No Substitute for the Real Thing:

The Importance of In-Context Field Experiments In Fundraising

Indranil Goswami

University at Buffalo, School of Management

goswami4@buffalo.edu

Oleg Urminsky

University of Chicago, Booth School of Business

oleg.urminsky@chicagobooth.edu

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Abstract:

We present a complete empirical case study of fundraising campaign decisions that demonstrates the importance of in-context field experiments. We first design novel matching-based fundraising appeals. We derive theory-based predictions from the standard impure altruism model and solicit expert opinion about the potential performance of our interventions. Both theory-based prediction and descriptive advice suggest improved fundraising performance from a framing intervention that credited donors for the matched funds (compared to a typical match framing). However, results from a natural field experiment with prior donors of a non-profit showed significantly poorer performance of this framing compared to a regularly framed matching intervention. This surprising finding was confirmed in a second natural field experiment, to establish the ground truth. Theoretically, our results highlight the limitations of both impure altruism models and of expert opinion in predicting complex "warm glow" motivation. More practically, our results question the availability of useful guidance, and suggest the indispensability of field testing for interventions in fundraising.

Keywords: Fundraising, Matching, Altruism, Warm Glow, Motivation, Field Experiment

1. Introduction

One of the most common solicitation techniques used in fundraising is matching – communicating to prospective donors that an external donor has committed to making a contribution based on the amount given by prospective donors. A matching solicitation can be thought of as a conditional leadership gift that uses a commitment to match others' contributions at a given rate, sometimes limited to the maximum amount the leader is willing to give (Karlan & List, 2007). Matching solicitations often promise to match every dollar donated (e.g., a 1:1 match), but both higher match ratios, e.g., 2:1, 3:1, etc. (Dove, 2000; Karlan & List, 2007) and lower match ratios, e.g., 1:3 (Karlan, List, & Shafir, 2011) have also been used. Popular press reports describe matching as a "staple of fund-raising" (Leonhardt, 2008) and a large body of academic work has studied matching solicitations.

The empirical results from research on matching solicitations have been extremely mixed. There is some evidence that matching improves fundraising outcomes (Bekkers, 2015; D. Karlan & List, 2007, 2012; Martin & Randal, 2009; Meier, 2007). At the same time, several papers have failed to find a positive effect, or have even reported a negative effect of matching (Baker, Walker, & Williams, 2009; Davis, Millner, & Reilly, 2005; Eckel & Grossman, 2008; Huck & Rasul, 2011; Karlan, List, & Shafir, 2011; Rondeau & List, 2008).

One particular concern about the effects of matching on funds raised is the potential for "crowding out" behavior. Donors may scale back their contributions in response to a match offer (Adena & Huck, 2017; Huck, Rasul, & Shephard, 2013). Similarly, a higher match ratio (compared to a standard 1:1 match) does not always increase fundraising performance (Karlan and List, 2007). Speculations in the literature attribute such behavior to scope-insensitivity for

quality signals (Karlan & List, 2007) and lack of attention to price information (Eckel & Grossman, 2017).

How can a fundraiser navigate the possibilities and decide on the best matching solicitation to use? What sources of guidance should the fundraiser rely on to make an informed decision about the offer design? In this paper, we show that common sources of guidance, implications of theoretical models and opinions of experts, might fall short of correctly predicting the results of fundraising tactics, such as our novel matching intervention. As a result, in-context field experiments might be indispensible for identifying optimal strategies.

We explore two types of interventions: reframing who gets credit for matched donation funds and setting a cutoff below which donated funds are not matched. We derive predictions of altruistic behavior from basic models of "warm-glow" and find that the models suggest, to varying degrees, that the novel matching interventions may improve fundraising. We solicit the advice of experienced fund managers and find that their opinions also substantively match the predictions of the model, suggesting that the model predictions might have descriptive validity. Finally, we test the predictions of these sources of guidance in two separate natural field studies, in which decision-makers were unaware they were participating in an experiment. The findings from the field reveal markedly opposite results: the novel framing intervention that was deemed most promising raised significantly less money than regular framing.

The goal of this paper is to evaluate the importance of in-context field experiments as the source of "ground truth," particularly in the domain of fundraising. Given the myriad and complex ways in which framing, cognitive biases, and contextual influences can affect warm-glow preferences, our results highlight the limited usefulness of model derivations and expert opinions in correctly anticipating the actual effects of fundraising interventions. Of course,

model predictions and expert advice might provide an initial useful starting point for designing new solicitaion ideas, but our findings suggest that these approaches might have limited use for predicting the viability of these appeals in the actual fundraising context. Anecdotal evidence abounds about both the limited ability and successes of experts in making accurate predictions and about both the limitations and potential of theoretical models to serve as useful abstractions for forecasting effects of actions in the real world. Using a complete, self-contained, "empirical case-study," we evaluate the fit of these approaches to the actual effects of behavioral interventions in an important domain. The results highlight the indispensability of in-context field experiments, at least for identifying optimal fundraising interventions.

The rest of the paper proceeds as follows. In the next section, we develop the predictions for our interventions from theoretical models of impure altruism. In section 3, we report the predictions of professional fundraising managers and highlight the broad convergence of guidance obtained from these two sources. We contrast these predictions with the actual results of an original natural field experiment and a subsequent pre-registered replication field experiment (sections 4 and 5). Our results demonstrate that the sources of guidance fundraisers are likely to rely upon poorly anticipate the real outcomes in the field. We conclude in section 6 with a discussion of the implications of our findings, both for theories of altruism and for fundraising practices.

2. **Predictions from Theoretical Models as Initial Guidance to the Fundraiser**

The standard model of altruistic behavior in fundraising, based on Andreoni (1990; also see Karlan & List, 2007), can be written as:

$$U_i = F(y_i, G, g_i) \quad (1)$$

Here an individual agent i gets utility from private consumption y_i, the total quantity of funds G raised by a charity, and the agent's own private contribution to charity g_i. Assuming y_i, G, g_i are all normalized to the same units, e.g., dollars; the consumption bundle (y_i, g_i) is related by the budget constraint $y_i + g_i \leq w_i$. Assuming that utilities are additively separable, the total utility can be written as:

$$U_i = u(y_i) + \delta_i h(G) + \gamma_i f(g_i) \quad (2)$$

It is typically assumed that $u(\cdot), h(\cdot), and\ f(\cdot)$ are identical across people and each is concave and increasing in y_i, G and g_i respectively (Lange, List, & Price, 2007) . The component $\delta_i h(G)$ represents pure altruism, the utility a person receives from the charity having the funds, which is heterogenous in the population based on the individual-specific parameter δ_i. The parameter δ_i captures characteristics of the fundraising appeal and givers' behavior. For example, it captures individual perceptions of uncertainty about the appeal's potential to raise G and signals that alleviate such concerns are likely to increase the utility derived from pure altruism (List & Lucking-Reiley, 2002).

The component $\gamma_i f(g_i)$ represents the individual-specific utility, or "warm-glow," that a donor receives from personally contributing funds. Donating a larger amount will generate more warm-glow for the donor. Similarly, other factors that make a contributor feel good about their own donation (e.g., boosting the ego, Andreoni, 1990) are likely to increase the warm-glow feeling from a given donation, via γ_i.

When a person donates g_i, the benefits from pure altruism and from warm-glow are countered to some degree by the cost, due to donor's loss of utility from private consumption $u(y_i)$. The balance of these factors is what determines how much the person chooses to donate.

2.1 Matching Solicitations

Next, we present a refinement of the standard impure altruism model that explicitly incorporates matching donations, adapted from Karlan and List (2006). In a standard 1:1 matching, every dollar donated to charity is matched by an external donor. So, the fundraising organization gets two dollars for every dollar the individual decides to donate. Consider potential donor *i*. If person *i* believes that *n* other individual donors (i.e., assuming $n + 1$ donors in the population) will each give an average of *g*, the total amount of money raised by the *n* other donors is $G = 2ng$. More generally, $G = \Phi ng$, where the *matching multipler* $\Phi = 2$ for 1:1 matching, 3 for 2:1 matching, etc. Incorporating these parameters into the standard model and making a few substitutions, the utility of potential donor *i* when making private contribution g_i can be expressed as:

$$U_i = u(w_i - g_i) + \delta_i h(\mathrm{G} + \Phi g_i) + \gamma_i f(g_i) \tag{3}$$

Optimal individual giving under this model is given by differentiating the above utility function w.r.t. g_i. This gives the first order condition (FOC) as:

$$u'(w_i - g_i) = \Phi \delta_i h'(\mathrm{G} + \Phi g_i) + \gamma_i f'(g_i) \tag{4}$$

Here, based on our assumptions, $u'(\cdot)$, $h'(\cdot)$, and $f'(\cdot)$ are weakly positive. Also, since $u(\cdot)$ is concave and $u'(\cdot)$ is decreasing in $y_i (= w_i - g_i)$, $u'(\cdot)$ is increasing in g_i. Therefore, equation 4) expresses the marginal utility of giving as a function of the marginal utility from pure altruism and the marginal utility from warm-glow.

2.2 Predictions from the Standard Matching Solicitations Model

The FOC in 4) makes several useful predictions, verified to various degrees by extant literature. We can think of donors as noisy utility maximizers, such that the utility from donation is assessed with error, and they give until the marginal utility of giving another dollar is less than the marginal utility of keeping the dollar, up to the budget constraint *w*. At the simplest level, when the matching multiplier (Φ) is higher or people derive higher utility from pure altruism (δ_i) or derive more utility from warm-glow (γ_i) based on their own donations, they will donate more, all else equal.

Of particular importance is how the matching multiplier Φ interacts with the other parameters. If the presence of higher matching ($\Phi \geq 2$) serves as a credible quality signal to decision-makers (Karlan & List, 2007), a match may also have the effect of bolstering the pure-altruism benefit, captured as an increase in $\Phi\delta_i$. Matching can also signal higher co-operation in the provisioning of public goods (Bekkers, 2015; Eckel & Grossman, 2003; also see Frey & Meier, 2004; Shang & Croson, 2009). This higher participation can in turn signal higher quality thereby increasing the utility derived from pure altruism, via increasing δ_i. Furthermore, prior donors, who have revealed some preference towards the cause, might have a higher valuation for the public goods generated by the charity based on the funds received, and this would also be expressed as a higher δ_i.

However, as the total amount of public good increases, on account of a higher matching multiplier Φ or a higher n (more donors), the marginal utility that an individual derives from increasing the total amount raised by the charity will decrease, and the individual's donation decision will be relatively more driven by warm-glow preferences (Ribar & Wilhelm, 2002). As a result, matching might induce donors to give less, as the benefits of matching funds crowd out the benefit of their own contribution, particularly if warm-glow benefits are relatively low.

Factors in the donation context can also change the marginal utility derived from warm-glow preferences via γ_i. For example, the nature of solicitor-solicitee interaction (DellaVigna, List, & Malmendier, 2012), attractiveness of the solicitor (Landry, Lange, List, Price, & Rupp, 2006), unconditional gifts (Landry, Lange, List, Price, & Rupp, 2011), generous acknowledgment and recognition one's contribution (Harbaugh, 1998) or psychological benefits of associating with the charity (e.g., Escalas & Bettman, 2003) could boost γ_i, increasing the benefits of personally giving. Thus, differences in the matching multiplier Φ could impact the value of warm-glow γ_i, if the match impacts potential donors' inferences about the charity itself, about their relationship to the charity, or about how they think the charity will view their donation.

Thus, introducing a match or increasing the matching multiplier introduces two broad types of potential countervailing forces in the decision context: potential for detrimental crowding-out and potential for beneficial signalling effects. The balance of these forces determines the net outcome. Recent empirical findings have indeed raised questions about whether higher matching multipliers ($\Phi > 2$) boost fundraising performance more than a basic 1:1 matching (Karlan & List, 2007; but see Meier & Frey, 2004). As suggested by the model, such results could arise on account of multiple reasons, including a reduction in incremental benefits from pure altruism when the match is higher, particularly if warm-glow benefits are not high.

Therefore, the impure altruism model does not make any unambigious prediction about the performance of a standard matching solicitation compared to a no-match control treatment. This is not good news for fundraisers who often resort to higher matching multipliers with the aim of raising more money (Dove, 2000). The idea that matching appeals have multiple conflicting effects on motives to donate raises the possibility, however, that new designs of matching incentives might better isolate those effects of the match that motivate donors.

2.3 Model-based Alternative Matching Strategies

2.3.1 Giving Credit to the Donor Framing

Previous research has shown that how a match is framed can have important consequences for the performance of a charitable solicitation. For example, a rebate framing (e.g., give $10 to the charity and get back $5 from a third party) has been shown to underperform compared to a financially equivalent match framing (e.g., give $5 to the charity and a third party will give the charity a $5 match; Blumenthal, Kalambokidis, & Turk, 2012; Davis, Millner, & Reilly, 2005; Eckel & Grossman, 2003). This has been attributed to a differential misunderstanding of the consequences of matching subsidies (Davis et al., 2005) or to differential beliefs about others' donations (Bekkers 2015).

We propose a "giving credit" framing intervention where we suggest to the donor that the match is being added to the donor's contribution instead of being made as a separate donation. This framing implies that the fundraising organization gives the donor credit for the full sum of both the donor's contribution and the ensuing matched amount. In effect, this could operate as a mental accounting intervention, adding the donor's match amount not only to the pure altruism utility but also to the private warm-glow utility. Under the regular framing, the first-order conditions for an individual donor considering their personal donation amount g_i are as given in (4). In contrast, under the "giving credit" frame, the first-order conditions for an individual donor considering their personal donation amount g_i would instead be:

$$u'(w_i - g_i) = \Phi\delta_i h'(\mathrm{G} + \Phi g_i) + \Phi\gamma_i f'(\Phi g_i) \qquad (5)$$

Given that the individual donation, g_i, is likely to be small w.r.t w_i, we can assume local linearity of $f(\cdot)$ in that range. Under this assumption, the "giving credit" frame should increase incremental utility from donating via the multiplier effect of matching on warm-glow preferences.

$$\Phi\gamma_i > \gamma_i \text{ for } \Phi \geq 2 \quad (6)$$

Therefore, the warm glow model of altruistic giving unambigiously predicts better fundraising performance with the credit framed matching compared to a regularly framed match, under the assumption that the credit-framing intervention only affects the warm-glow term. This is consistent with past research (Landry, Lange, List, Price, & Rupp, 2006; 2010) that has suggested nonmonetary factors (e.g., characteristics of a solicitor, appeal mode i.e., mail vs door-to-door, etc) can influence both the shape and magnitude of the warm-glow utility term in (5).

In this analysis, we have followed Karlan and List (2006) in focusing on the direct effects of the match framing. Thus, we implicitly assume that beliefs about others' donations would be the same (G) regardless of the framing, consistent with assumptions in the prior literature. While beyond the scope of this paper, the "warm glow" model could be extended to take into account game theoretic considerations, such that potential donors infer the effects of framing on others, revising their beliefs from G in the standard framing to G' in the novel "giving credit" framing.

In this analysis, we simply note that well-calibrated belief updating would be likely to reduce, but not eliminate, the effect of our proposed "giving credit" framing. When donors believe that they should give less because the framing will increase donations from others, the fact that they would give less should moderate their beliefs about the impact of the framing on others who are also making the same considerations, which would prevent beliefs from fully offsetting the warm glow benefits of the new framing.

