Games and Economic Behavior 104 (2017) 24–42

Contents lists available at ScienceDirect

Games and Economic Behavior

www.elsevier.com/locate/geb

Mixed signals: Charity reporting when donations signal generosity and income ☆

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ARTICLE INFO

Article history:
Received 13 February 2014
Available online 21 March 2017

JEL classification:
C91
D01
D80
H41

Keywords:
Signaling in a multi-dimensional type space
Charitable donations
Status
Donation visibility

ABSTRACT

False inference may be drawn in asymmetric information environments where the type space is multi-dimensional and the analysis is restricted to only one of those dimensions. We demonstrate this by studying donation-visibility in a charitable-giving environment. Past studies show that donation-visibility increases giving and argue that this is consistent with donations signaling generosity or income and thereby improving donors' status. However, this explanation relies on status being one-dimensional, acquired from only one attribute: generosity or income. The response may differ when instead status is multi-dimensional, depending on both attributes. Donors who prefer to be perceived as poor-and-generous rather than rich-and-stingy may give less when donations are visible. Using an experiment we examine the effect of donation-visibility when donations can signal multiple attributes. Revealing concerns for both income- and generosity-status, we find, in contrast to the one-attribute setting, that donation-visibility does not increase giving when donations signal both attributes.

1. Introduction

Asymmetric information may result in costly signaling as individuals aim to reveal their productivity, individual characteristic, or the type of product offered for sale. If the cost of signaling is lower for the more desirable types then it may be possible to sustain a fully revealing equilibrium, where higher types choose a signaling action that is sufficiently costly to deter individuals of lower types from mimicking, and where the lowest type, while free to mimic higher types, choose not to do so because the signaling cost is too high. The classic signaling framework centers on settings where an action serves as a one-dimensional signal, however there are settings where an action serves as a multi-dimensional signal. Charitable giving is one example, and we use this context to demonstrate how inference on multi- and single-dimensional signaling can differ. In particular, we study the response to announcements of charitable donations and using this example, we show how false inference may be drawn when the relevant type space has multiple dimensions and the analysis is restricted to only one of those dimensions.

☆ We thank the editor and three reviewers for their very helpful comments. This paper grew out of an earlier project with Ori Heffetz. We are indebted to him for his insights and support in getting the project started, and thank him for his help in designing the experiment. The experimental study was funded by generous support from the NSF (grant SES-0963034 Vesterlund). The views expressed in this paper are solely those of the authors and not those of the Federal Reserve Bank of Boston or the Federal Reserve System. This study was approved by the IRB at the University of Pittsburgh.

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http://dx.doi.org/10.1016/j.geb.2017.03.001
0899-8256/

The signaling explanation of donation-visibility has been used to explain why some nonprofits publicly announce and recognize donors' contributions at the end of the campaign—such as in recognizing the donor's contribution in a newsletter, in a program for a funded event, or on a plaque commemorating the completion of a project.[1] The argument is that donation announcements at the end of a campaign allows individuals to signal personal attributes that society perceives as desirable. Announced donations therefore make it possible for donors to acquire status and change their "rank in relation to others" or "relative rank in a hierarchy of prestige."[2] The amount given may signal the individual's generosity (Hollander, 1990; Bénabou and Tirole, 2006) and/or professional success and wealth (Glazer and Konrad, 1996; Harbaugh, 1998a). We refer to the former as generosity-status and to the latter as income-status, and focus on income-status as resulting from a positive inference on attributes such as skills and ability rather than from income per se. With generosity- and income-status being desirable, the donor's status increases in the amount given, and ex-post announcements increase the incentive to give.

Indeed, past studies largely confirm that individuals give and volunteer more when observed.[3] However the literature on status acquisition only examines environments where donations signal a single attribute. Laboratory studies on donation-visibility have not varied income in the lab and thus secure that generosity-status is the only source of status. Theoretical modeling of status acquisition also emphasizes one-dimensional status. For example, in Glazer and Konrad (1996) individuals acquire status from the inference on wealth, and donations only signal income-status. With one source of status, generosity or income, status increases in the amount given and this added incentive helps explain why fundraisers benefit from announcing contributions at the completion of a fundraising campaign.

As an example of multi-dimensional signaling, we argue in this paper that past positive results on donation-visibility are sensitive to the assumption that donations only signal one desirable attribute. We demonstrate that donation-visibility may not increase giving when status depends on multiple attributes and donations are used to simultaneously draw inference on these attributes. We use a simple model to first demonstrate that donation-visibility can decrease giving in a multidimensional-status setting. As an example, we consider a situation that allows for both income- and generosity-status and where generosity is a function of the share of income given.[4] With donations signaling both income and generosity, there may be donation ranges where the amount donated simultaneously increases the assessment of the donor's income-status and decreases the assessment of the donor's generosity-status (i.e., share of income given). The effect of donation-visibility in such cases will depend on the relative weight attached to the two sources of status. For example individuals who prefer to be perceived as poor-and-generous rather than rich-and-stingy may give less when donations are announced.

To study the response to donation-visibility in a multi-dimensional status setting we then design an experiment where, in contrast to previous studies on donation-visibility, income differs across individuals. We rely on a two-stage design, where in the first stage participants solve math problems and earn income depending on their relative performance. With income being dependent on skill it reflects a desirable attribute and thus may endow those with high income with higher status. Specifically participants with above-median performance are referred to as the "Best Performers" and earn \$35, while the "Not Best Performers" earn \$15. The second stage introduces participants to a charity and asks them to donate part of their earnings. To identify concerns for income-status and generosity-status and to determine the response to donation-visibility, we rely on a 2×2 between-subject experimental design, varying both income- and donation-visibility. The emphasis is on determining for each performance group, high- or low-performers, how the distribution of contributions responds to treatment.

Our study reveals donation patterns consistent with concerns for both income- and generosity-status. Specifically, looking at the case when donations are not visible we find that income-visibility increases giving by high-performers and decreases

[1] The objective in this literature is not to understand why a particular announcement strategy is preferred over another, but rather to understand why at the end of a campaign there are benefits from announcing the donations that were made during the campaign. Announcements at the end of a one-time campaign are particularly intriguing as they cannot affect future donations. A different strand of the literature instead examines the advantage of announcing donations during the campaign (see e.g., Andreoni, 1998; Romano and Yildirim, 2001; Vesterlund, 2003). For some campaigns it may not be technically feasible to announce donations during the campaign, while others may announce donations both during and after the campaign.

[2] Definitions of status are taken from the Merriam Webster dictionary. Harbaugh (1998a) notes the cynical statement by George Bernard Shaw (1896) that "...a millionaire does not really care whether his money does good or not, provided he finds his conscience eased and his social status improved by giving it away..." Concerns for status have helped explain conspicuous consumption and prosocial behavior (for a review see Heffetz and Frank, 2011).

[3] Evidence that visibility increases giving is seen in Sell and Wilson (1991), Hoffman et al. (1994), Bohnet and Frey (1999), Gachter and Fehr (1999), Andreoni and Petrie (2004), Rege and Telle (2004), Filiz-Ozbay and Ozbay (2014), Samek and Sheremeta (2014), and Lacetera and Macis (2010). Studies on volunteering or exerting effort for charities document a similar effect (Ariely et al., 2009; Carpenter and Myers, 2010; and Zhang and Zhu, 2011). Similarly Funk (2010) finds a positive effect on voting. Related is also evidence that individuals opt not to make identifiable donations (Dana et al., 2007; Hamman et al., 2010; DellaVigna et al., 2012; Andreoni et al., 2012; Broberg et al., 2007; Andreoni and Bernheim, 2009; Lazear et al., 2012), or would pay to walk away from such decisions (Dana et al., 2006). Dufwenberg and Muren (2006) and Noussair and Tucker (2007) are exceptions to the finding that visibility increases giving, however they rely on participants that may acquire status from not giving rather than from giving (economics and/or mathematics majors). This is consistent with Duffy and Kornienko (2010) showing that giving depends on the ranking system. For a survey of the literature see Vesterlund (2006, 2016).

[4] While a particular donation may be seen as generous when made by someone who is poor, it may be seen as stingy when made by someone who is wealthy. The notion that generosity is measured as the share of income donated is widespread. For example, Luke 21:1–4 writes: "Jesus looked up and saw the rich putting their gifts into the offering box, and he saw a poor widow put in two small copper coins. And he said, 'Truly, I tell you, this poor widow has put in more than all of them. For they all contributed out of their abundance, but she out of her poverty put in all she had to live on.' Both the Bible and the Koran refer to the percentage of income or wealth donated when providing guidelines on how much to give (see e.g., "How Much to Donate? God Knows," http://www.nytimes.com/2010/05/01/your-money/01money.html?_r=0).

it by low-performers. With this evidence that income-status affects donations, we examine the role of generosity-status by looking at how low-performers respond to income-visibility when instead donations are visible. With donations known we do not find that income-visibility decreases giving by low performers. That is, the response to income-visibility depends on whether donations are or are not visible. This sensitivity to donation-visibility is consistent with individuals being concerned not only about their relative performance rank, but also about their relative generosity rank.

In a setting where individuals care both about income- and generosity-status, and donations serve as a signal of both, it need not be the case that donation-visibility increases giving. Indeed we do not confirm the standard result that donation-visibility increases giving. As anticipated this finding is largely driven by low-performers who, absent income-visibility, respond to donation-visibility by decreasing and pooling their contributions at a level that is less likely to be falsely attributed to someone with high income. While donation-visibility alone causes donations to be concentrated at a low level, we find instead that donations are dispersed when donations as well as income are visible. This suggests that when income is not visible donation-visibility may cause individuals to decrease their donation so as to be perceived as poor-and-generous.

Our study shows that by looking at environments with one source of status one may falsely infer a positive effect of donation-visibility that may not result in environments where there are multiple sources of status. The important implication of this finding is that similar false inference can result in other multi-dimensional signaling environments where the analysis is restricted to only one dimension.

The remainder of the paper proceeds as follows: in section 2 we present as an example a simple model of status and demonstrate the main argument of the paper; in section 3 we present our experimental design and explain what pattern of contributions are expected by participants who are motivated by income- and generosity-status. A description of the experimental implementation is provided in section 4, the experimental results in section 5, and robustness checks in section 6. Finally, we conclude in section 7.

2. A simple model of status

In explaining why donation-visibility can increase giving, the literature has relied on the following simple argument: individuals care about status, and donations can help increase personal status either by increasing the assessment of income or generosity. With donations increasing status, donation-visibility increases the return to giving and thus overall giving.

