# Donor behavior around fundraising goals: Evidence from donations to children's hospitals

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**Abstract**

We investigate donations to children's hospitals using data from 1,326 contributions to 121 fundraising campaigns. We find that fundraising goals are associated with changes in donation behavior along both extensive and intensive margins. Donor participation increases as fundraising goals approach, and a considerable number of donors choose their donation to exactly reach fundraising goals. However, our analysis shows that while donor participation increases, donation amounts decrease. Our findings support previous work on "goal-gradient giving" and underscore the need for charities to consider how fundraising targets impact donor behavior.

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# 1 Introduction

Donors gain utility from helping charities reach a fundraising goal (Andreoni, 1990; Duncan, 2004; Sargeant, 1999; Sargeant et al., 2006). As the expected value of donation impact increases near the goal, the goal-gradient hypothesis suggests an increase in the rate of donor participation will follow (Cryder et al., 2013; Jensen et al., 2013). Fundraising campaigns approaching a goal may therefore experience both an increase in the rate of donations and donors who choose their donation to exactly target fundraising goals. We explore goal-gradient and goal-targeting behavior among donors using data from real donations to children's hospitals.

Consistent with the literature on charitable giving, we observe evidence of goal-gradient behavior among donors. We also observe precise goal targeting in 33% of campaigns. Monte Carlo simulations of the data suggest that this level of goal targeting likely did not occur by chance. In a regression analysis, we find that donations tend to decrease as they approach a goal. Moreover, we find that donations are smallest after a fundraiser's goal has been met. Our results suggest that donor participation and donation amount are affected by proximity to a fundraising goal.

# 2 A simple model of goal-gradient behavior

We can think of two main effects a fundraising goal may have on donor behavior. First, donors may be more likely to donate before the goal is reached (the extensive margin). Second, donors may make smaller contributions as the goal approaches (the intensive margin). To illustrate these two effects we sketch a simple model of donor utility.

Suppose a donor decides whether to donate $d > 0$ to a fundraiser with numerical goal $g$ and total donations from all other donors $D = \sum_{j \neq i}^{n} d_j$. The donor observes $g$ and $D$ when deciding $d$. Suppose the donor's utility is

$$U = \bar{y} + d\Big[\alpha + \underbrace{\beta_1 \mathbb{1}(g-D)^+ \gamma_1^{\frac{1}{(g-D)^+}}}_{\text{before goal is met}} - \underbrace{\beta_2 \mathbb{1}(D-g)^+ \gamma_2^{\frac{1}{(D-g)^+}}}_{\text{after goal is met}}\Big] \tag{1}$$

where $\bar{y}$ is numeraire utility from all other goods, $\mathbb{1}(\cdot)$ is the indicator function and $(x)^+ = \max(x, 0)$.

Assuming the donor chooses $d$ on the margin, the key insight from Equation 1 is that marginal utility of donating kinks at the goal:

$$\frac{\partial U}{\partial d} = \begin{cases} \alpha + \beta_1 \gamma_1 \frac{1}{(g-D)^+} & \text{if} \quad g > D \\ \alpha - \beta_2 \gamma_2 \frac{1}{(D-g)^+} & \text{if} \quad D > g \end{cases} \tag{2}$$

where we assume $\alpha > 0, \{\beta_1, \gamma_1, \beta_2, \gamma_2\} > 1$, and $\alpha + \alpha - \beta_2 \gamma_2 \frac{1}{(D-g)^+} > 0$. Equation 2 says that the donor always gets some utility $\alpha$ from donating, but that utility is either boosted or attenuated depending on whether the goal is reached when the donor chooses $d$.

Before the goal is reached ($g > D$) the donor receives additional utility $\beta_1 > 1$ simply from donating (the extensive margin). Moreover, this boost is moderated by the state of the

fund when the donor considers $d$. Since $\gamma_1 \frac{1}{(g-D)^+}$ gets larger as $D \to g$, the donor gets more utility from choosing a smaller donation (the intensive margin). But when few donations have been made and $g - D > 0$ is large, $\gamma_1 \frac{1}{(g-D)^+}$ is small, so the added utility of donating before the goal is reduced.

The picture flips after the goal is met ($D > g$). The donor still receives $\alpha$, but now they incur a disutility $\beta_2$ for arriving late to the party, and that disutility grows by $\gamma_2 \frac{1}{(D-g)^+}$ as total donations exceed the goal.