Consequently, this intervention provides a good test case to examine the validity of guidance offered by the theoretical model. From a practical point of view, we note that the proposed framing is costless, unlike a higher match ratio which might exhaust the limited ability of a donor to match donations. Thus, the credit framing intervention has both theoretical and practical significance.

2.3.2 Incremental Matching Mechanism

Some researchers have discussed the intriguing possibility that instituting some kind of threshold for matching could increase donations by reducing the crowding-out effects of the match (e.g., Sanders, Smith, & Norton, 2013). Anik, Norton, & Ariely (2014) find a beneficial effect of a match that kicks in only if sufficiently many people agree to participate. Different matching mechanisms than a simple $(\Phi - 1)$ match for every dollar donated are also possible, and may affect how much donors choose to give. For example, instead of a 1:1 match until a certain threshold amount (D) is raised, a lumpsum match offer that only triggers when the threshold is reached $(D{:}\,D)$ has been shown to raise more funds (Baker et al., 2009).

We consider specifically an offer made to prior donors to match every dollar they contribute over and above their previous contribution (i.e., a 1: Δ offer). Defining p_i as donor *i*'s most recent prior donation, the matching multiplier Φ now depends on the prior and current donation:

$$\Phi = 2 - min\left(1, \frac{p_i}{g_i}\right) \tag{7}$$

Therefore, for $g_i \leq p_i$, there is no multiplying effect of donations as $\Phi = 1$. Also, the matching multiplier is strictly less than that in the case of a full 1:1 match where $\Phi = 2$.

We define G' as donor *i*'s beliefs about how much will be raised from other donors, including the incremental matches based on those other donors. Under the incremental match offer, the FOC will be the same as no match (with G' in the pure altruism utility term) when $g_i \leq p_i$. However, there will be at discontinuity at $g_i = p_i$, such that the FOC will differ from the full match for $g_i > p_i$:

$$u'(w_i - g_i) = \begin{cases} \delta_i h'(\mathrm{G}' + g_i) + \gamma_i f'(g_i) & \text{if } g_i \leq p_i \\ 2\delta_i h'(G' + 2g_i - p_i) + \gamma_i f'(g_i) & \text{if } g_i > p_i \end{cases} \quad (8)$$

This matching intervention could result in multiple differences in utility, relative to the full match. First, the direct (non-strategic) effect of the change on donors' beliefs about funds raised by others, is that *G*' will be smaller than the corresponding believed funds *G* raised under the full (1:1) match, since only a fraction of the donations (i.e. the incremental amounts) will be matched. If so, the incremental match would lead to less crowding out relative to control than the 1:1 match does, because $h'(\cdot)$ will be evaluated at an earlier, less flat part of the curve. Therefore, the utility derived from incremental pure altruism from the same individual donation could be higher under the incremental match than the full match.

Second, the incremental match introduces a discontinuity, such that there is no match benefit to the individual, holding beliefs about others' donations constant, for donations at or below the prior year's donation. As a result, the incremental pure altruism benefit of donating an additional dollar will be higher directly above the prior donation amount compared to below. This is likely to shift some donors who would have given the same amount as before or slightly less without a match, to instead give more than the prior donation, increasing donation amounts compared to full matching. This is also clear from equation (8), as $2g_i - p_i < \Phi g_i$ for Φ =2 (the matching multiplier for a full match) and therefore $h'(\cdot)$ is evaluted at a relatively less flat portion of the curve. Consequently, the incremental utility derived from pure altruism is likely to be higher with incremental matching compared to full matching, holding beliefs about others' donations constant.

Third, as discussed in the context of framing, beliefs about others' donations could be afffected not only directly, via a lower implied match rate as discussed above, but also indirectly, via changes in beliefs about the likelihood and amount of others' donations. While the model makes a simplifying assumption that donors don't engage in that level of strategic thinking, we reiterate that the effect of such reasoning is likely to be a moderation but not elimination of the effects of the incremental match.

The incremental matching could also be thought of as a poorer match compared to a full 1:1 match offer. Therefore, although it could reap benefits from lesser crowding out, as outlined above, it could also suffer from some disadvantages compared to a full match. For example, the signalling benefits of a higher match and its consequent salutary effect on both the heterogenous pure altruism as well as the warm-glow components might be reduced. As a result, the balance of these countervailing forces determines the relative performance of an incremental match compared to a full match mechanism, and the model makes no unambigious predictions about the results.

2.3.3 Incremental Matching with Credit to the Donor

Lastly, we consider the joint effects of combining both changes to the matching offer, incremental matching and "giving credit" framing. When considering making a donation less than or equal to the donation from the prior year, the first order conditions will the same as no match. However, there will be a discontinuity at $g_i = p_i$, such that the first order conditions will differ from the standard match and the previous incremental match for $g_i > p_i$:

$$u'(w_i - g_i) = \begin{cases} \delta_i h'(\mathrm{G}' + g_i) + \gamma_i f'(g_i) & \text{if } g_i \leq p_i \\ 2\delta_i h'(G' + 2g_i - p_i) + (4g_i - p_i)\gamma_i f'(2{g_i}^2 - p_i g_i) & \text{if } g_i > p_i \end{cases} \quad (9)$$

Following a similar line of reasoning used when comparing credit framing with a standard match to regular framing, the model makes analogous predictions about the unambigious benefits of incremental matching with credit framing over incremental matching alone. Intuitively, this is because both the benefits of incremental matching and that of the discontinuity are now magnified by the warm-glow term when $g_i > p_i$.

In sum, it is clear from the above discussion that the impure model of altruistic giving makes unambiguous predictions about the benefits of "giving credit" framing over regular framing with standard (1:1) matching, and similarly about the benefits of "giving credit" framing over regular framing with incremental (1: Δ) matching. The model is more ambiguous about the benefits of standard (1:1) matching over no-matching, or incremental matching (1: Δ) matching over standard (1:1) matching. The former two comparisons comprise the strongest test cases for evaluating how the quality of guidance from various *ex-ante* sources stacks up against empirical evidence.

3. Expert Opinion as Guidance to the Fundraiser

A different source of guidance, that charities may in fact be more likely to rely on, is people with experience and expertise in fundraising, whether their own staff or peers with corresponding roles at other organizations. The beliefs of fundraising experts could reflect the model implications, particularly if the model represents a good description of reality. Indeed researchers recommend collecting expert beliefs before conducting experiments (DellaVigna & Pope, 2017). However, the experts' beliefs could also diverge from the model implications. The discrepancy could occur either because experts are less accurate than relatively accurate statistical models (Dawes & Corrigan, 1974; Dawes, Faust, & Meehl, 1989), or because they have learned about donor's actual behaviors that diverge from the model implications. To test this, we surveyed experts with practical experience in raising money for non-profits, to measure their beliefs about the causal effects of the proposed interventions.

3.1 Design

We used the services of a professional online panel company to recruit fundraising managers (N=105) of non-profit organizations for a brief survey. Participants had an average of 10.2 years of experience in fundraising related work, and 66% reported having worked in fundraising campaigns that specifically used matching contributions.

Experts read about a direct mail fundraising campaign for a non-profit and about the intended target audience (see Table 1 for a summary; the actual stimuli used in all studies are provided in the Online Appendix). Experts then read about each of the five different solicitation strategies discussed earlier: control (no matching), standard matching (i.e., 1:1), standard matching with "giving credit" framing, incremental matching (i.e., 1: Δ), and incremental matching with "giving credit" framing.

This within-subjects design elicits expert advice for multiple fundraising appeals simultaneously, which is similar to the approach used in recent research (e.g., DellaVigna & Pope, 2017). While this is different from how potential donors encounter appeals (one at a time), it realistically reflects the actual differences in the market, such as between managers and customers (Shen et al 2012). The joint evaluation in the expert survey is consistent with how fundraisers brainstorm the advantages and disadvantages of the options under consideration. By comparing multiple options, the managers can prioritize strategies, or select different strategies for different target groups.

Experts compared four pairs of two out of the five conditions (see Table 1) and answered two questions (e.g., compared to X, do you think participation would be higher in Y) about each pair, using five-point Likert scales (1=Definitely Yes, 2=Probably Yes, 3=Cannot Predict, 4=Probably No, 5=Definitely No). First, they evaluated how likely they thought it was that participation rates (i.e., the number of people responding to the appeal) would be higher in one condition versus the other. Then they evaluated how likely the average donation amount (i.e., among those who responded to the appeal with a non-zero donation) was to be higher in one condition versus the other. These two questions were answered for each of the four pairs: standard matching vs. control, standard matching with "giving credit" framing vs. standard matching with regular framing, incremental matching vs. standard matching (both with regular framing), and incremental matching with "giving credit" framing vs. incremental matching with regular framing. Experts then answered a few follow-up questions about their work experience.

Conditions	**Solicitation text shown to experts**
Control	"During our 75th Anniversary, we hope you will continue to join us in demonstrating your commitment to Chicago's art and artists by making a contribution today."
Standard Matching	"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future. This supporter will give $1 for EVERY $1 you contribute. **So, for every dollar you give**, we will receive two dollars in support of our programs — your dollar and a dollar from this supporter. Let's not lose this match — please give today!"
Standard Matching with "giving credit" framing	"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future. This supporter **will add $1 to your contribution** for EVERY $1 you give. So, for each dollar you give, **we will receive two on your behalf** in support of our programs. Let's not lose this match—please give today!"
Incremental Matching	"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future. This supporter **will give $1 for every additional $1 you donate OVER your last gift**. So, for each dollar you add to the amount of your last contribution of $«PREVIOUS», we will receive two in support of our programs —your dollar and a dollar from this supporter. Let's not lose this match — please give today!" *[the placeholder $<<PREVIOUS>> reminded the donor about his/her last contribution amount]*
Incremental Matching with "giving credit" framing	"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future. This supporter **will add $1 to your contribution for every $1 you donate OVER your last gift**. So, for every dollar you add to the amount of your last contribution of $«PREVIOUS», **we will receive two dollars on your behalf** in support of our programs. Let's not lose this match—please give today!" *[the placeholder $<<PREVIOUS>> reminded the donor about his/her last contribution amount]*

Table 1: Conditions with actual descriptions that were shown to experts in the survey.

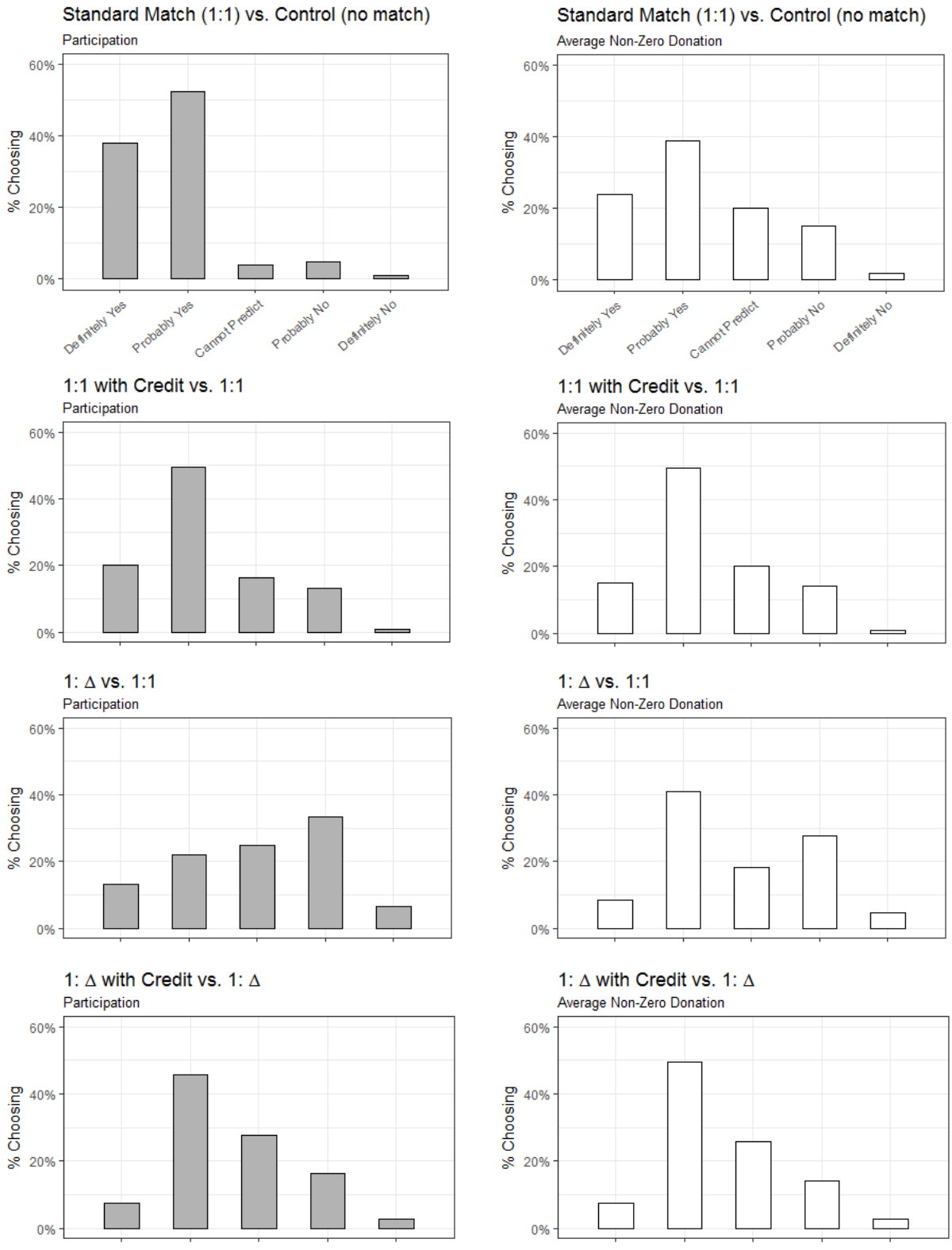

Figure 2: Distribution of raw responses given by experts in the survey

3.2 Results

The raw distribution of experts' responses is shown in Figure 1. Our analysis was intended to determining whether experts were significantly more likely to evaluate one of the solicitation variations as performing better than the other. Accordingly, we recoded responses favoring one version ("definitely yes" or "probably yes" on the Likert scale) as -1, neutral responses (the middle option, "cannot predict") as 0, and responses favoring the other version ("probably no" or "definitely no" as +1. We then compared the mean response of the recoded values to zero.

3.2.1 Participation

Comparing standard matching to control, 90% of the experts thought participation would be higher (M= -0.847 vs. 0, $t(104)=17.50$, $p<.001$) with standard matching, and 6% thought participation would be lower.[1] The experts also expected that the "giving credit" framing would boost participation for matching solicitations. Comparing standard matching to "giving credit" framing, 70% of the experts thought the "giving credit" framing would yield higher participation, while 14% thought participation would be lower (M= -0.552 vs. 0, $t(104)=7.72$, $p<.001$).

However, the experts were pessimistic about incremental matching. Experts were split on whether incremental matching would yield higher participation than standard matching, both using regular framing, with 35% saying it would be higher and 40% saying it would be lower (M= 0.047 vs. 0, $t(104)=0.56$, $p=.576$). However, even in incremental matching offers, the experts were more likely to believe that the "giving credit" framing would be increase

[1] Proportions do not add up to 100% because some people said, "cannot predict."

participation relative to the standard framing relative to (53%), rather than lowering participation (19%; M = -0.343 vs. 0, $t(104)=4.49$, $p<.001$).

