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Time inconsistent charitable giving ☆

James Andreoni [a,b,c], Marta Serra-Garcia [a,c,*]

[a] University of California, San Diego, United States
[b] NBER, United States
[c] CESifo, Germany

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ABSTRACT

We usually assume purchasers of commodities experience utility at the point of transacting a purchase, when money and ownership are exchanged. With charitable giving, the social rewards from giving can begin being enjoyed the moment a decision to give has been made. Later, when the gift is transacted, the donor can again experience utility from giving and seeing their donations at work. We show both theoretically and experimentally that these early flows of social utility can generate time inconsistent charitable giving. A fundraiser can get more donations (50 percent more in our Experiment 1) by allowing a donor to decide now to give later. We develop a theoretical model of social utility gained through social image concerns, and in two additional experiments examine its implications for commitment demand and test the model predictions for how charities can manipulate information to influence time inconsistent charitable giving.

1. Introduction

A large fraction of charitable gifts results from decisions to give that are made well ahead of the actual gift. This is true for recurring donations, pledges, wills, trusts, and donor-advised funds, among others.[1] If both the benefits and the cost of the gift are evaluated at the time the gift is transacted, preference rankings between giving and not giving cannot change over time, and we should never see time inconsistent charitable giving. Could there be some benefit to charitable organizations from this "decide now, give later" policy?

We study time inconsistent charitable giving in three experiments. In Experiment 1, we compare decisions made now to give now to decisions made now to give later (see also, Breman, 2011). In a simple between-subjects, two-week experiment, we find that one-time donations increase by 50% when they are implemented one week after the giving decision is made, rather than immediately. This implies that individuals often exhibit *time-inconsistent charitable giving*. Moreover, this time inconsistency benefits the charitable organizations. Experiment 1 frames the main research question for the remainder of this paper: Why do donors exhibit this time inconsistency, and can it be socially manipulated?

Our answer focuses on the social utility of charitable giving. Charitable giving differs from other consumption because it carries social information about the donor. For instance, there may be social norms to say yes to small requests to give, and potential donors have an unobserved propensity to behave normatively, which observers will wish to infer from their observed decisions. This kind of norm conformance is often referred to as *social image* concerns, or *audience effects* (where the audience can include the self or the experimenter), or *social pressure* from, say, fundraisers.[2] This is an attractive explanation because the signal of the potential giver's unobserved type can be conveyed when the deci-

☆ First version, November, 2016. Andreoni: University of California, San Diego, Department of Economics, 9500 Gilman Drive, La Jolla, CA 92093 (andreoni@ucsd.edu); Serra-Garcia: University of California, San Diego, Rady School of Management, 9500 Gilman Drive, La Jolla, CA 92093.

* Corresponding author at: University of California, San Diego, United States.
E-mail address: mserragarcia@ucsd.edu (M. Serra-Garcia).

[1] Common giving plans include recurring monthly gifts (16% of all online donations in 2017, NPSource, 2019), donor-advised funds (12.7% of all individual giving, National Philanthropic Trust, 2019;Andreoni, 2018), and bequests (9% of total giving in 2018, Giving USA, 2019).

[2] See Andreoni and Bernheim (2009) on social-image; Bénabou and Tirole (2006, 2011) on self-signaling and self-image; Andreoni and Rao (2011), Andreoni et al. (2017) and DellaVigna et al. (2012), Exley and Naecker (2017), Kessler (2017) for different types of social pressure.

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sion is made and need not wait until the gift is transacted. Stated differently, our model recognizes that charitable giving has value in large part because of social expectations and cultural institutions constructed to support the charitable sector.

In addition, there may also be utility derived from seeing the fruits of one's donations. This source of utility can *only* be experienced *after* a donation is transacted. This type of utility is commonly referred to as the warm-glow of giving (Andreoni, 1989, Andreoni, 1990) and is an essential building block of signaling models. In fact, what the models assume people are interested in signaling is their underlying desire to give, whether that comes from concern for the charity or from some internalization of conformity to a social norm to give. What social signaling does, however, is move some of the utility up from the time the donation is transacted to the time the intention to give in the future is credibly announced. Introducing social image thus yields time inconsistent choices, but this prediction is not based on time-inconsistent preferences. It can affect all people, with or without present-focused preferences (Ericson and Laibson, 2019).

Experiment 2 provides a first test of the dynamic model of image concern by adding commitment. Commitment has come to be both a method for diagnosing time-inconsistent preferences and a way to provide a cure for time-inconsistent choices (Ashraf et al., 2006;Ericson and Laibson, 2019). Experiment 2 examines behavior in a model of dynamic image signaling with probabilistic commitment (Augenblick et al., 2015). In a model of signaling and social payoffs, however, we show both theoretically and experimentally that commitment does not have the usual impacts. In our model, commitment acts as a signal of generosity. As a result, commitment will be of value to time-consistent givers, while time-inconsistent givers will prefer flexibility. We find that individuals who exhibit time-inconsistent charitable giving are significantly more likely to demand flexibility, rather than commitment. Among those who give in advance, commitment demand is predictive of time consistency. Though recent evidence suggests that commitment demand should be interpreted with caution (Carrera et al., 2019), the evidence indicates that in charitable giving commitment exhibits unique patterns, distinct from those documented in other non-social domains.

Experiment 3 directly tests the image signaling model by introducing gift announcements. This experiment illustrates the importance of this research agenda. In particular, charities can manipulate the environment to affect time inconsistent giving. This experiment manipulates both the size of the audience and the information shared with the audience about the giving and commitment choices of others (Ali and Bénabou, 2020). As predicted, behavior (in particular, time inconsistent charitable giving) is sensitive to the kinds of social payoffs we posit. Time-inconsistent giving increases when initial giving decisions are publicly announced, and commitment demand increases when commitment choices are subject to an audience. Time inconsistency is directionally reduced when all giving decisions, those made in advance and when gifts are due, are visible to an audience.

The temporal nature of altruistic decisions has only received attention in recent years, often with mixed results. Putting time pressure has mixed effects (Rand et al., 2012;Kessler et al., 2016; Recalde et al., 2018). Reminding donors may have hidden costs (e.g., Huck and Rasul, 2010;Damgaard and Gravert, 2017) and longer waiting times decrease future prosocial behavior (Craig et al., 2016). Multiple charitable asks crowd-in donations (Adena and Huck, 2019). In an important paper, Breman (2011) provided the first evidence on unlinking the time of the decision from the time of giving. She documents that when donors are asked now to increase their recurring monthly donations by the end of the month, or a month after that, they are more likely to do so when the option is one month later. This can be thought of asking whether people agree to increase their giving later or far later, and as such is not, strictly speaking, an example of time inconsistency. Kovarik (2009) and Dreber et al. (2016) document that dictators keep more money for themselves when their sharing decisions are implemented with delay. This suggests a stronger present-bias towards others' payoffs relative to own payoffs (Noor and Ren, 2011). By contrast, Kolle and Wenner (2018) study a dictator game with intertemporal effort allocation decisions, and find dictators are more generous when their decisions are implemented with delay. This finding suggests the opposite, that present-bias towards own payoffs is stronger. However there are several differences in their experimental designs that could account for the opposing findings, such as allocating goods (money) versus bads (effort) (see, for example, Andreoni et al., 2020a,b).

We are the first to consider dynamic social interactions as the source of time-inconsistent charitable giving. We also provide the first empirical evidence on commitment demand in intertemporal giving decisions. Our model of dynamic social image concerns builds on a rich literature of static models of social and self-image concerns (e.g., Bénabou and Tirole, 2006, 2011; Andreoni and Bernheim, 2009; Ariely et al., 2009; Ellingsen et al., 2012;Tonin and Vlassopoulos, 2013; Grossman, 2015;Filiz-Ozbay and Ozbay, 2014; Adena and Huck, 2020). The model opens up many new directions for research on the use of dynamic fundraising appeals, anonymity, pledges, and the public announcements of future gifts.

The paper is organized as follows. Next, Section 2 presents a motivating experiment showing time-inconsistent charitable giving. In Section 3 we develop a theoretical model of dynamic social image concerns. Section 4 presents our second experiment allowing subjects to choose commitment. Section 5 studies dynamic giving decisions and commitment demand when these decisions are made visible to an audience, providing a test of dynamic image concerns. Section 6 concludes.

2. Experiment 1: Time inconsistent giving

The objective of this experiment is to expose a unique kind of time inconsistency in charitable giving. If, as in most cases in economic theory, the utility of giving was realized at the moment of the transaction, then this time inconsistency would not appear. Here we hope to raise the question of what can make utility flows and payments to charities asynchronous.

2.1. Experiment 1 design

Subjects entered the laboratory for an experiment designed to last two visits exactly one week apart, to the hour, irrespective of their decisions. We compare two treatments. In both treatments subjects see identical presentations about a charity called GiveDirectly, and then are asked to give $5 of their participation fee to the charity. All decisions are made in the first week, and no new decisions are made in the second week.[3]

The control group is called Decide Now to Give Now (NN). Subjects decide now about donations made today and paid from today's participation fee. The treatment group is called the Decide Now to Give Later (NL). Here subjects face an identical week 1 deci-

[3] This experiment complements the field experiment by Breman (2011), who found that individuals, who were already donors to charities, were more likely to increase their recurring donations when the increase happened in about two weeks or in about six weeks. By contrast, our laboratory experiment provides evidence with a shorter time delay and among individuals who are not yet donors.

sion as in the control group, but the donation is transacted a week later and is paid from the later participation fee. We observed 179 subjects in the NN treatment and 173 in the NL treatment.[4]

2.2. Experiment 1 results

Fig. 1 shows that the one-week delay in transacting a charitable gift raises giving from 31% in the NN treatment to 45% in the NL treatment—a significant 50% increase in giving (χ^2-test, $p \leq 0.01$).[5] This shows that when deciding today about a donation transacted today, people are significantly less likely to give than when deciding today about a gift to be transacted just one week later.

This increase in giving is economically and behaviorally significant as well. Behaviorally, the effect of the delay cannot be explained by a model in which individuals only derive utility from the giving transaction and exhibit (standard) time-consistent preferences. Economically, it suggests charities can manipulate social payoffs to influence this time inconsistency. We explore these issues theoretically next.

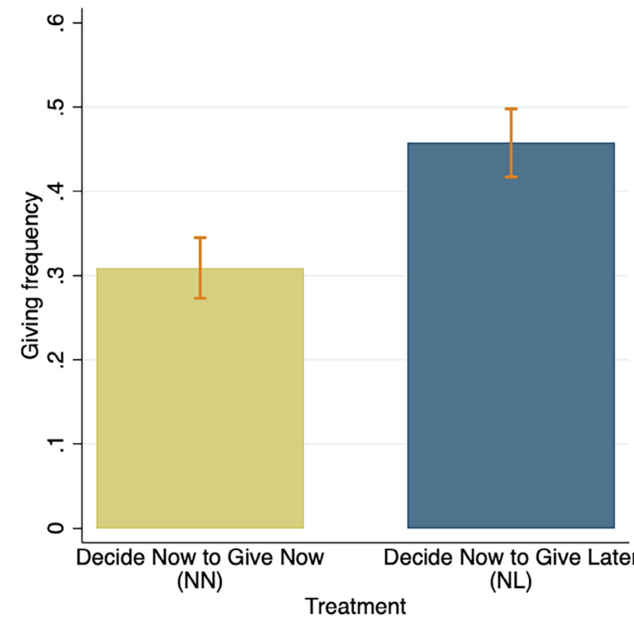

Fig. 1. Giving Decisions in the NN and NL Treatments. *Note:* Error bars denote ± 1 S.E..

3. A core theoretical model of social motives for giving

We propose that each individual has a privately known utility parameter v that indicates the utility v they receive from the act of giving to charity in our Experiment 1. This value can be interpreted as the warm-glow of giving, or as the value of satisfying a social norm of agreeing to give when asked for a small donation to a worthy charity. The utility v will be realized at the time of transacting the gift. However, if others learn a person's giving decision ahead of the transaction, they can form an expectation of v. This expectation is called a person's *social image*. We further assume that potential donors also care about their social image, and the higher the social image the better.

Here we build our benchmark model in which the only heterogeneity is in v, the utility one gets from the act of giving, and introduce image concerns, building on static models of image concerns, such as Bénabou and Tirole (2006) and Andreoni and Bernheim (2009). We will refer to v as a person's "type." We assume that v is drawn from a commonly-known and continuous distribution $f(v)$ on the interval $v \in [0, \bar{v}]$, where $\bar{v} > 1$. The cost of giving is normalized to be 1.

Imagine an *audience* observes an individual's actions but not their v's, and forms a belief about each individual's type. Image concerns are also known as audience effects as they require that someone, perhaps just the experimenter, the other subjects in the study, or a subject's "impartial spectator," to be viewing the participant's choice.

Definition: Audience. An audience is $n \geqslant 1$ individuals who make the same observations on a subject and thus form the same expectation of the subject's type, v, which we call μ. The audience can be characterized by their number and belief. For audience j write this as $\mathscr{A}_j = \{n_j : \mu_j\}$ meaning n_j individuals all hold the belief μ_j about a particular individual.

The individual gains more image utility the higher the audience believes v to be. Of course, the individual never observes the audience's belief, so we assume each person forms an accurate expectation of the audience's belief about the subject's own true type.