We take this idea a step further, and examine the effect of donation-visibility in an environment where status arises from multiple attributes and donations simultaneously serve as a signal of these attributes. In contrast to past studies where status is one-dimensional and donations serve as a signal of either income or generosity, we examine an environment where status depends both on the individual's income and generosity.[5] We argue that donation-visibility may backfire in such multi-dimensional settings because donations need not increase status. In particular, for a range of donations it is possible that a higher donation both increases the assessment of the donor's income and simultaneously decreases the assessment of her generosity.[6] Depending on the weight attached to these two types of assessments, it is possible that status is higher for someone who is perceived as poor-and-generous rather than rich-and-stingy. Absent status monotonicity donation-visibility may decrease rather than increase giving.[7]

To demonstrate how donation-visibility can affect charitable giving, consider a simple example where an individual, i, allocates her income, w_i, between consumption of a private good and a donation, d_i, to charity. Donations generate both warm-glow $v_i(d_i)$ (Andreoni, 1989, 1990) and status, $s_i(d_i)$; assuming separability and that status has consumption value (e.g., Frank, 1985) secures a utility function $\Psi_i(\cdot)$ of the following form: $\Psi_i(d_i) = U_i(w_i - d_i + s_i(d_i)) + v_i(d_i)$, where $U_i(\cdot)$ is the individual's utility from consumption and both $U_i(\cdot)$ and $v_i(\cdot)$ are assumed to be strictly increasing concave functions.[8]

The individual's optimal donation, d_i^*, is determined by the first-order condition $v_i'(d_i^*) = U_i'(w_i - d_i^* + s_i(d_i^*))(1 - s_i'(d_i^*))$, which highlights two channels through which status influences giving: status stock, $s_i(d_i)$, and the marginal return from status acquisition, $s_i'(d_i)$.[9] The marginal cost of giving decreases with status stock, as it lowers the marginal utility of consumption, and decreases with the return from status acquisition.

This simple model captures the predictions of a classic one-dimensional status-acquisition model, where the amount given signals either generosity or income, but not both. In that case, all else equal, status ($s(d_i)$) increases in donations and this positive status return $s_i'(d_i)$ introduces an additional motive for giving. Past experimental work on donation-visibility has centered on testing this comparative-static prediction when income is constant and homogeneous, thus ensuring that a larger donation only can signal greater generosity (e.g., Andreoni and Petrie, 2004; List et al., 2004; Rege and Telle, 2004; Burnham and Hare, 2007; Andreoni and Bernheim, 2009).

[5] Income-status is examined in Glazer and Konrad (1996), Harbaugh (1998a, 1998b), Ireland (1994). Generosity-status is examined in Bénabou and Tirole (2006), Conley and Kung (2010), Ellingsen and Johannesson (2008, 2011).

[6] Suppose that generosity-status is increasing in the share of income contributed. If a larger donation results in a disproportionate increase in the assessment of the individual's income, then a larger donation may decrease the assessment of the individual's generosity, e.g., generosity-status may be given by the share of (expected) income relative to some donation norm, $\propto$, e.g., $[\frac{d_i}{E(w_i|d_i)} - \propto]$.

[7] While the rank of wealthy-and-generous may be preferred, the individual may see it as too costly or impossible to secure such a perception.

[8] Later we show that the status-as-consumption assumption is consistent with the behavior seen in our experimental study.

[9] For an interior solution we assume that $lim_{d_i \to 0} \Psi_i' = \infty$ and $lim_{d_i \to w_i} \Psi_i' = -\infty$. Hence status return is always less than one ($s'(d_i) < 1$).

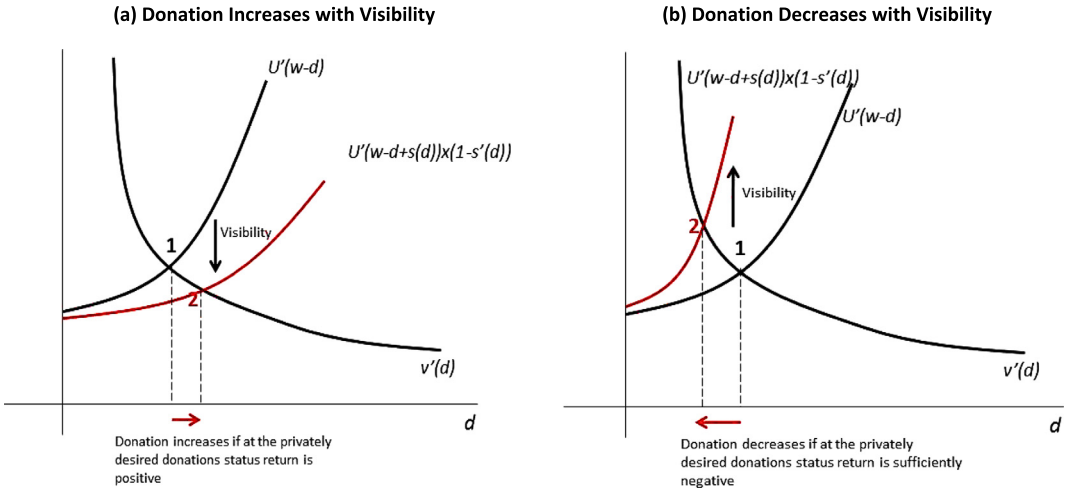

Fig. 1. Donation-visibility effect.

Status return may however be negative, when instead status is multi-dimensional and donations signal multiple attributes that interact with one another. Absent status monotonicity, donation-visibility can result in lower contributions.[10] Fig. 1 illustrates these two cases graphically, assuming that status stock is zero absent visibility and positive when positive donations are observed. Donations are shown on the horizontal axis, and the two curves—in panels (a) and (b)—show (i) the diminishing marginal warm glow ($v_i'(\cdot)$), and (ii) the increasing marginal utility of consumption ($U_i'(\cdot)$). The marginal warm glow captures the marginal benefit of an additional donation, while the marginal utility of consumption represents the cost of making such a donation. In both panels the point marked as point "1" shows the individual's optimal donation level when donations are nonvisible, i.e., the "privately desired donation level". Fig. 1 panel (a) illustrates the effect of donation-visibility when status return is positive, $s_i'(d_i) > 0$. With visible donations, an extra dollar donation not only decreases consumption, it also increases status. Thus donation-visibility decreases the marginal cost of a donation and shifts down the curve representing the marginal utility of consumption. Hence, for any given donation level, donation-visibility reduces the cost of giving. The end result is higher donations, marked in panel (a) as point "2". Panel (b), in contrast, illustrates a case where status return is negative and status decreases with donations, $s_i'(d_i) < 0$. In that case, even though revealing the privately-desired donation level yields a positive status stock (by assumption), the negative status return could increase the cost of giving thus shifting upward the marginal utility of consumption. This shift occurs because with donation-visibility a one dollar increase in giving not only reduces consumption but also *decreases* status, thus increasing the cost of giving. The resulting lower donation is illustrated by point "2" in panel (b).

3. Experimental design and comparative statics

To examine the effect of donation-visibility when donations can signal both income and generosity, we conduct a laboratory experiment consisting of two stages. In the first stage, participants perform a task to secure income and in the second stage they are given the option to donate part of that income. To understand the effect of visibility we rely on a 2×2 between-subject design, varying the visibility of both income and donation.

To confer status and a ranking in a social hierarchy, we wanted to study an environment where it is common knowledge who takes the action and who observes the individual taking the action. On one hand, the ability to signal status depends on the individual taking the action being observed; on the other hand, the desire to engage in costly signaling depends on the individual taking the action knowing who will draw inference on her status. For instance, driving a BMW in a typical middle class neighborhood would result in different status inference than when driving it in a high income area. To study the role of status, we opted for a setting where participants were seated in clusters of six in a manner that ensured easy identification of the other group members, and thus facilitated simultaneous identification of those taking and observing behavior.

To examine a setting where the individual's income is reflective of her ability and thus of a desirable attribute, we selected a two-stage design where income varies with the individual's performance. In the first stage participants are asked to perform a math task, and told that their performance compensation depends on the number of problems the participant solves relative to the other group members. The three participants with the highest performance earn $35 each and are referred to as a "Best Performer," and the three participants with the lowest performance earn $15 each and are referred to

[10] While in our example the overall assessment of status is one-dimensional the non-monotonicity results from the inference on generosity- and income-status not generally being positively correlated.

Table 1
2×2 experimental design.

	Nonvisible-income	Visible-income
Nonvisible-donation	DV = 0, IV = 0	DV = 0, IV = 1
Visible-donation	DV = 1, IV = 0	DV = 1, IV = 1

as a "Not Best Performer." Upon completion of the first stage, the participants are notified of their income, and depending on treatment given information on the other group members' income. In the nonvisible-income treatments participants know only their own income and the overall income distribution ($35, $35, $35, $15, $15, $15). In the visible-income treatments they are also informed of each of the other group members' specific income.

The second stage of the experiment offers participants the opportunity to contribute to a charity. Depending on the treatment, the individual's donation may or may not be revealed to the other group members. In the nonvisible-donation treatments participants only know their own donation. In the visible-donation treatments the participants are also told what amount each of the other group members donated. This information is provided after all donation decisions have been made.

Besides the variation in income- and donation-visibility, all other procedures are held constant across treatments. Participants are fully aware of the information structure in their treatment. That is, prior to taking any actions they know whether others will or will not observe their income and/or their donation. Table 1 summarizes the experimental design.

This design allows us to determine whether income- and generosity-status influence giving in this environment and to ask the main question of interest: will donation-visibility increase giving when donations serve as signals of both income- and generosity-status?

Income-status

Evidence of income-status considerations in this environment can be seen by examining the effect of income-visibility when donations are not visible.[11] Absent donation-visibility, income-visibility endows high-performers with high (income) status while endowing low-performers with low (income) status.[12] Hence, if income-status affects giving, then income-visibility (holding donations nonvisible) should increase giving by high-performers and decrease giving by low-performers. That is, we expect income visibility to have a differential effect on high- and low-performers.

Generosity-status

Evidence of generosity-status can be seen by comparing the effect of income-visibility on low-performers' giving when donations are and are not visible. Concern for generosity-status is predicted to attenuate the negative response to income-visibility by low-performers. This is because generosity and income-status act in opposite directions for low-performers. On one hand, revealing the income of the low-performers endows them with negative income-status, which decreases giving.[13] On the other hand, revealing the income of the low-performers makes every dollar they visibly donate seem more generous, and this in turn increases the incentive to give. As a result evidence that low-performers have an attenuated response to income-visibility when donations are visible is consistent with generosity-status concerns influencing giving.