A more complete model would account for the strategic considerations behind charitable giving (e.g. Duncan, 2004; Andreoni, 1990). Still, we are aware of no other study that sketches a model of the extensive and intensive margins of donor behavior around a fundraising goal. Our model, though simple, we makes two straightforward predictions. On the extensive margin, the number of donations will go up as the goal approaches. And on the intensive margin, the size of each donation will go down. In the next section we provide empirical evidence of both effects.

# 3 Data

Data were collected from two fundraising periods (2013 and 2014) for a single charity, The Stand, which raises money for children's hospitals in the New York metropolitan area. Fundraisers collected donations until a common end date, preceded by up to a four-month collection period. Donations were made through a website where each fundraiser had her own webpage. These personal webpages displayed a "thermometer" showing how much money was raised, the previous 20 donations made to the fundraiser, and the remainder to the goal. Fundraisers were required to set their goal to at least \$150. Fundraisers who did not collect the minimum are excluded from our analyses. A total of 202 fundraisers participated in the charity. We exclude fundraisers who failed to reach their goals ($n = 45$) and those whose self-contributions led their donation sum to meet or surpass the minimum required to participate in the charity ($N = 36$). Our final sample includes 1,326 donation observations to 121 fundraisers. Table 1 presents descriptive statistics for the analytical sample. The vast majority of donations (98%) were less than or equal to \$150. The distribution of these donations is given in Figure 1.

Table 1: Descriptive statistics.

| | Min | Max | Mean | Median | Std. dev. | Obs. |
|---|---|---|---|---|---|---|
| Fundraiser Goal (\$) | 150 | 3,000 | 333 | 150 | 420.5 | 121 |
| Fundraiser Donation Total (\$) | 150 | 4,136 | 474.65 | 287 | 566.44 | 121 |
| Fundraiser number of donations | 1 | 53 | 11 | 9 | 8.7 | 121 |
| Donation Amount (\$) | 1 | 1,800 | 43.31 | 25 | 83.9 | 1,326 |

*Notes*: The data are comprised of 1,326 donations to 121 fundraisers.