Next, we formally define the two types of possible signaling. These definitions are based on the assumption that each individual has only one audience (of size n).

Definition: Social-Signaling. A person is engaged in social-signaling if they believe that an *audience of others* is seeing the person's strategy unfold. Based on information the audience holds at any time, the audience forms (or updates) a belief, μ, about the value of the person's utility parameter v. A person who cares for social-signaling maximizes a utility function that is increasing in μ.

Definition: Self-Signaling. A person is engaged in self-signaling if they behave as if they are unsure of their own v value, and, importantly, act as their own audience in a social-signaling model (Bénabou and Tirole, 2006).

An important distinction between self- and social-signaling is that the self has the advantage of knowing their own full strategy for times $t = 1$ and $t = 2$, while the audience for social-signaling can only condition their beliefs on actions they observe.

Finally, we must define the image function $M(n : \mu)$:

Definition: Image Function $M(n : \mu)$**.** The function $M(n : \mu)$ maps the audience to a real number M, and has these qualities:

a) *Continuous*: $M(n : \mu)$ is continuous and differentiable w.r.t. μ.
b) *Increasing and concave in* μ: $\partial M/\partial\mu \geqslant 0$, and $\partial^2 M/\partial\mu^2 \leq 0$.
c) *Magnification by Audience*: Having a larger audience will magnify the effect of any existing audience; if $M(n_1 : \mu) > 0$, then for any $n_2 > n_1 \geqslant 1, M(n_2 : \mu) \geqslant M(n_1 : \mu)$. In particular, there will be a function $\omega(n)$ such that $M(n : \mu) = \omega(n)M(1 : \mu)$.
d) *Decreasing Marginal Magnification*: $\omega(n)$ has the features $n \geqslant \omega(n) \geqslant 1, 1 \geqslant \omega'(n) \geqslant 0$ and $\omega''(n) \leq 0$.
e) *Cardinal*: M is a cardinal measure.

Since a higher μ is desirable, (b) ensures M is increasing. Qualities (a), (c) and (e) make M tractable. Concavity in image utility

[4] To reduce attrition, the first four out of eight sessions of the NN and NL treatments paid a higher show-up payment in Week 2 of the study, paying $6 in Week 1 and $20 in Week 2. The second set of four sessions paid the same show-up of $15 in both weeks. We observe no significant differences in attrition ($\chi^2 = 0.197, p = 0.658$) and donation behavior (32.5% and 29.4%, respectively, $\chi^2 = 0.184, p = 0.668$ in NN; and 43.8% and 47.5%, respectively, $\chi^2 = 0.206$, $p = 0.650$, in NL) between these sessions and hence pool them in the analysis. In NN, 14 subjects (7.8%) failed to complete the study, and in NL the number was 20 (11.5%). The difference in completion rates is not significant across treatments, and subjects do not differ in their observable characteristics. We focus on the analysis of individuals who completed the study, though findings remain unchanged including all subjects. Further details of the design and the instructions for this experiment are found in Appendix B.

[5] In Appendix C, we show the results by gender. Giving by women increases from 30% to 50% with delay, that by men increases from 32% to 39%. The raw data and analysis files are available at OSF under https://osf.io/6zyjp/?view_only=c387108e145144b8a2dbf01f7aeb8f17.

and in the returns to a larger audience, as established in qualities (b) and (d), are common assumptions that only play a minor role when announcements are made, as detailed in Section 5.

3.1. Explaining give more later

We first demonstrate how this model of image concerns can generate the time-inconsistent charitable giving observed in Experiment 1. Imagine first that the only audience is the experimenter. This is the person who observes the individual's decision to give in Experiment 1, at the end of Week 1 and Week 2 (in the NL treatment). The individual's strategy is simply $g = 0$ or $g = 1$. To simplify notation, when there is an audience of one (the experimenter or the self), we will write $M(\mu)$, where the audience's belief about the donor's type v based on their observation of g is $\mu(g)$, where $\mu(1) \geqslant \mu(0)$.

There will exist a Perfect Bayesian Equilibrium of this signaling game in which the critical value of v, say $v^* \leqslant 1$, is such that $g = 0$ if $v < v^*$ and $g = 1$ if $v \geqslant v^*$. The question to pose is, how does the solution from the NN treatment, v^*_N, compare to the solution for the NL treatment, v^*_L?

First, consider NN. Then v^*_N solves these conditions:

$$v^*_N + M(\mu_N(1)) = 1 + M(\mu_N(0)), \quad (1)$$

where $\mu_N(0) = \frac{1}{F(v^*_N)} \int_0^{v^*_N} vf(v)dv$ and $\mu_N(1) = \frac{1}{1-F(v^*_N)} \int_{v^*_N}^{\bar{v}} vf(v)dv$.

Now consider NL. This treatment resembles NN in that the decision is reported to the experimenter in $t = 1$, but it differs in that the gift is transacted with the experimenter a week later at $t = 2$. Moreover, since the donation is featured in both meetings of the experiment, there is potential for social image utility in both periods. Let v^*_L solve the equations below, which determine the Perfect Bayesian Nash equilibrium in NL:

$$\delta v^*_L + M(\mu_L(1)) + \delta\beta M(\mu_L(1)) = \delta + M(\mu_L(0)) + \delta\beta M(\mu_L(0)), \quad (2)$$

where $\mu_L(0) = \frac{1}{F(v^*_L)} \int_0^{v^*_L} vf(v)dv$ and $\mu_L(1) = \frac{1}{1-F(v^*_L)} \int_{v^*_L}^{\bar{v}} vf(v)dv$. The one-week discount factor is $0 \leqslant \delta \leqslant 1$, and β is a depreciation factor applied to the $t = 1$ image utility in $t = 2$, in particular $0 \leqslant \beta \leqslant 1$.

Compare Eqs. (1) and (2). We obtain that $v^*_L < v^*_N$ if $\delta < 1$ or $\beta > 0$. This difference becomes larger as β increases or as δ decreases (see Appendix A for details). We hence predict time-inconsistent charitable giving, as documented in the motivating experiment, that is caused by the flow of image utility when the decision to give is made. Introducing social image yields time inconsistent *choices*, but this prediction is not based on time inconsistent *preferences*. When the decision-maker has full awareness of the audience effects, she will be perfectly happy with a fully contingent plan to decide now to give later and also to say no in one week to a request to "give now."[6]

Of course, forms of present-focused preferences could be part of the effect. Once warm glow utility flows in advance of the transaction, as we posit, it leads to an increase in giving, especially when agents have present-focused preferences (Ericson and Laibson, 2019).[7]

[6] See also Andreoni et al. (2020) for a similar finding in the context of fair allocations to two apparently equally deserving others.

[7] An alternative mechanism that could potentially play a role in delayed giving decisions is expectations if individuals feature expectations-based loss aversion (Köszegi and Rabin, 2007; Köszegi and Rabin, 2009) and view immediate gifts as a surprise but not delayed ones. In Experiment 1, all giving decisions were made at the same point in time, either over immediate gifts (NN) or delayed gifts (NL), which suggests differential expectations are unlikely. Our exploration of commitment demand and announcements also suggests these did not play a prominent role in the giving decisions we study.

4. Experiment 2: Commitment demand

In the domains of private consumption or effort decisions, commitment demand is often discussed as both a means of proving the existence of time inconsistency, and of curing it. In the context of charitable giving, these insights may differ significantly. When people have image concerns, commitment can be used as a costly signal of one's type. As a result, demand for commitment may be stronger among time-consistent rather than time-inconsistent donors.

Consider a within-subjects setting in which subjects are asked to make the same giving decision at two different times, $t = 1$ and $t = 2$, that are one week apart (to the hour). Each week the subject is asked to give \$5 to the charity GiveDirectly at time $t = 2$. Thus saying yes in $t = 2$ is to give now, while saying yes in $t = 1$ is to give later. All transactions take place in $t = 2$, while decisions are made both before or concurrent with the transaction. After the second decision is made one of the two decisions is randomly selected to be carried out in $t = 2$. The degree of randomness, however, is selected by the subject in $t = 1$ using a technique called *probabilistic commitment*, as introduced by Augenblick et al. (2015). Let p be the probability that the $t = 1$ decision is selected. We restrict p to three values: $p \in \{0.1, 0.5, 0.9\}$. We call p the level of commitment and for clarity will often refer to $p = 0.1$ as *flexibility* (F), $p = 0.5$ as *indifference* (I), and $p = 0.9$ as *commitment* (C), and instead write $p \in \{F, I, C\}$.

4.1. Image concerns in probabilistic commitment

Suppose individuals care about their self- and social-image. How will these individuals choose their level of commitment, p, and how is it related to their time inconsistency? Assume in $t = 1$ the audience (the experimenter) observes the decision to give later, g_1, and $p \in \{F, I, C\}$. From this, the audience forms an expected value of v, and the subject forms a (rational) expectation of this value. Call this $\mu_1(g_1, p)$. In $t = 2$, the individual decides about giving now, g_2, and the subject and the audience updates their beliefs regarding v, which we call $\mu_2(g_1, p, g_2)$. Finally, for ease of presentation and to accentuate the role of social image, we will assume that the one-week discount factor is $\delta = 1$ while allowing future image utility to be depreciated with β. All derivations reported in Appendix A will include $\delta < 1$, with identical qualitative findings.

An individual's expected utility is:

$$U(g_1, p, g_2) = (v - 1)(pg_1 + (1 - p)g_2) + M(\mu(g_1, p)) + \beta M(\mu(g_1, p, g_2))$$

The key to the predictions are the following four lemmas. Formal proofs of each of these are in Appendix A.

Lemma 1. *Assume the population is engaged in social-signaling, but not self-signaling. Further assume that some people in this population prefer to give in exactly one period. These people will prefer to give in $t = 1$ rather than $t = 2$.*

This lemma is very intuitive. A person who has chosen a strategy of $s = (0, 1 - p, 1)$ could also have accomplished the same level of consumption and giving by having chosen $s = (1, p, 0)$. The question for this donor is which path for revealing of the full strategy will generate the most social utility. The first strategy will yield $M(0, 1 - p) + \beta M(0, 1 - p, 1)$ while the otherwise equivalent second strategy will yield $M(1, p) + \beta M(1, p, 0)$. For the strategy $s' = (0, 1 - p)$ the maximum probability of giving is p, while for $s' = (1, p)$ the minimum probability of giving is p. Thus, we should anticipate $M(1, p) > M(0, 1 - p)$. As long as $M(1, p, 0) = M(0, 1 - p, 1)$, then choosing the unfolding of the full strategy that sends the strongest signal of one's full intentions in $t = 1$ should dominate.

Lemma 2. *Assume the population is engaged in social-signaling, but not self-signaling. Then, if in $t = 1$ the audience observes a person choosing $g_1 = 0$ for any p, the audience can conclude that this person also intends to choose $g_2 = 0$ in $t = 2$.*

The second lemma follows almost immediately from the first. It holds the critical implication that $g_1 = 0$ is sufficient for $g_2 = 0$.

Next consider that some people in this population may prefer to give in both periods. Since there is not a choice of $p = 1$, it will not be until $t = 2$ that these people reveal their full strategies. Define $E(v|g_1, p, g_2)$ as the expected v of an individual given the strategy (g_1, p, g_2). We add an extra assumption, which we relax in Appendix A:

Assumption 1 (*No Counter-Signaling:*). $E(v|1, p, 1)$ is the same for all p.

This assumption means that in $t = 2$, if the person has chosen to give in both periods, her expected type does not depend on her commitment choice. Thus, a person interested in social image will want to send the strongest signal of v in period $t = 1$ in order to get the highest social image.[8] This means choosing $s' = (1, C)$ since $E(v|1, C) \geqslant E(v|1, I) \geqslant E(v|1, F)$.

Lemma 3. *If $E(v|1, p, 1)$ is the same for all p and if the individual cares about social image and wishes to choose $g_1 = g_2 = 1$, the individual will choose strategy $s' = (1, C)$ in $t = 1$.*

Again, Lemma 3 naturally flows from social image concerns. It also has a very useful implication for those not choosing $s' = (1, C)$, which we state in Lemma 4:

Lemma 4. *If $E(v|1, p, 1)$ is the same for all p, if the individual cares about social image, and if in $t = 1$ the audience sees the strategy $s' = (1, p)$ for any $p \neq C$, then the audience will believe that $g_2 = 0$.*

We can now state a proposition for our probabilistic commitment game with social image concerns.

Proposition 1. *Assume all individuals care equally about social image, and that $E(v|1, p, 1)$ is the same for all p. Then there exists a Bayesian Perfect equilibrium of the probabilistic commitment game, which is characterized by numbers v^{F0}, v^{I0}, v^{C0}, and v^{C1}, such that $0 \leqslant v^{F0} \leqslant v^{I0} \leqslant v^{C0} \leqslant v^{C1} \leqslant 1$ and*

a) all individuals with $v < v^{F0}$ choose $s = (0, p, 0)$, for any p;
b) all individuals with $v^{F0} \leqslant v \leqslant v^{I0}$ choose $s = (1, F, 0)$;
c) all individuals with $v^{I0} \leqslant v \leqslant v^{C0}$ choose $s = (1, I, 0)$;
d) all individuals with $v^{C0} \leqslant v \leqslant v^{C1}$ choose $s = (1, C, 0)$;
e) all individuals with $v^{C1} \leqslant v \leqslant \bar{v}$ choose $s = (1, C, 1)$.