3.2.2 Average Contribution upon Participation

Comparing standard matching to control, 63% of the experts thought average contributions would be higher with standard matching, while 17% thought contributions would be lower (M= -0.457 vs.0, $t(104)=6.06$, $p<.001$). Experts were also very positive about the effect of framing on average contribution amounts, with 65% responding that matching with the "giving credit" framing would yield higher contributions than regular framing under standard matching, while only 15% thought it would be lower (M= -0.495 vs.0, $t(104)=6.78$, $p<.001$).

Experts were less optimistic about the effects of incremental matching on the amounts donors gave. Only 49% of the experts thought incremental matching would yield a higher conditional contribution than standard matching with regular framing, and 32% thought it would be lower (M= -0.171 vs.0, $t(104)=1.97$, $p=.052$). Nevertheless, experts were more likely to believe that the "giving credit" framing would yield larger donations in an incremental matching appeal than regular framing (57%) than believed the reverse (17%; M= -0.40 vs.0, $t(104)=5.34$, $p=<.001$).

Expert practitioners examined all our potential interventions as they typically would in team meetings before a fundraising campaign. Overall, the experts agreed with the predictions of the impure altruism model that the "giving credit" framing would be beneficial relative to regular framing or no framing, whether and the match was 1:1 or incremental. Similarly, consistent with the model implications, experts were more uncertain about the effect of incremental matching compared to standard matching.

Based on the sources of information discussed to this point, the fundraiser might feel confident about using the "giving credit" framing, and somewhat less certain about the benefits of instituting the incremental match compared to a standard match. How valuable are these sources of guidance to a diligent fundraiser trying to do adequate homework before deciding on the final campaign design? To get an answer to this question, we conducted a fundraising field experiment in collaboration with a local non-profit in Chicago.

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4. Field Experiment to Evaluate Guidance

4.1 Design

The non-profit was a small but well-established arts organization with less than 15 employees. It promoted young artists by organizing exhibitions and workshops, and also offered various art classes, including summer art classes for children. The non-profit was planning to conduct its annual fundraising campaign, and as part of celebrating its 75th anniversary, had secured a leadership gift from one of its patrons for that year's campaign. The organization leveraged the leadership grant to run a matching campaign during this fundraising drive, with five different randomized mail-based solicitations. This experiment, unlike the survey experiment, represents a natural field experiment (Harrison & List, 2004) in that decision makers did not know that they were part of an experiment.

The organization sent out mailers with a letter signed by the Deputy Director, a pledge card, and a prepaid self-addressed envelope. Mailers were sent to the organization's list of 3588 potential donors. The experimentally-manipulated matching offers, however, were only sent to the people who had previously donated, which constituted 1480 mailings. Targeting prior donors is common in fundraising field studies that use mailers (Goswami & Urminsky, 2016;

Huck & Rasul, 2011; Karlan & List, 2007, 2012; Karlan, List, & Shafir, 2011; List & Lucking-Reiley, 2002), because of substantially higher participation rates, potentially due in part to a greater willingness to open and read the solicitation. The targeted prior donors were primarily small-amount contributors (median last contribution: $45) who had previoiusly either bought a membership, enrolled in classes, attended an event, or contributed in some other way to the organization.

The matching offer for each experimental condition, when applicable, was presented both in the body of the letter and in a summary of the matching offer printed on the back flap of the self-addressed envelope (see the Online Appendix for full details of all the stimuli used). The prior donors were each sent one of the five experimental mailers, using a 2(Matching Mechanism: 1:1, 1:Δ) x 2(Credit to Donor Framing: Yes, No) + 1 (no-match control) between-subjects randomized design. Mailers were sent out in the first week of September, 2014. Contributions were recorded until February 2015 (i.e., for about five months), by which time contributions to the campaign had largely ended (only two contributions were received in February).

4.2 Results

We analyze the results in terms of three outcomes: participation, average contribution among donors (i.e., conditional upon sending in a donation), and net money raised. This approach can sometimes be more informative than merely looking at the overall money raised from a solicitation appeal, as different factors tend to impact the decisions of whether to give and how much to give (Goswami & Urminsky, 2016a).

4.2.1 Participation

Averaging across experimental conditions, the overall contribution rate was 5.6%.[2] The participation level in the standard 1:1 matching condition (8.1%) was directionally higher than in the control condition (5.1%), but the difference was not significant ($\chi^2(1)=2.25$, $p=.133$). This result is consistent with the mixed results in the prior literature on the effects of using matching solicitations with prior donors.

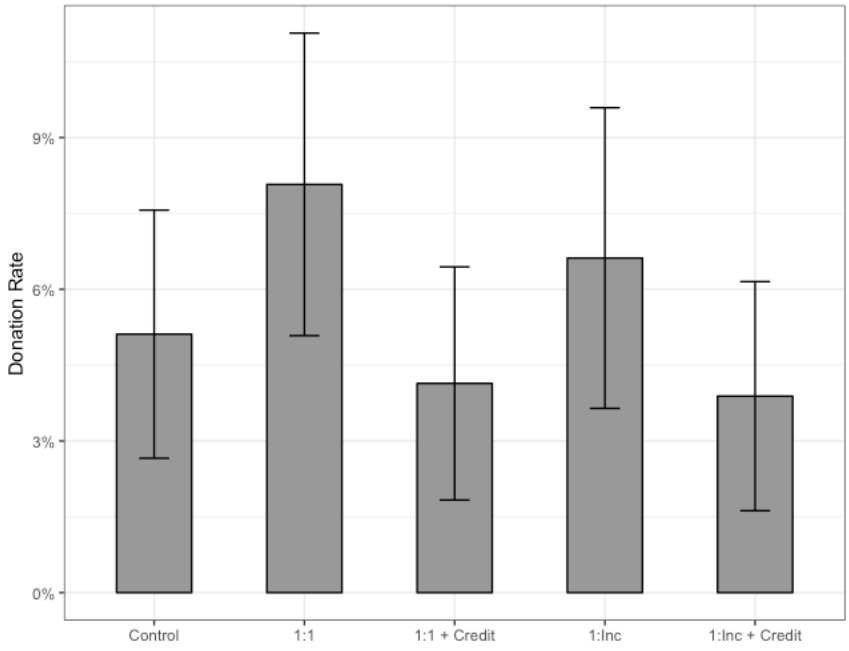

Figure 2: Participation in various experimental conditions. The vertical bars are 95% CI.

More importantly, we find no evidence that the "giving credit" framing improved donation rates, and the observed difference instead point in the opposite direction. Contrary to both the predictions of the impure altruism model and the expert practitioners, when the solicitation was framed to give donors credit for the matching funds, the participation rate was

[2] The raw distribution of contributions obtained in the various conditions is available in the online appendix.

significantly *lower* than the regular framing, under the standard match (4.1% vs. 8.1%; $\chi^2(1)=4.06$, $p=.043$). Likewise, when the incremental matching appeal used the "giving credit" framing, it directionally reduced, rather than increased, participation compared to the incremental matching offer with the regular framing (3.9% vs. 6.6%, %; $\chi^2(1)=2.08$, $p=.148$).

Overall, comparing both the matching conditions with credit framing to the combined matching conditions with regular framing, the "giving credit" framing significantly reduced participation (4.0% vs. 7.4%; $\chi^2(1)= 6.21$, $p=.013$). The detrimental effect of the "giving credit" framing did not vary depending on the matching mechanism used (full match1:1 vs. incremental 1:Δ; $\beta=0.149$, $z=0.281$, $p=.778$).

However, the prior guidance was correct when it came to the effects of incremental matches. Consistent with the equivocal implications of the model and skepticism of the experts, there were no detectable improvements in participation using an incremental match compared to a full match (6.6% vs. 8.1%; $\chi^2(1)=0.45$, $p=.499$).

Overall, although both the sources of guidance may have correctly captured the various levers affecting prosocial motivation, they failed to predict the extent and direction of how warm glow motivation might be affected by solicitation framing. Consequently, the effect of the "giving credit" framing on participations was favorably estimated by both the sources, whereas emprical evidence found a significantly detrimental effect of this framing on participations, compared to standard matching.

4.2.2 Average Contribution

We used log-transformations to account for the skew in the donation amounts, and calculate the average contribution per condition (see Fig. 3).[3]

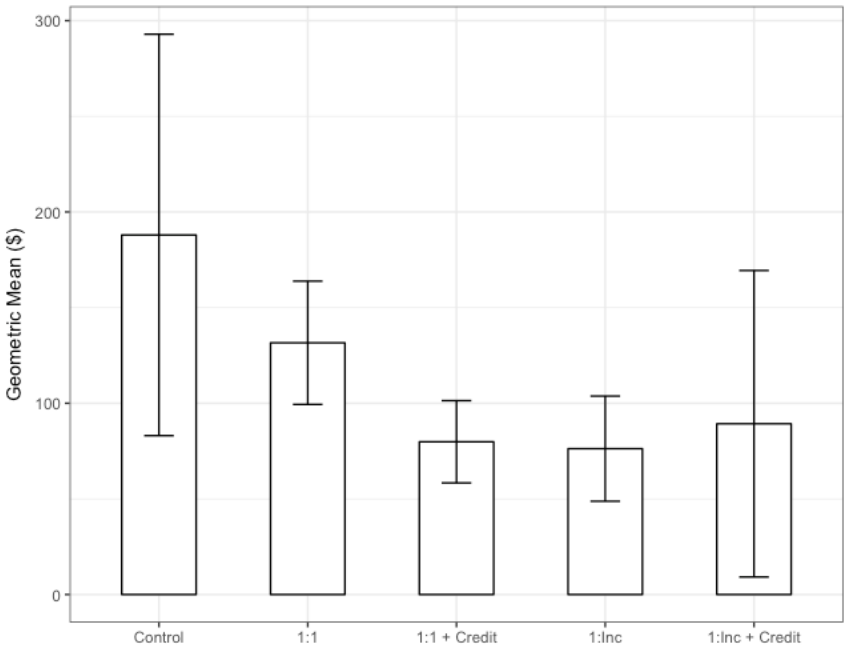

Figure 3: Log of average contribution among donors. The vertical bars are 95% CI.

Those prior donors who gave in this campaign contributed directionally less in the standard 1:1 match than in the control condition ($t(40)=1.34$, $p=0.187$; see Figure 3). Again this highlights the double-edged nature of standard matching as predicted by the theoretical model.

More importantly, we find no evidence that the "giving credit" framing increased contribution amounts. In fact, the "giving credit" framing significantly reduced contributions relative to regular framing, for the standard 1:1 match offer ($t(36)=2.43$, $p=.020$). Likewise,

[3] For robustness, we also examined average contribution and net contribution using non-parametric tests. We also examined the raw responses after employing both Grubbs Test and Winsorizing to handle outliers. The results are reported in the Online Appendix. Finally, we also examined the results after controlling for covariates.

even under incremental matching, the credit framing did not yield significantly higher donations than regular framing ($t(27)<1$). The effect of framing (regular vs. giving credit) did not significantly differ by match type (full match1:1 vs. incremental 1:Δ; β=0.642, t=1.52, p=.134).

The results again indicate that the "giving credit" framing of the match failed to improve contributions. Averaging across framing conditions, the "giving credit" match yielded statistically indistinguishable contributions compared to a regularly framed matching solicitation ($t(65)$=1.07, p=.288), among those choosing to donate.

As we found with participation, prior guidance about the effect of incremental matching compared to full matching was more consistent with the empirical evidence. Indeed, as seen in Figure 3, incremental matching with regular framing yielded significantly lower contribution than full matching with regular framing ($t(42)$=2.59, p=.013). However, once again, the guidance proved to be unhelpful in predicting the effect of credit match framing on contribution amounts.

4.2.3 Net Money Raised

To assess the net effects, incorporating both the number of donors and how much each donor gave, we analyzed the log-transformed average money raised per mailing across conditions. On account of directionally higher participation, the standard 1:1 match raised directionally more money than the control condition ($t(633)$=1.40, p=.161).

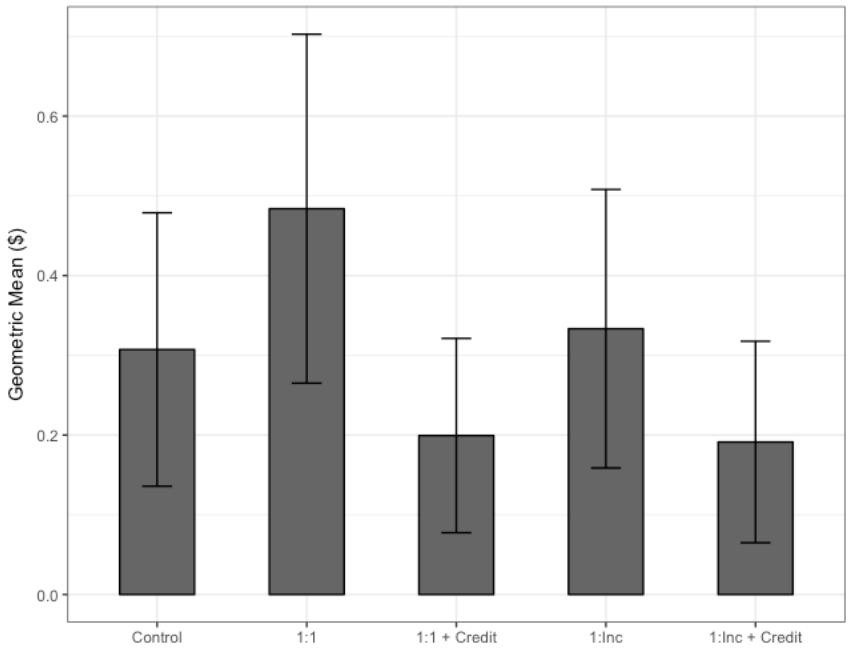

Figure 4: Log of net donations per mailing. The vertical bars are 95% CI.

However, we find no evidence that more money is raised when using the "giving credit" framing. In fact, the credit framing raised significantly less money per person than regular framing under standard matching ($t(610)=2.13$, $p=.033$). Even under the incremental matching scheme, "giving credit" framing raised directionally less money compared to regular framing ($t(553)=1.41$, $p=.160$). Overall, combining both the matching conditions, credit framing significantly reduced the money raised per mailing compared to the regular framing ($t(1165)=2.56$, $p=.010$). Often net money raised is the primary metric a fund manager looks at after a campaign ends, and these results could be seriously disappointing for the manager given the expectations set by the prior guidance.

4.3 Discussion

The results of the field study are quite at odds with the expectations a fundraiser would likely have from prior sources of guidance. Both the impure altruism model and expert practitioners predicted an improvement of fundraiding performance with the "giving credit" framing. However, the "giving credit" framing not only failed to improve fundraising, but instead consistently reduced the outcomes.

The results of the field experiment are not consistent with a failed manipulation (i.e. donors not affected by the framing). There is a consistent decrease in the "giving credit" framing compared to the regular framing used in standard matches for each of the three key metrices: participation, average contribution, and net money raised. Furthermore, incremental matching with the "giving credit" framing was directionally worse than incremental matching alone for both participation as well as for net money raised. Such consistency in results would be unlikely if potential donors did not notice the experimental manipulation.

Nevertheless, there may be a concern that the results of the field experiment occurred by chance, and the statistically significant results are an artifact of multiple hypothesis testing. The field study had five between-subjects experimental cells in order to have a full-factorial design along with a pure control conditionThis design was considered desirable to examine the full range of results under various combination of conditions. However, with the benefit of hindsight, the study was under-powered to detect the size of effects that were observed. Given the constraints on sample size (the number of pior donors), the most feasible approach to increasing statistical power would be to reduce the number of conditions.

