t-test for equality in mean donations between conditions without (<i>Standard&Standard-DN</i>) and with opt-out (<i>Optout&Optout-DN</i>), stage 1	<0.001***	The presence of the opt-out option reduces donations
4	Two-sided paired t-test for equality in mean donations between stage 1 and stage 2 for conditions without the opt-out option (<i>Standard&Standard-DN</i>)	0.026*	Giving reduces at stage 2 when opt out is not possible at stage 1
5	Two-sided paired t-test for equality in mean donations between stage 1 and stage 2 among those who opt in at stage 1 (<i>Optout&Optout-DN</i>)	0.048*	Giving reduces at stage 2 among those who do not opt out at stage 1

Note: *Standard&Standard-DN* refers to the combination of *Standard* and *Standard-DN*. *Optout&Optout-DN* refers to the combination of *Optout* and *Optout-DN*. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

3 Relation between participants' characteristics and type of sharer

Table S4. Multinomial probit results for relation between characteristics and type of sharer (marginal effects)

	(1)			(2)		
	Willing	Nonsharers	Reluctant	Willing	Nonsharers	Reluctant
envID	0.050*** (0.015)	-0.019* (0.009)	-0.032*** (0.012)	0.042*** (0.016)	-0.014 (0.009)	-0.028* (0.013)
female	0.073*** (0.026)	-0.048*** (0.017)	-0.026 (0.021)	0.073*** (0.026)	-0.048*** (0.017)	-0.025 (0.021)
age	0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)
income	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
graduate	0.022 (0.026)	0.009 (0.015)	-0.031 (0.021)	0.024 (0.026)	0.009 (0.015)	-0.033 (0.022)
volunteering frequency				0.002 (0.01)	-0.001 (0.006)	0.001 (0.008)
donating frequency				0.025* (0.011)	-0.012+ (0.006)	-0.013 (0.009)
student				0.03 (0.035)	-0.004 (0.021)	-0.026 (0.028)
N	826			814		

Note: Robust standard errors in parentheses. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

4 Framework for behavioral predictions

Our setup builds on Lazear et al. (2012). We consider the two stages of the experiment, $t = 1, 2$. In both stages, the setup is similar and is defined as follows.

The participant is endowed with an amount w_t and may play the DG ($D_t = 1$) or not ($D_t = 0$). To keep our set-up general, we refer to the DG as a “sharing environment”. If the participant is in the sharing environment, she splits the amount w_t between herself (x_t) and the charity (y_t). y_t^* represents the donation amount that maximizes utility once they are in the sharing environment. If she opts out from the sharing environment, she receives an amount $x_t = w_t - \varepsilon_t$, where ε_t is the economic cost of opting out, $\varepsilon_t > 0$, and gives zero to the charity ($y_t = 0$). Participants' payoff is thus defined as $x_t = w_t - y_t * D_t - \varepsilon_t * (1 - D_t)$. The actual cost paid to opt out, ε_t , may differ from the amount the participant is willing to pay, $\hat{\varepsilon}_t$, but we can only observe the actual amount paid. We assume that a person who chooses to be in a given environment obtains the same utility as someone exogenously assigned to such an environment, for the same level of payoff. In other words, opting out from the

sharing environment does not affect utility.¹ The participant's utility is assumed to be a function of the environment and payoffs: $U_t = U(D_t, x_t, y_t)$.

Stage 1

Willing sharers. They donate something if in the sharing environment: $\text{argmax}_{x_1 \in [0, w_1]} U(1, x_1, w_1 - x_1) < w_1$ (i.e., $y_1^* > 0$) and they prefer to be in such environment, i.e., $\widehat{\varepsilon}_1 = 0$ and $U(1, x_1, w_1 - x_1) > U(0, w_1 - \varepsilon_1, 0)$, for $\varepsilon_1 \geq 0$. Thus, they draw utility from giving and opt in the sharing environment.

Non-sharers. They do not give to the charity: $\text{argmax}_{x_1 \in [0, w_1]} U(1, x_1, w_1 - x_1) = w_1$ (i.e. $y_1^* = 0$). As opting out is costly and their willingness to pay to opt out is zero (i.e., $\widehat{\varepsilon}_1 = 0$), they always opt in the sharing environment: $\text{argmax}_{x_1 \in [0, w_1]} U(1, x_1, w_1 - x_1) = U(1, w_1, 0) > U(0, w_1 - \varepsilon_1, 0)$, for $\varepsilon_1 > 0$. For $\varepsilon_1 = 0$, they would be indifferent between opting in and opting out, i.e., $U(1, w_1, 0) = U(0, w_1, 0)$.

