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ABSTRACT

We conducted a within-subject laboratory experiment in which participants decided whether to experience physical discomfort for charity, with or without additional personal compensation. Acceptance decreased with greater discomfort and increased with both larger charitable donations and personal payments. We show that private monetary incentives and prosocial benefits interact in a less-than-additive way: personal compensation raises participation but attenuates the marginal impact of charitable donations, making the combined impact of private and social rewards smaller than the sum of their separate effects. We also find suggestive evidence that the sequencing of compensated and uncompensated choices may change the responsiveness to charitable benefits. Overall, our results indicate that context, especially the presence (and timing) of private rewards, can affect the relationship between incentives and prosocial behavior.

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A Appendix is available at http://www.nber.org/data-appendix/w34822

1 Introduction

Many organizations rely on the altruism of people to provide important services. In most countries, for example, the supply of blood for transfusions comes from volunteer, unpaid donors. People also serve without compensation to prepare and distribute food at pantries and shelters, clean up neighborhoods, assist the elderly, mentor students, and for fire and rescue services. These activities require time, effort, and sometimes discomfort, and the need for them often exceeds the available supply. The nature of these activities and the frequent shortages raise the question of whether the addition of monetary incentives might contribute to filling these needs.

Decades of study on the impact of extrinsic incentives on intrinsic motivation still breed debate over the contexts in which extrinsic incentives augment intrinsic motivations (Deci, 1972; Deci et al., 2017; Gerhart and Fang, 2015). The theory of motivation crowding suggests that monetary incentives would effectively replace and therefore decrease both intrinsic drive and participation in altruistic acts (Frey and Jegen, 2001; Bowles, 2016; Gächter et al., 2025). People may also consider monetary incentives morally objectionable in certain cases (Roth, 2007; Bowles, 2016; Gächter et al., 2025). Findings from empirical studies are mixed (Lacetera and Macis, 2010; Lacetera et al., 2012; Newman and Shen, 2012).

However, we are not aware of any study that independently varies personal monetary incentives and the value of collective benefit in prosocial choice evaluations, or that examines how private rewards interact with the size of the prosocial contribution. Consequently, it is currently hard to assess whether different incentive amounts affect prosocial behavior differently. Field studies provide valuable evidence, but their diverse contexts make it difficult to isolate and compare effects. Our study addresses this gap by independently varying private monetary incentives and charitable benefits while holding constant the underlying cost, allowing us to identify how these two stimuli interact.

We designed a laboratory experiment that includes common aspects of many volunteer activities and allows controlled variation of contextual elements. Participants made decisions about whether to endure physical discomfort for social benefit. They could choose to accept a low-level electric shock in exchange for different amounts of monetary donations to a charity of their choice, as well as personal financial compensation. The paradigm had two phases; both included a charitable donation, but only one offered varying levels of monetary compensation to the participant. The order of the two phases was random for each subject.

The objective of this design was to replicate the main elements of the decision process and the overall context in which prosocial activities occur. The inclusion of a donation and of physical discomfort in all conditions represents basic aspects of volunteering, i.e., costly effort and beneficial effects on others. Conversely, monetary compensation is not always present, but when it is, it may vary in amount. The within-subject component of the design allows

to identify how private incentives and prosocial benefits combine in affecting willingness to incur discomfort. Finally, charitable organizations often experiment with different incentives and alternate between adding or not adding them (Lacetera et al., 2012). By randomizing the order of exposure to monetary rewards across subjects, we are also able to replicate this common feature.

Our findings indicate that the willingness to experience discomfort decreases with higher discomfort levels, increases with both larger charitable donations and personal payments. However, personal payments attenuate the marginal effect of donations (a less-than-additive interaction between private and prosocial rewards), which is the central result of the paper. Order also appears to matter: participants first exposed to choices without personal compensation remained more sensitive to the charitable benefit in both phases, whereas starting with pay softened subsequent responsiveness—even when later decisions involved no payment. Given the small between-subject sample size, we interpret these order effects with caution.

Section 2 provides details on the experimental design and the data. In Section 3 we describe the findings, and we provide a discussion and concluding remarks in Section 4.

2 Design and data

Figure 1 synthesizes the design and phases of the experiment. We describe the details below.