Therefore, before we can definitively conclude the field study established a ground truth that is in opposition to the recommendations from theory and from experts, it would be useful to conduct a higher-powered confirmatory replication test, with pre-registered comparisons. To do so, we again partnered with the same organiztion, in the Spring of 2018, to conduct a new fundraising experiment, three and half years after the first study. In this new study, we focused the research design on one key comparison: "credit framing" versus regular framing for a standard 1:1 match.

5. Field Replication as a Test of Ground Truth

5.1 Design

The non-profit organization generally runs its annual campaign in the Fall of every year, but they agreed to run an additional campaign, in which we implemented out two-condition experiment, in the Spring. The study and the analysis plan were pre-registered (viewable at http://aspredicted.org/blind.php?x=na3yk9). Several aspects of the design were similar to the pervious field experiment. First, participants were not aware that they were taking part in an experiment, thereby providing a naturalistic experimental setting. Second, mailers were sent out with a letter signed by the Deputy Director, a pledge card, and a prepaid self-addressed envelope. The experimental intervention was implemented both in the letter as well as on the self-addressed envelope.

However, there were a few differences compared to the the pervious field experiment. Mailers were sent to 3646 people, or which 3036 were prior donors, and the remaining 610 were non-donors. Prior donors who had responsed to the Fall 2017 campaign and had donated more than $250 were excluded from the campaign. Likewise, donors for whom the organization had other upcoming, often individually customized strategies, were excluded, prior to randomization. The median last contribution from prior donors in the new study was $190, which was higher than the previous study.

Non-donors were people who had never donated to the organization, but had attended a free event hosted by the organization in the past five years. The sample was randomly divided into two experimental cells: one group received a standard 1:1 matching solicitation and the other received a 1:1 matching solicitation with the "giving credit" framing (the letters used, along with other stimuli used in this experiment, are provided in the online appendix). Note that while the incremental matching scheme precluded the use of non-donors, standard matching (with the regular framing or the "giving credit" framing) had no such technical restrictions.

All letters were sent out on the second week of May 2018. We collected resposes until the end of the second week of August 2018 – a period of little over three months from the start of the campaign.

5.2 Results

There was only one donation (of $50) received from a non-donor (who had responded to the standard 1:1 matching soliciation). Therefore, the analysis below only considers data from the prior donors, although the conclusions do not differ if the non-donors are included.

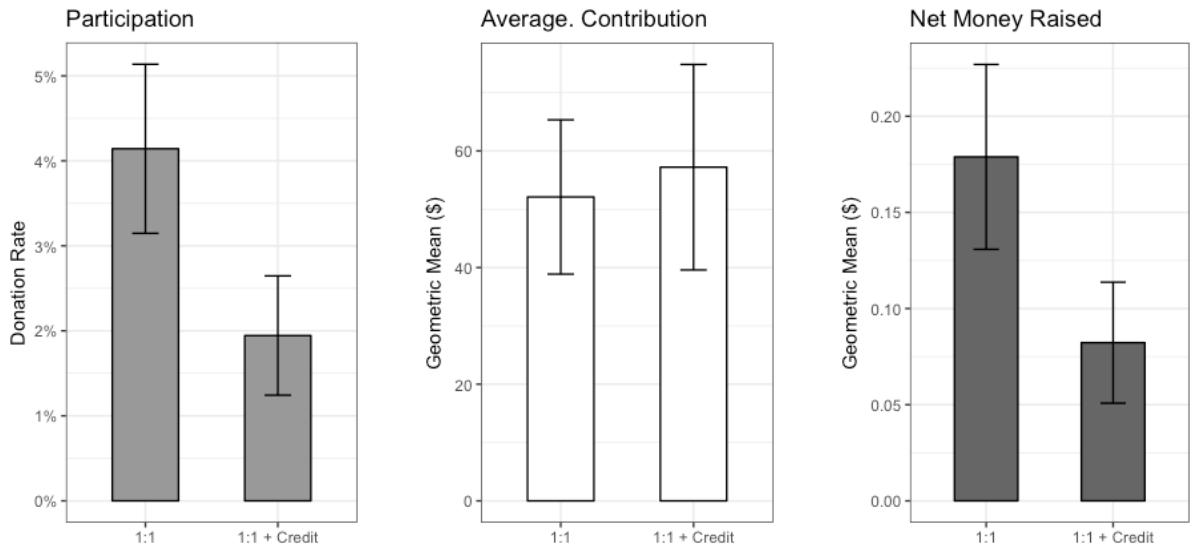

Figure 5: Participation, log of average contribution among donors, and log of net donations per mailing. The vertical bars are 95% CI.

5.2.1 Participation

Averaging across experimental conditions, the overall contribution rate was 3.1%.[4] However the participation levels were significantly different for the two conditions. The participation level in the standard 1:1 matching condition (4.1%; see Figure 5, first panel) was higher than in the "giving credit" framing condition (1.9%; $\chi^2(1)=12.34$, $p<.001$). Therefore, replicating the results of the previous field study, we again found a significant decrease in the likelihood of participation when the credit framing was employed, using a higher-powered pre-registered test.

5.2.2 Average Contribution

[4] The raw distribution of contributions obtained in the various conditions is available in the online appendix.

As in the original field experiment, we used log-transformed donation amounts to account for skew in the data. As shown in the middle panel of Figure 5, the average contribution among those who donated was not different in the two conditions ($t(91) < 1$). In the previous field study, we had found mixed evidence: the "giving credit" framing yielded significantly smaller contributions among participating donors when the standard 1:1 match was used, but not when incremental matching was used. While, we do not replicate this finding, we again find no evidence that the "giving credit" framing *increases* the size of donations, as predicted by the theoretical model and by expert fundraisers.

5.2.3 Net Money Raised

Overall, the standard 1:1 match raised significantly more money than the "giving credit" framing ($t(3034)=3.33$, $p<.001$), driven by the differences in donation rates. Therefore, in this pre-registered higher-powered field replication, we confirm that the "giving credit" framing raised significantly less money per mailing than regular framing of the matching solicitation. These results are robust to using nonparametric statistical tests, excluding outliers, or controlling for covariates.[5]

5.3 Discussion

In the replication study, a larger sample size and pre-registration were employed to reduce the likelihood of false-positive results due to post-hoc statistical analysis and multiple testing. The lower performance of the "giving credit" framing was replicated in the same fundraising context, driven by the replicated difference in donation rates.

[5] For robustness, we conducted non-parametric tests and used both a Grubbs Test and Winsorizing to deal with outliers. The results are reported in the Online Appendix.

6. General Discussion

In this paper, we explore the potential decision process of a fundraiser choosing which form of matching solicitation to implement, among four versions varying the framing of the match and the donation level at which the match first applies. We compare the guidance the fundraiser would receive from two sources: (1) the theoretical impure altruism model of donation behavior, and (2) the opinions of expert fundraisers. While these sources of guidance conveyed uncertainty and mixed results about some of the interventions, the general consensus was that the "giving credit" manipulation would either have no effect (if people failed to incorporate the match into their warm-glow utility) or a positive effect.

Given the common reluctance of fundraisers to conduct field experiments, our hypothetical fundraiser might well decide to implement the "giving credit" framing (with or without an incremental match) based on one or more of these sources of guidance. The results of our field experiment suggest that this decision, reasonably based on the likely sources of information available to the fundraiser, might be a serious mistake, in the current fundraising context. The results of a field experiment and a follow-up pre-registered replication field experiment consistently find strong evidence that the "giving credit" framing would result in significantly worse outcomes for the fundraising organization.

It is important to note that the "ground truth" might be context-specific, and therefore our findings highlight the importance of not only field experiments in general, but in-context, sufficiently-powered field experiments to learn this truth. This observation is in line with recent work finding that the effects of behavioral interventions vary by field context. This context specificity has been observed in fundraising as well. Although Landry et. al. (2006) found a positive effect of solicitor-solicitee interaction in a door-to-door campaign, in a subsequent study List & Price (2009) that matched soliciter-solicitee in terms of race and gender in a door-to-door fundraising drive failed to improve the performance of the campaign. Our findings highlight the complexity of the psychology of warm-glow motivation and consequently the limitations of model-based predictions and expert forecasts. However, our findings have only established the ground truth in our particular study setting, and we do cannot make claims about all fundraising campaigns.

6.1 Implications for research on fundraising

Why did the seemingly promising "giving credit" framing of fundraising appeals fail in the field? It appears that potential donors failed to incorporate the intended benefits into their warm-glow utility. Warm glow preferences were first proposed to explain empirical anomalies that were difficult to reconcile with a theory based on pure altruism (Andreoni 1988;1990). Notwithstanding the improvements this new theory afforded to our understanding of altruistic behavior, our results suggest that both empirical research on the enablers and inhibitors of warm-glow preferences and theoretical model development are needed before we can reliably predict the effects of novel fundraising interventions on donation behavior. Indeed, some research has suggested that mixing egoistic benefits (i.e., benefits to self) with altruistic benefits (i.e., benefits to others) in donation requests reduces its performance compared to using either reasons alone (Feiler, Tost, & Grant, 2012). The researchers suggest that this happens because messages employing mixed motives are construed as an overt attempt to persuade. This is consistent with the idea of a coercive nudge (e.g., Fitzsimons & Lehmann, 2004) which would then inhibit warm glow.

Relatedly, if donors are suspicious of matching claims, it's possible that this uncertainty could have been exacerbated by the framing. Given prior findings that disclosing more details about the match, including the source of leadership gift (Karlan & List, 2012), can improve results of charitable solicitations, perhaps the "giving credit" framing would be effective when more detailed information is available.

Another possibility is a generalization of intuitions that underlie social loafing (Latané, Williams, & Harkins, 1979). By telling potential donors that the leader would add to specifically their own donation, the potential donors might have felt less accountability for their own donation and less ownership of the resulting "joint" donation, undercutting their motivation to donate. It is also possible that the "giving credit" framing was more cognitively demanding to process and potential donors therefore deferred their decisions, resulting in a lower donation rate.

The impure altruism modeling framework is flexible enough to accommodate these possibilities, given additional assumptions or parameters. However, while such a modeling approach could describe the results *post hoc*, it would not provide the kind of *ex-ante* model predictions that are needed as a source of guidance to evaluate the viability of novel fundraising solicitations. Nevertheless, our findings, by highlighting the incompleteness of the theory of warm-glow, raises important questions to be addressed in future research to enable development of analytical models that make more precise predictions in the domain of fundraising. Perhaps these findings may motivate research that moves "from field back to lab," such that non-predicted findings in the field motivate more basic research in lab settings (i.e., as suggested by Bartels, Hastie & Urminsky 2018). However, that would require capturing the key psychological factors at play in donor's decisions in the field and successfully replicating them in a lab setting.

The discrepancy between expert predictions and the ground truth established in our field experiments (at least in this particular setting) also raises interesting questions (similar to those raised by DellaVigna & Pope 2017) about the conditions under which expert intuitions will and will not predict field outcomes. A better understanding of how donors made their choices would enable a comparison to experts' theories of how donors make choices, and may help answer these questions.

6.2 Implications for fundraising practices.

What would our hypothetical fundraiser who relied on reasonable sources of information and chose to implement the "giving credit" framing with incremental matching learn from the experience? Unfortunately, the fundraiser is unlikely to learn much from the observational data that results from just running a novel campaign, due to the lack of a comparison and the resulting inability to conclude reliably what the counterfactual donations would have been. As a result, fundraisers are unlikely to update their beliefs effectively, resulting in the perpetuation of unreliable expert opinion. Absent a controlled trial, as in our field experiment, the fundraiser would not have learned that the "giving credit" intervention was a costly mistake.

The promise of theory-based decision making is that it provides generalizable guidance. However, many practitioners might not be surprised to hear that theoretical economic models developed by academics sometimes generate implications that do not hold up in the field. In fact, prior field experiments have documented other findings that may be rationalizable ex post under the impure altruism model with specific assumptions, but which contradict plausible *a priori* interpretations of the model (Andreoni, 1988; Eckel & Grossman, 2003; Karlan & List, 2007).

These practitioners, sceptical of academic predictions, may believe that they or their experienced colleagues will predict better. However, in our data, professional fundraising managers overwhelmingly and incorrectly predicted that the "giving credit" framing would perform better than the regular framing. Other fundraising managers might put less trust in expert opinions but be confident that with a bit of data about donors, they could choose the best

option. However, prior concerns about the potential difficulty of measuring social preferences in lab studies (Levitt & List, 2007) suggest that using such "pre-test" surveys before launching a campaign, even with incentive-compatible mechanisms, may be of limited benefit.

As a test of this, we conducted a low-cost incentive compatible experiment with online participants, using methods similar to those found in some academic research on altruism (Newman & Shen, 2012; Bartels, Kvaran, & Nichols, 2013), that we thought would be feasible for a typical charity. The results of this experiment, reported in the Online Appendix, were largely inconclusive, although the "giving credit" framing was directionally better than the standard framing. Thus, this kind of survey research also failed to anticipate the results of our field experiments, illustrating that this approach is not always beneficial, either to managers making decisions, or to researchers looking to understand the underlying psychology in the lab. Of course, it is quite possible that a better experiment, perhaps using larger incentives, more realistic materials and/or interviewing actual donors to the specific charity, would have accurately predicted the results of the field studies. However, even if that were the case, doing so would only be feasible for large charities, and the higher costs (in money, employee time, and taxing donors' patience for being contacted) would reduce the advantage over field experiments.

Taken together, the results strongly support a pessimistic view of the fundraiser's ability to accurately predict field outcomes without field experiment data in the relevant context. In this pessimistic view, we echo recent work which concludes that the combination of reasoning processes in a decision may result in different outcomes in different contexts (Goswami & Urminsky, 2016a) and that even field results from one setting may not generalize to another (Alcott & Mullainathan, 2012). While our findings about the weakness of the "giving credit"

framing relative to a typical match framing have been shown to be robust within a single context, replicated in two studies conducted years apart, our data cannot speak to the robustness of the difference across fundraising contexts. Thus, contrary to the conclusions of many academic papers, we do not recommend that fundraisers rely on our findings to make decisions about the type of framed match to use.

Instead, our positive recommendation for fundraisers is to simply test planned interventions in the field before full implementation, and to continue testing new ideas, whether generated from theoretical models, empirical academic research, other fundraisers' seemingly successful practices or expert intuitions, in the field. While such experiments are not costless, doing so is well within reach of most fundraising organizations and the learning can far outweigh the minimal costs (Goswami & Urminsky, 2016b). In fact, many marketing organizations (particularly those operating online) have not only adopted experimentation, but restructured their marketing activities around experimentation, to the point where field testing is an ongoing and seamless aspect of their practice (Brynjolfsson & Mcafee 2011). There is simply no substitute for in-context field experiments to test the consequences of fundraising interventions.

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Online Appendix

Contents

Experimental Stimuli: Field Experiment 1

Letter sent to prior donors in the control condition

September 5, 2014

«Name»

«Company»

«Address»

«City», «State» «Postal_Code»

Dear «Short_Salutation»,

Art enters our lives at different moments, both intentionally and unexpectedly. For some, it is a brief yet memorable encounter; for others, a long-term relationship that has been cultivated over years. And for many more, art is an essential part of life—something that has always been there, engrained in everything you do. Whatever your relationship, the fact that art begins and ends with people is universal. Art exists solely because of the people who communicate through it, interpret it, share in it—you.