The formal proof of this is in Appendix A, but given the structure provided thus far, it is rather easy to construct image functions M and probability distribution functions of $f(v)$ that would be consistent with an equilibrium. For instance, suppose that in $t = 1$ the whole population of subjects can be apportioned to one of the four pools above (note in $t = 1$, both types in (d) and (e) are in the same pool choosing $(1, C)$). Assuming a form for $f(v)$ then one can identify the five values of v needed to establish the edges of the pools. Then to find the image utility M for each pool we note that in equilibrium there will be one type who is indifferent between joining two adjacent pools. For instance, there will be a type v^{F0} who is indifferent to joining the pool that does not give and the pool that gives only with probability $p = F$. For this type, $(1 + \beta)M(0, p, 0) = 0.1(v^{F0} - 1) + (1 + \beta)M(1, 0.1, 0)$. If we assume a value for $M(0, p, 0)$ we can build the value of $M(1, 0.1, 1)$ for $p = F$. Next, we know that there will be someone with $v = v^{I0}$ who is just indifferent to pooling with those with lower and those with higher v's. For this person $0.1(v^{I0} - 1) + (1 + \beta)M(1, F, 0) = 0.5(v^{I0} - 1) + (1 + \beta)M(1, I, 0)$. Continuing in this manner, for any assumption of $f(v)$ and β, we construct the M function that will satisfy equilibrium.

Notice that Proposition 1 implies that someone giving in $t = 1$ and choosing C will be more likely than someone selecting I or F to choose to give in $t = 2$ as well. So, interestingly, commitment is predictive of time *consistency* rather than inconsistency.

This prediction is distinct from those of models of present-focused preferences. In Dreber et al. (2016) giving is tempting, while in Saito (2015) and Noor and Ren (2011) being selfish is tempting. The latter models also predict that individuals give more later. If individuals are sophisticated, commitment would be predictive of time *inconsistency*. If individuals are naïve, commitment and time inconsistency would not be necessarily associated.

4.2. Experimental design

We conducted a within-subjects experiment, in which all subjects participated in a two-week (to the hour) study. In contrast to Experiment 1, each individual made two giving decisions in this experiment. Both decisions were about giving \$5 to a deserving charity in week 2. The odds of g_1 being chosen were selected by the subject in week 1, coincident with the choice of g_1. This probability p is constrained to be $p \in \{0.1, 0.5, 0.9\}$. All these stages were known to subjects before making any decisions. Instructions are shown in Appendix B.

A total of 183 subjects participated in week 1, and 163 returned for week 2. This attrition was unrelated to decisions to give and commitment choices in week 1 (χ^2-test, $p = 0.537$). We focus the analysis on 163 subjects.[9,10]

4.3. Experiment 2 results

First, we examine within-subject behavior in Experiment 2. We find that 25.2% of the subjects always give, while 38.0% never give. The remainder, 36.8%, make different decisions over time. Of these, 62% (or 22.7% of subjects in the sample) decide now to give later, but not to give now. The remainder, 38% (14% of the sample) choose to give now, but do not decide now to give later. Those choosing now to give later but not now to give now in $t = 2$ are more numerous than the opposite. The difference is marginally significant (McNemar's test, $p = 0.07$). If we include a replication of this experiment, which is the baseline treatment in our next experiment, we find that the effect is significant overall (McNemar's test, $p = 0.015$), as reported below. Hence, despite the use of a within-subject design, which could increase individuals' awareness of time-inconsistency, we again find evidence of more giving when it takes place later.

[8] See Feltovich et al. (2002) for introducing the concept of counter-signaling. We discuss the implications of counter-signaling in Appendix A and explore it empirically in Appendix C.

[9] Details on attrition and behavior are shown in Appendix C.

[10] Note that a standard reason for why people should demand flexibility is provided by Kreps (1979), who shows that, given the future is uncertain, individuals should demand flexibility. Only 36.4% of our subjects choose flexibility. Of those who do, Kreps suggests that if $E(v) > 1$ for $t = 2$, the most likely strategy would be $(1, F, 1)$. Likewise if $E(v) < 1$, the most likely strategy choice should be $(0, F, 0)$. In fact $(1, F, 1)$ represents only 7.4% of choices and is outnumbered by $(1, F, 0)$ at 14.7%. These patters do not provide an explanation for subjects' decision to give more later. In Appendix D we further examine whether subjects self-reported resolving uncertainty between the week 1 and week 2 sessions of the experiment, we do not find evidence that uncertainty explains commitment and giving patterns.

Table 1
Distribution of Subjects' Choices in the Probabilistic Commitment Experiment.

(1) g_1	(2) Percent of Subjects	(3) Commitment Choice	(4) Percent of Subjects	(5) g_2	(6) Percent of Subjects
$g_1 = 0$	52.1%	C	25.8%	0	18.4%
				1	7.4%
		I	14.1%	0	12.3%
				1	1.8%
		F	12.3%	0	7.4%
				1	4.9%
$g_1 = 1$	47.9%	C	12.9%	0	4.3%
				1	8.6%
		I	12.9%	0	3.7%
				1	9.2%
		F	22.1%	0	14.7%
				1	7.4%

Note: $n = 163$ subjects.

Table 2
Giving in Week 2, by Giving in Week 1 and Commitment Demand.

	(1)	(2)	(3)
	Gift in Week 2 ($g_2 = 1$)		
	If $g_1 = 1$	If $g_1 = 0$	Both
Commitment (p)	0.484**	−0.100	−0.102
	(0.235)	(0.121)	(0.147)
Gift in Week 1 (g_1)			0.006
			(0.093)
Gift in Week 1 (g_1) X Commitment (p)			0.583**
			(0.288)
Observations	78	85	163

Note: This table presents the marginal effects (calculated at the means of all variables) from probit regressions relating choices in week 1 to giving decisions in week 2. Commitment (p) is the value of p chosen by the individual in Week 1. Gift in week 1 is a dummy variable that takes value 1 if the individual chose $g_1 = 1$, and zero otherwise. Giving in Week 1 × Commitment is the interaction between these two variables. Column (1) focuses on individuals who chose to give in week 1, column (2) focuses on individuals who chose not to give in week 1, and column (3) pools all individuals in the experiment. Individual characteristics such as gender, ethnicity, whether the subject is a native English speaker, and their score in the Cognitive Reflection Test are included as covariates. Robust standard errors, clustered at the session level, are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1 summarizes the commitment choices of subjects and their give-now decisions, according to their decision to give later. Column (4) shows that, among subjects who decide now to give later, $g_1 = 1$, flexibility is most frequently preferred, by 22.1% of the subjects, while commitment and indifference are both chosen by 12.9% of subjects. This distribution is different from chance (χ^2-test, $p = 0.056$).

Focusing on individuals who decide now to give later, but do not decide now to give now in $t = 2, (g_1, g_2) = (1, 0)$, we observe an even stronger preference for flexibility. The choice pattern $(g_1, p, g_2) = (1, F, 0)$ is observed for 14.7% of subjects. By contrast, 4.3% of subjects who only give later choose to commit, and 3.7% choose indifference. The preference towards flexibility is statistically significant (χ^2-test, $p < 0.01$). This yields Finding 1.

Finding 1 (Give more later and Commitment): Individuals who choose to give more later exhibit a preference for flexibility.

The preference for flexibility is no longer observed among individuals who always give. Instead, these subjects appear to choose levels of commitment with equal likelihood. Strategy $(g_1, p, g_2) = (1, C, 1)$ is preferred by 8.6% of subjects, $(1, I, 1)$ is preferred 9.2%, and $(1, F, 1)$ is preferred by 7.4%. This distribution of choices is not significantly different from chance (χ^2-test, $p = 0.843$). This yields Finding 2.

Finding 2 (Always give and Commitment): Individuals who always give exhibit an equal likelihood of choosing each of the possible levels of commitment.

The distribution of commitment choices and giving decisions in week 1 is predictive of giving in week 2, as shown in Table 2. Among those individuals who give in week 1, choosing commitment significantly increases the likelihood of a gift in week 2. For those who do not give, commitment is not predictive of giving in week 2. Hence, in line with the image model, individuals who choose commitment are more likely to be time-consistent.

To summarize, this experiment provides new findings with respect to the role of commitment in charitable giving. In contrast to commitment demand in the effort or monetary domains (e.g., Augenblick et al., 2015), commitment is not associated with time inconsistency. Commitment choices should be interpreted carefully, however, as they could be driven by a lack of understanding of commitment, an important concern documented in Carrera et al. (2019). While patterns of commitment demand are in line with image concerns being an important driver of giving decisions, they do not provide a conclusive test of image concerns. For example, a model of naïve present focus paired with a weak preference for flexibility could explain some of the patterns in commitment demand we observe. We view these findings as providing novel evidence on the dynamics of charitable giving, consistent with our model, but in need of further empirical exploration.

5. Experiment 3: Manipulating social image

To directly test image concerns, we extended Experiment 2 to add three treatments that each manipulate the audience and the information they use to form social image. All three new treatments add the other subjects in the experimental session as the audience, about 20 to 23 individuals. We then vary the part of the strategy we announce to this audience. Treatment Announce 3 tells the new audience all three elements of each other player's strategy. In $t = 1$ subjects in a given session are told g_1 and p of all subjects present, and then in $t = 2$ are also told g_2. Announce 2 tells the subjects in a session only the two $t = 1$ choices of g_1 and p. Finally, Announce 1 reveals one element, g_1 in $t = 1$, and nothing else. We refer to the absence of announcements as Baseline.

5.1. Several audiences

Notice that announcing giving decisions to other subjects will create two audiences, the experimenter and the other subjects in the session. Next, we discuss how our model of image concerns must be adjusted to account for this.

5.1.1. Image function for several audiences

Begin with two audiences, $\mathscr{A}_a = \{n_a : \mu_a\}$ and $\mathscr{A}_b = \{n_b : \mu_b\}$. Intuitively, the aggregation function should have the basic qualities of the image function of a single audience noted above. Let $N(n_a : \mu_a, n_b : \mu_b)$ be the aggregation function for these two audiences. As we note in the definition of M, image utility can be written as $w(n)M(\mu)$. Recall that μ is the expected value of the individual's belief about the audiences' beliefs about the individual's v. Following this, we can form the individual's expectation, μ_{ab}, as the weighted average of each audience's expected belief:

$$\mu_{ab} = \frac{n_a}{n_a + n_b}\mu_a + \frac{n_b}{n_a + n_b}\mu_b. \tag{3}$$

Then it is natural to define $N(n_a : \mu_a, n_b : \mu_b)$ as

$$N(n_a : \mu_a, n_b : \mu_b) = \omega(n_a + n_b)M(\mu_{ab}), \tag{4}$$

where $M(\mu_{ab})$ has all of the qualities of the image function of a single audience defined above. The generalization to three or more audiences is straightforward.

In our experiment, n_a will be about 20, while n_b will be 1. Given the concavity of $\omega(n)$ and the concavity of M, the existence of the larger audience will have the effect of greatly dulling the impact of the smaller audience, while the opposite effect will not be true. Inside M, the smaller audience will be weighed approximately by 1/21 while the large audience will be weighted 20/21, making the smaller audience nearly inconsequential to the predictions. Thus, when the two audiences differ, we will provide an analysis for the larger audience for the starkest predictions. The more important the experimenter is relative to others in the session the more effects will be titled in the direction of the Baseline, in which the experimenter is the only audience.

5.1.2. Equilibrium conditions

Earlier we described how to construct the critical values of v that serve to define the different pools in equilibrium. While the full derivation of these is in Appendix A, we write them here in a form that is most useful for understanding the predictions of the announce conditions.

$$v^{F0} = 1 - (1+\beta)w(n)(M(\mu_F) - M(\mu_0))/0.1 \tag{5}$$
$$v^{I0} = 1 - (1+\beta)w(n)(M(\mu_I) - M(\mu_F))/0.4 \tag{6}$$
$$v^{C0} = 1 - w(n)(M(\mu_C) + \beta(M(\mu_{C0}) - (1+\beta)M(\mu_I)))/0.4 \tag{7}$$
$$v^{C1} = 1 - \beta(M(\mu_{C1}) - M(\mu_{C0}))/0.1 \tag{8}$$

where $\mu_0 = E(v|0 \leqslant v \leqslant v^{F0}), \mu_F = E(v|v^{F0} \leqslant v < v^{I0}), \mu_I = E(v|v^{I0} \leqslant v < v^{C0}), \mu_C = E(v|v^{C0} \leqslant v \leqslant \bar{v}), \mu_{C0} = E(v|v^{C0} \leqslant v < v^{C1})$, and $\mu_{C1} = E(v|v \geqslant v^{C1})$.

5.2. Predictions for the announcement conditions

We discuss predictions on the announcement conditions going from least to most restrictions on the two audiences.

5.2.1. Predictions for Announce 3

We begin with Announce 3 under the assumption of only social signaling. Announce 3 simply expands the audience from 1 to n members. As is easily seen, this applies pressure for v^{F0}, v^{I0}, v^{C0}, and v^{C1} to all move lower. This means that, relative to the Baseline, we expect more individuals to agree to give in week 1 and 2, increasing the average values for g_1 and g_2.