2.1 Participants

The experiment took place at Johns Hopkins University (JHU). We recruited participants through the JHU online announcement system. Thirty-three individuals participated in the experiment, from whom we excluded two, leaving us with fourteen men and seventeen women (average age 24.1 years), each making 210 choices. In eighteen instances, the retained subjects did not make their choices within the allotted time, so we dropped these observations as well. The final sample includes 6,492 choices. Appendix Table A.1 reports the demographic information on the subject pool.

2.2 Experimental Procedure

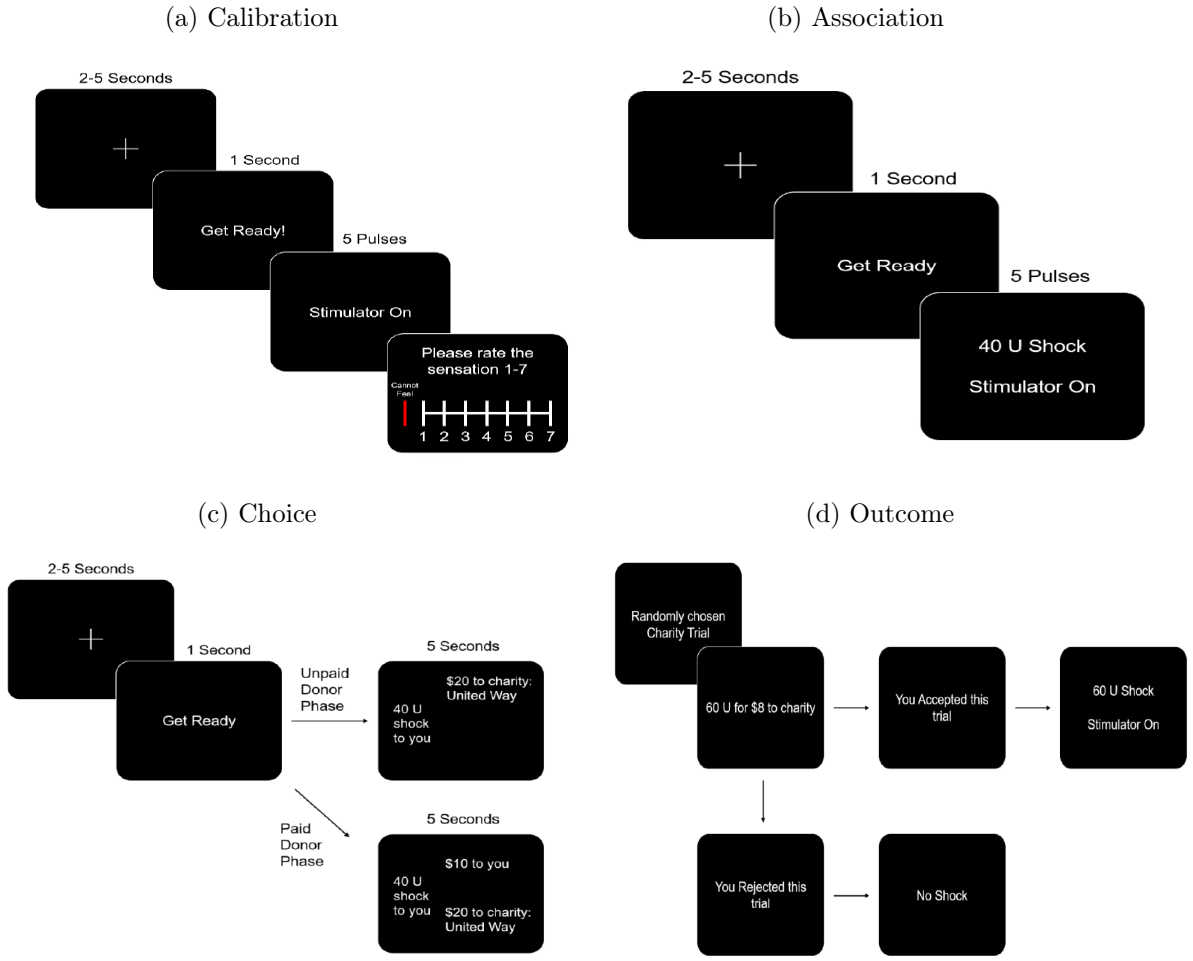
2.2.1 Calibration

Participants first underwent a calibration procedure to set electric stimulation levels to their unique pain tolerances. This allowed us to administer shocks of matched subjective value to each individual. We affixed electrodes to the participants' non-dominant forearm (left for all of them) before calibration. Subjects experienced distinct levels of an attenuated 10mA signal

in 5 bursts (BIOPAC MP150, STMISOC, BIOPAC Systems, Inc., Goleta, CA). Stimulations began at a signal strength of 35dB below the 10mA signal. Each participant then ranked the sensation on a scale from 1 to 7, with 1 meaning they could feel the sensation and 7 meaning they would not want to experience that sensation again. Once a participant submitted a rating of 5 or above, the calibration procedure ended, and the preceding stimulation was recorded.