At the Hyde Park Art Center, we work to make sure that anyone in our city can participate and progress in the visual arts. With your help, we provide long-term arts education both within our award-winning facility and inside of our neighboring south side Chicago Public Schools. Alongside this work, we nurture artistic advancement and launch diverse Chicago artists into the international contemporary art dialogue.

Successfully carrying out and intertwining these differing activities has grown our audience to over 45,000 participants each year and gained us national recognition as a model for how an organization can develop its city's artists while remaining accessible and relevant to its immediate community.

During our 75th Anniversary, we hope you will continue to join us in demonstrating your commitment to Chicago's art and artists by making a contribution to the Hyde Park Art Center today.

By investing in the Art Center you will: provide artists at all levels the opportunity to challenge their practice and take the next step in their career; empower students to learn new skills through art and become positive leaders amongst their peers; and, continue to build a vibrant community of art participants and supporters in Chicago.

We truly appreciate your involvement and support, and hope to see you soon!

Thank you,

Christina Jensen
Deputy Director

P.S. Please join us on Saturday, September 13 from 12 - 9 PM for our free 75th Anniversary BBQ Block Party Bash. You can find out more about the Block Party, all of our programs, and make a gift online at hydeparkart.org.

Letter sent to prior donors in the 1:1 matching condition

September 5, 2014

«Name»

«Company»

«Address»

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Dear «Short_Salutation»,

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This supporter will give $1 for EVERY $1 you contribute. **So, for each dollar you give, we will receive two dollars in support of our programs—your dollar and a dollar from this supporter.**

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Letter sent to prior donors in the 1:1 matching with credit framing condition

September 5, 2014

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«Company»

«Address»

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Dear «Short_Salutation»,

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Letter sent to prior donors in the 1: Δ matching condition

September 5, 2014

«Name»

«Company»

«Address»

«City», «State» «Postal_Code»

Dear «Short_Salutation»,

Art enters our lives at different moments, both intentionally and unexpectedly. For some, it is a brief yet memorable encounter; for others, a long-term relationship that has been cultivated over years. And for many more, art is an essential part of life—something that has always been there, engrained in everything you do. Whatever your relationship, the fact that art begins and ends with people is universal. Art exists solely because of the people who communicate through it, interpret it, share in it—you.

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This supporter will give $1 for every additional $1 you donate OVER your last gift. **So, for each dollar you add to the amount of your last contribution of $«Gift», we will receive two in support of our programs—your dollar and a dollar from this supporter.**

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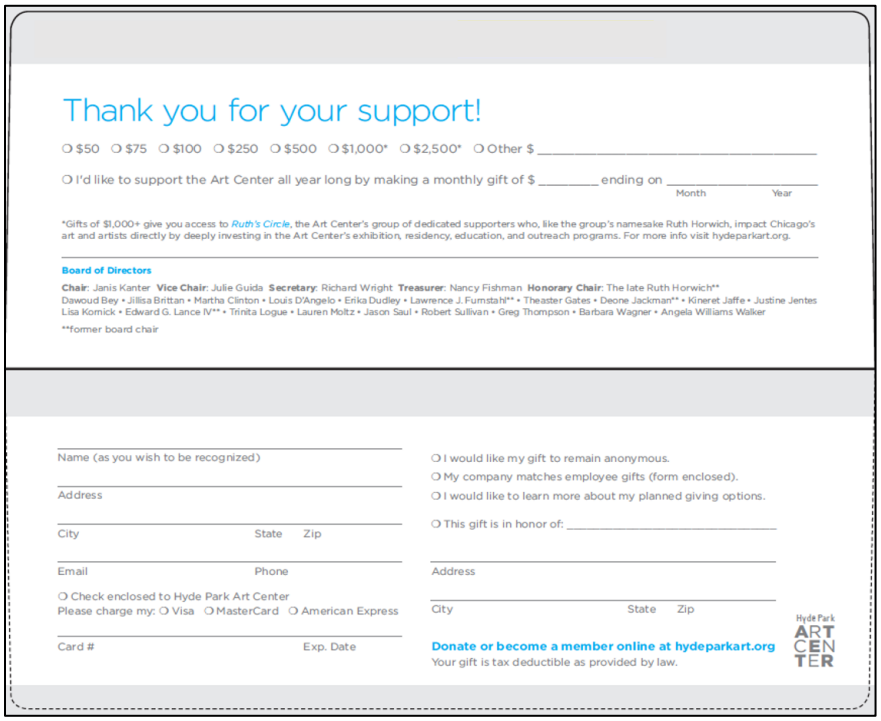
Pledge Card included in all conditions



Thank you for your support!

❍ $50 ❍ $75 ❍ $100 ❍ $250 ❍ $500 ❍ $1,000* ❍ $2,500* ❍ Other $ _____

❍ I'd like to support the Art Center all year long by making a monthly gift of $ _____ ending on _____ (Month / Year)

*Gifts of $1,000+ give you access to *Ruth's Circle*, the Art Center's group of dedicated supporters who, like the group's namesake Ruth Horwich, impact Chicago's art and artists directly by deeply investing in the Art Center's exhibition, residency, education, and outreach programs. For more info visit hydeparkart.org.

Board of Directors

Chair: Janis Kanter **Vice Chair**: Julie Guida **Secretary**: Richard Wright **Treasurer**: Nancy Fishman **Honorary Chair**: The late Ruth Horwich**
Dawoud Bey • Jillisa Brittan • Martha Clinton • Louis D'Angelo • Erika Dudley • Lawrence J. Fumstahl** • Theaster Gates • Deone Jackman** • Kineret Jaffe • Justine Jentes
Lisa Komick • Edward G. Lance IV** • Trinita Logue • Lauren Moltz • Jason Saul • Robert Sullivan • Greg Thompson • Barbara Wagner • Angela Williams Walker

**former board chair

Name (as you wish to be recognized)

Address

City State Zip

Email Phone

❍ Check enclosed to Hyde Park Art Center
Please charge my: ❍ Visa ❍ MasterCard ❍ American Express

Card # Exp. Date

❍ I would like my gift to remain anonymous.
❍ My company matches employee gifts (form enclosed).
❍ I would like to learn more about my planned giving options.

❍ This gift is in honor of: _____

Address

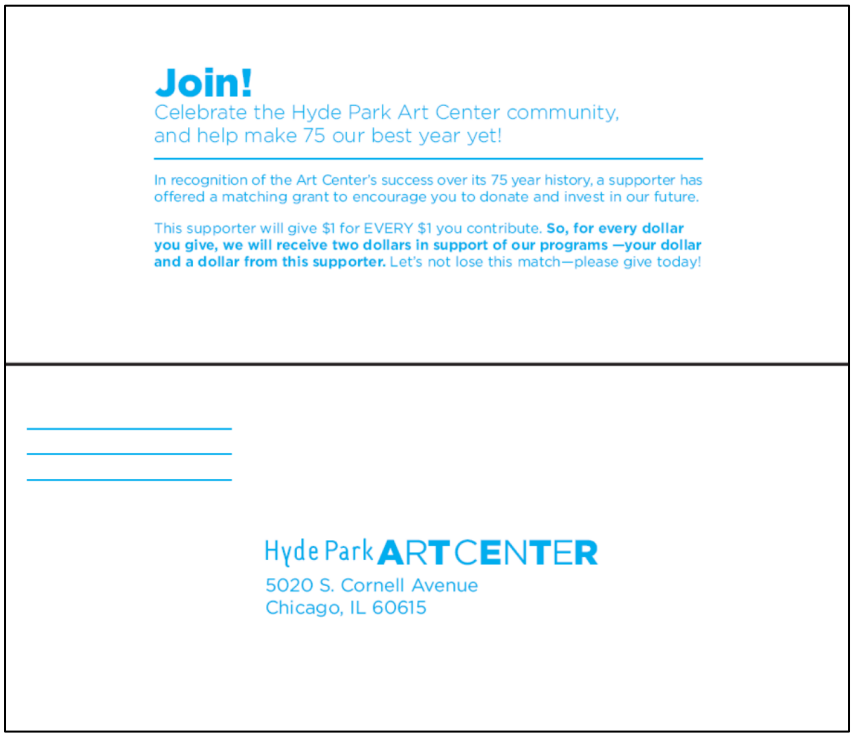
City State Zip

Donate or become a member online at hydeparkart.org
Your gift is tax deductible as provided by law.

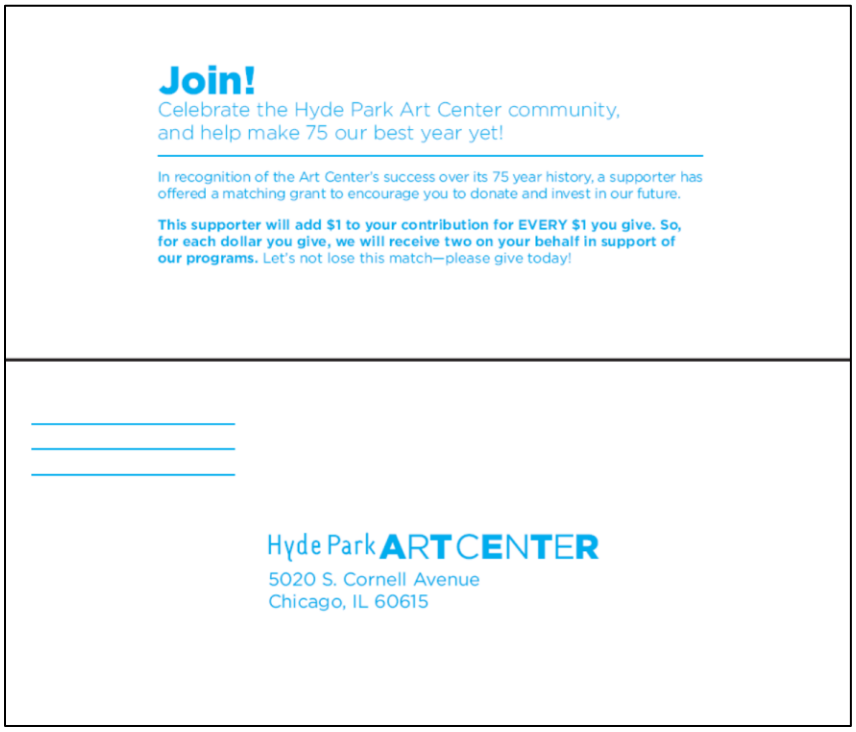
Hyde Park ART CENTER

Return envelope in control condition

Return envelope in 1:1 matching condition



Return envelope in 1:1 matching with credit framing condition



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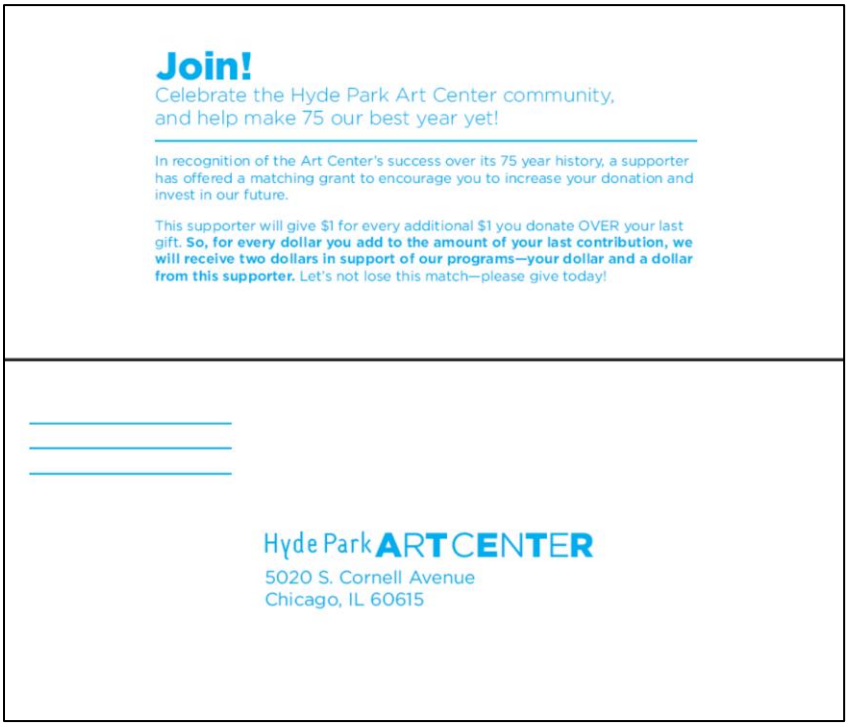

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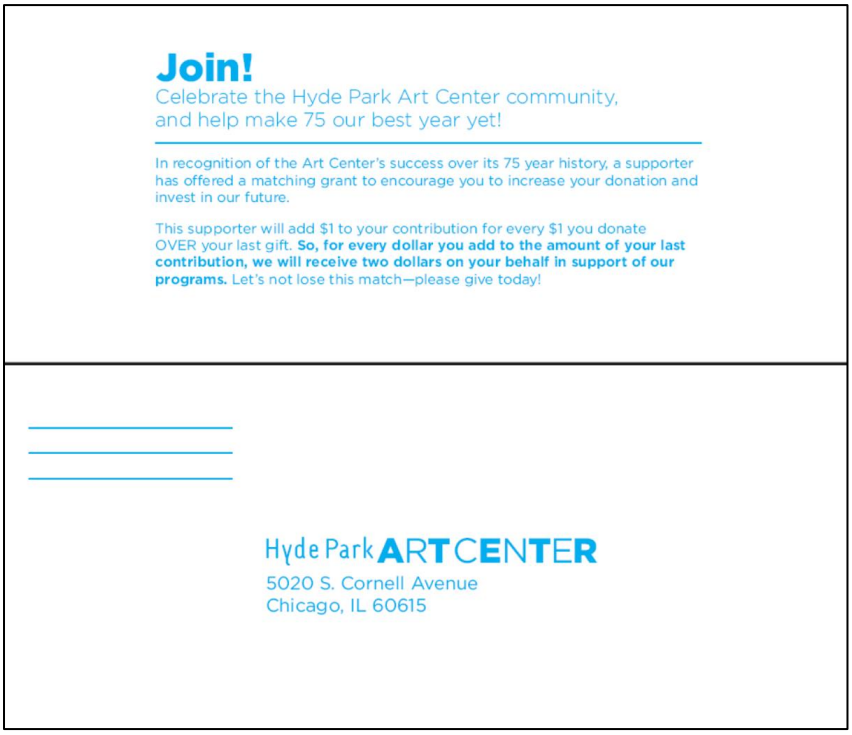

Experimental Stimuli: Field Experiment 2

Letter sent to prior donors in the 1:1 matching condition

May 7, 2018

[Long Salutation]
[Address Lines]
[City], [State], [Postal Code]

"The Art Center is a key component of the community. It is the space where people gather to share ideas, projects, and experiences. The Art Center has allowed me to meet people and to better know our neighborhood, its history, and its community." –Hyde Park Art Center Student

Spring 2018 Portrait Painting Class with Teaching Artist Randall Miller

Dear [Short Salutation],

Behind the Coca Cola machine that serves as a secret passageway at Hyde Park Art Center, the Oakman Clinton School & Studios reverberate with creative energy. Sometimes the spaces are quiet and artists are focused. At other times, the studios buzz with conversation, critique, instruction, and exchange of ideas between people of all different backgrounds. Seven days a week, art projects are started, reworked, and completed.

On Saturday mornings, the drawing and painting studio fills with people who know each other well. Some artists have taken this class for years and are honing their craft. "Our Portrait Painting class is like a community within the community," says teaching artist Randall Miller. "Many of the artists have been taking Portrait for years, nurturing friendships as well as individual talent. There is an amazing collective wisdom to the group; techniques, ideas

about materials, and even coupons for art supplies are shared freely." At the same time, new students are quickly welcomed into the micro-community of the classroom and the larger community of the Art Center.