Next, suppose some people are not engaging in social-signaling in the Baseline, but only self-signaling. Then the self-signaling person would be indifferent to $s = (1, p, 0)$ and $s = (0, 1-p, 1)$. Since the announcements in treatment Announce 3 are clearly adding social-signaling, our predictions for Announce 3 as compared to the Baseline are largely the same, but that we should expect the incidence of $s = (0, 1-p, 1)$ in Announce 3 to decline relative to the Baseline.

5.2.2. Predictions for Announce 2

Announce 2 is identical to Announce 3 except no information on g_2 is provided. The main effect of this is that unless $v \geqslant 1$, there is no reason to give in both periods for image reasons. This means we can simply define $v_{C1} = 1$ in Eqs. (5)–(8) above.

If the only audience is others, we predict v^{F0}, v^{I0}, and v^{C0} all lower relative to the Baseline, due to the observability of the week 1 gift. This means that we expect a rise in g_1. Since the week 2 gift is not observed, we then also predict a reduction in g_2. These predictions are softened towards Baseline when the experimenter is part of the audience, but, we conjecture, the general effects should be in the directions just described.

5.2.3. Predictions for Announce 1

Given that the audience in Announce 1 will only see whether $g_1 = 1$ or 0, all subjects will sort into just two pools. The first is for $g_1 = 0$ and the second for $g_1 = 1$. The cutoff value separating them is v^{A1}. Without any signaling value from p or from giving in $t = 2$, any subject with $v < 1$ will have an incentive to attach to any $g_1 = 1$ the minimum level of commitment, $p = F$. However, those for whom $v \geqslant 1$ will still have an incentive to give in $t = 2$. For these people, the choice of p is irrelevant as it pertains to the new audience.

In the equilibrium we find the value of v^{A1} to solve

$$\omega(n)M(\mu_0) - (v^{A1} - 1)0.1 - \omega(n)M(\mu_{A1}) = 0 \tag{9}$$

Imagine for a minute that $v^{A1} = v^{F0}$ in Announce 3, such that the same number of people choose $g_1 = 0$. Then the first two terms of (9) would be the same as in Announce 3, but clearly $\mu_{A1} > \mu_{F0}$ even if $v^{A1} = v^{F0}$, since those who choose $g_1 = 1$ pool with all higher types. This means that if we start at $v^{A1} = v^{F0}$, then the value of the expression in (9) will be less than zero in value. How must we adjust v^{A1} to return equilibrium?

Differentiating the left hand side of (9) with respect to v^{A1} we find an ambiguous result:

$$\begin{aligned} \frac{\partial}{\partial v^{A1}} \quad & \omega(n)M(\mu_0) - (v^{A1} - 1)0.1 - \omega(n)M(\mu_{A1}) \\ = \quad & \omega(n)M'(\mu_0)(v^{A1} - \mu_0)\tfrac{f(v^{A1})}{F(v^{A1})} \\ - \quad & \omega(n)M'(\mu_{A1})(\mu_{A1} - v^{A1})\tfrac{f(v^{A1})}{1-F(v^{A1})} \\ - \quad & 0.1. \end{aligned}$$

Since $\mu_0 < \mu_{A1}$, by concavity $M'(\mu_0) > M'(\mu_{A1})$. And since $\mu_0 < v_{A1} < \mu_{A1}$ it follows that $(v^{A1} - \mu_0) > (\mu_{A1} - v^{A1})$.[11] This makes the net value of the first two terms positive. However, for the full derivative to be positive the net value of the first two terms must exceed -0.1. While, intuitively, this seems likely, the actual result is unclear.[12] As a consequence, we cannot compare the effect of

[11] Concavity of the image function M is not crucial for this result as it would hold if M were linear.

[12] This is in contrast to a simpler model in which announced decisions simply give more joy and increase the behavior announced (giving or commitment), as the image model takes into account equilibrium effects.

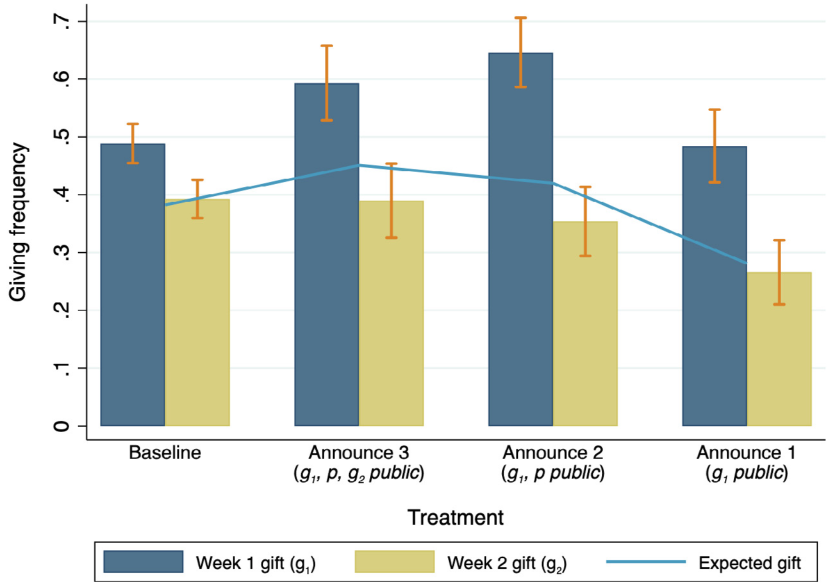

Fig. 2. Giving by Announcements Treatment. *Note*: Error bars denote ±1 S.E.

Table 3
Main Predictions From Image Concerns Model in the Announcement Treatments.

	Directions of Change Relative to Baseline	
Outcome:	g_1	g_2
Predictions		
Announce 3	+	+
Announce 2	+	–
Announce 1	?	–
Data		
Announce 3	+ (***)	– (n.s.)
Announce 2	+ (***)	– (n.s.)
Announce 1	– (n.s.)	– (***)

Note: All changes are relative to the Baseline treatment (in which the only audience is the experimenter). "+" denotes an increase. "'–" denotes a decrease. The question mark "?" denotes an ambiguous prediction. Under data, we present the sign of the effects and in parenthesis their statistical significance. n.s. denotes not significant, ***, **, * denotes significant at the 1%, 5% and 10% level, respectively.

Announce 1 on $g_1 = 0$ to the Baseline or to the other conditions. However, we can expect strong reductions in p and g_2 (both conditional on $g_1 = 1$), since they are not observed by others in the session.

Table 3 summarizes the predictions regarding how the Announcement treatments will differ from the Baseline, without announcements. We present our main predictions concerning giving decisions, g_1 and g_2, which are the focus of our tests in Experiment 3. After our main results, we discuss commitment choices.[13]

5.3. Experiment 3 design

Experiment 3 enhances Experiment 2 by adding the 20 to 23 other experimental participants as audience.[14] In Announce 1, we announce g_1 to all participants in Week 1. In Announce 2, we announce (g_1, p). Announce 3 reveals the full strategy (g_1, p, g_2). The announcement plans were known to all subjects before decisions were made. These sessions were otherwise like Experiment 2. The order of sessions across treatments was randomized, and participants are balanced with regards to their gender, origin, and responses to the Cognitive Reflection Test (as shown in Appendix C).

A total of 263 new subjects participated in Experiment 3. Of these, 244 completed both weeks of the experiment.[15] There were 64, 65, and 59 in Announce 1, 2 and 3, respectively. In addition, 56 participated in a replication of Experiment 2, which is the Baseline treatment in Experiment 3. Since behavior in the new sessions of

Table 4
Treatment Effects in the Announcements Experiment.

	(1) Probit Week 1 gift decision g_1	(2) Probit Week 2 gift decision g_2	(3) Linear reg. Expected gift E(g)
Announce 3	0.111***	−0.000	0.084
	(0.037)	(0.104)	(0.084)
	[0.007]	[0.997]	[0.351]
Announce 2	0.151***	−0.042	0.041
	(0.046)	(0.087)	(0.068)
	[0.008]	[0.643]	[0.552]
Announce 1	0.004	−0.136***	−0.091**
	(0.052)	(0.044)	(0.034)
	[0.935]	[0.007]	[0.018]
Constant			0.366***
			−0.068
Observations	407	407	407
R-squared			0.043

Note: Probit marginal effects (calculated at the means of all variables), and OLS coefficients. The variables Announce 1, Announce 2 and Announce 3 are dummy variables that take value one if the individual was a participant in that treatment, and zero otherwise. The omitted category is the Baseline treatment. Individual characteristics such as gender, ethnicity, whether the subject is a native English speaker, and their score in the Cognitive Reflection Test are included as covariates. Robust standard errors, clustered at the session level, are shown in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Randomization inference (randomization-t) p-values shown in squared brackets (Young, 2019).

[13] Results regarding self-signaling and counter-signaling behavior are presented in Appendix C.

[14] Details are shown in Appendix C.

[15] There are no significant differences in participation in the Week 2 session by treatment (χ^2-test, $p = 0.129$), or by giving decisions and commitment choices within each treatment (χ^2-test, $p > 0.1$ in all treatments).

Table 5
Additional Treatment Effects in Experiment 3.

	(1)	(2)	(3)
	Linear regressions		Probit regression
	Commitment p	Commitment if $g_1 = 1$ $p * g_1$	g_2 if $g_1 = 1$
Announce 3	−0.033	0.078**	0.030
	(0.027)	(0.036)	(0.124)
	[0.229]	[0.046]	[0.834]
Announce 2	−0.005	0.075*	-0.071
	(0.035)	(0.040)	(0.095)
	[0.882]	[0.085]	[0.476]
Announce 1	−0.029	−0.017	-0.142*
	(0.046)	(0.029)	(0.080)
	[0.549]	[0.554]	[0.090]
Constant	0.506***	0.184***	
	(0.050)	(0.048)	
Observations	407	407	215
R-squared	0.007	0.048	

Note: OLS coefficients are shown in columns (1)-(2) and probit marginal effects (calculated at the means of all variables) in column (3). The omitted category is the Baseline treatment. The same individual characteristics are included as covariates as in Table 4. Robust standard errors, clustered at the session level, are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Randomization inference (randomization-t) p-values shown in squared brackets (Young, 2019).

the Baseline treatment was not significantly different from behavior in Experiment 2,[16] all subjects in Experiment 2 are included in the analysis of Experiment 3 and form part of the Baseline treatment. Detailed instructions of this experiment are shown in Appendix B.

In the empirical analysis, we first examine, g_1 and g_2, which are our primary outcome variables. We acknowledge, however, that g_2 may have been impacted by the information provided at the end of the first week's session regarding the strategies chosen by others (see, e.g., Frey and Meier, 2009; Shang and Croson, 2009).

5.4. Experiment 3 results

Fig. 2 shows the results from the three new announcement treatments along with the Baseline. Here we see clear evidence of continued time-inconsistent charitable giving. In fact, when described relative to give now, the effect appears stronger in the treatments with announcements. The difference between gifts in week 1 (g_1) and week 2 (g_2), which is of 10 percentage points in the Baseline, more than doubles in the treatments with announcements. Using a differences-in-differences regression analysis, we find the difference increases when g_2 is not announced, by 12 percentage points in Announce 1 ($p = 0.079$), and by 20 percentage points in Announce 2 ($p = 0.007$). It also increases 11 percentage points in Announce 3, but this increase is not significant ($p = 0.231$).

Table 4 displays the estimated treatment effects of the announcements treatments on the main outcome variables discussed in the predictions. We also add the expected gift, $E(g) = pg_1 + (1-p)g_2$, to show the overall effect on giving. Randomization inference p-values are shown in squared brackets (Young, 2019). We begin with the first column of Table 4 which shows the effects announcements on the Week 1 gift. This outcome provides the clearest test of the model, as it is the first decision made by participants. Consistent with the predictions, we find that giving increases in Announce 3 and 2. We do not find an effect of Announce 1.

The second column of Table 4 shows the effects announcements on the Week 2 gift. We find evidence in line with the predictions in Announce 1 and 2, whereby giving in Week 2 was expected to decrease. The effect in Announce 1 is significant, while that in Announce 2 is not significant, but directional. Contrary to our predictions, we do not find an increase in giving in Announce 3. As discussed above, this may be in part due to the fact that announcement decisions in Week 1 may convey information that leads to social influence effects, beyond the social image model.

Finally, we examine the results shown in column (3) of Table 4, which tests the effects of announcements on expected gifts. These are naturally a combination of the effects on Week 1 and Week 2 decisions. Again, all three coefficients have the expected sign, one of which is significant. These findings indicate that only announcing the initial decision to give, without announcing commitment choices or the final gift, may discourage giving overall. Providing more information can directionally increase giving, though its effects may lack statistical significance and be weak in magnitude.

Overall, of the five treatment effects with clear theoretical predictions discussed in Table 4, four were measured with the correct sign, and three of those have significant coefficients. We must, however, acknowledge that multiple (five) hypotheses are tested (List et al., 2016). If we use a Bonferroni correction, on our primary outcome variables, g_1 and g_2, results remain nevertheless unchanged (all randomization inference p-values remain below 0.05). This leads to Finding 4:

Finding 4 (Image concerns and audience effects): Exogenously varying the information about intertemporal giving decisions known to others strengthens time inconsistency in charitable giving, and these audience effects are broadly consistent with the dynamic model of image concerns.