Generosity-status cannot be assessed by examining the analogous response by high-performers to income-visibility. This can be seen by reviewing the opposing effects that result from income-visibility for high-performers when donations are initially observable. Assume for example that individual's only care about income-status, then income-visibility has two opposing effects: while it endows high-performers with high income status, it eliminates the positive (income) status return the individual aimed to acquire by making a sufficiently large contribution. The former increases the incentive to give, while the latter decreases it. If generosity-status concerns also exist, income visibility would again have two opposing factors. Revealing high-performers' income makes a donation seem less generous and this reduces the incentive to give. Yet, if generosity-status exists, then status may be improved by giving more since (generosity) status return is not eliminated by income-visibility. Hence, it is not possible to determine for high-performers how the response to income-visibility varies with donation-visibility, and thus not possible to identify generosity status from high-performers.[14]

[11] Recall that we refer to income-status as signaling attributes such as skills and ability, rather than income per se.

[12] Income visibility may endow donors with income status also when donations are visible; however for a clear test of income status we focus on the case of nonvisible donations only. To demonstrate the effect of negative status return in Fig. 1 we assume that status stock is positive when donations are visible and zero otherwise. In the experimental set up, however, donation- and income-visibility may affect status stock either positively or negatively.

[13] In fact, if only income-status affects behavior, then the negative effect of income-visibility on low-performers' giving is predicted to be largest (most negative) when donations are visible. The reason is that with visible donations income-visibility both endows low-performers with low income-status stock—as is the case when donations are nonvisible—and it eliminates the (positive) status return existing when donations are visible and income is not, thus further decreasing the incentive to give.

[14] It is also not possible to examine generosity-status by looking at the effect of donation-visibility when income is visible. Without knowing the generosity norm it is unclear how status stock changes in response to donation-visibility. The revelation of a high-performer's low donation may result in an assessment that the donor is stingy and this may reduce status stock to the extent that, in spite of positive status return, donation-visibility does not increase donations.

4. Experimental details

To shed light on the effect of donation-visibility in a multisource-status environment we designed our experiment to fulfill several criteria. First, as noted earlier we wanted an environment where participants in a group were able to identify each other, and in some treatments were able to determine the income and donations made by other group members. Second, we wanted a performance task where individuals cared about their relative performance so that signaling income conferred status. And third, we wanted to study donations to an organization that was perceived as desirable in the sense that donations could be used to signal both generosity and income. Below we first explain how our experimental design aimed to meet these criteria, and then how we implemented the study.

4.1. Meeting the design criteria

To be able to recognize other group members, individuals were seated in groups of six. There were four such groups, denoted A through D, in each session. Members of each group were seated in a cluster of cubicles, with three facing the other three. Individuals were identified by ID numbers (1 through 6), which were posted in front of each individual's cubicle. Both the ID number and the individual were visible to other group members during the session. However, the individual computer screen was only visible to the individual. Depending on treatment, the computer monitor displayed information on individual income and on donations, referring to individuals by their ID number. For example, for the visible-income treatments, the individual screens displayed a list of the six ID numbers along with information on each group member's income and performance rank (Best or Not Best Performer). The information was shown before they were asked to make a donation. In the donation-visibility treatments, each group member's ID number and donation amount were displayed on all six screens after donations were made.

To secure an environment where individuals care about their relative performance ranking and want to signal this ranking to others, we gave participants ten minutes to correctly find the sum of as many sets of five-two-digit numbers as possible. When given five minutes to solve such problems, Niederle and Vesterlund (2007) found that participants exerted substantial effort, and that the vast majority thought that their performance exceeded that of other group members. Furthermore, performance on the 'adding-up-five-two-digit-number' task has been shown to be insensitive to incentives. In particular the intrinsic motivation associated with securing a high performance appears to push people to exert maximum effort independent of incentives (Eckartz, 2014). We see this as evidence that individuals care about their relative performance on the task. In doubling the length of the task we hoped to strengthen the perceived association between performance and the participant's ability.

To have a giving environment where donations are considered worthy and desirable, and where donations may be affected by status concerns, we examine giving to an actual charity rather than to an experimentally generated public good. To limit the possibility that the incentive to free-ride varies across treatments we used the "individualized-charity" approach introduced by Ottoni-Wilhelm et al. (2016). Specifically each participant was paired with a child between 1 and 12 years of age whose house has suffered extensive fire damage. Participants were asked to contribute funds to purchase books for the child they were paired with.[15] They were informed that these books would be delivered by the American Red Cross of Southwestern Pennsylvania when they arrive to assist the family at the scene of the fire. Participants were told that these books would help the child cope with the disaster, and that neither the American Red Cross nor any other donor provides books to the affected children at this critical point in time. Participants were informed that this one-participant–one-recipient matching meant that a participant could not rely on the donations being made by others: if the participant did not make a donation, the child would not get any books.

4.2. Experimental procedures

The experiment was conducted at the Pittsburgh Experimental Economics Laboratory (PEEL) at the University of Pittsburgh. Two sessions were conducted for each of the four treatments (8 sessions in total).[16] Twenty-four undergraduate students participated in each session. With 8 groups per treatment we had a total of 32 groups or 192 participants. 45 percent of the participants were male, and their age ranged from 18 to 24, with the mean age being 19.6.[17]

[15] Thus the child's designated gift was independent of what other participants donated to their designated child. At the request of the American Red Cross, the experimenters handled the purchase of books. For each participant in the experiment we ordered books of values corresponding to the amount donated and packaged the purchased books in an individual gift bag. The American Red Cross of Southwestern Pennsylvania distributed one bag to each child affected by the fire. Participants were encouraged to help pack the individual gifts and could receive a gift receipt from the Red Cross for the gift they made to the child.

[16] Randomization was done at the session level—all participants in a session were under the same experimental condition. The first condition we started with was determined randomly; then we proceeded with the other conditions (order was random) to complete one set of all treatments. We repeated this procedure for the second set of all treatments, to complete two sessions per treatment. Seeing common knowledge as essential in our signaling environment, we opted not to randomize within session.

[17] When assigning individuals to groups, balanced gender composition was an objective. Of the 32 groups, 19 groups had balanced gender composition (3 women and 3 men), 10 groups had 2 women and 4 men, 2 groups had 4 women and 2 men, and 1 group had 1 woman and 5 men. Our regression analysis controls for gender and gender composition.

A session proceeded as follows. First, instructions were distributed and read aloud, providing time for participants to ask questions in private. The instructions explained the session procedure, the identifier system, what information participants would receive during the study, and who the recipients would be. The participants were informed that books would be purchased for an amount equal to the amount donated. To assure the participants that donations would reach the intended recipients, they were given two forms they could fill out at the end of the study—one requesting a donation receipt from the American Red Cross and another to indicate whether the participant wished to help package the books. The two forms were distributed along with the instructions and were collected at the end of the experiment.

Once the instructions had been read, the experimenter asked the participants, one group at a time, to silently stand up to better see the other members of their group. The experimenter reminded participants of the identification system by noting that each of the groups had its own letter, and that the individual identifier numbers at each computer station corresponded to the participant sitting at that station. A few concrete examples of the identification numbers were given in each group.

The ten-minute computerized addition task began after the members of each group were reseated. Participants could use paper and pencil to solve the problems, but were not allowed to use calculators or any other electronic devices. During the addition task the time remaining was projected on a big screen in the lab. The experiment was programmed and conducted using the software z-Tree (Fischbacher, 2007). When the ten minutes for the addition task were over, a buzzer sounded and the participants had to stop solving problems. Each individual was then informed on her screen whether s/he was "a Best Performer" and earned $35, or "not a Best Performer" and earned $15. To ensure that information on the income distribution was held constant across treatments we reminded the participants that there were three "Best Performers" who earned $35 and three "not Best Performers" who earned $15. In the nonvisible-income treatments participants were given no information on who was in which category. In the visible-income treatments, the ID numbers of the three "Best Performers" and three "not Best Performers" were clearly displayed on the participants' screens.

Having received the relevant income information, each participant was then asked how much s/he wanted to donate to the child with whom s/he was matched. Donations could be made in increments of $5 (i.e., $0, $5, $10, and so on) and were not allowed to exceed the participant's earnings from the performance task. Following the donation decision, participants were asked a few questions, some of which elicited their beliefs regarding the other group members' donations. Two questions were incentivized and could increase an individual's earnings by at most $2. Participants in the visible-donation treatments were then provided with a list reporting the amount each group member donated (including zeros). This step was omitted in the nonvisible-donation treatments.

Finally, in all four treatments, a summary page listed the participant's own total earning, donation amount, and net earnings as the difference between the two. Including the incentivized-belief questions, the average individual earning from the study, net of donation, was $19.90, plus an additional $6 show-up fee.

5. Results

In examining the results we first report on the performance and overall donations. We then examine the response to treatment. Of particular interest is whether we find evidence consistent with concerns for both income- and generosity-status and whether a positive response to donation-visibility generally extends to environments where donations may signal both generosity and income.

5.1. Performance and giving

The participants in our study exerted substantial effort during the 10-minute addition task. Fig. 2 panel (a) shows the distribution of the number of correctly solved problems for the pooled sample. The median and average number of correctly solved problems were 21 and 21.39 (std. err. 0.473), respectively.[18] These performance levels suggest that participants were motivated to achieve a high performance on the task. The number of problems solved naturally differed between the two performance ranks. The median and mean performances were 24 and 25.55 (std. err. 0.568) for "Best Performers," and 18 and 17.22 (std. err. 0.459) for "Not Best Performers."

The individualized charity appeared to be one that participants generally cared about. 70.3 percent of participants contributed at least $5. Fig. 2 panel (b) shows the distribution of donations for the pooled sample. The modal and median contributions were both $5, and the average contribution was $6.04 (std. err. 0.464). As expected, participants with higher incomes contributed more. The average contribution was $8.49 (std. err. 0.759) for "Best Performers" and was $3.59 (std. err. 0.403) for "Not Best Performers". Interestingly the two performance groups contributed on average the same share of income. The differences in giving, however, are not reflected in the median contributions, which was $5 for both the "Best Performers" and for the "Not Best Performers."