Whether you are a long-time class-taker, or you have never been behind the "Coke door," your personal investment of money, time, or other resources is what makes the Art Center thrive. **We hope you will continue to support these creative communities by making a financial contribution to Hyde Park Art Center today.**

For a limited time, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter will GIVE $1 for EVERY $1 you contribute. **So, for each dollar you give, we will receive two dollars in support of our programs—YOUR DOLLAR AND A DOLLAR FROM THIS SUPPORTER.**

Hyde Park Art Center is one of the only places in Chicago where art makers of all levels, ages, and stages come together in an inclusive learning environment. Each person's perspectives are specific and personal, but also contribute to an environment of exchange and conversation where the whole is greater than the sum of its parts. "I've been working with Hyde Park Art Center for some time, and it's been a pleasure being part of such a diverse community," says DaLawn Simpson, a regular figure model for the Portrait Painting class and others such as Sculpture: Portrait & Figure, and The Figure in Watercolor. (Simpson is pictured above as the subject of students' paintings.) "Society would find it very beneficial to have more facilities like this."

In an increasingly polarized society, institutions that bridge the economic, racial, and geographic lines that divide us through art-making, like those in Hyde Park Art Center's studios, are more important now than ever.

Your contribution today will help the Art Center continue offering 200 skill-based courses annually in painting, drawing, ceramics, textiles, printmaking, digital media, and more while ensuring all spaces in the building are vibrant and diverse learning environments. **Because of supporters like you, the Art Center is able to welcome both long-time class-takers and newcomers who might not otherwise be able to participate to learn skills like portrait painting.**

We truly appreciate your involvement and hope that you will help us take advantage of this matching grant and give today!

Sincerely,

Kate Lorenz

Executive Director

Letter sent to prior donors in the 1:1 matching with credit framing condition

May 7, 2018

[Long Salutation]
[Address Lines]
[City], [State], [Postal Code]

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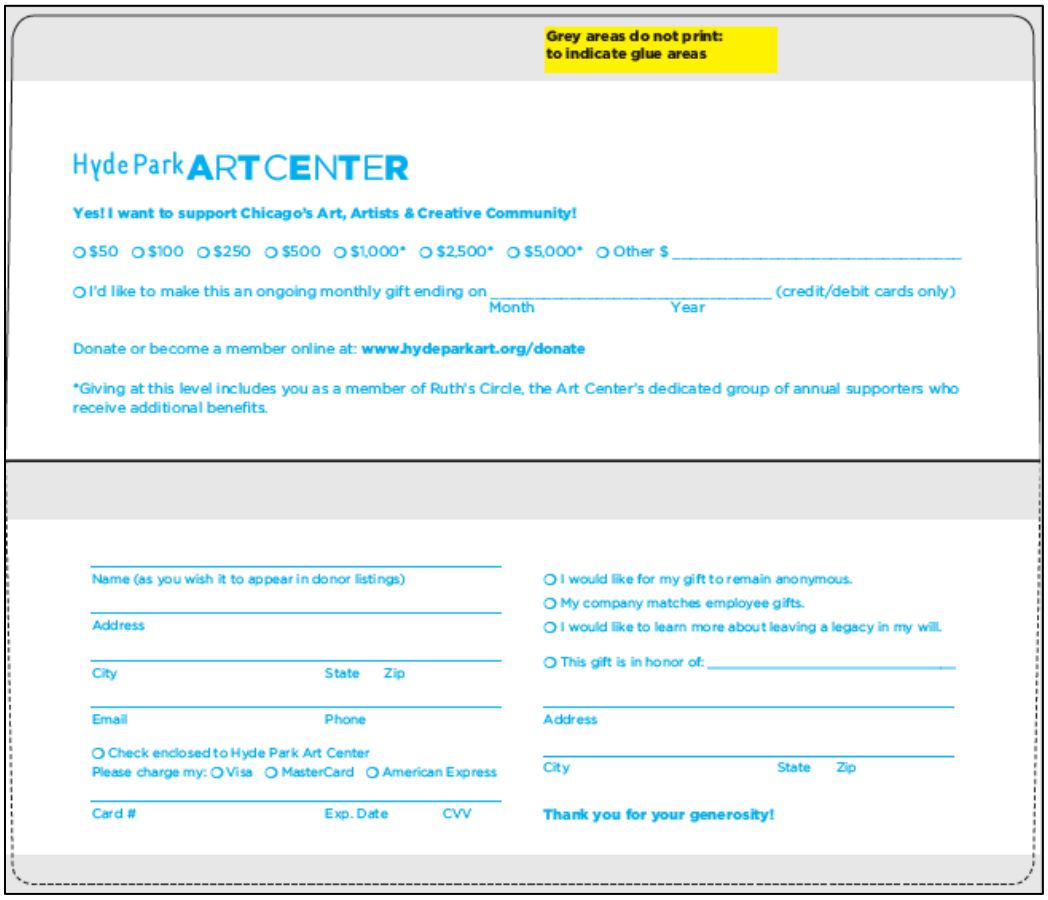
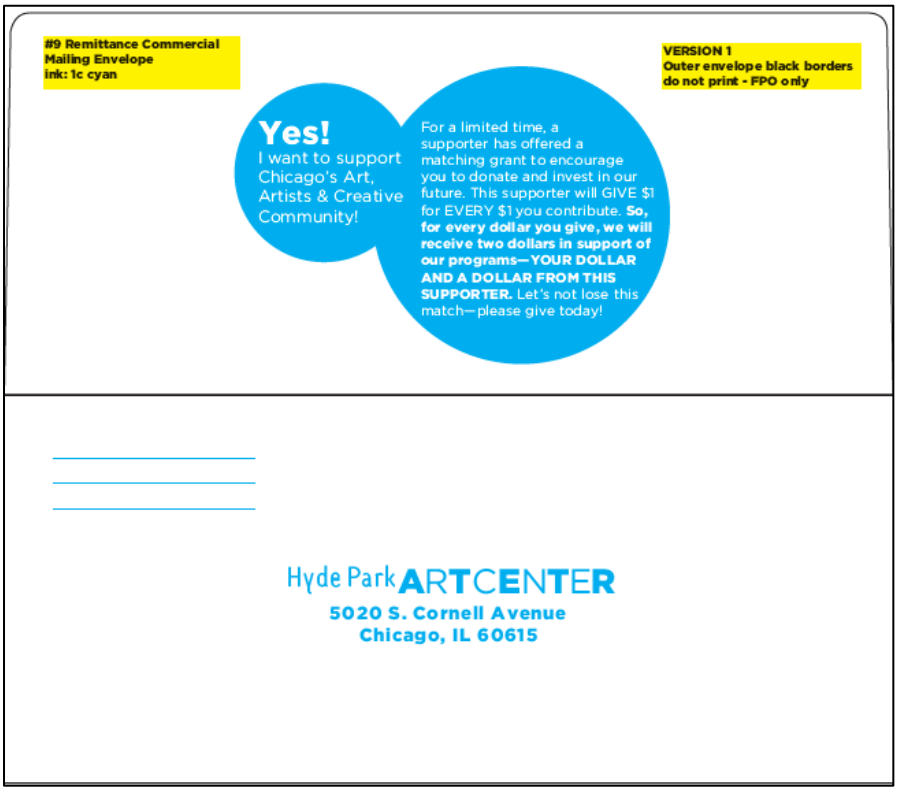


Return envelope in 1:1 matching condition



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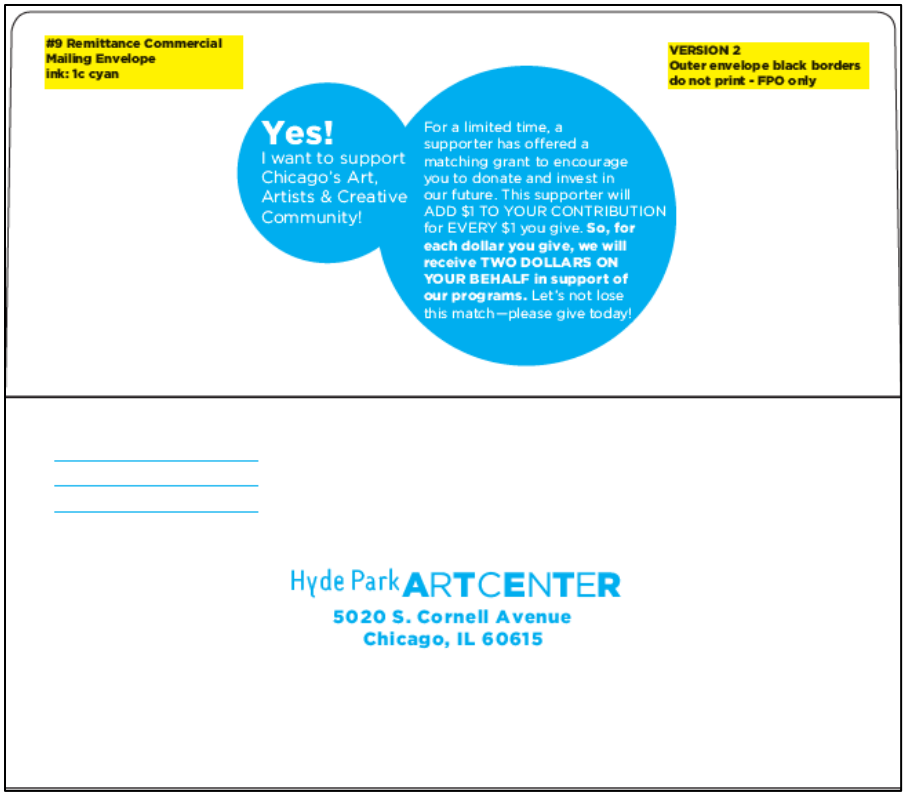

#9 Remittance Commercial
Mailing Envelope
ink: 1c cyan
VERSION 2
Outer envelope black borders
do not print - FPO only
Yes!
I want to support Chicago's Art, Artists & Creative Community!
For a limited time, a supporter has offered a matching grant to encourage you to donate and invest in our future. This supporter will ADD $1 TO YOUR CONTRIBUTION for EVERY $1 you give. So, for each dollar you give, we will receive TWO DOLLARS ON YOUR BEHALF in support of our programs. Let's not lose this match—please give today!
Hyde Park ARTCENTER
5020 S. Cornell Avenue
Chicago, IL 60615

Experimental Stimuli: Survey of Experts

Introduction

We are planning to **test a few matching fundraising solicitations on prior donors** of a local non-profit. The non-profit promotes young artists by organizing exhibitions and workshops. It also offers summer art classes for children.

The solicitations will be sent using postal mail. The mail will include an appeal letter, a pledge card, and a return envelope.

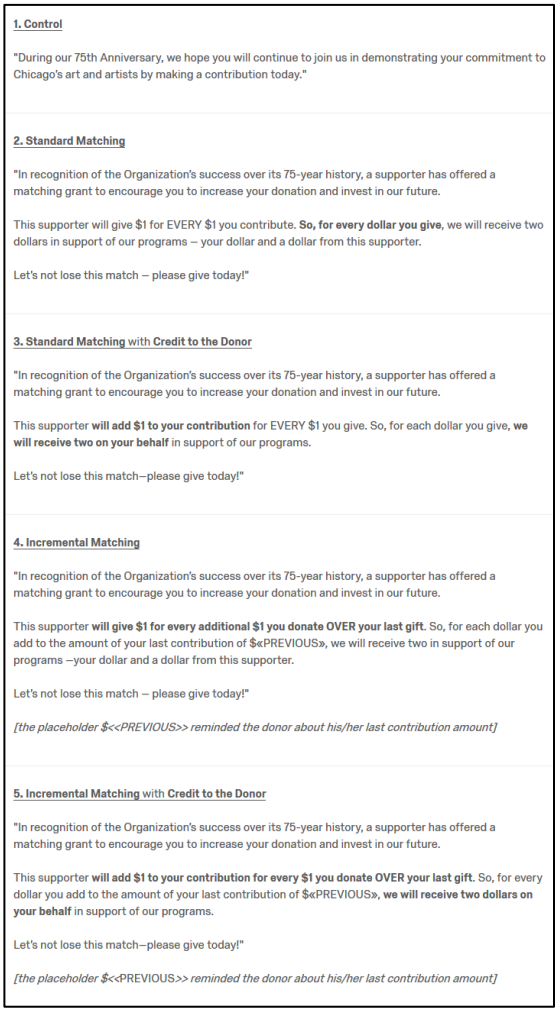
Random groups of donors will be sent different matching solicitations, and we are interested to compare the groups on participation (**average donate rate**) and the amount donated by participating donors (**average donation amount**).

We are interested in your opinion about these matching fundraising solicitations. There are no right or wrong answers.

We are **planning to test five (5) different appeal letters**. A random group of **prior donors will see only one letter**.

Below you will see the actual texts (shown within quotation signs) in these letters. Please review them carefully before answering a few questions about them.

Details about the five test conditions (left panel) and an illustrative example of a paired comparison (1:1 vs. Control, right panel)



1. Control

"During our 75th Anniversary, we hope you will continue to join us in demonstrating your commitment to Chicago's art and artists by making a contribution today."

2. Standard Matching

"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter will give $1 for EVERY $1 you contribute. **So, for every dollar you give**, we will receive two dollars in support of our programs – your dollar and a dollar from this supporter.

Let's not lose this match – please give today!"

3. Standard Matching with **Credit to the Donor**

"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter **will add $1 to your contribution** for EVERY $1 you give. So, for each dollar you give, **we will receive two on your behalf** in support of our programs.

Let's not lose this match—please give today!"

4. Incremental Matching

"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter **will give $1 for every additional $1 you donate OVER your last gift**. So, for each dollar you add to the amount of your last contribution of $«PREVIOUS», we will receive two in support of our programs –your dollar and a dollar from this supporter.

Let's not lose this match – please give today!"

[the placeholder $<<PREVIOUS>> reminded the donor about his/her last contribution amount]

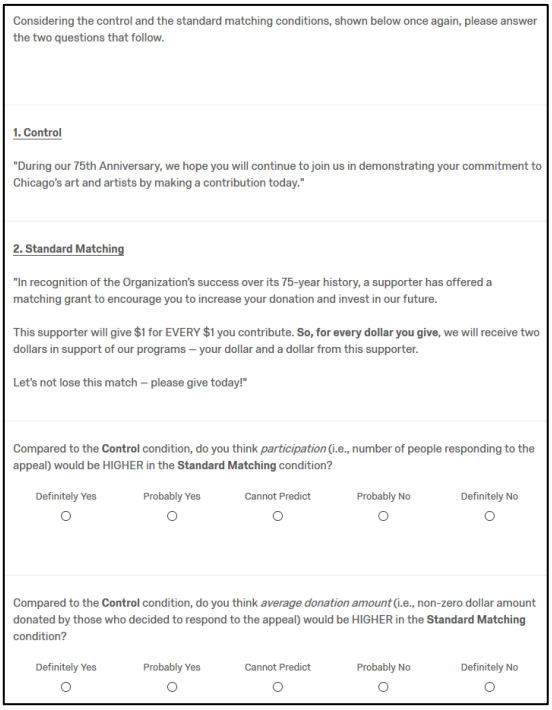
5. Incremental Matching with **Credit to the Donor**

"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter **will add $1 to your contribution for every $1 you donate OVER your last gift**. So, for every dollar you add to the amount of your last contribution of $«PREVIOUS», **we will receive two dollars on your behalf** in support of our programs.