5.5. Additional results

Table 5 explores the treatment effects on the commitment decisions of individuals. Overall, commitment levels do not vary by treatment, as shown in column (1). Relative to Baseline, conditional on choosing to give in week 1 ($g_1 = 1$), individuals should choose higher levels of p in Announce 2 and Announce 3, as these are visible to the audience. By contrast, they should decrease their choice of p in Announce 1. Column (2) of Table 5 shows that commitment increases in Announce 2 and 3, while it directionally decreases in Announce 1, consistent with the model, though the latter change is not statistically significant.[17]

We next explore why giving drops significantly in week 2 in Announce 1 and directionally in Announce 2. Since others in the session do not observe donation decisions in week 2 in these treatments, a disincentive effect is possible, and it would be stronger among those who give in week 1. Column (3) of Table 5 examines week 2 decisions for those who give in week 1. Consistent with the model, there is directional evidence of a drop in giving in Announce 1, which is marginally significant, and in Announce 2, which is not statistically significant.

6. Conclusion

In a simple longitudinal experiment, giving increases nearly 50 percent simply by adding a week's delay between the *decision* to give and the *transaction* of that gift. In our additional within-subjects experiments 2 and 3, the week-long delay also increases time inconsistent giving, especially when giving decisions are publicly announced. Building on the observation that charitable giving is a social act yielding social utility, we present a new dynamic model of norm-conformance through image concerns that explains

[16] Donation decisions and commitment decisions in week 1, as well as donation decisions in week 2 did not differ (χ^2-test, $p > 0.1$ in all cases).

[17] Detailed descriptive statistics of commitment choices in Experiment 3, by treatment, are shown in Appendix C.

why giving increases with delay, but which also provides a rich set of testable hypotheses beyond this. The contribution is thus theoretical, empirical, and conceptual.

Why are these results important? Our findings change the perspective of research in a non-trivial way. Rather than thinking of charitable giving as purchasing goods and services for others, our model asks readers to view the act of giving as a *social process* with unique social rewards that can be consumed at various times within this process.

Viewing charitable giving as a social process means that our focus changes to the dynamics of giving. With this approach we see that utility can flow at the time the *decision* to give has been made. Thus, utility can be reallocated from the time of the giving transaction to the time of the giving decision, and so increases the value of deciding today to give at some point in the future. This new view provides a more complete picture of motivations surrounding giving and raises many interesting questions for future research. For instance, it suggests there could be an optimal distance of time between the agreement to give and the ultimate timing of the giving transaction. Other innovations in fundraising that take advantage of this form of preferences can also be studied, such as the potential benefit of taking pledges for future donations (Andreoni and Serra-Garcia, 2020).

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Appendix A. Theoretical framework

A.1. Give more later

Proposition A.1. *Individuals give more later. Specifically, if $\delta < 1$, the share of subjects choosing $g = 1$ is higher in the NL treatment than in the NN treatment.*

Proof. In the NN treatment, there exists a unique Perfect Bayesian Equilibrium, characterized by a number v_N^* such that (*a*) $0 \leqslant v_N^* < 1$, (*b*) all individuals with $v_N^* \leqslant v$ choose $g = 1$, while all individuals with $v < v_N^*$ choose $g = 0$, where v_N^* solves □

$$v_N^* + M(\mu_N(1)) = 1 + M(\mu_N(0)), \tag{10}$$

$\mu_N(0) = \frac{1}{F(v_N^*)}\int_0^{v_N^*} vf(v)dv$, and $\mu_N(1) = \frac{1}{1-F(v_N^*)}\int_{v_N^*}^{\bar{v}} vf(v)dv$. Similarly, in the NL treatment, there exists a unique Perfect Bayesian Equilibrium, characterized by a number v_L^* such that (*a*) $0 \leqslant v_L^* < 1$, (*b*) all individuals with $v_L^* \leqslant v$ choose $g = 1$, and all individuals with $v < v_L^*$ choose $g = 0$, where v_L^* solves

$$\delta v_L^* + M(\mu_L(1)) + \delta\beta M(\mu_L(1)) = \delta + M(\mu_L(0)) + \delta\beta M(\mu_L(0)), \tag{11}$$

$\mu_L(0) = \frac{1}{F(v_L^*)}\int_0^{v_L^*} vf(v)dv$ and $\mu_L(1) = \frac{1}{1-F(v_L^*)}\int_{v_L^*}^{\bar{v}} vf(v)dv$. The one-week discount factor is $0 \leqslant \delta < 1$, and β is a depreciation factor applied to the $t = 1$ image utility in $t = 2$, in particular $0 \leqslant \beta \leqslant 1$. Comparing (10) and (11), we obtain that $v_L^* < v_N^*$ if $\delta < 1$ or $\beta > 0$. This difference becomes larger as β increases or as δ decreases. Naturally, if $\delta = 1$, individuals do not discount the future, and $\beta = 0$, such that their image utility fully depreciates by $t = 2$, then delay does not affect giving and $v_L^* = v_N^*$.

A.2. Probabilistic commitment

We assume that every population consists of some subjects with v close to zero who will choose $g_1 = g_2 = 0$. Set the image utility experienced by these people to $M_0 \leq 0$. Others will be so charitable as to have $v > 1$ and so will always choose $g_1 = g_2 = 1$. To explain time-inconsistent charitable giving in our game of probabilistic commitment, it must be that some people prefer to give in only one of the periods, and in particular must favor giving in $t = 1$.

It is possible that some people will be engaged in self-signaling as well as social-signaling if they see the experimenter as an audience. Here we will first assume that everyone is engaged in social-signaling with an audience of $n = 1$, that is, the experimenter. We must acknowledge, however, that some subjects may not see the experimenter as an audience and will be engaged only in self-signaling. We turn to self-signaling in Section A.3.2.

A.3. Definitions of signaling preferences

Definition: Social-Signaling. A person is engaged in social-signaling if they believe that an *audience of others* is seeing the person's strategy unfold. Based on information the audience holds at any time, the audience forms (or updates) beliefs about the expected value of the person's utility parameter v. Call the person's excpectation about the audience's belief μ. A person who cares for social-signaling maximizes a utility function that is increasing in μ.

Definition: Self-Signaling. A person is engaged in self-signaling if they behave as if they are unsure of their own v value, and, importantly, act like their own audience in a social-signaling model.

An important distinction between self- and social-signaling is that the self has the advantage of knowing their own full strategy for $t = 1$ and $t = 2$, while the audience for social-signaling can only condition their beliefs on actions they observe.

Definition: Self-and-Social Signaling. A person could have both self- and social-signaling motives.

Having both motives will mean finding a way to aggregate social image utility across at least two audiences.

A.4. Analysis of only social image types

Lemma 1. *Assume the population is engaged in social-signaling, but not self-signaling. Further assume that some people in this population prefer to give in only one period. These people will prefer to give in $t = 1$ rather than $t = 2$.*

Proof. By assumption, the person can choose either $s = (1, p, 0)$ or $s = (0, 1-p, 1)$ as both stragies will result in the same potential flows of earnings. However, the audience in $t = 1$ must form their first estimate of the donor's v based only on the portion of their strategies revealed in $t = 1$, that is $s' = (g_1, p)$. Suppose first that $s' = (1, p)$. Then the audience's *minimal* belief is that v is at least high enough to give $g = 1$ with probability p. Suppose instead that $s' = (0, 1-p)$. Now the audience's *maximal* belief is that v is high enough to give $g = 1$ with probability p. Since $E(v|1, p) \geqslant E(v|0, 1-p)$, the strategy $(1, p, 0) \succ (0, 1-p, 1)$. □

Lemma 1 already largely established Lemma 2.

Lemma 2. *Assume the population is engaged in social-signaling, but not self-signaling. Then, if in $t = 1$ the audience observes a person choosing $g_1 = 0$ for any p, the audience can conclude that this person also intends to choose $g_2 = 0$ in $t = 2$.*

Proof. Suppose not. Then this person chooses $s = (0, p, 1)$. This contradicts Lemma 1. □

Next let's consider that some people in this population may prefer to give both periods. Since there is not a choice of $p = 1$, it will not be until $t = 2$ that these people reveal their full strategies. We add an extra assumption, which we will relax later:

Assumption 1 (*No Counter-Signaling:*). The $E(v|1, p, 1)$ is the same for all p.

This assumptions implies that a person interested in social image will want to send the strongest signal of v in period $t = 1$ in order to get the highest social image. This means choosing $s' = (1, C)$ since $E(v|1, C) \geqslant E(v|1, I) \geqslant E(v|1, F)$.

Lemma 3. *If $E(v|1, p, 1)$ is the same for all p and if the individuals cares about social image and wishes to choose $g_1 = g_2 = 1$, the individual will chose strategy $s' = (1, C)$ in $t = 1$.*

Proof. Since social image utility will be the same in $t = 2$ regardless of p, and the objective is to choose $g_1 = g_2 = 1$ and p to maximize utility, then this is the same as choosing p to maximize social image at $t = 1$. This is achieved by choosing $s' = (1, C)$ in $t - 1$ and $g_2 = 1$ in $t = 2$. □

This lends itself naturally to the next lemma:

Lemma 4. *If $E(v|1, p, 1)$ is the same for all p, if the individual cares about social image, and if in $t = 1$ the audience sees the strategy $s' = (1, p)$ for any $p \neq C$, then the audience will believe that $g_2 = 0$.*

Proof. Suppose not. Then, this will contradict Lemma 3. □

We can now state a proposition for our probabilistic commitment game with social image concerns.

Proposition 1. *Assume all individuals care equally about social image, and that the $E(v|1, p, 1)$ is the same for all p. Then there exists a Bayesian Perfect equilibrium of the probabilistic commitment game, which is characterized by numbers v^{F0}, v^{I0}, v^{C0}, and v^{C1}, such that $0 \leqslant v^{F0} \leqslant v^{I0} \leqslant v^{C0} \leqslant v^{C1} \leqslant 1$ and*

a) all individuals with $v < v^{F0}$ choose $s = (0, p, 0)$, for any p;
b) all individuals with $v^{F0} \leqslant v \leqslant v^{I0}$ choose $s = (1, F, 0)$;
c) all individuals with $v^{I0} \leqslant v \leqslant v^{C0}$ choose $s = (1, I, 0)$;
d) all individuals with $v^{C0} \leqslant v \leqslant v^{C1}$ choose $s = (1, C, 0)$;
e) all individuals with $v^{C1} \leqslant v \leqslant \bar{v}$ choose $s = (1, C, 1)$.

Proof. Notice that in $t = 1$ there will be at most 4 pools consisting of those choosing the strategy $s' = (g_1, p)$ of $(0, p), (1, F), (1, I)$, and $(1, C)$. Lemma 3 shows that those wishing to give in both $t = 1$ and $t = 2$ would choose $(1, C)$ in $t = 1$. Then in $t = 2$ the pool at $(1, C)$ would be split into two pools by a $v^{C1} < 1$ such that those with $v^{C0} \leqslant v < v^{C1}$ choose $g_2 = 0$ and those with $v^{C1} \leqslant v \leqslant \bar{v}$ choose $g_2 = 1$. We assume that for certain distributions of v and definitions of the image function $M()$, this will indeed be an equilibrium, and then prove the proposition by construction.