Subjects went through this calibration process twice to establish consistency. The second calibration determined each individual's maximum threshold for subsequent phases.

Figure 1: Flow of the experimental design



Notes: The panels show the flow of the experiment in its four phases.

2.2.2 Association

Participants then developed associations between units of shock and their perceptions by experiencing their personally calibrated shock levels. The lowest recorded perceivable stimulus level was 10 shock units (10U), and 100U represented their maximum threshold. Stimulations

between those values were linearly interpolated from the minimum and maximum shock levels. For example, if 10U were equivalent to 29dB attenuation and 100U were equivalent to 20db attenuation, 60U would be 24dB. Participants experienced stimulations from 20U to 100U in increments of 20U, in random order without replacement.

2.2.3 Choice

After the association phase, subjects chose a charity to benefit from their decisions (Appendix Table A.2). Each participant experienced two choice phases: unpaid and paid. In both phases, they decided to accept or reject a donation to the charity of their choice in exchange for incurring an uncomfortable electric shock. During the unpaid phase, subjects would receive no personal monetary reward, whereas the paid phase offered various levels of compensation. Participants had between three and five seconds to make choices and were encouraged to consider each offer independently, since one offer shown would be randomly selected to be realized in the outcome phase. If a participant did not make a choice in the time window allotted, that offer was removed from the pool of outcome scenarios.

The unpaid and paid phases included the same levels of charitable donations and shocks in their offers. Contributions to charity ranged from \$0 to \$20 in increments of \$4. In the paid phases, compensation ranged from \$0 to \$10 in \$2 increments. The order of the unpaid and paid phases was random; fourteen subjects went through the unpaid phase first, whereas sixteen first experienced the paid phase.

2.2.4 Outcome

Next, the computer randomly selected one offer from both the unpaid and paid conditions. The selected offers were displayed on the screen along with the participants' response. Only if the participant accepted the offer would the shock be administered and money dispensed. If a subject rejected the offer, neither compensation nor charitable contribution (if any) occurred.

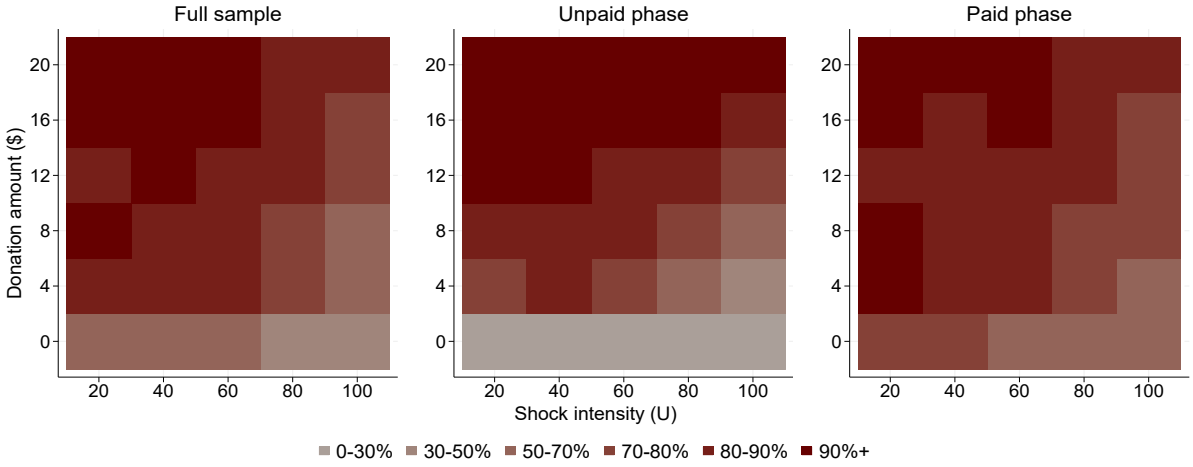
Subjects received a \$15 participation fee in addition to the compensation that they could earn during the outcome phase. The money to donate to the charity of choice was recorded and distributed to each charity as a lump sum after the collection of the last participant.