Let's not lose this match—please give today!"

[the placeholder $<<PREVIOUS>> reminded the donor about his/her last contribution amount]



Considering the control and the standard matching conditions, shown below once again, please answer the two questions that follow.

1. Control

"During our 75th Anniversary, we hope you will continue to join us in demonstrating your commitment to Chicago's art and artists by making a contribution today."

2. Standard Matching

"In recognition of the Organization's success over its 75-year history, a supporter has offered a matching grant to encourage you to increase your donation and invest in our future.

This supporter will give $1 for EVERY $1 you contribute. **So, for every dollar you give**, we will receive two dollars in support of our programs – your dollar and a dollar from this supporter.

Let's not lose this match – please give today!"

Compared to the **Control** condition, do you think *participation* (i.e., number of people responding to the appeal) would be HIGHER in the **Standard Matching** condition?

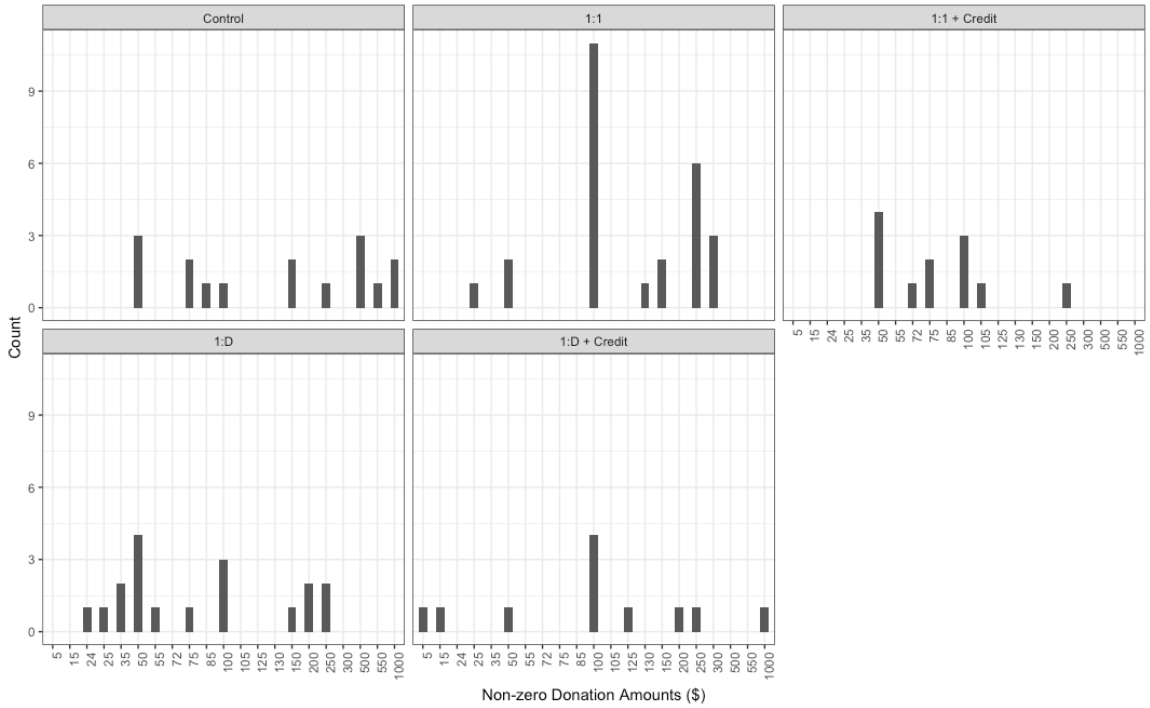
Definitely Yes	Probably Yes	Cannot Predict	Probably No	Definitely No
○	○	○	○	○

Compared to the **Control** condition, do you think *average donation amount* (i.e., non-zero dollar amount donated by those who decided to respond to the appeal) would be HIGHER in the **Standard Matching** condition?

Definitely Yes	Probably Yes	Cannot Predict	Probably No	Definitely No
○	○	○	○	○

Additional Analysis: Field Experiment 1

1. *Distribution of actual non-zero donations in the five experimental conditions, including control*



2. *Non-parametric Analysis*

We used the Wilcox rank test to perform non-parametric analysis for average contribution and net amount raised in the campaign.

Average (non-zero) Contribution: Using the Wilcox tests, redit framing significantly reduced average contribution compared to regular framing for a 1:1 match (p=.010), although the regular match did not yield statistically distinguishable contribution compared to control (p=.545). Reducing the matching multiplier, by introducing an incremental matching, reduced contributions compared to full matching with regular framing (p=.013); and credit framing for incremental matches did not improve performance significantly (p=.481). Overall, combining the various matching mechanisms, the results of "giving credit" framing was not statistically different from regular framing (p=.255).

Net Money Raised: Non-parametric Wilcox tests confirmed that a credit framing significantly reduced net money raised compared to regular framing for a 1:1 match (p=.036), although a 1:1 match was not a significant improvement over control (p=.140). The incremental matching mechanism did not improve performance compared to a full match (p=.434); and adding a credit framing to the incremental mechanism was marginally detrimental (p=.155). Overall, combining both matching mechanisms, the "giving credit" framing raised significantly less money per mailing compared to regular framing (p=.011).

The results using non-parametric tests further confirms while that the effect of credit framing on contribution upon participation is ambiguous, there is indeed a significant decrease in net money raised with credit framing. The findings suggest that the decrease in net money raised with "giving credit" framing is largely driven by a decrease in participation.

In sum, the conclusions drawn in the paper hold if we use non-parametric tests for analyzing statistical significance.

3. Analysis of Raw Donation Amount after Handling Outliers

We attempted to flag outliers in the raw donation amounts using multiple techniques: Iterative Grubbs' test that assumes the univariate data set comes from a normal distribution, and Winsorizing that does not impose any distributional assumptions on the data set. Both 90% and 95% Winsorizing were used. The results of all three approaches are described below.

3.1 Iterative Grubbs' test: The test detected seven outliers, all on the higher end of the data set i.e., donations > $300. These donations were replaced by the highest non-outlier donation amount, i.e., $300.

3.1.1 Average (non-zero) Contribution: Among donors, the average money raised in control was $177.18. The average amount raised in the regular 1:1 matching condition was $155.96 (*ns* vs. control, $t(40)<1$). However, adding credit framing to a 1:1 match raised only $89.75, on average, from participating donors. This reduction was significant ($t(36)=2.41$, p=.021). Therefore, the decrease in average contribution in a 1:1 matching solicitation on account of credit framing was robust to outlier treatment using Grubbs' test. The incremental matching mechanism was also severely detrimental for average contribution relative to full matching ($99.94; $t(42)=2.19$, p=.033), and adding a credit framing did not increase contributions significantly ($122.27; $t(27)<1$). Overall, using this outlier handling strategy, there was a marginal decrease in contributions from "giving credit" framing compared to regular framing, across different matching mechanisms ($105.30 vs $133.04, $t(65)=1.29$, p=.199).

3.1.2 Net Money Raised: The net money raised per mailer in control was $9.05 and that in the regular matching condition was $12.59 ($t(633)<1$). However, adding the "giving credit" framing to a 1:1 match

significantly reduced money raised ($3.71; $t(610)=2.86$, $p=.004$). The incremental matching mechanism was also marginally detrimental compared to full matching ($6.61; $t(592)=1.73$, $p=.083$), and adding a credit framing reduced net money raised further, though this reduction was not significant ($4.75, $t(553)<1$). Overall, across different matching mechanisms, credit framing raised significantly lower money per mailer compared to regular framing ($4.23 vs $ 9.85, $t(1165)=2.76$, $p=.006$).

3.2 90% Winsorizing: The test detected nine outliers – five in the lower end of the data set (< $35) and four on the upper end (>$500). The outliers at the lower end were replaced by the lowest non-outlier donation amount, i.e., $35. The outliers at the upper end were replaced by the highest non-outlier donation amount, i.e., $500.

3.2.1 Average (non-zero) Contribution: Among donors, the average money raised in control was $252.18, and a 1:1 match generated significantly lower contributions ($156.34; $t(40)=2.11$,$p=.041$). Moreover, adding a credit framing to a 1:1 match reduced contributions even further ($89.75; $t(36)=2.43$,$p=.019$). Therefore, once again, the decrease in average contribution in a 1:1 matching solicitation on account of credit framing was robust to outlier treatment. The incremental matching mechanism also reduced average contribution relative to a regularly framed 1:1 match ($101.01; $t(42)=2.19$, $p=.034$), and adding a credit framing did not increase contributions significantly ($145.00; $t(27)=1.13$, $p=.269$). Overall, using this outlier handling strategy, there was a directional decrease in contributions from "giving credit" framing compared to regular framing, across different matching mechanisms ($116.17 vs $133.75, $t(65)<1$).

3.2.2 Net Money Raised: Since we excluded the low outliers (but retained zero donations, which, by definition, are required for analyzing net amount) the net revenue here should be interpreted as outlier-excluded average donation times the probability of donating. The net money raised per mailer in control was $12.89 and that in the regular matching condition was $12.62 ($t(633)<1$). However, adding the "giving credit" framing to a 1:1 match reduced money raised significantly ($3.71; $t(610)=2.86$, $p=.004$). The incremental matching mechanism was also marginally detrimental compared to full matching ($6.69; $t(592)=1.72$, $p=.086$), and adding a credit framing reduced net money raised further, though this reduction was not significant ($5.63, $t(553)<1$). Overall, across different matching mechanisms, credit framing raised significantly lower money per mailer compared to regular framing ($4.66 vs $ 9.91, $t(1165)=2.43$, $p=.015$).

3.3. 95% Winsorizing: The test detected six outliers – three in the lower end of the data set (< $25) and three on the upper end (>$550). The outliers at the lower end were replaced by the lowest non-outlier donation amount, i.e., $25. The outliers at the upper end were replaced by the highest non-outlier donation amount, i.e., $550.

3.3.1. Average (non-zero) Contribution: Among donors, the average money raised in control was $261.56, and a 1:1 match generated significantly lower contributions ($155.96; $t(40)=2.22$,$p=.032$). Moreover, adding a credit framing to a 1:1 match reduced contributions even further ($89.75; $t(36)=2.41$,$p=.021$). Therefore, once again, the decrease in average contribution in a 1:1 matching solicitation on account of credit framing was robust to outlier treatment. The incremental matching

mechanism also reduced average contribution relative to a regularly framed 1:1 match ($100.00; $t(42)=2.19$, $p=.033$), and adding a credit framing did not increase contributions significantly ($147.72; $t(27)=1.14$, $p=.265$). Overall, using this outlier handling strategy, there was a directional decrease in contributions from "giving credit" framing compared to regular framing, across different matching mechanisms ($117.47 vs $133.07, $t(65)<1$).

3.3.2 Net Money Raised: Since we excluded the low outliers (but retained zero donations, which, by definition, are required for analyzing net amount) the net revenue here should be interpreted as outlier-excluded average donation times the probability of donating. The net money raised per mailer in control was $13.37 and that in the regular matching condition was $12.59 ($t(633)<1$). However, adding the "giving credit" framing to a 1:1 match reduced money raised significantly ($3.71; $t(610)=2.86$, $p=.004$). The incremental matching mechanism was also marginally detrimental compared to full matching ($6.62; $t(592)=1.73$, $p=.084$), and adding a credit framing reduced net money raised further, though this reduction was not significant ($5.74, $t(553)<1$). Overall, across different matching mechanisms, credit framing raised significantly lower money per mailer compared to regular framing ($4.71 vs $ 9.86, $t(1165)=2.35$, $p=.019$).

Using a series of outlier detection and handling strategies using the raw, untransformed donation data, there was a robust decrease in net money raised per mailing with credit framing compared to regular framing although the results for average contribution among those donating was more ambiguous. Overall, the results substantively replicate the findings reported in the paper, suggesting that the reported findings are robust to alternative analysis strategies.

4. Regression Analyses

For each of the key metrics (participation, average contribution, and net amount received), we report the results of three regression models that control for various covariates. Model 1 is a simple, univariate logistic regression. Model 2 controls for last donation amount from prior donors. Model 3 controls for all the covariates we had in the data set or could impute (e.g. Median Income from Zip Codes).

All the models use the regularly framed standard 1:1 match as the base condition.

Participation

	Dependent variable:		
	Participation		
	(1)	(2)	(3)
Constant	-2.43*** (0.20)	-5.60*** (0.84)	-8.12*** (1.18)
Control	-0.49 (0.33)	-0.42 (0.58)	-0.46 (0.59)
1:1 + Credit	-0.71* (0.36)	-0.31 (0.55)	-0.23 (0.56)
1:Δ	-0.21 (0.32)	0.76 (0.44)	0.84 (0.46)
1:Δ + Credit	-0.78* (0.37)	0.10 (0.50)	0.24 (0.50)
Log Last Donation		0.51** (0.18)	0.22 (0.20)
Log Lifetime Donation			0.49** (0.17)
Lifetime #Transactions			0.02 (0.02)
Median Inc. (ZIP level)			0.00001* (0.000004)
Observations	1,480	1,353	1,333
Log Likelihood	-316.25	-186.10	-168.44
Note:			*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

Average Contribution

	Dependent variable:		
	Log of Non-zero Contribution		
	(1)	(2)	(3)
Constant	4.89*** (0.17)	2.91*** (0.70)	1.82 (1.28)
Control	0.35 (0.27)	-0.27 (0.42)	-0.28 (0.48)
1:1 + Credit	-0.49 (0.30)	-0.68 (0.41)	-0.58 (0.44)
1:Δ	-0.54* (0.26)	-0.60 (0.33)	-0.52 (0.37)
1:Δ + Credit	-0.38 (0.31)	-0.85* (0.36)	-0.76 (0.39)
Log Last Donation		0.47** (0.14)	0.41* (0.17)
Log Lifetime Donation			0.21 (0.20)
Lifetime #Transactions			-0.01 (0.01)
Median Inc. (ZIP level)			0.000001 (0.000003)
Observations	83	44	43
R^2	0.14	0.34	0.36
Adjusted R^2	0.10	0.25	0.22
F Statistic	3.17*	3.86**	2.44*
Note:			*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

Net Amount Received

	Dependent variable:		
	Log Donation Amount		
	(1)	(2)	(3)
Constant	0.39*** (0.06)	-0.26* (0.12)	-0.43** (0.13)
Control	-0.13 (0.09)	-0.05 (0.07)	-0.06 (0.07)
1:1 + Credit	-0.21* (0.09)	-0.06 (0.07)	-0.04 (0.07)
1:Δ	-0.11 (0.09)	0.11 (0.07)	0.11 (0.07)
1:Δ + Credit	-0.22* (0.09)	-0.01 (0.07)	0.01 (0.07)
Log Last Donation		0.10*** (0.03)	0.07* (0.03)
Log Lifetime Donation			0.02 (0.02)
Lifetime #Transactions			0.02*** (0.005)
Median Inc. (ZIP level)			0.000002* (0.000001)
Observations	1,480	1,353	1,333
R^2	0.01	0.01	0.04
Adjusted R^2	0.003	0.01	0.03
F Statistic	2.02	4.04**	6.79***
Note:			*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

5. Lasso Regressions

We attempted to identify covariates to include in regressions of each of the three key dependent measures (as in section 4) using Double-Lasso covariate selection (Urminsky, Hansen, & Chernozhukov 2016[6]). This analysis fails to find sufficient empirical support for including any additional covariates in any of the three models. Therefore, the regressions in section 4 that include covariates might not be very informative and should be interpreted with caution. We report the results here for the sake of completeness, as we report the same models for Field Study 2 below.