Average contribution also differs by treatment. Fig. 3 summarizes the results by treatment and performance category. Looking at the response to donation-visibility (DV = 0 to DV = 1) we find that, in contrast to previous studies, donation-

[18] The average number of correctly solved problems did not differ significantly by treatment. Comparing any two treatments, the smallest mean difference in performance was 0.125 and the largest was 1.708. The p-values of two-sided t-tests ranged between $p = 0.25$ and $p = 0.92$.

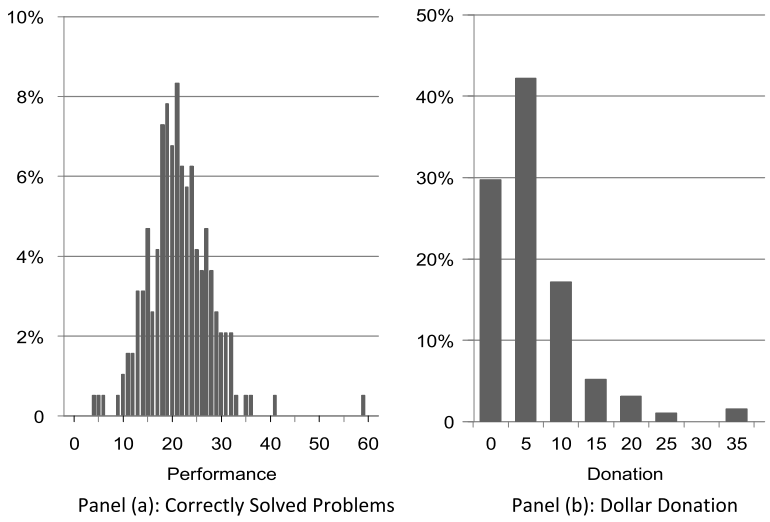

Fig. 2. Distribution of performance and donation ($n = 192$).

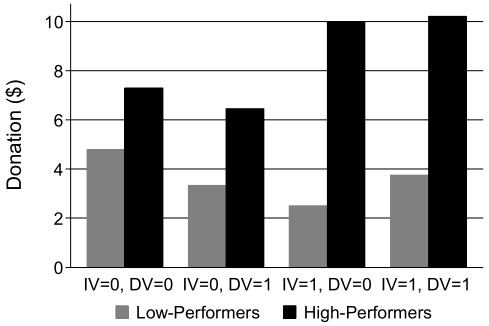

Fig. 3. Average donations by condition and by performance rank.

visibility does not generally increase giving. If anything giving by high- and low-performers decreases with donation-visibility when income is nonvisible (IV = 0), while it increases somewhat with donation-visibility when income is visible (IV = 1).

This response to donation visibility is consistent with the signaling argument of this paper: when donations are used to infer both income and generosity, donation-visibility may lead to lower contributions. That is, contributions may decrease when moving from the treatment with IV = 0 and DV = 0 to the treatment with IV = 0 and DV = 1. To argue that multi-dimensional signaling contributes to this response we begin by examining whether behavior is consistent with participants being concerned both about income- and generosity-status.

5.2. Income-status, generosity-status, and overall effect

In examining the evidence on income and generosity status we first characterize the overall pattern of contributions in response to treatment. We then assess the statistical significance of this response in Table 2 where we properly control for group composition, etc.[19]

Examining the effect of income-visibility while donations are nonvisible is key to determining whether behavior is consistent with income-status concerns. Comparing the first set to the third set of columns in Fig. 3 we see that, holding donations nonvisible, income-visibility (IV = 0 to IV = 1) decreases mean giving by low-performers from \$4.80 to \$2.50 and increases it for high-performers from \$7.30 to \$10. Fig. 4 presents the effect income-visibility has on the distribution of contributions when donations are nonvisible. Although income-visibility has no effect on the participant's choice set, we find that income-visibility shifts the contribution distribution to the left for low-performers and shifts it to the right for high-performers. This response to income visibility is consistent with income-status concerns.

Next we examine whether the pattern of contributions is consistent with generosity status concerns. Fig. 3 suggests that the response to income-visibility by low-performers depends on whether donations are or are not visible. When donations

[19] On reviewer request we limit statistical inference to our central regression analysis.

Table 2
Contributions analysis by performance level[+].

	Low-performers ($n = 96$)		High-performers ($n = 96$)	
	Ordered probit	OLS	Ordered probit	OLS
Income-visible	−0.708**	−2.638*	0.706*	3.291
	(0.359)	(1.381)	(0.412)	(2.853)
Donation-visible	−0.454	−2.041	0.287	1.040
	(0.427)	(1.623)	(0.354)	(2.392)
Income- & donation-visible	0.851*	3.308*	−0.249	−0.831
	(0.484)	(1.771)	(0.481)	(3.347)
Constant		13.935**		34.692**
		(6.784)		(16.054)

[+]Standard errors are in parenthesis, clustered by group. (*) indicates significance at the 10% level, and (**) indicates significance at the 5% level. All the regressions include controls for gender, percent of females in the group, the interaction of (gender X percent females in the group), and age.

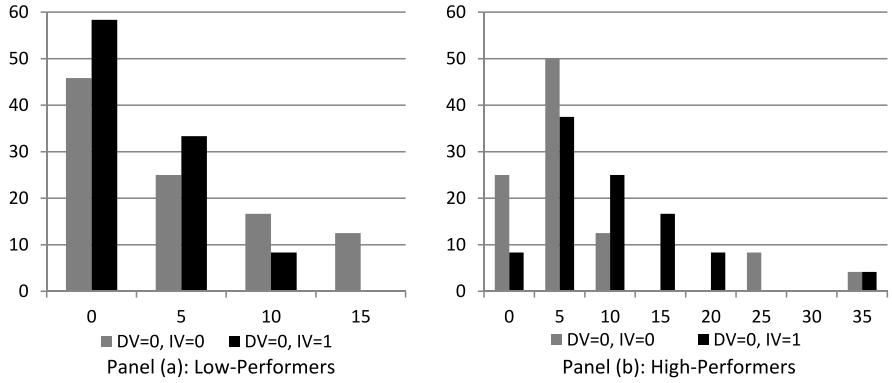

Fig. 4. Contribution distribution with nonvisible and visible income holding donations nonvisible.

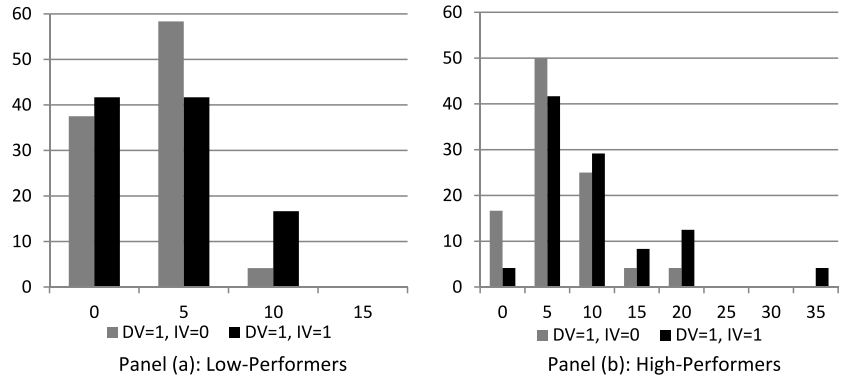

Fig. 5. Contribution distribution with nonvisible and visible income, holding donations visible.

are not visible, income-visibility decreases low-performers' mean donations from \$4.80 to \$2.50. When instead donations are visible the response to income-visibility is slightly positive (increasing from \$3.33 to \$3.75). This increase in donations stands in contrast to the negative effect income-visibility has on low-performers when donations are nonvisible, and is consistent with generosity status concerns. Absent generosity status we would expect income-visibility to decrease giving.

Fig. 5 presents the effect of income-visibility on the distribution of giving when donations are visible. Panel (a) demonstrates the effect on giving by low-performers, and panel (b) presents the effect on giving by high-performers. While only the response by low-performers allows us to examine evidence of generosity-status we show the results for high-performers for completeness. With the decrease in giving by low-performers in Fig. 4 panel (a) being consistent with income-status concerns, we see in Fig. 5 panel (a) that income visibility shifts the contribution distribution to the right when donations are visible. This differential response to income-visibility by low-performers, when donations are visible versus nonvisible, is consistent with generosity-status concerns. For high-performers we continue to see that income-visibility increases donations, from \$6.45 to \$10.20; however as noted above we cannot use this response to infer whether generosity-status does

or does not affect behavior. Roughly speaking, income visibility could endow the high-performers with high income-status and low generosity-status causing them to be seen as rich and stingy.[20]

To statistically assess the evidence on income and generosity status we must take into account the form of signaling that may occur in our environment. Each contribution level likely results in different inference on types. For example, consider the inference on whether a donation is made by a high-performer. Certainly all contributions in excess of \$15 will reveal the donor as being a high-performer, but even smaller contributions can be indicative of the donor being a high-performer. While a low-performer is free to donate \$10 and \$15, such a high donation amount may be seen as too costly for a low-performer and thus be judged as more likely to be made by a high-performer. Hence increasing donation from \$0 to \$5 may be fundamentally different, in terms of income-status inference, from increasing donation from \$5 to \$10, or from \$10 to \$15. That is, in this signaling environment donations are inherently ordinal. We therefore use an Ordered Probit to account for this ordinal nature and to recognize the possibility of signaling.[21] Regressing the donation level on treatment dummies—income-visible, donation-visible, and their interaction—Table 2 presents the results. We report the results separately for low- and high-performers, given their expected differential reaction to treatment. We also report results from the corresponding OLS.

As noted above the response by high-performers can only attest to income-status concerns. Table 2 shows that income-visibility, and thus the revelation that these individuals are high-performers, increases individual donations (although the effect is only significant in the ordered probit). For low-performers, we find instead that income-visibility, and thus the revelation that these individuals are low-performers, decreases individual donations when donations are nonvisible.[22]

As evidence of generosity status this response to income-visibility by low-performers is however attenuated when donations are visible—see the positive interaction term of income-visibility and donation-visibility. Taken together, the pattern of response by low-performers to income-visibility when donations are and are not visible and the response of high-performers to income-visibility are consistent with the existence of both income- and generosity-status.

The results in Table 2 also shed light on the main question of this paper—does a positive response to donation-visibility generally extend to environments where donations may signal both generosity and income? The coefficient on "donation-visible" indicates no positive effect of donations-visibility on giving, in contrast to existing findings in the literature. This lack of response can be explored by directly examining signaling in our study.