3 Results

Figure 2 shows the acceptance rates of the electric stimulation by the amount of the charitable contribution and the intensity of the shock, in the full sample as well as separately by whether a participant was experiencing the Unpaid or Paid phase. Darker red colors in the heat plots indicate higher shares of participants accepting the stimulation. Predictably, the shares are higher for higher charitable contributions and lower shock intensities. However, especially for

the highest donation amounts, acceptance rates are higher in the Unpaid phase than in the Paid phase. Because the plot that displays behavior in the Paid phase includes choices for which participants would receive payment for themselves in addition to allowing donations, this evidence suggests that the addition of extrinsic rewards may reduce the response to prosocial incentives rather than enhancing it.

Figure 2: Acceptance rates by charitable contribution and shock intensity



Notes: The panels report heat plots displaying the share of participants who accepted the electric stimulation by dollar amount of the charitable donation and units of the electric stimulation. The graph on the left displays statistics that include all the observations; the graph in the center the acceptance rates while respondents were experiencing the Unpaid phase, and the one on the right the acceptance rates in the Paid phase. Darker red areas indicate higher shares, as the legend explains.

To further examine this result, in Figure 3 we present acceptance rates in the Paid phase by charitable contribution and intensity of the shock, separately by the amount of private payments offered. First, the plots show that acceptance is more frequent for higher payments, indicating a positive, increasing responsiveness to material rewards. Second, the impact of these rewards seems to fade with higher dollar values. Third, for no or low monetary payments, the willingness to accept the electric stimulation is generally lower than in the Unpaid phase with, of course, no private returns. Overall, the effect of monetary payments on top of prosocial incentives is less than additive; for small payments, there was no increase or even a decrease in acceptance relative to the Unpaid baseline for the same charitable contribution, whereas larger payments raised acceptance, but at a decreasing rate.

Because these patterns occur even at donation levels where acceptance rates are below 100%, this is not merely a "ceiling effect"; rather, it suggests that combining private and social rewards is effective, but the overall effect is less than the sum.

Figure 3: Acceptance rates by charitable contribution, shock intensity and compensation amount in the paid phase



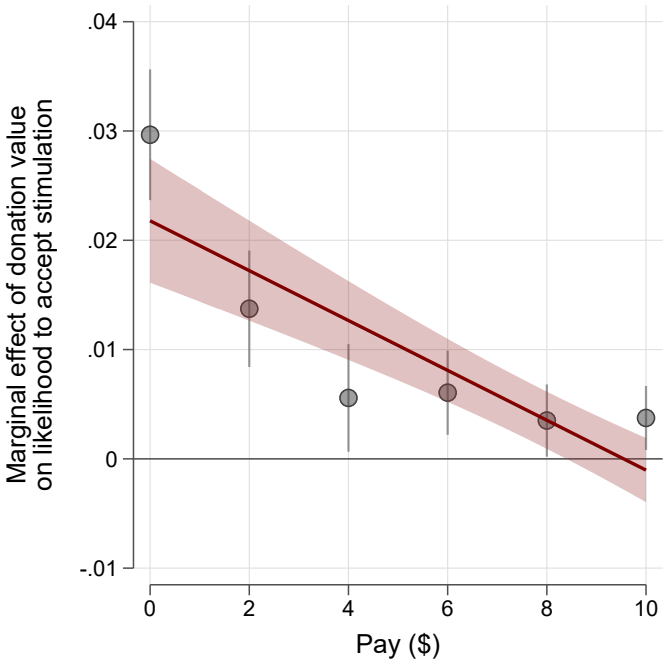
Notes: The panels report heat plots displaying the share of participants who accepted the electric stimulation by dollar amount of the charitable donation and units of the electric stimulation, separately by each compensation level. Darker areas indicate higher shares, as the legend explains.

Figure 4 provides additional evidence by showing the decreasing marginal effects of the donation amount on acceptance, for different monetary rewards.