Let $f(v), 0 \leqslant v \leqslant \bar{v}$, be the probability distribution function for v, with density function $F(v) = \int_0^v f(v)dv$. We assume $f(v)$ is continuous, and twice differentiable. Then define the function $a(x, y)$ as the average (that is, expected value) of v conditional on $x \leqslant v \leqslant y$:

$$a(x,y) = \frac{1}{F(y) - F(x)} \int_x^y v f(v) dv$$

Then, define the expected value of v within each pool as

$$\begin{aligned} \mu_0 &= a(0, v^{F0}), \\ \mu_F &= a(v^{F0}, v^{I0}), \\ \mu_I &= a(v^{I0}, v^{C0}), \\ \mu_C &= a(v^{C0}, \bar{v}), \\ \mu_{C0} &= a(v^{C0}, v^{C1}), \text{and} \\ \mu_{C1} &= a(v^{C1}, \bar{v}). \end{aligned}$$

Next, define the utility of a donor in a given pool at time $t = 1$. We will use $M()$ to indicate the image utility in $t = 1$ and $\delta\beta M()$ as the discounted image utility for $t = 2$, where $0 < \delta\beta \leqslant 1$. We use δ to represent the one week discount rate, and $0 < \beta \leq 1$ to represent the idea that social image earned in period 1 may only partly carry over to the period 2 decision.

$$U(v|0, p, 0) = M(\mu_0) + \delta\beta M(\mu_0) \tag{12}$$
$$U(v|1, F, 0) = 0.1\delta(v - 1) + M(\mu_F) + \delta\beta M(\mu_F) \tag{13}$$
$$U(v|1, I, 0) = 0.5\delta(v - 1) + M(\mu_I) + \delta\beta M(\mu_I) \tag{14}$$
$$U(v|1, C, 0) = 0.9\delta(v - 1) + M(\mu_C) + \delta\beta M(\mu_{C0}) \tag{15}$$
$$U(v|1, C, 1) = \delta(v - 1) + M(\mu_C) + \delta\beta M(\mu_{C1}). \tag{16}$$

Then in equilibrium, the critical values v^{F0}, v^{I0}, v^{C0}, and v^{C1} solve these four equations:

$$U(v^{F0}|0, p, 0) - U(v^{F0}|1, F, 0) = 0 \tag{17}$$
$$U(v^{I0}|1, F, 0) - U(v^{I0}|1, I, 0) = 0 \tag{18}$$
$$U(v^{C0}|1, I, 0) - U(v^{C0}|1, C, 0) = 0 \tag{19}$$
$$U(v^{C1}|1, C, 0) - U(v^{C1}|1, C, 1) = 0 \tag{20}$$

By the assumption that M is increasing, continuous, and concave, this system will have a unique solution where $0 \leqslant v^{F0} \leqslant v^{I0} \leqslant v^{C0} \leqslant v^{C1} \leqslant 1$. The final inequality follows from the assumption that all those with $v \geqslant 1$ will choose $g_1 = g_2 = 1$ as long as $M \geqslant 0$ and by continuity there will form a pool of "always give" types that includes some points $v < 1$ in the neighborhood of $v = 1$. □

A.4.1. Generalization to counter-signaling

If we weaken the assumption of no counter-signaling, we can potentially get one or even two new types of equilibria that include counter-signaling. By counter-signaling we mean that the highest type person choosing $g_1 = g_2 = 1$ does not employ the strongest signal of $p = C$ in $t = 1$ but instead sends a weaker signal choosing, say $s' = (1, I)$ rather than $(1, C)$, thus pooling with lower type in $t = 1$, such that in $t = 2$ this person can reveal themselves to be (among) the highest types. They can do this if the utility lost in the lower quality signal sent in $t = 1$ can be made up for by those with high enough v such that the social image $M(1, I, 1) > M(1, C, 1)$. In particular, if upon seeing the full strategy of $s = (1, I, 1)$ the social image for this strategy increases just enough such that $U(v|1, I, 1) \geqslant U(v|1, C, 1)$ if and only if $v = \bar{v}$, and for all others the inequality is reversed. Then we can establish a new equilibrium where the most generous type can further separate from those of lower v. This is shown in Corollary 1 below.

If there is a sufficiently long right tail of the distribution of types, $f(v)$, then it is possible for there to be two counter-signals: $(1, F)$ by the highest group, and $(1, I)$ by the second highest group. This is shown in Corollary 2.

Of course, if there is no social information about g_2, then counter-signaling will not be possible, excluding these strategies as equilibria. This will return when discussing Experiment 3.

Corollary 1. *Assume the no-counter-signaling assumption fails, and in particular assume* $M(\mu_I) + \beta M(\bar{v}) > M(\mu_C) + \beta M(\mu_{C1})$, *but* $M(\mu_F) + \beta M(\bar{v}) < M(\mu_C) + \beta M(\mu_{C1})$. *Then, there exists a probability distribution function* $f(v), 0 \leqslant v \leqslant \bar{v}$, *and a neighborhood of* $\bar{v}, N_\epsilon(\bar{v})$, *such that all j with* $v_j \in N_\epsilon(\bar{v})$ *choose the strategy* $s = (1, I, 1)$. *In equilibrium the image function* $M(\mu)$ *assures us that the individual i with* $v_i = \bar{v} - \epsilon^*$ *is indifferent to counter-signaling or choosing* $s = (1, C, 1)$.

Proof. If these assumptions hold, then a person with $v_i = \bar{v}$ can deviate from the strategy $s = (1, C, 1)$ to the counter-signaling strategy whereby the person pretends to be a lower v type by choosing $s' = (1, I)$ in $t = 1$ such that in $t = 2$ the complete strategy $s = (1, I, 1)$ can be revealed. Since, by Lemma 2 the audience is anticipating that any strategy $s' = (1, I)$ must be completed in $t = 2$ with $s = (1, I, 0)$, the audience must ask who is most likely to profit from this deviation. If the answer is that only individuals at or very near $v_i = \bar{v}$, then this counter-signaling strategy can become an equilibrium. Given continuity, there will be a neighborhood of $\bar{v}$ where all i with v_i in this neighborhood will form a small pool that sends the counter-signal in period 1 and further separates themselves from the other "always give" types.

In particular, let $\mu(\epsilon) = a(\bar{v} - \epsilon, \bar{v})$ be the expected value of v given $v \in N_\epsilon(\bar{v})$. Then, for the equilibrium to exist, we need to find a value of ϵ, say ϵ^*, such that the no-counter-signaling conditions, appropriately modified, hold for $v_i \in N^*_\epsilon(\bar{v})$ but not for those with $v \notin N^*_\epsilon(\bar{v})$. Specifically, $M(\mu_I) + \beta M(\mu\epsilon^*) > M(\mu_C) + \beta M(\mu_{C1})$, but $M(\mu_F) + \beta M(\mu(v^*) < M(\mu_C) + \beta M(\mu_{C1})$. □

Corollary 2. *Assume* $M(\mu_F) + \beta M(\bar{v}) > M(\mu_C) + \beta M(\mu_{C1})$. *Then there exist a neighborhood of* $\bar{v}, N_\epsilon(\bar{v})$, *such that all i with* $v_i \in N_\epsilon(\bar{v})$ *choose the strategy* $s = (1, F, 1)$. *And, letting* $\bar{v}'$ *be the lowest element of* $N_\epsilon(\bar{v})$, *then there exists another neighborhood of* $\bar{v}'$ *such that all* $v_j \in N_\gamma(\bar{v}')$ *such that* $v_j < \bar{v}'$ *the strategy* $s = (1, I, 1)$ *will be optimal.*

Proof. Here we simply follow the logic of Corollary 1, applying the method twice, under the assumption that the distribution of v will actually support the equilibrium. □

A.4.2. Analysis of only self-signaling types

Assuming people are only self-image signalers is equivalent to assuming that $t = 1$ and $t = 2$ are combined to a single decision. In particular, to a self-signaler the strategies $s = (1, p, 0)$ and $(0, 1 - p, 1)$ are the same. This then reduces the self-signal to choosing a probability with which to give, say q, where now q has five possible values, $q = 0, 0.1, 0.5, 0.9$, or 1. The strategy $q = 0$ results from $s = (0, p, 0)$ and $q = 1$ from $s = (1, p, 1)$. Contrary to the above, now $(1, p, 0)$ and $(0, 1 - p, 1)$ both produce p.

With a model of pure self-signaling the solution is obvious:

Proposition 2. *If subject care only about self-signaling there will exist an equilibrium will be characterized by four numbers,* $v_{0.1} \leqslant v_{0.5} \leqslant v_{0.9} \leqslant v_1 \leqslant 1$, *such that*

a) If $v_i < v_{0.1}$ *then i will give with probability* $q = 0$.
b) If $v_{0.1} < v_i \leqslant v_{0.5}$ *then i will give with probability* $q = 0.1$
c) If $v_{0.5} < v_i \leqslant v_{0.9}$ *then i will give with probability* $q = 0.5$
d) If $v_{0.9} < v_i \leqslant v_1$ *then i will give with probability* $q = 0.9$
e) If $v_1 < v_i$ *then i will give with probability* $q = 1$

Proof. This is a subclass of the case considered in Proposition 1. The same tools can be applied to construct this proof. □

Appendix B. Instructions and decision screens

B.1. Summary of session structure

All experiments invited subjects to participate in a 2-week experiment. We refer to Week 1 and Week 2 sessions in what follows. Participation in the two sessions was always required and independent of decisions made in Week 1.

The structure of the Week 1 session was as follows. First there was a Welcome Sheet, shown below. After subjects read the Welcome Sheet, a GiveDirectly Pitch was done. The slides of GiveDirectly were shown on a screen in front of the room, visible to all subjects. The experimenter read the slides. After reading the slides, the instructions were read out loud. For each Experiment, we present the instructions and decision screens shown in Week 1 below. The text in square brackets that follows was not read aloud. All treatment differences are indicated in brackets below.

In Week 2 of Experiment 1, subjects did not receive any additional written instructions. In all treatments, they were first reminded of their donation decision in Week 1 on their computer screens, and then asked to complete several survey questions on their computer. Once everyone had completed the survey, the subjects were called individually to receive their payment.

In Week 2 of Experiments 2 and 3, subjects made their Week 2 donation decision (g_2). At the beginning of the session, subjects were reminded of their Week 1 decisions (g_1 and p). In the treatment Announce 3 sessions, they were reminded that their Week 2 donation would also be announced, following the same procedures as the announcements in Week 1. Once all subjects had made their decisions and completed several survey questions, a volunteer was randomly selected to roll a dice in front of the room, to determine for each subject whether their Week 1 or Week 2 decisions would be implemented, according to their choice of g_1, g_2 and p.

[WELCOME SHEET]
Welcome

Thank you for participating in this experiment. During the experiment you and the other participants are asked to answer a series of questions. Please do not communicate with other participants. If you have any questions please raise your hand and an experimenter will approach you and answer your question in private.

This experiment consists of two parts.

- Part 1: Today we will ask you to answer a series of questionnaires.
- Part 2: A follow up survey that you will be asked to fill out a week from today.

Payment

You receive for the participation in this experiment $30. Please note that in order to obtain you all payments you need to answer both parts of the experiment.

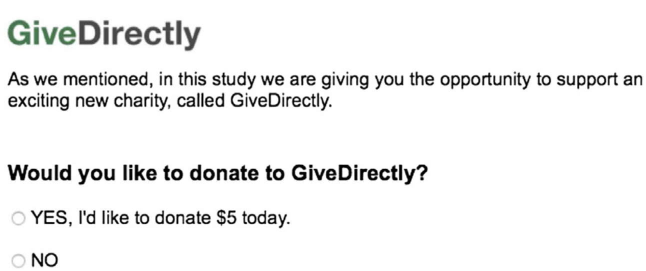
- Today you receive $15 for showing up to the experiment and answering the first part of the experiment. You can collect the $15 from the experimenter after the session is finished.
- The remaining $15 you will receive at the end of the next week's session.

B.2. Experiment 1

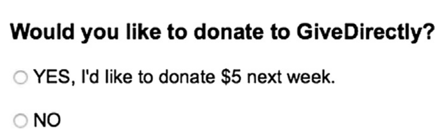
[At the end of the GiveDirectly pitch:]

- [TreatmentNN]: We would like to ask you whether you would like to donate $5 of your show up fee for today's session to GiveDirectly. You will be asked to answer this question on your screens in a minute. If you answer "YES, I'd like to donate $5 today," $5 of your show up fee today will be donated. If you say "NO," no donation will be made. Your decisions are final today.
- [TreatmentNL]: We would like to ask you whether you would like to donate $5 of your show up fee for next week's session to GiveDirectly. You will be asked to answer this question on your screens in a minute. If you answer "YES, I'd like to donate $5 next week," $5 of your show up fee next week will be donated. If you say NO, no donation will be made. Your decisions are final today.

Decision Screens
NN:



NL:



B.3. Experiments 2 and 3

The instructions of Experiment 3 are shown below. In brackets the additional variations in Treatments Announce 1, Announce 2 and Announce 3 are shown. The instructions for Experiment 2 did not explicitly discuss the indifference option, which was offered on the computer screens only. This discussion was added explicitly in Experiment 3, including the Baseline treatment of Experiment 3, which replicates Experiment 2. The results demonstrate no differences in decisions. The former set of instructions is available upon request.

Your Donation Decision

In this study we will ask you to make two donation decisions, but only one of these two will end up being the decision that counts. One donation decision will be made today. Call this your week-1 donation decision. Your second donation decision will be made next week, when you return to the lab to complete this study. Call this your week-2 donation decision.

Here is how it works. **Week-1 donation decision**

Today we will ask you whether you would like to donate $5 of your show up fee for next week's session to GiveDirectly. You will be asked to answer this question on your screens in a minute. If you answer "YES, I'd like to donate $5 next week," $5 of your show up fee next week will be donated. If you say NO, no donation will be made. 8pt **Week-2 donation decision**

Next week, when you return to the lab to complete this study, you will have the opportunity to renew or revise your donation decision. In particular, next week you will be asked again whether you would like to donate $5 of your show up fee for next week's session to Give Directly. If you answer "YES, I'd like to donate $5 today," $5 of your show up fee next week will be donated. If you say NO, no donation will be made.

IMPORTANT: Only one of your decisions, either your week-1 or your week-2 donation decision, will be implemented. That is, only one decision will be the decision-that-counts. We will not use both! The most you will ever donate in this study is $5. The least you can donate is $0.

How will we decide whether your week-1 donation decision or your week-2 donation decision is the decision-that-counts?

Next week, after you make your week-2 donation decision, we will ask someone in the room to roll a 10-sided die to determine which decision is the decision-that-counts. All 10 numbers on the die are equally likely. Based on your decision, there will be a 1 in 10 chance or a 9 in 10 chance that the decision-that-counts is your week-1 decision.

Today you will have three options to choose from:

A. Your **week-1 donation decision** will count with a **1 in 10 chance**, and so your week-2 donation decision will count with a 9 in 10 chance.
B. Your **week-1 donation decision** will count with a **9 in 10 chance**, and so your week-2 donation decision will count with a 1 in 10 chance.
C. Your choice between Option A or Option B is determined using a coin flip.