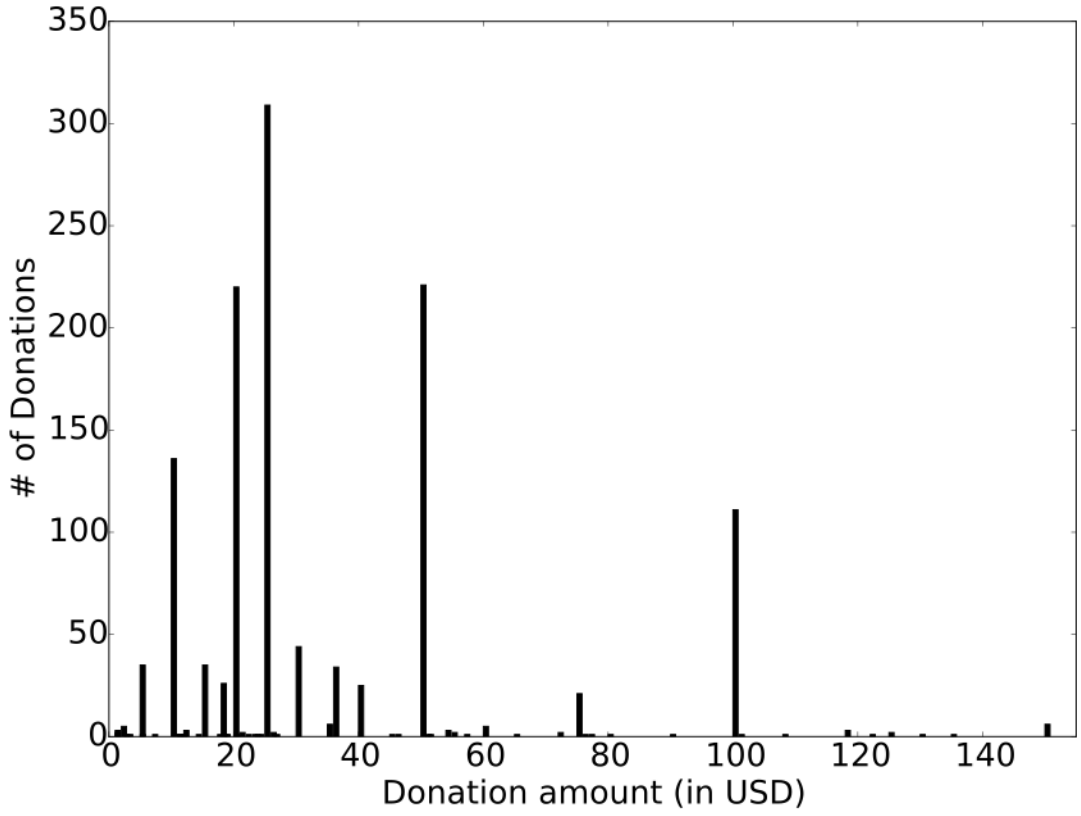


Figure 1: Histogram of donation amounts. *Notes:* Donations above $150 are omitted to focus on the majority of donations.

# 4 Methods and empirical results

We begin with a graphical analysis of goal-gradient behavior. We then test for goal-targeting behavior and conclude with a multivariate regression analysis of donation amounts.

## 4.1 Goal-gradient behavior

The goal-gradient hypothesis predicts an increase in the rate of donations as fundraising goals approach and a decline after the goal is reached (Cryder et al., 2013). Figure 2 shows the number of donations per day relative to the day the goal is reached (time=0). We observe an increased rate of donations when nearing the goal, as shown on the left side of time=0. Upon reaching the goal (points to the right of time=0), donation rate declines sharply. Taken together, these results are consistent with goal-gradient behavior.