5.3. Signaling

The results thus far indicate that behavior is affected by both income- and generosity-status concerns. Finding, in addition, no positive effect of donation-visibility on giving when income is nonvisible is consistent with donation-visibility having an ambiguous effect on giving when donations serve as a multidimensional status signal. As seen in our simple model (Section 2), when donations signal both income and generosity, low performers may prefer to give a small amount and be perceived as poor-and-generous, rather than to give a moderate amount and be perceived as rich-and-stingy.[23] We can examine this possibility by reviewing how the distribution of low-performers' donations responds to donation-visibility when income-visibility varies. In particular, if low performers care about status and are concerned that they will be perceived as rich-and-stingy, then donation visibility may cause them to decrease donations to signal that they are instead poor-and-generous. That is when income is not visible, we may expect donation-visibility to result in the donations by low performers to contract around a low donation level.

Fig. 6 panel (a) illustrates the effect of donation-visibility when income is nonvisible. It shows how with donation-visibility contributions by low-performers contract around a \$5 contribution. This contraction is also seen in the standard deviation of the contribution distribution which decreases from 5.41 to 2.82 (F-test, $p = 0.003$; test power is 0.863). Markedly the likelihood of a \$5-contribution significantly increases (from 25% to 58.3%) with the increased frequency of \$5-contributions stemming both from a decrease in the number of non-contributors and from a decrease in the number of participants who give more than \$5. The decrease in large contributions is consistent with low-performers selecting a contribution that is less likely to be attributed to a high-performer, and preferring that others perceive them as poor-and-generous rather than as rich-and-stingy.[24] This is supported by a belief-elicitation survey we conducted at the end of the

[20] Income-visibility not only affects status stock (increasing income-status and reducing generosity-status), but also affects status returns. While income-visibility eliminates the positive income-status return, it makes generosity-status return positive. That is, the marginal incentive to give more is on one hand reduced since an increased donation does not signal higher income anymore, yet on the other hand, the marginal incentive to give is increased as a higher donation now signals greater generosity.

[21] Indeed, we find (by analyzing elicited beliefs) that contributions of \$0 or \$5 are viewed as most likely to be made by low performers while contributions of \$10 and \$15 are judged more likely to be made by high performers. That is, while the dollar-difference between making \$0 or \$5 contribution, a \$5 or \$10 contribution, or a \$10 to \$15 contribution is the same, in our signaling setting the inference depends greatly on whether the \$5 increase is from an initial contribution \$0, \$5 or \$10.

[22] Given the ordinal nature of donations in our signaling model we use an Ordered Probit to examine the response to treatment. Regressing donation level on dummies for being a high-performer and having visible income, and their interaction, we find that the response to income visibility differs significantly between high- and low-performers ($p = 0.01$).

[23] This follows from the model where income inference is monotonic in giving, but the share of giving (generosity) may decline with income. This is also confirmed in the data where we find in a belief elicitation survey that income inference is indeed monotonic in giving.

[24] With donations visible and income nonvisible the likelihood that a \$5 contribution is made by a low-performer is 58.33%, while the likelihood that a contribution of \$10 or \$15 is made by a low-performer is merely 4.17%.

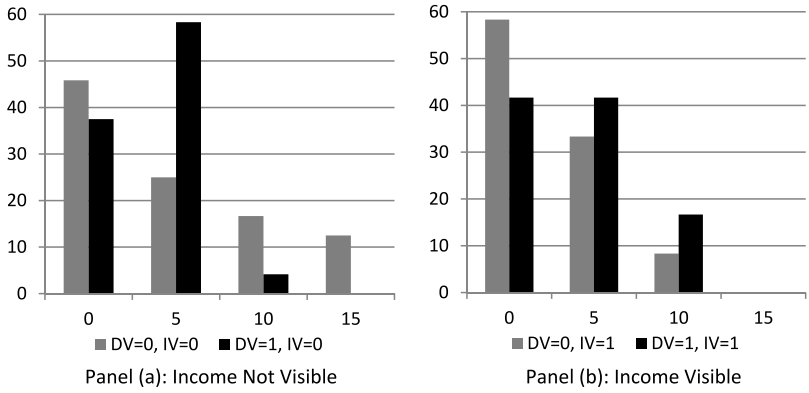

Fig. 6. Low-performers' contribution distribution with nonvisible and visible donations.

Table 3
Probability of giving more than \$5[+].

	Low-performers ($n = 96$)		High-performers ($n = 96$)	
	Probit marginal effect	OLS	Probit marginal effect	OLS
Income-visible	−0.226***	−0.256**	0.333***	0.340**
	(0.078)	(0.106)	(0.137)	(0.150)
Donation-visible	−0.315***	−0.327***	0.233*	0.225*
	(0.092)	(0.117)	(0.134)	(0.132)
Income- & donation-visible	0.435***	0.413***	−0.215	−0.225
	(0.163)	(0.138)	(0.197)	(0.206)
Constant		1.962***		1.508
		(0.637)		(0.996)

[+]Standard errors are in parenthesis, clustered by group. (*) indicates significance at the 10% level, (**) indicates significance at the 5% level, and (***) indicates significance at the 1% level. The coefficient and standard error on the interaction terms is corrected to account for the nonlinear nature of the estimation. All the regressions include controls for gender, percent of females in the group, the interaction of (gender X percent females in the group), and age.

study and before participants were given any information on income and/or giving. In that survey, subjects predicted the six contributions by low- and high-performing members of their group. We find that to the extent participants expect a \$0 or \$5 contribution, they see it as most likely that these low contributions were given by low-performers. However, to the extent participants expected contributions of \$10 and \$15, they see it as most likely that these contributions were made by high-performers.

Shifting to Fig. 6 panel (b), it is clear that the response to donation-visibility is substantially different when income is visible compared to when income is nonvisible (examining the response to donation visibility in panel (a) vs. the response in panel (b)). In this case low-performers need not worry that a high contribution will be interpreted as anything other than a generous act, and donation-visibility shifts the distribution to the right. Rather than the decrease in variance found with nonvisible income, we see that donation-visibility has no significant effect when income is visible (increasing the standard deviation from 3.30 to 3.69, F-test $p = 0.597$).

Consistent with signaling, Fig. 6 shows bunching at a particular contribution (\$5) when income is not visible and donations are visible. Panel (a), along with the elicited beliefs, suggest that giving in excess of the \$5 (endogenously selected) contribution is central to drawing inference on the individual being a high-performer. This suggests that we can assess the signaling response to treatment by examining the likelihood of seeing donations in excess of \$5. Table 3 reports Probit and OLS regressions of giving more than \$5 on treatment dummies and their interaction. The results mirror our other findings. Looking at the first two columns we see for low-performers that, consistent with signaling, donation-visibility makes contributions in excess of \$5 less likely when income is not visible. The interaction between income-visibility and donation-visibility, however, reveals that the response to donation-visibility is significantly different when income is visible. In sharp contrast, when income is known, donation-visibility causes an insignificant increase in the likelihood that low-performers give more than \$5.[25]

Looking at the last two columns of Table 3 we see the response by high-performers. Consistent with the income-status hypotheses, income-visibility increases the likelihood that high-performers give more than \$5. When income is not visible

[25] Testing the joint hypothesis that the sum of the coefficients on donation-visible and on the interaction term equals zero yields $\chi^2(1) = 1.79$; $p = 0.18$. Within the two-source status model the effect of donation-visibility need not be positive when income is observed. This is because status stock may decrease when the privately-desired donation is made visible. While donation-visibility leads to an unambiguously positive status return when income is visible, the overall effect of donation-visibility may be negative provided a sufficiently large decrease in status stock.

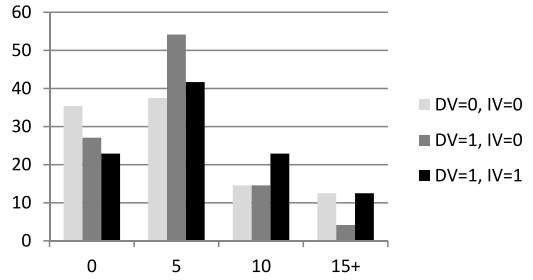

Fig. 7. Response to donation visibility: aggregate contribution distribution—pooled sample.

the effect of donation-visibility on the likelihood that high-performers give more than \$5 is positive (but insignificant in the probit regression; $p = 0.101$).

While the \$5 cutoff was selected ex-post, it is important to keep in mind that signals in environments such as the one we study arise endogenously and that the \$5 cutoff is not only suggested by the central role it plays in the contribution distributions across treatments, but more importantly by the participants' beliefs reported across treatments. As noted earlier, participants see contributions of \$0 and \$5 as most likely coming from low-performers, and they see contributions of \$10 and \$15 as most likely coming from high-performers. That is, the elicited beliefs point to \$5 as the cut off at which inference on performance type switches.

In addition, further evidence on signaling is seen by examining participants' beliefs about donations by others. To examine the role of multidimensional signaling we focus on the case where income is not visible, and we restrict attention to low-performers who made a positive donation and thus may be concerned that they are seen as a non-generous high-performer. In distinguishing themselves from high-performers the primary donation of interest for the low-performers is the expected lowest donation by a high-performer. If a low-performer fears to be perceived as a stingy high-performer when donations are visible (and income is not), she would tend to give less than what she believes high-performers give, in particular she would give less than the lowest expected donation by a high-performer. Yet, if a low-performer does not have such signaling concerns, her donation should not be affected by her beliefs regarding the lowest donation by high-performers. Examining the reported beliefs by low-performers we find that donation-visibility did not alter the expected lowest donation by high-performers (\$6.54 with nonvisible donations ($IV = 0$, $DV = 0$) and \$6.33 with visible donations ($IV = 0$, $DV = 1$)); however the relation between the low-performers' donation and their expectation changes. Calculating the gap between each low-performer's actual donation and her predicted lowest donation by a high-performer in her group, we find an average gap of \$2.31 when donations are nonvisible and −\$1 when donations are visible. That is, with visible donations low performers select contributions that are lower than the smallest contribution expected by high performers. The same pattern is seen when including low-performers who decided not to give; the gap between donation and belief regarding the lowest donation by high-performers declines—from +0.417 when donations are nonvisible to −2.292 when donations are nonvisible—with the difference being significant (two-sided t-test yields $p = 0.04$; power of the test is 0.523).

5.4. Summary and return to visibility

While past research has shown advantages of announcing donor contributions, our study adds grounds for caution when the income of prospective donors is heterogeneous and not known. The inherent conflict between signaling income and generosity is perhaps best illustrated by summarizing the effect of donation visibility on the pooled sample. Fig. 7 shows first that absent information on income, donation-visibility causes the contribution distribution to contract around \$5, allowing individuals to be seen as poor-and-generous rather than as rich-and-stingy. When income is instead visible, there is no risk of false inference on income type. We find that the effect of donation visibility is indeed reversed when income becomes visible, shifting the distribution to the right.