If you chose Option A today, the following will occur. A volunteer will roll a 10-sided die and:

- Your **week-1** donation decision will be the decision-that-counts if number "1" is the outcome of the die roll.
- Your **week-2** donation decision will be the decision-that-counts if numbers "2", "3", "4", "5", "6", "7", "8", "9" or "10" are the outcome of the die roll.

If you choose Option B today, the following will occur. A volunteer will roll a 10-sided die and:

- Your **week-1** donation decision will be the decision-that-counts if numbers "2", "3", "4", "5", "6", "7", "8", "9" or "10" are the outcome of the die roll.
- Your **week-2** donation decision will be the decision-that-counts if number "1" is the outcome of the die roll.

If you chose Option C today, a volunteer will flip a coin to determine whether your payment will be determined according to Option A or Option B.

- If the outcome of the coin flip is "heads", Option A will be the option assigned to you.

- If the outcome of the coin flip is "tails", Option B will be the option assigned to you.

[Announce 1:

Announcing Decisions

At the end of the session today, after everyone's decisions have been recorded, we will announce your week-1 donation decision to all of the participants in the room today. We will do this two ways.

First, we will use the screen at the front of this room to display the decision of each participant. The screen display may look something like this:

Seat Number	Week-1 Donation Decision
1	Yes, donate $5 next week
2	No
3	Yes, donate $5 next week

... and so forth.

Next, we will call out seat numbers sequentially, starting at a randomly determined seat number. When we call your seat number, for example seat number 25, please stand up and say "I am at seat 25". Then, please read the decision you made today listed on the screen, by saying "I chose yes, donate $5 next week", or "I chose no". Please remember to stay standing until we are ready to call the next seat number.

As you can see, this means that the other participants in this session will learn your week-1 donation decision.]

[Announce 2:

Announcing Decisions

At the end of the session today, after everyone's decisions have been recorded, we will announce your week-1 donation decision and your choice between Options A, B and C to all of the participants in the room today. We will do this two ways.

First, we will use the screen at the front of this room to display the decision of each participant. The screen display may look something like this:

Seat Number	Week-1 Donation Decision	Option A, B or C?
1	Yes, donate $5 next week	Option A
2	No	Option B
3	Yes, donate $5 next week	Option C

... and so forth.

Next, we will call out seat numbers sequentially, starting at a randomly determined seat number. When we call your seat number, for example seat number 25, please stand up and say "I am at seat 25". Then, please read the decision you made today listed on the screen, by saying "I chose yes, donate $5 next week", or "I chose no", and thereafter adding "And I chose Option A", "And I chose Option B" or "And I chose Option C". Please remember to stay standing until we are ready to call the next seat number.

As you can see, this means that the other participants in this session will learn your week-1 donation decision, and your choice between Option A, B or C.]

[Announce 3:

Announcing Decisions

At the end of the session today, after everyone's decisions have been recorded, we will announce your week-1 donation decision and your choice between Options A, B and C to all of the participants in the room today. We will do this two ways.

First, we will use the screen at the front of this room to display the decision of each participant. The screen display may look something like this:

Seat Number	Week-1 Donation Decision	Option A, B or C?
1	Yes, donate $5 next week	Option A
2	No	Option B
3	Yes, donate $5 next week	Option C

... and so forth.

Next, we will call out seat numbers sequentially, starting at a randomly determined seat number. When we call your seat number, for example seat number 25, please stand up and say "I am at seat 25". Then, please read the decision you made today listed on the screen, by saying "I chose yes, donate $5 next week", or "I chose no", and thereafter adding "And I chose Option A", "And I chose Option B" or "And I chose Option C". Please remember to stay standing until we are ready to call the next seat number.

As you can see, this means that the other participants in this session will learn your week-1 donation decision, and your choice between Option A, B or C.

When you return to the lab next week, after everyone's decisions have been recorded, we will announce your week-2 decisions, following the same procedures as described above. We will also remind everyone in the room of your decisions in week 1.]

In summary:

- Today you make a decision about donating $5 out of your show-up fee for next week's session to Give Directly. This decision will be carried out next week with a 1 in 10 or a 9 in 10 chance.
- Next week you will be asked again to make a decision about donating $5 out of your show up fee for next week's session to Give Directly. This decision will be carried out next week with a 9 in 10 or a 1 in 10 chance.
- Only one of these two decisions will be carried out.
- You make both donation decisions before you know which decision will be carried out.
- You decide today whether you would like Option A (your week-1 donation decision to count with a 1 in 10 chance and so your week-2 donation decision will count with a 9 in 10 chance), Option B (your week 1 donation decision to count with a 9 in 10 chance and so your week-2 donation decision will count with a 1 in 10 chance) or Option C (you would like to flip a coin between these two options).
- After you have made your week-2 donation decision, a die will be rolled to determine whether your week-1 or your week-2 donation decision is the decision that counts. If you chose to flip a coin, a coin will be flipped beforehand.
- [Announce: At the end of the session today, [1: your week-1 donation decision [2, 3: and your choice between Options A, B and C]] will be announced to the rest of the participants in the room.
- [Announce: At the end of the session next week, [1, 2: there will be no announcements. [3: your week-2 donation decision will also be announced to the rest of the participants in the room, together with your week-1 decision and your choice between Options A, B and C.]]

Next you will be asked about your donation decision on the screens. **Remember: Your donation decision today could be the decision-that-counts so treat this decision as if it were the decision that will count.**

Decision Screens

Week 1 decision:

GiveDirectly

As we mentioned, in this study we are giving you the opportunity to support an exciting new charity, called GiveDirectly.

Would you like to donate to GiveDirectly?

○ YES, I'd like to donate $5 next week.

○ NO

Commitment decision (on screen following week 1 decision):

As we mentioned, we will also ask you next week about your donation decision. Here you can choose whether you would like your donation decision today to be the decision-that-counts with a 1 in 10 chance or a 9 in 10 chance. You can also say that it doesn't matter to you which option is chosen, in which case we will flip a coin to decide for you.

Please select below what option you would prefer:

○ **A:** I definitely want
my donation decision **today** to count with a **1 in 10 chance**
(and so my donation decision **next week** to count with a **9 in 10 chance**.)

○ **B:** I definitely want
my donation decision **today** to count with a **9 in 10 chance**
(and so my donation decision **next week** to count with a **1 in 10 chance)**.

○ **C:** I truly don't care which option A or B above is chosen.
Please flip a coin to decide.

Appendix C. Additional analyses

C.1. Analysis of show-up rates

Table C.1 examines the determinants of the decision to show-up in Week 2, in the NN and NL treatments. We do not find that the treatment, or the decision to give within each treatment, or any individual characteristic is related to show-up in Week 2. Table C.2 provides the same analysis for the Commitment and Announcement Experiments.

C.2. Gender differences in Experiment 1

Table C.3. disaggregates the results of Experiment 1 by gender. In the NN and NL treatments the number of male participants is 124 and the number of female participants is 194.

Table C.3
Results by Gender.

	Men	Women
NN and NL Treatments		
Decide Now to Give Now (NN): Share of giving	0.323	0.300
	(0.058)	(0.046)
Decide Now to Give Later (NL): Share of giving	0.390	0.500
	(0.064)	(0.051)
NN vs. NL: χ^2-test (*p*-val)	0.754	0.183

Notes: This table presents the behavior of male and female participants in the NN and NL treatments. The table presents the frequency of each behavior unless otherwise noted. Standard errors are displayed in parentheses for giving rates.

Table C.1
Analysis of Show-up Rates (Experiment 1).

	No-show rate	Give (g = 1)			
	in Week 2	If no-show	If show-up	*p-value*	N
NN Treatment	7.8%	28.6%	30.9%	*0.856*	179
NL Treatment	11.6%	45.0%	45.8%	*0.949*	173
NL vs. NN show-up rate (p-value χ^2-test)	*0.235*				

Table C.2
Analysis of Show-up Rates (Experiments 2 and 3).

	Experiment 2	Experiment 3 (Announcements)			
	Probabilistic Commitment	Baseline	Announce 1	Announce 2	Announce 3
No-show rate	10.9%	6.7%	5.9%	3.0%	13.2%
χ^2-test *p*-value (Announcements)		0.129			
Week 1 Decision	If show-up	If show-up	If show-up	If show-up	If show-up
No + c = 0.9	26%	27%	8%	22%	10%
No + c = 0.5	14%	16%	22%	8%	24%
No + c = 0.1	12%	5%	22%	6%	7%
Yes + c = 0.9	13%	13%	23%	15%	15%
Yes + c = 0.5	13%	16%	17%	22%	22%
Yes + c = 0.1	22%	23%	8%	28%	22%
	If no-show	If no-show	If no-show	If no-show	If no-show
No + c = 0.9	35%	50%	0%	50%	22%
No + c = 0.5	10%	25%	0%	0%	0%
No + c = 0.1	0%	25%	0%	0%	0%
Yes + c = 0.9	20%	0%	50%	0%	11%
Yes + c = 0.5	10%	0%	50%	0%	44%
Yes + c = 0.1	25%	0%	0%	50%	22%
χ^2-test *p*-value	0.537	0.401	0.352	0.841	0.372

C.3. Session sizes and balance in observables in Experiment 3

The session size in treatments Announce 1, Announce 2 and Announce 3 was as follows. In treatment Announce 1 the size of the Week 1 sessions was 22, 22 and 24, across three sessions. In Announce 2, the size of the sessions was 21, 22 and 24. In Announce 3, the size of the sessions was 21, 23 and 24.

Table C.4. shows that participants did not differ in their baseline characteristics across treatments.

C.4. Commitment decisions in Experiment 3

Table C.5. provides detailed descriptive statistics of commitment choices in Experiment 3, by treatment.

C.5. Self-signaling and counter-signaling in Experiment 3

Our model of dynamic image concerns makes additional testable predictions for the effects of announcements on behaviors such as self-signaling and counter-signaling. We present the results of testing these predictions in columns (1) and (2) of Table C.6. We expect to observe less self-signaling in all treatments, as a new audience has been added with other participants. This implies that, behaviorally, we expect fewer individuals to choose the strategy $(0, p, 1)$. Consistent with the model, column (1) of Table C.6 shows that self-signaling is reduced directionally in all treatments, though the effects are only marginally significant in some treatments.

Next, the predictions of the image model imply that counter-signaling should increase in Announce 3, relative to Baseline, and it should decrease in Announce 2 and Announce 1 relative to Announce 3. To investigate counter-signaling, we test whether individuals are more or less likely to choose the strategies $(1, I, 1)$ and $(1, F, 1)$. The results are shown in column (2) of Table C.6. We find that counter-signaling increases in Announce 3 directionally. It decreases significantly in Announce 1 relative to Announce 3 (χ^2-test, $p < 0.01$), and we find a directional drop in this behavior in Announce 2 relative to Announce 3 (χ^2-test, $p = 0.396$).

Table C.6
Self-Signaling and Counter-Signaling in Experiment 3.

	(1) Probit regressions Self-signaling $(0, p, 1)$	(2) Counter-signaling $(1, I, 1)$ & $(1, F, 1)$
Announce 3	−0.086*	0.057
	(0.049)	(0.040)
	[0.048]	[0.169]
Announce 2	−0.084*	0.015
	(0.050)	(0.037)
	[0.094]	[0.679]
Announce 1	−0.066	−0.055*
	(0.050)	(0.029)
	[0.200]	[0.066]

Note: Probit marginal effects (calculated at the means of all variables) are shown. The variables Announce 1, Announce 2 and Announce 3 are dummy variables that take value one if the individual was a participant in that treatment, and zero otherwise. The omitted category is the Baseline treatment. Individual characteristics such as gender, ethnicity, whether the subject is a native English speaker, and their score in the Cognitive Reflection Test are included as covariates. Robust standard errors, clustered at the session level, are shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Randomization inference (randomization-t) *p*-values shown in squared brackets (Young, 2019).

Table C.4
Balance Check in Experiment 3.

	Treatments				χ^2-tests
	Baseline	Announce 3	Announce 2	Announce 1	*p*-value
% Female	55.7%	54.7%	67.7%	64.4%	0.241
% English mother tongue	37.0%	46.9%	40.0%	37.3%	0.544
% Asian ethnicity	75.8%	82.8%	76.9%	86.4%	0.265
Nr. correct answers to 3 CRT questions	1.88	1.56	1.54	1.66	0.522
N	219	59	65	64	

Table C.5
Commitment Decisions in Experiment 3.

		Treatment			
Week 1 gift, Week 2 gift		Baseline	Announce 1	Announce 2	Announce 3
Dynamically inconsistent (yes, no)	$p = F$	68.8%	72.2%	68.2%	53.3%
	$p = I$	14.6%	27.8%	18.2%	26.7%
	$p = C$	16.7%	0.0%	13.6%	20.0%
	Frequency (N)	48/219	18/64	22/65	15/59
Dynamically inconsistent (no, yes)	$p = F$	29.6%	25.0%	33.3%	0.0%
	$p = I$	14.8%	0.0%	0.0%	66.7%
	$p = C$	55.6%	75.0%	66.7%	33.3%
	Frequency (N)	27/219	4/64	3/65	3/59
Dynamically consistent (yes, yes)	$p = F$	27%	15%	15%	25%
	$p = I$	39%	46%	50%	45%
	$p = C$	34%	38%	35%	30%
	Frequency (N)	59/219	13/64	20/65	20/59
Dynamically consistent (no, no)	$p = F$	18%	14%	15%	19%
	$p = I$	33%	48%	25%	57%
	$p = C$	49%	38%	60%	24%
	Frequency (N)	85/219	29/64	20/65	21/59

Table D.1
Self-reported behaviors between week 1 and week 2 sessions (Experiment 2).