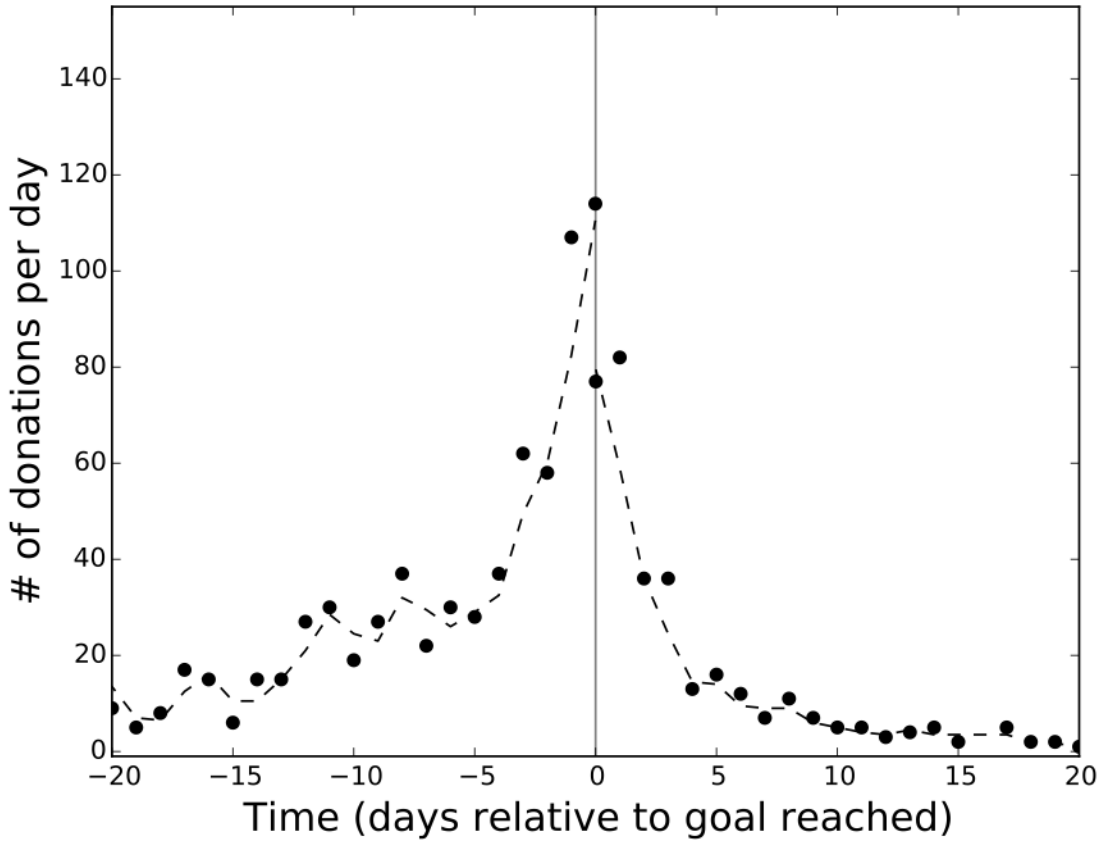


Figure 2: Donation rate and proximity to goal. *Notes:* Rates of donations (per day) are plotted over time relative to the goal being reached. Dashed lines indicate data on each side of time=0 smoothed with a two-day moving average. The top point on time=0 represents donations preceding the goal being met while the bottom point on this day represents donations after a goal is reached. The goal-targeting or goal-surpassing donations ($N = 121$) are omitted.

## 4.2 Goal-targeting behavior

To assess goal targeting in donations, we plot each donation against the amount remaining to the goal in Figure 3. Donations that appear along the diagonal are "targeted" donations, that is, the sum of that donation and all previous donations equals the goal. The shade and transparency of each point are scaled according to how many donations occurred at that remainder-to-goal point. Overall, there were 40 instances of goal targeting among the 121 fundraisers (33%).

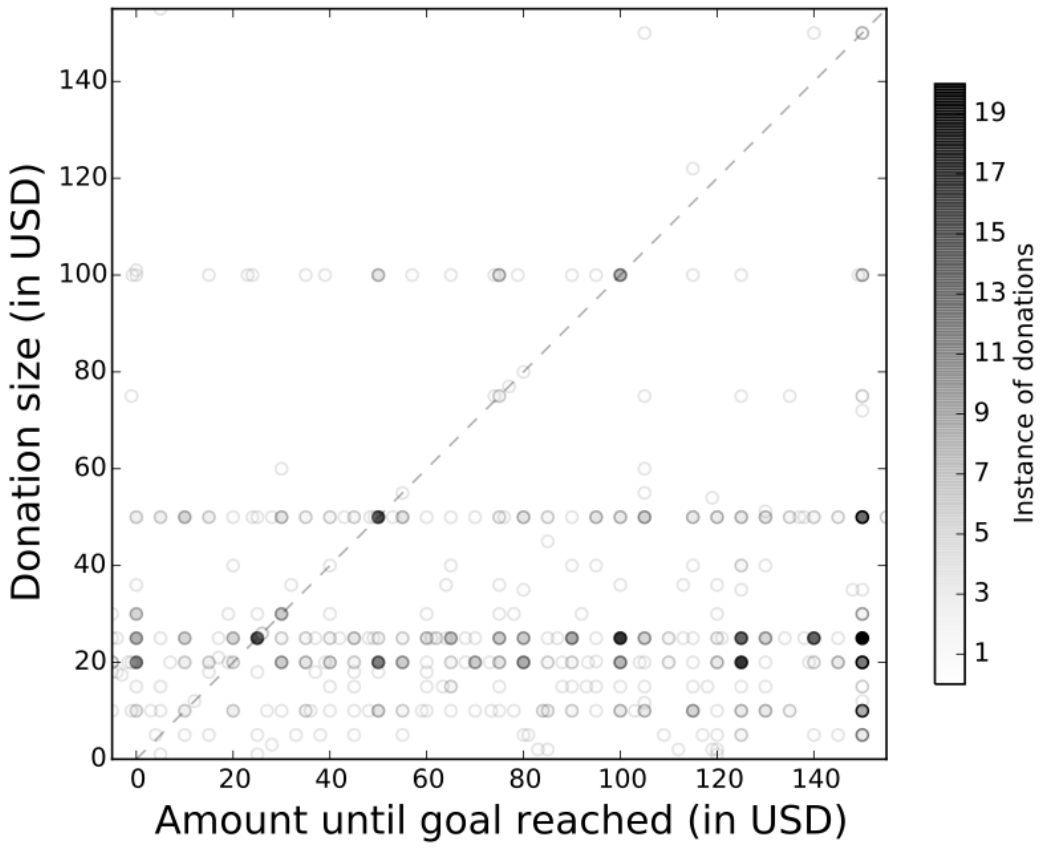


Figure 3: Donation amount and frequency as a function of remainder to goal. *Notes:* Point shades and transparencies are scaled according to the number of occurrences of that donation-remainder pair. The axes are bounded to $150 to highlight the majority of goal-targeting instances.