Reluctant sharers. They donate if in the sharing environment: $\text{argmax}_{x_1 \in [0, w_1]} U(1, x_1, w_1 - x_1) < w_1$, but prefer to opt out from the sharing environment for some cost, i.e., $U(1, x_1, w_1 - x_1) < U(0, w_1 - \varepsilon_1, 0)$, for some $0 < \varepsilon_1 \leq \widehat{\varepsilon}_1$ (for $\varepsilon_1 = 0$, they always opt out). Given the amount they donate when they are in the sharing environment $y_1^* = w_1 - \text{argmax}_{x_1 \in [0, w_1]} U(1, x_1, w_1 - x_1)$, the price $\widehat{\varepsilon}_1$ that reluctant sharers are willing to pay to opt out increases with y_1^* : $\widehat{\varepsilon}_1 = f(y_1^*)$, $f' > 0$, $f'' < 0$. In other words, reluctant sharers' willingness to pay to opt out is positively related to the amount they give in the sharing environment (Lazear et al., 2012).

Hypothesis 1 derives from the presence of these three types.

With respect to social information, it should increase the pressure to give to the charity, that is $y_{1,SI}^* > y_1^*$, where SI refers to the presence of social information. Since the willingness to pay to opt out increases with the optimal amount given in the sharing environment, it follows that $\widehat{\varepsilon}_{1,SN} > \widehat{\varepsilon}_1$. Thus, the willingness to pay to opt out is higher than the fixed cost to opt out ε_1 for a larger number of participants when social information is displayed. These two opposite effects lead to hypotheses 2 and 3.

¹ Our predictions can be extended to include disutility from opting out from the sharing environment by including some psychological costs z_t , so that $z_t = 0$ if the individual opts in the sharing environment (or even $z_t < 0$ if opting in the sharing environment generates utility, for example in terms of bolstered self-image to accept a sharing request), $z_t > 0$ otherwise. In this case utility depends also on z_t , i.e., $U = U(D_t, x_t, y_t, z_t)$. These psychological costs may derive for example from disutility from self-signaling that one prefers to avoid the request to share. Including these costs affects the share of reluctant sharers and how much they give at stage 2 if they opt out from the sharing environment at stage 1.

Stage 2

Stage 2 differs from stage 1 in two ways: opt-out is not possible ($D_2 = 1$ for all participants), and the experienced utility depends on payoff allocation at stage 1.

We distinguish between whether opt-out was possible or not at stage 1.

Case a. If opt-out was not possible at stage 1 (i.e., $D_1 = 1$ for all):

$$(1) U(1, x_2, w_2 - x_2 | 1, x_1, w_1 - x_1) \leq U(1, x_1, w_1 - x_1) \text{ for } x_2 = x_1$$

Equation (1) implies that for the same level of giving at both stages, participants draw lower or equal utility from giving at stage 2 than stage 1. For non-sharers and willing sharers who are driven by pure altruism or have a strong norm about the fair split of the endowment, the equality in the equation above holds, meaning that their behavior at stage 2 is not affected by that at stage 1 and their maximization problem and optimal solution are the same as at stage 1. For non-sharers this means: $y_2^* = y_1^* = 0$ and for those with a strong sharing norm: $y_2^* = y_1^* > 0$. All others are expected to reduce their giving at stage 2. Putting the behavior of the three types together, we derive hypothesis 4.

Case b. If opt-out was possible at stage 1 (i.e., $D_1 = 1$ or $D_1 = 0$ depending on participant's decision):

For willing sharers and non-sharers: $D_1 = 1$. Then equation (1) and the related reasoning apply. Namely, non-sharers always give zero and willing sharers either behave consistently in the two stages or reduce their giving, leading to hypothesis 5.

For reluctant sharers: $D_1 = 0$ and $y_1 = 0$. Their utility at stage 2 is $U(1, x_2, w_2 - x_2 | 0, w_1 - \varepsilon_1, 0)$. Since they cannot opt out from the sharing environment and have not established a positive self-image at stage 1, they give a positive amount, i.e., $\text{argmax}_{x_2 \in [0, w_2]} U(1, x_2, w_2 - x_2 | 0, w_1 - \varepsilon_1, 0) < w_2$.²

Hypothesis 6 is drawn from the behavior of reluctant sharers and non-sharers at stage 2.

² Note that if opting out entails some cognitive costs (i.e., $z_1 > 0$), then reluctant sharers increase the amount given at stage 2 to compensate for these costs, compared to the case with no cognitive costs ($z_1 = 0$). In this case, the utility function at stage 2 is: $U(1, x_2, w_2 - x_2, 0 | 0, w_1 - \varepsilon_1, 0, z_1)$, $z_1 > 0$, so that $\text{argmax}_{x_2 \in [0, w_2]} U(1, x_2, w_2 - x_2, 0 | 0, w_1 - \varepsilon_1, 0, z_1) < \text{argmax}_{x_2 \in [0, w_2]} U(1, x_2, w_2 - x_2, 0 | 0, w_1 - \varepsilon_1, 0, 0)$. Our design does not allow to disentangle the effect of such cognitive costs. That is, the positive amount given at stage 2 may be driven by both the fact that reluctant sharers are in the sharing environment, and therefore feel compelled to give, and the cognitive costs caused by opting out at stage 1.