	GD thought	GD read	Thought others	Thought budget	GD more favorable
Always give					
Flexibility	3.6	2.8	2.9	4.3	3.0
Indifference	3.3	2.1	2.2	2.9	3.1
Commitment	3.4	2.1	2.6	3.1	3.0
Never give					
Flexibility	3.3	2.5	2.8	3.7	2.8
Indifference	3.0	1.9	1.9	3.4	2.3
Commitment	3.5	2.3	2.4	4.3	2.8
Give more later					
Flexibility	3.1	2.3	2.8	3.6	3.0
Indifference	4.0	2.0	2.0	4.0	2.3
Commitment	3.4	2.0	2.1	2.7	2.6
Give less later					
Flexibility	4.4	3.4	3.0	4.4	3.6
Indifference	3.3	2.0	2.3	3.0	2.3
Commitment	3.3	2.7	2.3	4.2	3.1

Appendix D. Uncertainty and flexibility: additional results

In this section we examine additional survey evidence regarding the role of uncertainty in Experiment 2. At the end of the week 2 session, after all donation decisions had been made, we asked individuals to indicate their level of agreement with the following statements: "Over the last week…(a) I thought about GiveDirectly" (GD thought); (b) I read or did research about GiveDirectly" (GD read); (c) I learned about other charities like GiveDirectly" (Thought others); (d) I thought about whether my financial situation allows me to donate to GiveDirectly" (Thought budget). Answers were provided on a 5-point Likert scale, ranging from strongly disagree to strongly agree. Based on these statements we construct an index, that we label as Resolving Uncertainty index, that measures the extent to which the individual thought and did research about her donation decision. We also elicited the extent to which the search for information about GiveDirectly changed the subject's opinion, through the statement "Over the last week I became more favorable about GiveDirectly." (GD more favorable). We present average responses to each variable in Table D.1. Based on these statements we construct an index, labeled Resolving Uncertainty index, that measures the extent to which the individual thought and did research about her donation decision. A higher value of the index indicates more research and thought was given to the donation decision. We also elicited the extent to which the search for information about GiveDirectly changed the subject's opinion, through the statement "Over the last week I became more favorable about GiveDirectly.".

In Table D.2. we examine the relationship between these measures and donation behavior. Naturally, since these measures were elicited after donation decisions have been made, the results should be interpreted with caution. Column (1) of Table D.2. displays the results of a linear regression on the (standardized) Resolving Uncertainty index and giving and commitment decisions. The results indicate that individuals who demanded flexibility report a higher likelihood doing more thinking and research between week 1 and week 2, relative to those individuals who are indifferent between commitment and flexibility. However, those subjects who choose to give more later ($g_1 = 1$ and $g_2 = 0$) and demand flexibility are *less* likely to do research and think about the charity, which speaks against the concern that this type of

Table D.2
Flexibility and Uncertainty.

	(1) Resolving Uncertainty Index	(2) Became more favorable towards charity
Flexibility	0.886*	−0.066
	(0.404)	(0.415)
Give more later X Flexibility	−0.970*	0.728
	(0.489)	(0.518)
Never give X Flexibility	−0.310	0.463
	(0.493)	(0.620)
Give less later X Flexibility	0.409	1.348**
	(0.399)	(0.467)
Commitment	0.177	−0.066
	(0.263)	(0.384)
Give more later X Commitment	−0.675	0.302
	(0.485)	(0.619)
Never give X Commitment	0.520	0.513
	(0.486)	(0.628)
Give less later X Commitment	0.355	0.811
	(0.489)	(0.460)
Give less later	0.426	−0.728
	(0.286)	(0.421)
Never give	−0.126	−0.711
	(0.472)	(0.542)
Give less later	0.039	−0.728*
	(0.435)	(0.381)
Constant	−0.374	0.212
	(0.306)	(0.352)
Observations	163	163
R-squared	0.133	0.094

Note: This table presents the estimate coefficients from an ordinary least squares regression relating choices in Experiment 2 and self-reported measures of behavior between the week 1 and week 2 session. The Resolving Uncertainty index is the sum of the answers to the following statements: Over the last week…(a) I thought about GiveDirectly; (b) I read or did research about GiveDirectly; (c) I learned about other charities like GiveDirectly; (d) I thought about whether my financial situation allows me to donate to GiveDirectly. A value of 1 corresponds to strongly disagree and 5 corresponds to strongly agree. The variable Became more favorable towards charity takes values 1 to 5, reflecting disagreement/agreement with the statement "Over the past week I became more favorable about GiveDirectly". Both dependent variables are standardized. All explanatory variables are dummy variables that take value one if the subject chose the described behavior. Robust standard errors, clustered at the session level, are shown in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

time-inconsistent individuals demanded flexibility due to uncertainty.

Column (2) of Table D.2. explores the relationship between changes in opinion with regards to GiveDirectly, time inconsistency and demand for flexibility. The results indicate that subjects who chose (No, Yes) and demanded flexibility express becoming significantly more favorable towards GiveDirectly in the week between the first and second session of the experiment. The behavior of these subjects is consistent with Kreps (1979), since they were initially uncertain and cautious, but changed their donation decision, potentially due to their change in opinion about GiveDirectly. By contrast, the behavior of subjects who chose to give more later ($g_1 = 1$ and $g_2 = 0$) and demanded flexibility is again inconsistent with Kreps (1979). These subjects change their decision towards not giving in week 2, but they do not report becoming *less* favorable towards the charity, since the coefficient for this group is not significant and positive (0.728).

References

Adena, M., Huck, S., 2019. Giving once, giving twice: a two-period field experiment on narrow framing in charitable giving. J. Public Econ. 172, 127–134.
Adena, M., Huck, S., 2020. Online fundraising, self-image, and the long-term impact of ask avoidance. Manage. Sci. 66 (2), 722–743.
Ali, N., Bénabou, R., 2020. Image versus information. Am. Econ. J.: Microecon. 12 (3), 1–49.
Andreoni, J., 1989. Giving with impure altruism: applications to charity and Ricardian equivalence. J. Polit. Econ. 97, 1447–1458.
Andreoni, J., 1990. Impure altruism and donations to public goods: a theory of warm-glow giving. Econ. J. 100, 464–477.
Andreoni, J., 2018. The benefits and costs of donor-advised funds. Tax Policy Econ. 32 (1), 1–44.
Andreoni, J., Aydin, D., Barton, B., Bernheim, B.D., Naecker, J., 2020a. When fair Isn't fair: understanding choice reversals involving social preferences. J. Polit. Econ. 128 (5), 1673–1711.
Andreoni, J., Gravert, C., Kuhn, M.A., Saccardo, S., Yang, Y., 2020b. Arbitrage Or Narrow Bracketing? On Using Money to Measure Intertemporal Preferences. NBER working paper 25232.
Andreoni, J., 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., 2011. The power of asking: How communication affects selfishness, empathy, and altruism. J. Public Econ. 95 (7), 513–520.
Andreoni, J., Rao, J.M., Trachtman, H., 2017. Avoiding the ask: a field experiment on altruism, empathy, and charitable giving. J. Polit. Econ. 125 (3), 625–653.
Andreoni, J., Serra-Garcia, M., 2020. The pledging puzzle: how can revokable promises increase charitable giving?. Manage. Sci.. forthcoming.
Ariely, D., Bracha, A., Meier, S., 2009. Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. Am. Econ. Rev. 99 (1), 544–555.
Ashraf, N., Karlan, D., Yin, W., 2006. Tying odysseus to the mast: evidence from a commitment savings product in the Philippines. Quart. J. Econ. 121 (2), 635–672.
Augenblick, N., Niederle, M., Sprenger, C., 2015. Working over time: Dynamic inconsistency in real effort tasks. Quart. J. Econ. 130 (3), 1067–1115.
Bénabou, R., Tirole, J., 2006. Incentives and prosocial behavior. Am. Econ. Rev. 96 (5), 1652–1678.
Bénabou, R., Tirole, J., 2011. Identity, morals and taboos: Beliefs as Assets. Quart. J. Econ. 126 (2), 805–855.
Breman, A., 2011. Give more tomorrow: Two field experiments on altruism and intertemporal choice. J. Public Econ. 95 (11), 1349–1357.
Carrera, M., Royer, H., Stehr, M., Sydnor, J., Taubinsky, D., 2019. How are Preferences for Commitment Revealed? NBER Working Paper No. 26161.
Craig, Ashley C., Garbarino, Ellen, Heger, Stephanie A., Slonim, Robert, 2016. Waiting to give: stated and revealed preferences. Manage. Sci. 63 (11), 3672–3690.
Damgaard, M.T., Gravert, C., 2017. Now or never! The effect of deadlines on charitable giving: Evidence from two natural field experiments. J. Behav. Exp. Econ. 66, 78–87.
DellaVigna, S., List, J.A., Malmendier, U., 2012. Testing for altruism and social pressure in charitable giving. Quart. J. Econ. 127 (1), 1–56.
Dreber, A., Fudenberg, D., Levine, D.K., Rand, D.G., 2016. Self-Control, Social Preferences and the Effect of Delayed Payments. Working paper.
Ellingsen, T., Johannesson, M., Mollerstrom, J., Munkhammar, S., 2012. Social framing effects: Preferences or beliefs?. Games Econ. Behav. 76 (1), 117–130.
Ericson, K., Laibson, D., 2019. Intertemporal Choice. Handbook Behav. Econ. Appl. Found. 1 2, 1–67.
Exley, C.L., Naecker, J., 2017. Observability increases the demand for commitment devices. Manage. Sci. 63 (10), 3262–3267.
Feltovich, N., Harbaugh, R., To, T., 2002. Too cool for school? Signalling and countersignalling. RAND J. Econ., 630–649.
Filiz-Ozbay, E., Ozbay, E.Y., 2014. Effect of an audience in public goods provision. Exp. Econ. 17 (2), 200–214.
Frey, B., Meier, S., 2009. Social comparison and pro-social behavior: testing 'conditional cooperation' in a field experiment. Am. Econ. Rev. 94 (5), 1717–1722.
Giving USA, 2019. Leaving a Legacy: A New Look at Planned Giving Donors. Giving USA Special Report. The Giving Institute.
Grossman, Z., 2015. Self-signaling and social-signaling in giving. J. Econ. Behav. Org. 117, 26–39.
Huck, S., Rasul, I., 2010. Transactions costs in charitable giving: evidence from two field experiments, The B.E. J. Econ. Anal. Policy 10 (1) (Advances), Article 31.
Kessler, J., 2017. Announcements of Support and Public Good Provision. Am. Econ. Rev. 107 (12), 3760–3787.
Kessler, J., Kivimaki, H., Niederle, M., 2016. Generosity Over Time. Unpublished manuscript.
Kreps, D., 1979. A representation theorem for "Preference for Flexibility". Econometrica 47 (3), 565–577.
Kovarik, J., 2009. Giving it now or later: Altruism and discounting. Econ. Lett. 102 (3), 152–154.
Kolle, F., Wenner, L., 2018. Time-Inconsistent Generosity: Present Bias Across Individual and Social Contexts. Working paper.
Köszegi, B., Rabin, M., 2007. Reference-dependent risk attitudes. Am. Econ. Rev. 97 (4), 1047–1073.
Köszegi, B., Rabin, M., 2009. Reference-dependent consumption plans. Am. Econ. Rev. 99 (3), 909–936.
List, J.A., Shaikh, A.M., Xu, Y., 2016. Multiple Hypothesis Testing in Experimental Economics. NBER Working Paper 21875.
National Philanthropic Trust, 2019. 2019 Donor-Advised Fund Report.
NPSource, 2019. The Ultimate List Of Charitable Giving Statistics For 2018. From https://nonprofitssource.com/online-giving-statistics/.
Noor, J., Ren, L., 2011. Temptation and Social Preference. Unpublished manuscript.
Rand, D.G., Greene, J.D., Nowak, M.A., 2012. Spontaneous giving and calculated greed. Nature 489 (7416), 427–430.
Recalde, Maria P., Riedl, Arno, Vesterlund, Lise, 2018. Error-prone inference from response time: The case of intuitive generosity in public-good games. J. Public Econ. 160, 132–147.
Saito, K., 2015. Impure altruism and impure selfishness. J. Econ. Theory 158, 336–370.
Shang, J., Croson, R., 2009. A field experiment in charitable contribution: the impact of social information on the voluntary provision of public goods. Econ. J. 119, 1422–1439.
Tonin, M., Vlassopoulos, M., 2013. Experimental evidence of self-image concerns as motivation for giving. J. Econ. Behav. Org. 90, 19–27.
Young, A., 2019. Chanelling fisher: randomization tests and the statistical significance of seemingly significant experimental results. Quart. J. Econ. 134, 557–598.