6. Selection and single-dimensional signaling

As the donation task was announced at the beginning of our study, there is the possibility that the initial performance task resulted in selection. While participants likely were motivated to put forth a high performance to secure higher earnings (going from \$15 to \$35), more generous participants might have worked even harder to earn and donate more, and more selfish people might have exerted less effort to secure low income and an excuse to donate less.

In considering such a selection concern, it is important to first note that the main insight of the paper—that the response to donation-visibility depends on whether donations signal only generosity or both income and generosity—are not derived by comparing donations by high- and low-performers; rather, it is derived by examining how donations by a particular performance group changes by treatment. In particular evidence of multidimensional signaling was seen by the low-performers' differential response to donation-visibility when income was and was not visible. This result is only affected by selection if selection varies by treatment.

Table 4
Performance analysis: attempted and correct problems[+].

	Low-performers ($n = 96$)		High-performers ($n = 96$)	
	OLS		OLS	
	Attempted	Correct	Attempted	Correct
Income-visible	0.010	0.083	0.512	0.509
	(1.741)	(1.717)	(1.440)	(1.398)
Donation-visible	1.953	2.873	−1.562	−1.141
	(2.273)	(2.739)	(2.326)	(2.455)
Income- & donation-visible	−0.841	−0.952	2.895	2.641
	(2.768)	(3.111)	(3.251)	(3.490)
Constant	12.641	14.926	16.711	20.720
	(7.797)	(9.741)	(10.522)	(10.891)

[+]Standard errors are in parenthesis, clustered by group. (*) indicates significance at the 10% level, (**) indicates significance at the 5% level, and (***) indicates significance at the 1% level. All the regressions include controls for gender, percent of females in the group, the interaction of (gender X percent females in the group), and age.

Fortunately we find no evidence that selection varied by treatment, nor do we find evidence of selection by generosity. We first explore whether selection varied by treatment, and then whether there is evidence of selection in the sense that high- and low-performers differ in their individual characteristics, and in their degree of generosity.

By examining the performance cut-offs between low- and high-performers we can assess whether selection varied by treatment. The median score for each group of six participants was the threshold score that separated high- from low-performers in each group. Despite variation in the median group score, the average median score does not vary by treatment. The lowest average median score was 20.56 (in treatment IV = 1, DV = 0), and the highest average median score was 21.06 (in treatment IV = 0, DV = 0). As additional evidence that selection does not vary by treatment we examine how performance differs by treatment. While there was substantial individual variation in performance we find in Table 4 that neither the mean number of attempted nor the mean number of correctly solved problems vary significantly by treatment. As evidence of selection varying across treatments we might have expected higher performance when participants know that others will learn their performance rank, however neither the number of attempted nor correct answers respond to income being visible. Thus there is no evidence of differential performance and selection across treatments.

The reason selection does not differ by treatment is likely that performance on the 'adding-up-five-two-digit-number' task is insensitive to incentives (see e.g., Eckartz, 2014). The insensitivity to incentives was one of the reasons why we chose this task for the study. Such insensitivity to incentives also suggests that selection likely played a limited role in assigning potentially more generous individuals to be high-performers. Even if generous individuals had an additional incentive to perform, it is unlikely that this added incentive improved performance and thus resulted in selection.

To examine the role of selection note first that it was far from deterministic whether an individual became a high- or a low-performer. The median score used to determine the individual's performance rank was determined separately for each group, and because individuals were randomly assigned to a group of six there is an inherent randomness in whether an individual is assigned to be a high-performer. This degree of randomness limits the potential role of selection. Examining the lowest and highest median scores across all groups in the data (16 and 28, respectively) we find that scores of 137 out of the 192 participants are within these thresholds. That is, for 137 participants it was quite arbitrary which performance rank the individual received.

In light of the non-deterministic assignment it is perhaps not surprising that individual characteristics (age, gender, and race) do not differ significantly between low- and high-performer groups.[26] When looking at the share of income contributed, both high- and low-performers donate 24% of their earnings to the charity. The share donated of course varies by treatment, and a better assessment of generosity may result from the donation shares seen when neither income nor donation is visible. Interestingly rather than finding that high-performers are more generous, we find that low-performers donate an insignificantly higher share of their income than do high-performers (0.32 versus 0.21, $p = 0.22$).[27]

6.1. Experiment 2: selection

While we do not find evidence of selection in our first experiment we conducted a second experiment to further assess whether the knowledge that a donation task followed the performance task resulted in selection. We refer to our first experiment as Experiment 1 and to this second experiment as Experiment 2. Experiment 2 used the performance and donation tasks of Experiment 1, but did not inform participants that the donation task would follow the performance task. Participants were only informed that they would be paid for performing in the first stage and that there would be a second

[26] For low- and high-performers, respectively, the mean ages were 19.5 and 19.6 ($p = 0.42$), mean share of women were 0.48 and 0.42 ($p = 0.39$), and mean value of race 2.72 and 2.82 ($p = 0.39$).

[27] A similar pattern, namely that people with more money donate a smaller proportion, has been found also in Charness et al. (2014).

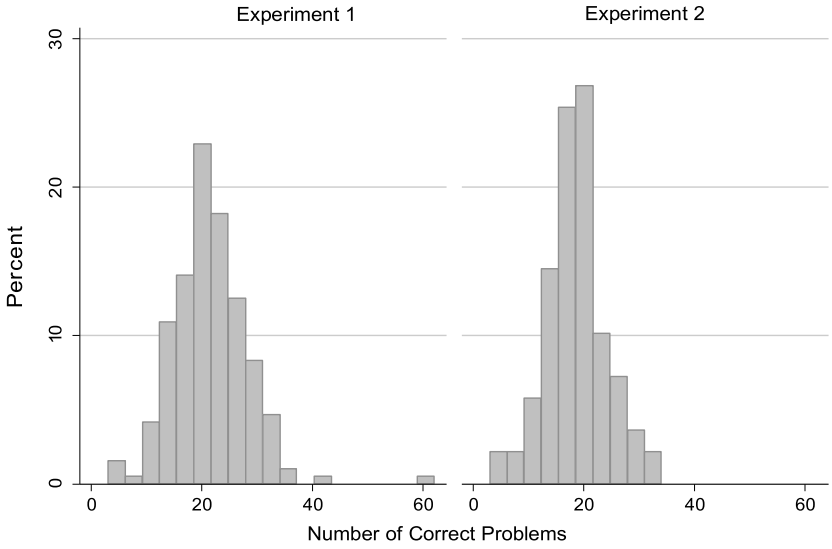

Fig. 8. Distribution of correct problems.

Table 5
Share of income contributed in Experiments 1 and 2 when signaling is not possible [DV = 0, IV = 0] or [DV = 0, income fixed].

	Low-performers	High-performers	Low- and high-performers
Experiment 1	0.32	0.21	0.26
Experiment 2	0.34	0.43	0.39
Experiment 2, $w = 15$	0.35	0.44	0.40
Experiment 2, $w = 35$	0.32	0.40	0.36

stage with "a costly decision". Generosity should therefore not affect selection into the low- and high-performance group, and we can, by comparing donation shares in Experiment 2, assess whether selection played a role in Experiment 1.

In addition to assessing selection, we also use Experiment 2 to evaluate the effect of donation-visibility when there is single- rather than multi-dimensional signaling. In Experiment 2 we made room only for generosity status, and we eliminated the role of income-status by not informing participants of their relative ranking (best or not best performer) and by paying all participants in a session the same fixed earnings—either \$15 or \$35. In fact participants were given no information on how earnings would be determined. Participants were only told that "to secure your earnings you are asked to perform a calculation task. Once the calculation task is over, you will be informed of your earnings"; and were given an encouragement to "try to solve as many problems correctly as you can". To examine the effect of donation-visibility we varied whether donations were revealed to other group members at the end of the experiment. A total of 138 new subjects, from the same subject pool as Experiment 1, participated in Experiment 2; 72 with donation-visible and 66 with donation-nonvisible.[28]

We first assess selection by examining performance. The distribution of the correct number of problems solved is shown in Fig. 8 above. Despite having different incentives to perform, the performance distributions are quite similar in the two experiments. Selection would imply a greater variance in performance in Experiment 1 (with more generous individuals trying to secure a high performance, and less generous individuals trying to secure a lower performance). However we find no evidence of such behavior, excluding one outlier who solved 59 correct problems, there is no significant difference in the variance ($p = 0.24$).

Next, we examine donation shares to determine whether there is evidence of selection in Experiment 1 of the more generous individuals into the high-performance group. As noted earlier, generosity is best assessed by determining contributions when neither donations nor income is visible. Thus we examine mean contribution shares in Experiment 1 when donations and income were nonvisible, and contribution shares in Experiment 2 when donations are not visible (recall income did not vary in Experiment 2). As seen in Table 5 there is no evidence of selection by generosity. While in Experiment 1 we had low-performers earn \$15 and high-performers earn \$35, in Experiment 2 we had sessions where both high- and low-performers earned \$15 and other sessions where both high- and low-performers earned \$35. Table 5 summarizes mean contribution shares for the pooled sample, and separately for the subsamples by income and performance. In neither the \$15 nor the \$35 sessions do we see pooled donation shares below that of the high-performers in Experiment 1 (0.4 and

[28] As before, balanced gender composition in each group was an objective when assigning subjects to groups. That effort was successful—19 groups had a balanced-gender composition, and 4 groups had 4 women and 2 men each.

Table 6
Effect of donation-visibility on giving when signal is one- or multi- dimensional, $W = \$15^{+}$.

	Experiment 1		Experiment 2				Experiments 1 and 2	
	Low-performers ($n = 96$)		All ($n = 96$)		Low-performers ($n = 48$)		Low-performers ($n = 144$)	
	Ordered probit	OLS	Ordered probit	OLS	Ordered probit	OLS	Ordered probit	OLS
Income-visible	−.708**	−2.638*					−0.740**	−3.089**
	(0.359)	(1.381)					(0.345)	(1.385)
Donation visible	−0.454	−2.041	0.420**	1.912*	0.597**	2.691**	−0.476	−2.377
	(0.427)	(1.623)	(0.197)	(0.999)	(0.238)	(1.261)	(0.392)	(1.530)
Donation & income visible	0.851*	3.308*					0.957**	4.224**
	(0.484)	(1.771)					(0.432)	(1.733)
Experiment 2 (no income status)							0.842***	3.345***
							(0.211)	(0.890)
Constant		13.935**		10.027		14.556		13.251**
		(6.784)		(14.225)		(12.492)		(6.382)

$^{+}$Standard errors are in parenthesis, clustered by group. (*) indicates significance at the 10% level, (**) indicates significance at the 5% level, and (***) indicates significance at the 1% level. All the regressions include controls for gender, percent of females in the group, the interaction of (gender X percent females in the group), and age.