5 Robustness tests

Table S5. OLS regression results on treatment effects on donations at stage 1 (Column 1), including interactions between treatments and gender (Column 2), and on probability to opt out (Column 3), including interactions between treatments and gender (Column 4)

	(1)	(2)	(3)	(4)
<i>Standard-DN</i>	-0.510*	-0.442		
	(0.223)	(0.354)		
<i>Optout</i>	-0.919***	-0.786*		
	(0.217)	(0.336)		
<i>Optout-DN</i>	-1.305***	-1.215***	0.019	0.015
	(0.204)	(0.329)	(0.020)	(0.035)
envID	0.860***	0.859***	-0.032*	-0.032*
	(0.094)	(0.094)	(0.014)	(0.014)
female	0.963***	1.092***	-0.027	-0.031
	(0.155)	(0.327)	(0.022)	(0.030)
age	0.018***	0.018***	-0.000	-0.000
	(0.006)	(0.006)	(0.001)	(0.001)
income	0.010+	0.010+	-0.000	-0.000
	(0.005)	(0.005)	(0.001)	(0.001)
graduate	-0.267+	-0.270+	-0.031	-0.031
	(0.156)	(0.156)	(0.021)	(0.021)
<i>Standard-DN</i> x female		-0.107		
		(0.455)		
<i>Optout</i> x female		-0.221		
		(0.442)		
<i>Optout-DN</i> x female		-0.143		0.007
		(0.420)		(0.042)
constant	0.950*	0.867+	0.245***	0.246***
	(0.431)	(0.460)	(0.060)	(0.060)
<i>p-value of Optout = Optout-DN</i>	0.051+			
R ²	0.126	0.126	0.016	0.016
N	1395	1395	826	826

Note: baseline experimental condition: *Standard* in Columns 1 and 2; *Optout* in Columns 3 and 4. Robust standard errors in parentheses. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table S6. Differences-in-differences results on treatment and temporal spillover effect on donation

	(1)
<i>Standard-DN</i>	-0.511* (0.223)
<i>Optout</i>	-0.536* (0.215)
<i>Optout-DN</i>	-0.866*** (0.201)
stage2	-0.193* (0.083)
<i>Standard-DN x stage2</i>	0.129 (0.117)
<i>Optout x stage2</i>	0.109 (0.096)
<i>Optout-DN x stage2</i>	0.141 (0.097)
envID	0.852*** (0.093)
female	0.956*** (0.151)
age	0.021*** (0.006)
income	0.010+ (0.005)
graduate	-0.371* (0.149)
constant	0.949* (0.423)
p-value <i>Standard-DN x stage2 + stage2 = 0</i>	0.435
p-value <i>Optout x stage2 + stage2 = 0</i>	0.080+
p-value <i>Optout-DN x stage2 + stage2 = 0</i>	0.291
R ²	0.121
N	2638
# clusters	1319

Note: the dependent variable is donation at each stage. Baseline experimental condition: *Standard*. Clustered robust standard errors in parentheses. + p < .10, * p < .05, ** p < .01, *** p < .001.

Table S7. OLS regression results on treatment effects on donations at stage 2 (Column 1), controlling for donations at stage 1 (Column 2), including interactions between treatments and gender (Column 3), and on total donations (Column 4), including interactions between treatments and gender (Column 5)