In addition to these main findings, we also exploited the between-subject variation in the timing of exposure to the Unpaid and Paid phases and found that ordering is not neutral. Willingness to experience the stimulation was less reactive to the charitable return when exposure to monetary incentives occurred before the pure volunteer (unpaid) phase. In particular, the response to prosocial incentives was much weaker in the paid phase when it preceded the unpaid session and the offered pay was \$0. This is the case in which the Unpaid and Paid phases coincide in terms of returns, so one might expect responses to be very similar - but they are not. This difference persists, although less markedly, at low monetary rewards. Appendix Figures A.1 and A.2 display this evidence.[1]

[1]Appendix Figures A.3 and A.4 combine the evidence from the within- and between-subject analyses of incentive and ordering effects.

Figure 4: Marginal effect of charitable donation on acceptance of the electric stimulation, by amount of private reward



Notes: The round markers represent the estimated marginal effects on the likelihood to accept an electric stimulation of the different dollar amounts of the charitable donation, by each value of the individual pay in the Paid phase, controlling for the level of the stimulation and which phase (Paid or Unpaid) a participant experienced first. They report the point estimates of the linear regression parameter δ_k from the following model (for the Paid phase only): $D_i = \alpha + \beta Charity_i + \sum_{k=1}^{5} \gamma_k I(Pay = 2k)_i + \sum_{k=1}^{5} \delta_k I(Pay = 2k)_i * Charity_i + \sum_{s=2}^{5} \eta_s I(Shock = 20k)_i + \vartheta I(Unpaid\ phase\ first)_i + \epsilon_i$, where D_i is a 0-1 indicator of the choice of whether a subject i (i=1,...,31) accepted a given level of electric stimulation (1) or not (0), in each of the j=1,...6 decisions, one for each proposed donation; $Charity_i$ indicates the dollar amount of the charitable donation to make if subject i accepted the electric stimulation (\$0, 4, 8, 12, 16, 20); $I(Pay = 2k)$ is a binary indicator for whether the value of the monetary pay, in the paid phase, was $2k$ ($k = 1, ...5$; payment of \$0 omitted); $I(Shock = 20k)$ is an indicator for whether the units of electric stimulation were $20k$ ($k = 1, ...5$; shock of 20U omitted); and $I(Unpaid\ phase\ first)_i$ is a binary indicator for whether subject i experienced the unpaid phase first. The vertical lines represent the estimated confidence intervals, with standard errors clustered at the subject level. The equation of the red line is $y_i = \hat{\beta} + \hat{\gamma} Pay_i$, where $\hat{\beta}$ and $\hat{\gamma}$ are the linear regression parameter estimates from $D_i = \alpha + \beta Charity_i + \delta Pay_i + \gamma Pay_i * Charity_i + \sum_{s=2}^{5} \eta_s I(Shock = 20k)_i + \vartheta I(\text{Unpaid phase first})_i + \epsilon_i$; here both the charitable amounts and the private payments are entered linearly. The shaded area represents the confidence intervals.

Appendix Tables A.3 through A.6 report regression parameter estimates, where we add, on the right-hand side, prosocial and private either linearly (A.3 and A.4), or separately as binary indicators for each dollar amount (A.5 and A.6).[2]

[2]We opted for linear probability models as opposed to, for example, logit or probit because most statistical software packages, such as Stata that we use, discard categories of the regressors that "predict success perfectly", i.e., that all correspond to only one of the two values of the outcome variable. Linear regression procedures, conversely, keep all observations. We relied on the latter to retain the largest possible sample size, especially because we ran the regressions separately by phase, shock intensity and (in the Paid phase) individual compensation, therefore each regression relied on a relatively small sample size. Because the regression analyses have only the donation amounts on the right-hand side, and we enter them as categorical indicators, the predicted values of the outcome, even in a linear specification, all stay within the [0,1] interval. Estimates are very similar if we run logit models instead, especially when we aggregate on larger subsamples.

Whereas the findings on the attenuating effect of monetary incentives on the responses to the prosocial value of accepting the electric stimulation rely on within-subject variation and therefore a large sample size, the ordering effects that we document derive from variation between precipitants, and therefore on a small number of observations. As such, we interpret this latter result as suggestive.

4 Discussion and Conclusions

We found that monetary incentives increased individuals' willingness to experience discomfort for charitable donations overall. Importantly, however, personal payments attenuated the responsiveness to increases in the charitable donation: private and prosocial rewards did not combine additively. This less-than-additive interaction depended in part on the amount of the compensation; small payments (e.g., $2) sometimes yielded no increase relative to the unpaid baseline, whereas larger payments (e.g., $10) increased acceptance of physical discomfort for prosocial benefit. We also find suggestive evidence—based on between-subject comparisons—that the presentation order of paid and unpaid choices may shape responsiveness to charitable benefits. In particular, those with prior exposure to a purely altruistic setting showed increased willingness to experience discomfort for social good when incentives were offered. Conversely, participants exposed to incentives first had statistically indistinguishable acceptance levels once they entered the purely altruistic phase.