0.36 versus 0.21). Of course these shares might mask that generosity varies with being a low- or a high-performer. However, in contrast to selection we do not find that low-performers in Experiment 2 are more generous than in Experiment 1, and we do not find that high-performers in Experiment 2 are less generous than in Experiment 1. In fact, the Experiment 2 high-performers are twice as generous as those seen in Experiment 1.

6.2. Experiment 2: single- versus multi-dimensional signaling

In addition to evaluating selection Experiment 2 also allows us to assess the effect of donation-visibility when donations serve as a single- or multi-dimensional signal of status. That is, between the two experiments we can evaluate the response to donation-visibility when there is- and there is-not a concern for income-status. Recall that when income was not visible Experiment 1 showed that donation-visibility failed to increase contributions by low-performers. Low-performers responded to donation-visibility by more frequently contributing an amount that was less likely to be attributed to a high-performer ($5). Repeating our results in column 1 of Table 6 we see that the response to donation-visibility only is positive when donations do not signal income (i.e., income visible). Experiment 2 allows us to directly examine the effect of donation-visibility when income-status is absent. Columns 2 and 3 report the response to donation-visibility in Experiment 2 for participants who earned $15 (column 2) and for participants who earned $15 and also had low performance (column 3). We find a positive response to donation-visibility in both cases. Finally in the last column we pool the data on low-performers in the two experiments to explore the effect of donation-visibility when donations serve only as a signal of generosity-status (with visible income in Experiment 2 and in treatment IV = 1 & DV = 1 in Experiment 1), and when donations signal both generosity- and income-status (Experiment 1 in treatment IV = 0 & DV = 1). To pool the results we code Experiment 2 as having visible income. For these low-performers we first note that income-visibility continues to have a negative effect on giving, however the positive coefficient on the Experiment 2 dummy reveals that this negative effect is counteracted in Experiment 2 where income-status plays no role. Second the interaction between donation- and income-visibility reveals that donation-visibility increases giving when income is known and donations serve as a one-dimensional signal of generosity, but that it does not increase giving when donations serve as multi-dimensional signals of both income- and generosity-status. Consistent with multiple-dimensional signaling influencing comparative statics, we find that the response to donation-visibility depends critically on whether income is or is not visible (as seen by the differential response to donation visibility in Experiments 1 and 2, and by the interaction of income- and donation-visibility).

The response to donation-visibility in the single-dimensional signaling environment of Experiment 2 also complements and strengthens our Experiment 1 finding that the response to donation-visibility depends on whether income is or is not visible (Section 5.2). This further supports the evidence that a contribution in Experiment 1 may serve as a multi-dimensional signal.

7. Conclusion

The literature on charitable giving has largely reached the consensus that donation-visibility increases giving. A common explanation for the advantages of donation-visibility is that disclosing the amount that an individual contributes will be seen as a positive signal of the individual's type, and that a desire to acquire status will boost donations when these can be seen. In this paper we argue that this comparative static is sensitive to the assumption that status is one-dimensional and increasing in donations. While status monotonicity follows when status is one-dimensional and donations signal only one desirable characteristic, this need not be the case when status is composed of multiple dimensions and donations signal several attributes, such as income and generosity.

Using an example where generosity-status increases in the share of income donated, we demonstrate that while higher donations may increase income-status they may at the same time reduce generosity-status. Depending on the weights attached to these different sources of status, it is possible that higher status can be achieved with a lower donation. In particular, a lower donation amount may give rise to the perception that the individual is poor-and-generous rather than rich-and-stingy, and the status of the former may exceed that of the latter.

Examining behavior in a simple donation experiment we find comparative statics that are consistent with participants benefiting both from signaling high generosity and high income. In this multisource status environment we find that donation visibility fails to increase the amount donated to charity. Thus our results demonstrate how false inference may be drawn when the relevant type space has multiple dimensions and the analysis is restricted to only one of those dimensions.

The response to donation-visibility may help explain why some organizations opt not to announce donations at the end of a fundraising campaign. Organizations that solicit in circles where the names of donors do not confer information on individual incomes, or where income heterogeneity is high, may fare better by not publishing individual contributions. If nonetheless they decide to publicly announce donations, then they may benefit from including in the announcement information on the individual donor's job title or neighborhood of residence.

Appendix A. Instructions

Welcome

Thank you for agreeing to participate in our study on decision making. In this study you are asked to perform a calculation task. The money you earn in this task depends on your performance relative to the performance of others in your group. Once you have earned money from the calculation task, you will have the opportunity to donate some of your money to a child in need. That is, you will each be paired with a child and we will ask you to decide how much of your earnings to keep for yourself, and how much to donate to the child. Your payment from the study will be your earnings from the calculation task, minus your donation, plus a $6 show up fee. Note that you cannot donate your show up fee. The study should take less than an hour. At the end you will be paid your total payment in private and in cash.

For this study you will be put in a group of six people. There are four groups in the room: A, B, C, and D. Before we begin, we will ask you and your group members to stand up such that you get familiar with your group. We ask that you do not speak to each other, or communicate in any other way during the study. We also ask that you do not discuss the procedures and details of the study, including your performance or donation amount, with others (including your group members) outside this room. If at any point you have questions please raise your hand, and one of us will come to answer you in person.

Your identity and information

Your name will never be revealed during the course of the study. We will use the number at your computer station as your ID number. Your number will be either 1, 2, 3, 4, 5, or 6. Your group letter along with your ID number are the identifier we use when paying for your participation in the study.

During the study, [T1: we will tell you how much each member of your group earned, and how much each member donated to the child he or she is paired with] [T2: we will tell you how much each member of your group earned, but we will not tell you how much each member donated to the child he or she is paired with] [T3: we will tell you how much each member of your group donated to the child he or she is paired with, but we will not tell you how much each member earned] [T4: we will not tell you how much each member of your group earned, nor will we tell you how much each member donated to the child he or she is paired with].

[T1, T2, T3: When we provide your information to the other group members we will use your ID number to refer to you, and when we provide you information on the other members of your group we will use their ID numbers to refer to them].

Calculation tasks

In the calculation task you are asked to calculate the sum of five randomly chosen two-digit numbers. You will be given 10 minutes to calculate the correct sum of a series of these problems. A buzzer will sound at the end of the 10 minutes. You cannot use a calculator to determine the sum of numbers, but are welcome to use the provided pencil and paper.

To submit an answer, simply click on the submit button with your mouse. When you enter an answer the computer will immediately tell you whether your answer is correct or not. Your answers to the problems are anonymous.

The computer will count the number of problems you solve correctly during the 10 minutes. Your count of correct answers does not decrease if you provide an incorrect answer to a problem.

When the 10 minutes are up, the computer will inform you how many problems you solved correctly. The system will then compare your performance with that of the rest of the members in your group, and will determine whether you are among the best three performers in your group of six. We will refer to these best three performers as "Best Performers." Your earnings from the calculation task depend on whether you are among the Best Performers or not. The Best Performers will each earn $35 from the calculation task while those who are not among the Best Performers each will earn $15. You will find out whether you are among the Best Performers immediately after all six members of your group have completed the 10-minutes calculation task.

Donation

As mentioned, you and the other members of your group will each have the opportunity to donate part of your earnings to a child in need. Each group member is paired with a different child in Southwestern Pennsylvania (Allegheny, Washington, Greene, and Fayette Counties). All of these children are between 1 and 12 years old, and their family home has suffered extensive fire damage. Most or all of their family's possessions have been lost. The sum of money donated by you will be spent to purchase books for the child you are paired with. The American Red Cross will give the books to the child you are paired with immediately after the child has been affected by a severe fire.

As soon as a fire is reported in Southwestern Pennsylvania, the American Red Cross is contacted and volunteers are dispatched to the site. They help the affected families find temporary shelter, provide them with clothing, a meal, and give them a comfort bag with essential toiletries. Each day an average of one family in Southwestern Pennsylvania experiences a severe fire. These families depend on the American Red Cross for emergency help to cope with the sudden loss of their home and belongings. Unfortunately the American Red Cross only has funds to provide these families with the bare essentials, and they do not provide any "comfort" items for the children of the affected families.

We have joined the American Red Cross of Southwestern PA to collect funds to buy books for the affected children. The child you are paired with will receive books of a value that equals your donation. If you do not contribute anything, the child will not receive any books. Each person in this study is paired with a different child. Neither the American Red Cross nor any other donors provide books to the child at the scene of the fire. In explaining why the American Red Cross is seeking this type of support, their Director of Emergency Services, Michael Adametz states "Children's needs are often overlooked in the immediate aftermath of a disaster because everyone is concerned primarily with putting the fire out, reaching safety, and finding shelter, food and clothing... just the basics of life. So many times, I've seen children just sitting on the curb with no one to talk to about what's happening... for this reason I've found trauma recovery experts in the community to work with us to train our volunteer responders in how to address children's needs at the scene of a disaster... being able to give the children fun and distracting books will provide a great bridge for our volunteers to connect with kids and get them talking about what they've experienced."

Once you have completed the calculation task you will have the opportunity to use your earnings from the task to help out the child you are paired with. For administrative purposes donations must be made in increments of $5, i.e., $0, $5, $10, $15, etc.

Immediately after the study, we will order books corresponding to the amount that you donate. Please let us know if you are interested in being present when we order the books, or when we drop them off at the American Red Cross. If you wish to receive a receipt from the American Red Cross for your donation, you will need to fill out the acknowledgment form on the next page. Note however that by doing so you will relinquish your anonymity. If you wish to remain anonymous, leave the acknowledgment form blank.

Information you and others will receive

As explained above, at the end of the calculation task you will be told how many problems you answered correctly, and whether you are among the Best Performers in your group of six. This information will appear on your screen, and you are asked not to share it with anyone else.

[T1: In addition, we will tell you and the other group members how much each specific group member (including yourself) earned in the calculation task. Thus all group members will be informed how much each of the other group members earned and who the Best Performers are.