We test the likelihood of goal targeting in our data happening by chance with three Monte Carlo simulations: (1) simulate the number of goal-targeted donations when the donation reaching or surpassing the goal was removed, and sample with replacement from each fundraiser's donation pool; (2) same as (1) but sample without replacement; and (3) same as (1) but sample with replacement from the entire population of 1,326 donations. Each simulation is performed 10,000 times for all 121 fundraisers, yielding 10,000 percentages of goal targeting per simulation. The distribution of these goal-targeting percentages are plotted as a histogram in Figure 4 to illustrate the probability of randomly matching each fundraiser's remainder-to-goal.[1] On average, the likelihood of randomly hitting the goal for Simulation 1 ("With Replacement"), Simulation 2 ("Without Replacement"), and Simulation 3 ("From Population") is 15%, 10%, and 6%, respectively. In none of the 10,000 samples for each of the three simulations does goal targeting reach 33%, suggesting that the probability of

[1]We also consider simulations where we resample with replacement the entire string of donations made to each fundraiser. The percentage of goal targeting does not reach greater than 15% in any of these simulations.

observing this amount of targeting by random chance is exceedingly small (less than 0.01%).

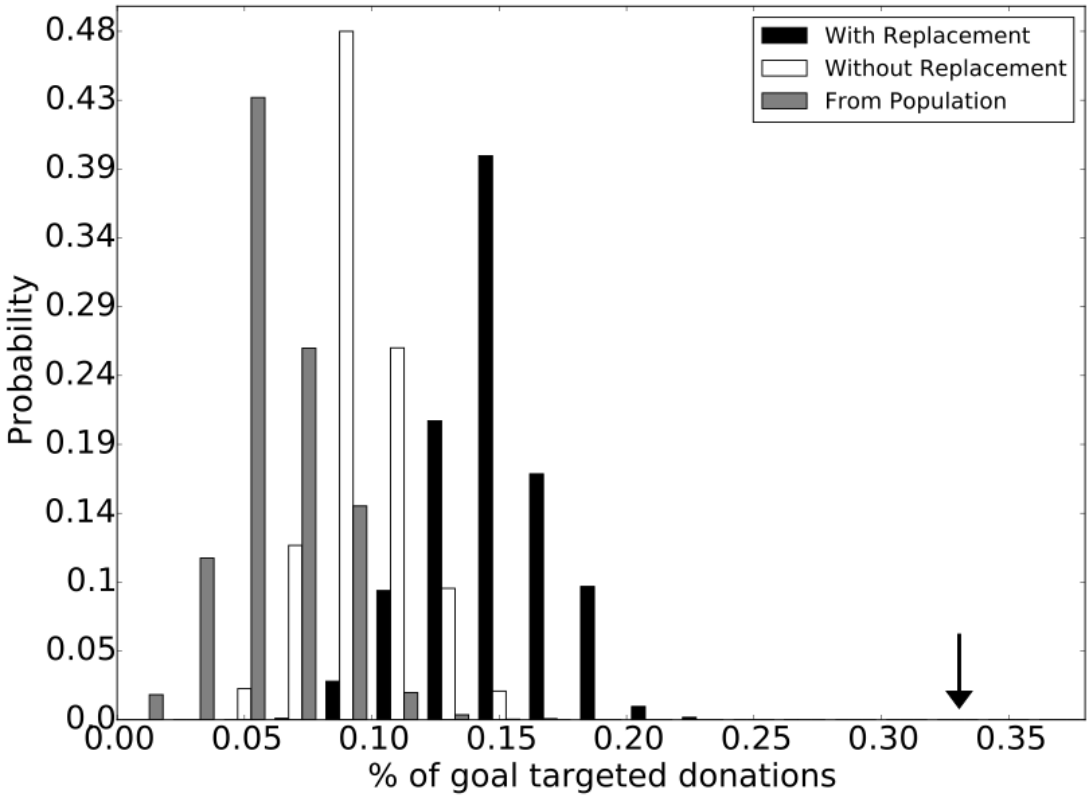


Figure 4: Histogram of simulated goal-targeting percentages *Notes:* Data are from Monte Carlo simulations (10,000 iterations per simulation) testing for likelihood of random goal hitting by sampling from a fundraiser's pool with replacement, sampling from a fundraiser's pool without replacement, and by sampling from the entire population. The black arrow indicates the percent of targeted donations observed in the real data (33%).