	(1)	(2)	(3)	(4)	(5)
<i>Standard-DN</i>	-0.381 ⁺ (0.227)	0.059 (0.112)	-0.432 (0.354)	-0.840 ⁺ (0.437)	-0.874 (0.688)
<i>Optout</i>	-0.611 ^{***} (0.214)	0.180 ⁺ (0.098)	-0.591 ⁺ (0.326)	-1.407 ^{***} (0.420)	-1.377 [*] (0.649)
<i>Optout-DN</i>	-0.969 ^{***} (0.205)	0.156 (0.099)	-0.861 ^{***} (0.327)	-2.145 ^{***} (0.398)	-2.073 ^{***} (0.641)
donation stage1		0.862 ^{***} (0.018)			
envID	0.885 ^{***} (0.094)	0.143 ^{***} (0.046)	0.885 ^{***} (0.094)	1.736 ^{***} (0.183)	1.736 ^{***} (0.184)
female	0.988 ^{***} (0.152)	0.158 [*] (0.076)	1.027 ^{***} (0.331)	1.865 ^{***} (0.298)	1.899 ^{***} (0.643)
age	0.021 ^{***} (0.006)	0.006 [*] (0.003)	0.021 ^{***} (0.006)	0.041 ^{***} (0.011)	0.041 ^{***} (0.011)
income	0.011 [*] (0.005)	0.002 (0.002)	0.011 [*] (0.005)	0.017 ⁺ (0.010)	0.017 ⁺ (0.010)
graduate	-0.348 [*] (0.152)	-0.118 (0.077)	-0.349 [*] (0.152)	-0.592 [*] (0.298)	-0.593 [*] (0.299)
<i>Standard-DN</i> x female			0.097 (0.461)		0.067 (0.890)
<i>Optout</i> x female			-0.033 (0.432)		-0.049 (0.854)
<i>Optout-DN</i> x female			-0.169 (0.420)		-0.113 (0.817)
Constant	0.560 (0.431)	-0.259 (0.198)	0.542 (0.456)	1.477 ⁺ (0.836)	1.459 (0.892)
p-value <i>Optout</i> = <i>Optout-DN</i>	0.778	0.058 ⁺		0.05 [*]	
R ²	0.128	0.801	0.128	0.128	0.128
N	1395	1395	1395	1395	1395

Note: baseline experimental condition: *Standard*. Robust standard errors in parentheses. ⁺ p < .10, ^{*} p < .05, ^{**} p < .01, ^{***} p < .001.

Table S8. Hurdle model results on treatment effects on donations at stage 1, stage 2 and total donations (marginal effects)

	Donations stage 1			Donations stage 2			Total donations		
	E	I	Avg	E	I	Avg	E	I	Avg
<i>Standard -DN</i>	-0.025	-0.410 ⁺	-0.509 [*]	-0.019	-0.305	-0.378	-0.023	-0.636	-0.824 ⁺
	(0.023)	(0.212)	(0.230)	(0.024)	(0.218)	(0.234)	(0.023)	(0.431)	(0.462)
<i>Optout</i>	-0.057 [*]	-0.675 ^{***}	-0.909 ^{***}	0.008	-0.697 ^{***}	-0.603 ^{***}	0.008	-1.580 ^{***}	-1.395 ^{***}
	(0.023)	(0.196)	(0.214)	(0.021)	(0.199)	(0.212)	(0.020)	(0.392)	(0.415)
<i>Optout -DN</i>	-0.084 ^{***}	-0.965 ^{***}	-1.288 ^{***}	-0.019	-0.941 ^{***}	-0.950 ^{***}	-0.018	-2.098 ^{***}	-2.101 ^{***}
	(0.023)	(0.191)	(0.207)	(0.022)	(0.194)	(0.207)	(0.020)	(0.382)	(0.406)
envID	0.049 ^{***}	0.721 ^{***}	0.882 ^{***}	0.043 ^{***}	0.763 ^{***}	0.901 ^{***}	0.038 ^{***}	1.533 ^{***}	1.772 ^{***}
	(0.010)	(0.086)	(0.089)	(0.009)	(0.087)	(0.088)	(0.008)	(0.171)	(0.173)
female	0.073 ^{***}	0.669 ^{***}	0.955 ^{***}	0.069 ^{***}	0.711 ^{***}	0.983 ^{***}	0.062 ^{***}	1.373 ^{***}	1.856 ^{***}
	(0.018)	(0.145)	(0.154)	(0.016)	(0.146)	(0.151)	(0.015)	(0.287)	(0.297)
age	0.001	0.014 ^{***}	0.018 ^{***}	0.001 [*]	0.016 ^{***}	0.021 ^{***}	0.001	0.034 ^{***}	0.039 ^{***}
	(0.001)	(0.005)	(0.006)	(0.001)	(0.005)	(0.006)	(0.001)	(0.010)	(0.011)
income	0.001	0.008	0.010 [*]	0.001	0.009 ⁺	0.011 [*]	0.001	0.012	0.018 ⁺
	(0.001)	(0.005)	(0.005)	(0.001)	(0.005)	(0.005)	(0.001)	(0.009)	(0.010)
graduate	0.004	-0.331 [*]	-0.274 ⁺	-0.015	-0.297 [*]	-0.346 [*]	-0.024	-0.410	-0.604 [*]
	(0.018)	(0.142)	(0.155)	(0.016)	(0.143)	(0.152)	(0.015)	(0.282)	(0.298)
N		1395			1395			1395	

Note: *E* represents extensive margin; *I* represents intensive margin, *Avg* represents both steps of the hurdle model. Robust standard errors in parentheses. ⁺ p < .10, ^{*} p < .05, ^{**} p < .01, ^{***} p < .001.

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