Moreover, after the donation decisions, we will tell you and the other group members how much each specific member (including you) decided to donate to the child he or she is paired with. Thus all group members will know how much each of the other group members donated.]

[T2: In addition, we will tell you and the other group members how much each specific group member (including yourself) earned in the calculation task. Thus all group members will be informed how much each of the other group members earned and who the Best Performers are.

However, after the donation decisions, we will not tell you or the other group members how much each specific member decided to donate to the child he or she is paired with. Thus no group member will know how much each of the other group members donated.]

[T3: Note that we will not tell you or the other group members how much each specific group member earned in the calculation task. Thus no group member will be informed how much each of the other group members earned or who the Best Performers are.

However, after the donation decisions, we will tell you and the other group members how much each specific member (including you) decided to donate to the child he or she is paired with. Thus all group members will know how much each of the other group members donated.]

[T4: Note that we will not tell you or the other group members how much each specific group member earned in the calculation task. Thus no group member will be informed how much each of the other group members earned or who the Best Performers are.

Moreover, after the donation decisions, we will not tell you or the other group members how much each specific member decided to donate to the child he or she is paired with. Thus no group member will know how much each of the other group members donated.]

If you have any questions, please raise your hand now and one of us will come to your seat to answer your question. You are reminded to please not discuss any details regarding your or others' performance or donation with anyone during or after the study.

Before we begin, we will ask each group at a time to please stand up such that each participant will get familiar with his or her group members. Please do not talk or communicate, just stand up so you can see each other.

We will begin momentarily.

————————————————————————————————

Group ____ ID Number ____

Acknowledgment form

Please send a receipt for my contribution of books with the value of $_____ (to be filled out by the assistant)

My address is
Name_____
Address_____
City_____
State_____
Zip_____

Please note that you relinquish your anonymity by filling out this form

————————————————————————————————

If you would like to be present for the purchase or the delivery of the books please provide us with your email and we will contact you when we order the books and deliver them to the American Red Cross.

Name_____
Email_____

References

Andreoni, James, 1989. Giving with impure altruism: applications to charity and Ricardian equivalence. J. Polit. Economy 97 (6), 1447–1458.

Andreoni, James, 1990. Impure altruism and donations to public goods: a theory of warm-glow giving. Econ. J. 100 (401), 464–477.

Andreoni, James, 1998. Toward a theory of charitable fund-raising. J. Polit. Economy 106 (6), 1186–1213.

Andreoni, James, Bernheim, Douglas, 2009. Social image and the 50–50 norm: a theoretical and experimental analysis of audience effects. Econometrica 77 (5), 1607–1636.

Andreoni, James, Petrie, Ragan, 2004. Public goods experiments without confidentiality: a glimpse into fund-raising. J. Public Econ. 88, 1605–1623.

Andreoni, James, Rao, Justin M., Trachtman, Hannah, 2012. Avoiding the ask: a field experiment on altruism, empathy, and charitable giving. Working Paper. Available at: http://econ.ucsd.edu/~jandreon/WorkingPapers/AndreoniRaoTrachtman.pdf.

Ariely, Dan, Bracha, Anat, Meier, Stephan, 2009. Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. Amer. Econ. Rev. 99 (1), 544–555.

Bénabou, Roland, Tirole, Jean, 2006. Incentives and prosocial behavior. Amer. Econ. Rev. 96 (5), 1652–1677.

Bohnet, Iris, Frey, Bruno S., 1999. The sound of silence in prisoner's dilemma and dictator games. J. Econ. Behav. Organ. 38 (1), 43–57.

Broberg, Tomas, Ellingsen, Tore, Johannesson, Magnus, 2007. Is generosity involuntary? Econ. Letters 94 (1), 32–37.

Burnham, Terence C., Hare, Brian, 2007. Engineering human cooperation: does involuntary neural activation increase public goods contribution? Hum. Nat. 18 (2), 88–108.

Carpenter, Jeffrey, Myers, Caitlin Knowles, 2010. Why volunteer? Evidence on the role of altruism, image, and incentives. J. Public Econ. 94 (11–12), 911–920.

Charness, Gary, Cobo-Reyes, Ramon, Jimenez, Natalia, 2014. Identities, selection, and contribution in a public-good game. Games Econ. Behav. 87, 322–338.

Conley, John P., Kung, Fan-Chin, 2010. Private benefits, warm glow and reputation in the free and open source software production value. J. Public Econ. Theory 12 (4), 665–689.

Dana, Jason, Cain, Daylian M., Dawes, Robyn M., 2006. What you don't know won't hurt me: costly (but quiet) exit in dictator games. Org. Behav. Hum. Decis. Process. 100 (2), 193–201.

Dana, Jason, Weber, Roberto A., Kuang, Jason Xi, 2007. Exploiting moral wiggle room: experiments demonstrating an illusory preference for fairness. Econ. Theory 33 (1), 67–80.

DellaVigna, Stefano, List, John A., Malmendier, Ulrike, 2012. Testing for altruism and social pressure in charitable giving. Quart. J. Econ. 127 (1), 1–56.

Duffy, John, Kornienko, Tatiana, 2010. Does competition affect giving? J. Econ. Behav. Organ. 74 (1–2), 82–103.

Dufwenberg, Martin, Muren, Astri, 2006. Generosity, anonymity, gender. J. Econ. Behav. Organ. 61 (1), 42–49.

Eckartz, Katharina, 2014. Task Enjoyment and Opportunity Costs in the Lab: The Effect of Financial Incentives on Performance in Real Effort Tasks. Jena Economic Research Papers 2014-005.

Ellingsen, Tore, Johannesson, Magnus, 2008. Pride and prejudice: the human side of incentive theory. Amer. Econ. Rev. 98 (3), 990–1008.

Ellingsen, Tore, Johannesson, Magnus, 2011. Conspicuous generosity. J. Public Econ. 95 (9–10), 1131–1143.

Filiz-Ozbay, Emel, Ozbay, Erkut Y., 2014. Effect of an audience in public goods provision. Exper. Econ. 17 (2), 200–214.

Fischbacher, Urs, 2007. Z-tree: Zurich toolbox for ready-made economic experiments. Exper. Econ. 10 (2), 171–178.

Frank, Robert H., 1985. Choosing the Right Pond. Oxford University Press, New York.

Funk, Patricia, 2010. Social incentives and voter turnout: evidence from the Swiss Mail Ballot system. J. Eur. Econ. Assoc. 8 (5), 1077–1103.

Gachter, Simon, Fehr, Ernst, 1999. Collective action as a social exchange. J. Econ. Behav. Organ. 39 (4), 341–369.

Glazer, Amihai, Konrad, Kai, 1996. A signaling explanation for private charity. Amer. Econ. Rev. 86 (4), 1019–1028.

Hamman, John R., Loewenstein, George, Weber, Roberto A., 2010. Self-interest through delegation: an additional rationale for the principal–agent relationship. Amer. Econ. Rev. 100 (4), 1826–1846.

Harbaugh, William T., 1998a. What do donations buy? A model of philanthropy based on prestige and warm glow. J. Public Econ. 67 (2), 269–284.

Harbaugh, William T., 1998b. The prestige motive for making charitable transfers. Am. Econ. Rev. Pap. Proc. 88 (2), 277–282.

Heffetz, Ori, Frank, Robert H., 2011. Preferences for status: evidence and economic implications. In: Benhabib, Jess, Bisin, Alberto, Jackson, Matthew O. (Eds.), Handbook of Social Economics. Elsevier, Amsterdam, pp. 69–91.

Hoffman, Elizabeth, McCabe, Kevin, Shachat, Keith, Smith, Vernon, 1994. Preferences, property rights, and anonymity in bargaining games. Games Econ. Behav. 7 (3), 346–380.
Hollander, Heinz, 1990. A social exchange approach to voluntary cooperation. Amer. Econ. Rev. 80 (5), 1157–1167.
Ireland, Norman J., 1994. On limiting the market for status signals. J. Public Econ. 53 (1), 91–110.
Lacetera, Nicola, Macis, Mario, 2010. Do all material incentives for pro-social activities backfire? The response to cash and non-cash incentives for blood donations. J. Econ. Psych. 31 (4), 738–748.
Lazear, Edward P., Malmendier, Ulrike, Weber, Roberto A., 2012. Sorting in experiments with application to social preferences. Am. Econ. J. Appl. Econ. 4 (1), 136–163.
List, John A., Berrens, Robert P., Bohara, Alok K., Kerkvliet, Joe, 2004. Examining the role of social isolation on stated preferences. Amer. Econ. Rev. 94 (3), 741–752.
Niederle, Muriel, Vesterlund, Lise, 2007. Do women shy away from competition? Do men compete too much? Quart. J. Econ. 122 (3), 1067–1101.
Noussair, Charles, Tucker, Steven, 2007. Public observability of decisions and voluntary contributions in a multiperiod context. Public Finance Rev. 35 (2), 176–198.
Ottoni-Wilhelm, Mark, Vesterlund, Lise, Xie, Huan, 2016. Why do People Give? Testing Pure and Impure Altruism. Working Paper.
Rege, Mari, Telle, Kjetil, 2004. The impact of social approval and framing on cooperation in public good situations. J. Public Econ. 88 (7–8), 1625–1644.
Romano, Richard, Yildirim, Huseyin, 2001. Why charities announce donations: a positive perspective. J. Public Econ. 81 (3), 423–447.
Samek, Anya Savikhin, Sheremeta, Roman M., 2014. Recognizing contributors: an experiment on public goods. Exper. Econ. 17 (4), 673–690.
Sell, Jane, Wilson, Rick K., 1991. Levels of information and contribution to public goods. Soc. Forces 70 (1), 107–124.
Shaw, G.B., 1896. Socialism for millionaires. In: Essays in Fabian Socialism. Constable, London (reprint 1949).
Vesterlund, Lise, 2003. The informational value of sequential fundraising. J. Public Econ. 87 (3–4), 627–657.
Vesterlund, Lise, 2006. Why do people give? In: Steinberg, Richard, Powell, Walter W. (Eds.), The Nonprofit Sector, 2nd edition. Yale Press.
Vesterlund, Lise, 2016. Using experimental methods to understand why and how we give to charity. In: Kagel, John H., Roth, Alvin E. (Eds.), The Handbook of Experimental Economics, Vol. 2. Princeton University Press, Princeton, NJ.
Zhang, Xiaoquan (Michael), Zhu, Feng, 2011. Group size and incentives to contribute: a natural experiment at Chinese Wikipedia. Amer. Econ. Rev. 101 (4), 1601–1615.