To further examine the relationship between goal proximity and donation amounts we estimate the following model:

$$d_i = \beta_0 + \beta_1(\text{To go}_i \leq 0) + \beta_2(0 < \text{To go}_i \leq 50) + \beta_3(50 < \text{To go}_i \leq 100) + \mathbf{X_i}'\gamma + \varepsilon_i \quad (3)$$

where $d_i$ is the dollar amount of a donation made by donor $i$. The variable $\text{To go}_i$ measures the dollar amount until a goal is reached at the time donor $i$ makes her donation, with a negative value indicating the goal has been surpassed. The coefficients $\beta_1$, $\beta_2$, and $\beta_3$ are multiplied by indicator functions for various bins of $\text{To go}_i$ and allow us to examine how distance-to-goal correlates with donation amount. The omitted category is greater than \$100 until the goal is reached. The vector $\mathbf{X_i}'$ contains control variables that likely affect donor behavior. Specifically, we include the running average of the previous 20 donations, the order (as a percentile) in which the donation was made relative to other donations to the same

fundraiser, a year-month-week fixed effect, and a fundraiser fixed effect.[2] Standard errors are clustered at the fundraiser level though results are not sensitive to level of clustering. In order to prevent a few unusually large donations from skewing the regression results, we drop fundraisers who receive a donation within the top 1% ($250) of all donations. We then compare the results from this subsample with the full sample.

Though we do not interpret our regression results as causal, interesting relationships emerge between distance-to-goal and amount donated in Table 2. Column (1) shows that, relative to donations made more than $100 before a goal is reached, donations made closer to the goal tend to be smaller, with the smallest donations occurring after the goal is reached. A similar pattern emerges in column (2) for the full sample, though the coefficients are less precise. The $R^2$ drops by roughly 10 percentage points from column (1) to column (2), suggesting that including uncommonly large donations obfuscate overarching patterns in behavior.

Table 2: Regression results.

| *Donation amount ($d_i$)* | (1) | (2) |
|---|---|---|
| To go $\leq 0$ | -20.85*** | -35.63* |
| | (5.58) | (20.71) |
| $0 <$ To go $\leq 50$ | -11.04** | -21.51* |
| | (4.63) | (11.07) |
| $50 <$ To go $\leq 100$ | -0.23*** | -0.65** |
| | (0.05) | (0.29) |
| Order (as percentile) | 26.00*** | 49.41** |
| | (7.32) | (21.45) |
| Top 1% included | No | Yes |
| Year-month-week FE | Yes | Yes |
| Fundraiser FE | Yes | Yes |
| Observations | 1161 | 1326 |
| $R^2$ | 0.29 | 0.19 |

*Notes*: Each column is a separate regression. The omitted distance-to-goal variable is greater than $100. Robust standard errors clustered at the fundraiser level are given in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

# 5 Concluding remarks

Consistent with theoretical and experimental literature on charitable giving, we find evidence of goal-gradient behavior among donors to children's hospitals across two fundraising periods in 2013 and 2014. In addition, we see a statistically significant number of donors target their donations to exactly reach the amount remaining in a fundraiser's target. We provide further evidence of goal-targeting in our regression analysis, where we show that approaching a goal is associated with a decrease in donation amount and surpassing a goal is associated with

[2]Including a once-lagged donation as a control yields similar results.

even small donations. This might suggest that the greater perceived impact of donations made near a goal induces donors to contribute less than they otherwise would have.

Designing successful fundraising campaigns requires an understanding of how different features of a charity can impact donor incentives and in turn donations (List, 2011). Our findings suggest that charities that use fundraising targets need to think about how their targets may impact donor behavior along the extensive and intensive margins of charitable giving. Laboratory experiments have shown that charity design can significantly impact donations (Gneezy et al., 2014; Carpenter et al., 2008, 2010). Exploring the combined effect that goal-gradient and goal-targeting behaviors have on donations in controled settings is a promising avenue for future research.

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