Our results therefore provide evidence that private and prosocial incentives can raise participation but do not combine additively. This lends support to views that point out the motivation-crowding effect of monetary rewards for prosocial activities, whereby explicit rewards can shift attention toward self-regarding motives and thereby dampen the behavioral weight of intrinsic or other-regarding considerations (Frey and Jegen, 2001; Bowles, 2016). More specifically, our evidence points to a form of crowding out that operates on "responsiveness" rather than participation *per se*; incentives raise acceptance overall, but they attenuate the incremental role of charitable returns. We also show that different contextual elements may influence these responses, such as the amount of the individual rewards (and, more tentatively, the timing of their introduction). What we show resembles cases where people choose to donate more to charity in a condition designed to bring less attention to a less desirable gift than those who were primed with an image of the gift (Chao, 2018). One implication, of potential relevance also to practitioners, is that making the charitable outcome salient may help mitigate extrinsic motivational crowding. A further insight is that altruistic motivation can be altered by frame of reference, and that the addition of extrinsic incentives can occur in ways that do not hinder intrinsic pro-social motivations. Instead, they may be used in concert to create optimal responses.

Our experiment has its limitations. First, the sample size of thirty-one participants is

modest. On the one hand, it is standard for laboratory studies of this kind, which require specialized equipment and individualized calibration procedures. On the other hand, this leaves us with limited statistical power for between-subject comparisons.

Second, the offers presented to participants did not yield data with ideal levels of variance for modeling on an individual level. The average acceptance rate of all offers with non-zero incentives for either the participant or charity was about 81%, and there was little variation at the highest incentive levels. Future studies would benefit from limiting the magnitude of incentives or increasing the level of personal cost required to generate prosocial contributions. Additionally, future work with larger samples could more precisely assess whether and how the sequencing of private rewards affects responsiveness to prosocial benefits, and would test whether emphasizing the prosocial benefits of the outcome increases willingness to participate even in the absence of monetary incentives. Our results show that monetary incentives can both erode and increase prosocial motivation; emphasizing the social benefit of people's contributions and carefully sequencing incentives may help practitioners use payments without diluting altruistic motives.

References

Bowles, S. (2016). *The Moral Economy: Why Good Incentives Are No Substitute for Good Citizens*. New Haven, CT: Yale University Press.

Chao, M. (2018). Intentions-based reciprocity to monetary and non-monetary gifts. *Games 9*(4), 74.

Deci, E. L. (1972). The effects of contingent and noncontingent rewards and controls on intrinsic motivation. *Organizational behavior and human performance 8*(2), 217–229.

Deci, E. L., A. H. Olafsen, and R. M. Ryan (2017). Self-determination theory in work organizations: The state of a science. *Annual review of organizational psychology and organizational behavior 4*, 19–43.

Frey, B. S. and R. Jegen (2001). Motivation crowding theory. *Journal of Economic Surveys 15*, 589–611.

Gächter, S., E. Kaiser, and M. Königstein (2025). Incentives crowd out voluntary cooperation: evidence from gift-exchange experiments. *Experimental Economics*, 1–32.

Gerhart, B. and M. Fang (2015). Pay, intrinsic motivation, extrinsic motivation, performance, and creativity in the workplace: Revisiting long-held beliefs. *Annu. Rev. Organ. Psychol. Organ. Behav. 2*(1), 489–521.

Lacetera, N. and M. Macis (2010). Do all material incentives for pro-social activities backfire? the response to cash and non-cash incentives for blood donations. *Journal of Economic Psychology 31*, 738–748.

Lacetera, N., M. Macis, and R. Slonim (2012). Will there be blood? incentives and displacement effects in pro-social behavior. *American Economic Journal: Economic Policy 4*, 186–223.

Newman, G. E. and Y. J. Shen (2012). The counterintuitive effects of thank-you gifts on charitable giving. *Journal of Economic Psychology 33*, 973–983.

Roth, A. E. (2007). Repugnance as a constraint on markets. *Journal of Economic Perspectives 21*, 37–58.