6. Potential Moderators

We examined potential moderation of the experimental interventions by Last Donation Amount, Median Household Income, Lifetime Transaction Amount, and Lifetime Transaction Count of the relationship between each of the condition pairs and participation, contribution upon participation, net contribution. We also examined moderation by these covariates of the interaction between overall matching mechanism (incremental, 1:1) and overall framing (credit framing, regular framing). For brevity, we report significant interactions ($p<.05$), along with interpretations of the results.

Moderation by Last Donation Amount

Online Table 1: For high last donation amount (mean + 1SD), credit framing decreased average net contribution, whereas for low last donation amount (mean - 1SD) there was a small increase with credit framing.

DV: Log of Donation Amount (net)	*β*	*SE*	*t*	*p*
(Intercept)	-0.52	0.25	-2.05	0.041
Condition = 1:1 + Credit framing vs. 1:1	0.60	0.34	1.76	0.079
Last Donation Amount	0.17	0.06	2.67	0.008
Condition x Last Donation Amt.	-0.17	0.08	-1.96	0.050

[6] Urminsky, O., C. Hansen & V. Chernozhukov, The Double-Lasso Method for Principled Variable Selection, *UChicago Working Paper,* 2016

Moderation by Lifetime Transaction Amount

Online Table 2: For high lifetime transaction amount (mean + 1SD), matching increased participation, more than it did for low lifetime transaction amount (mean - 1SD).

DV: Participation	*β*	*SE*	*z*	*p*
(Intercept)	-9.15	1.50	-6.11	<.001
Condition = 1:1 vs. Control	3.94	1.73	2.28	0.023
Log Lifetime Transaction Amount	0.89	0.18	4.84	<.001
Condition x Log Lifetime Transaction Amt.	-0.44	0.22	-1.97	0.049

Online Table 3: For high lifetime transaction amount (mean + 1SD), matching decreased average contribution upon participation, whereas for low lifetime transaction amount (mean - 1SD) matching increased average contribution upon participation. The results are similar to that found for participation (Online Table 2).

DV: Log of Donation Amount (upon Participation)	*β*	*SE*	*t*	*p*
(Intercept)	-0.21	1.18	-0.18	0.859
Condition = 1:1 vs. Control	3.97	1.34	2.97	0.005
Log Lifetime Transaction Amount	0.66	0.14	4.68	<.001
Condition x Log Lifetime Transaction Amt.	-0.49	0.17	-2.94	0.006

Online Table 4: For high lifetime transaction amount (mean + 1SD), incremental mechanism increased average contribution upon participation, whereas for low lifetime transaction amount (mean - 1SD) incremental mechanism decreased average contribution upon participation.

DV: Log of Donation Amount (upon Participation)	*β*	*SE*	*t*	*p*
(Intercept)	3.46	0.60	5.76	<.001
Incremental mechanism vs. 1:1 (combined)	-2.36	1.07	-2.20	0.032
Log Lifetime Transaction Amount	0.19	0.09	2.16	0.034
Incremental mech. x Log Lifetime Transaction Amt	0.33	0.16	2.02	0.048

Moderation by Lifetime Transaction Count

No significant interactions.

Moderation by Median Household Income

No significant interactions.

Therefore, the moderation analysis found largely weak results, with the exception of results in table 3 above.

7. Additional Results: Randomization Check

Online Table 5: The table shows that randomization for the field experiment worked for all the variables except the lifetime transaction count. However, the values of lifetime transaction account are not very different across conditions and range between 4 and 5 in absolute terms. Due to certain technical problems (migration to a new MIS, etc.) we could not retrieve the Last Donation Amount figures for 127 prior donors. The non-profit did not share demographic information about the donors like age, gender, education, or income, and we use publically available data (www.psc.isr.umich.edu/dis) to retrieve median household income from zip codes.

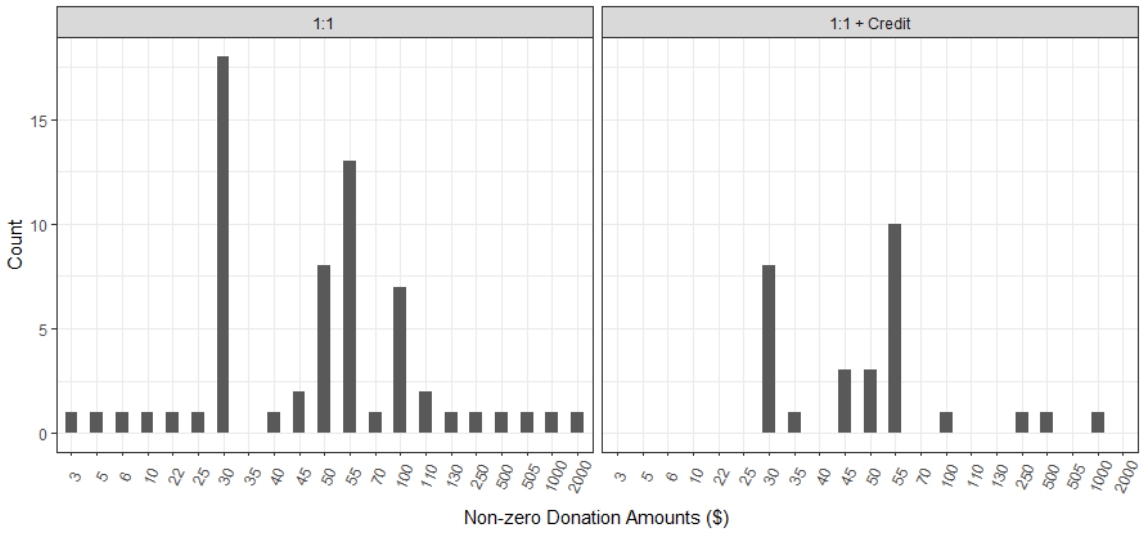
	Control	1:1	1:1 Credit	1: Δ	1: Δ Credit	*F*	*p*
Last Donation Amount ($)	63.51	68.66	78.25	74.21	79.20	1.66	.155
Median Household Income ($)*	54526.85	54713.19	55019.63	52983.56	54771.48	0.22	.926
Lifetime Transaction Amount ($)	1736.20	2142.11	702.97	561.60	682.78	1.53	.188
Lifetime Transaction Count	5.5	5.1	3.6	3.9	3.8	5.32	<.001

*based on zip-code

Given the lack of balance with respect to Lifetime Transaction Count in randomization, we reanalyzed the main results of the study after controlling for this covariate. The results were substantively similar to those reported in the paper.

Additional Analysis: Field Experiment 2

1. Distribution of actual non-zero donations in the two experimental conditions



2. Non-parametric Analysis

Average (non-zero) Contribution: Using Wilcox rank test we found no difference in the average contribution between a "giving credit" framed match and a regularly framed match (p=.754)

Net Money Raised: Non-parametric analysis using Wilcox rank test also found that credit framing significantly reduced total money raised compared to regularly framed 1:1 match (p<.001). The results held with both log-transformed as well as raw donation amounts.

In sum, the conclusions drawn in the paper hold if we use non-parametric analysis for analyzing statistical significance.

3. Analysis of Raw Donation Amount after Handling Outliers

We attempted to flag outliers in the raw donation amounts using multiple techniques: Iterative Grubbs' test that assumes the univariate data set comes from a normal distribution, and Winsorizing that does impose any distributional assumptions on the data set. Both 90% and 95% Winsorizing were used. The results of all these three approaches are described below.

3.1 Iterative Grubbs' test: The test detected nine outliers all on the higher end of the data set i.e., Donations of $130 or higher. These donations were replaced by the highest non-outlier donation amount, i.e., $110.

3.1.1 Average (non-zero) Contribution: Among donors, the average amount raised in the regular 1:1 matching condition was $54.78. The corresponding amount in the 1:1 matching condition with credit framing was $53.10. The difference was non-significant ($t(91)=0.25$, $p=.799$).

3.1.2 Net Money Raised: The net money raised per mailer sent to prior donors was $2.27 in the regular 1:1 matching condition. The corresponding amount in the 1:1 matching condition with credit framing was $1.03, significantly lower than the regular condition ($t(3034)=3.20$, $p=.001$).

3.2 90% Winsorizing: The test detected nine outliers – five in the lower end of the data set ($3, $5, $6, $10, $22) and four on the upper end ($505, $1000, $1000, $2000). The outliers at the lower end were replaced by the lowest non-outlier donation amount, i.e., $25. The outliers at the upper end were replaced by the highest non-outlier donation amount, i.e., $500.

3.2.1 Average (non-zero) Contribution: Among donors, the average amount raised in the regular 1:1 matching condition was $82.89. The corresponding amount in the 1:1 matching condition with credit framing was $84.23. However, this difference was non-significant ($t(91)=0.07$, $p=.941$).

3.2.2 Net Money Raised: Since we excluded the low outliers (but retained zero donations, which, by definition, are required for analyzing net amount) the net revenue here should be interpreted as outlier-excluded average donation times the probability of donating. The net money raised per mailer sent to prior donors was $3.43 in the regular 1:1 matching condition. The corresponding amount in the 1:1 matching condition with credit framing was $1.65, significantly lower than the regular condition ($t(3034)=1.98$, $p=.047$).

3.3 95% Winsorizing: The test detected six outliers – three in the lower end of the data set ($3, $5, $6) and three on the upper end ($1000, $1000, $2000). The outliers at the lower end were replaced by the lowest non-outlier donation amount, i.e., $10. The outliers at the upper end were replaced by the highest non-outlier donation amount, i.e., $505.

3.3.1 Average (non-zero) Contribution: Among donors, the average amount raised in the regular 1:1 matching condition was $82.14. The corresponding amount in the 1:1 matching condition with credit framing was $85.00. However, this difference was non-significant ($t(91)=0.11$, $p=.914$).

3.3.2 Net Money Raised: Since we excluded the low outliers (but retained zero donations, which, by definition, are required for analyzing net amount) the net revenue here should be interpreted as outlier-excluded average donation times the probability of donating. The net money raised per mailer sent to prior donors was $3.40 in the regular 1:1 matching condition. The corresponding amount in the 1:1

matching condition with credit framing was $1.65, lower than the regular condition ($t(3034)=1.93$, $p=.053$).

In sum, the conclusions presented in the paper are robust to various outlier detection and handling strategies using the raw, untransformed donation data.

4. Regressions

For each of the key metrics (participation, average contribution, and net money raised), below we report the results of three regression models that control for various covariates. Model 1 is a simple, univariate logistic regression. Model 2 controls for last donation amount from prior donors. Model 3 controls for all the covariates we had in the data set or could impute (e.g. Median Income from Zip Codes).

Participation:

	Dependent variable:		
	Participation		
	(1)	(2)	(3)
Constant	-3.14*** (0.13)	-1.94*** (0.50)	-2.25* (0.88)
Condition=1:1 + Credit	-0.78*** (0.23)	-0.70** (0.23)	-0.67** (0.24)
Log Last Donation		-0.26** (0.10)	-0.33** (0.12)
Log Largest Donation			0.33 (0.23)
Log Lifetime Donation			-0.01 (0.20)
Lifetime Transaction Count			0.04** (0.01)
Days from Last Donation			0.0001 (0.0001)
Days from Largest Donation			-0.002*** (0.0003)
Median Income (ZIP Level)			-0.00001 (0.00001)
Pop. Density (ZIP Level)			0.000001 (0.00001)

Observations	3,036	3,031	2,983
Log Likelihood	-409.40	-389.95	-321.94

Note: $^{*}p<0.05$; ><.05 $^{**}p<0.01$; ><.01 $^{***}p<0.001$

Average Contribution:

	Dependent variable:		
	Log of Non-zero Contribution		
	(1)	(2)	(3)
Constant	3.97^{***} (0.12)	2.57^{***} (0.36)	1.71^{*} (0.66)
Condition=1:1 + Credit	0.09 (0.21)	-0.14 (0.19)	-0.18 (0.18)
Log Last Donation		0.32^{***} (0.07)	0.27^{**} (0.09)
Log Largest Donation			0.04 (0.16)
Log Lifetime Donation			0.09 (0.15)
Lifetime Transaction Count			-0.0002 (0.01)
Days from Last Donation			0.0001 (0.0002)
Days from Largest Donation			0.00001 (0.0001)
Median Income (ZIP Level)			0.00001 (0.00001)
Pop. Density (ZIP Level)			-0.00001 (0.00001)
Observations	93	88	88
R^2	0.002	0.19	0.33
Adjusted R^2	-0.01	0.17	0.25
F Statistic	0.18	9.71^{***}	4.25^{***}
Note:			*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

Net Amount Received:

	Dependent variable:		
	Log Donation Amount		
	(1)	(2)	(3)
Constant	0.16*** (0.02)	0.25*** (0.06)	0.14 (0.08)
Condition=1:1 + Credit	-0.09*** (0.03)	-0.08** (0.03)	-0.08** (0.02)
Log Last Donation		-0.02 (0.01)	-0.03 (0.02)
Log Largest Donation			0.15*** (0.03)
Log Lifetime Donation			-0.11*** (0.03)
Lifetime Transaction Count			0.03*** (0.003)
Days from Last Donation			-0.0001* (0.00002)
Days from Largest Donation			-0.00001 (0.00002)
Median Income (ZIP Level)			-0.0000003 (0.0000005)
Pop. Density (ZIP Level)			-0.0000001 (0.000001)
Observations	3,036	3,031	2,983
R^2	0.004	0.004	0.08
Adjusted R^2	0.003	0.003	0.08
F Statistic	11.07***	5.82**	29.06***
Note:			*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

5. Lasso Regressions

Models below use Double-Lasso covariate selection (Urminsky, Hansen, & Chernozhukov 2016) to determine which covariates to include in the regression specification. For net amount raised, the lasso did not identify any covariates with sufficient empirical support to include, and therefore no model has been included for that metric.

Overall, the results hold controlling for covariates identified by the Double-Lasso procedure.

	Dependent variable:	
	Participation	Log of Non-zero Contribution
	Logistic	*OLS*
	(1)	(2)
Constant	-2.39*** (0.23)	1.73*** (0.46)
Condition=1:1 + Credit	-0.73** (0.24)	-0.09 (0.18)
Lifetime Transaction Count	0.05*** (0.01)	
Days from Last Donation	-0.002*** (0.0003)	
Log Last Donation		0.22** (0.08)
Log Largest Donation		0.13 (0.13)
Log Lifetime Donation		0.07 (0.09)
Observations	2,997	88
R^2		0.27
Adjusted R^2		0.23
Log Likelihood	-328.79	
F Statistic		7.55***
Note:		*p<0.05; ><.05 **p<0.01; ><.01 ***p<0.001

6. Potential Moderators

We examined potential moderation by Last Donation Amount, Largest Donation Amount, Lifetime Transaction Amount, and Lifetime Transaction Count, Median Household Income, Population Density, Days from Last Donation, Days from Largest Donation for participation, contribution upon participation, net contribution.

No moderating effect of these variables was found for participation and contribution upon participation. For net contribution, we only report the significant interactions ($p<.05$), along with interpretations of the results.

Online Table 6: For high largest donation amount (mean + 1SD), credit framing decreased average net contribution much more than when largest transaction amount is low (mean - 1SD).

DV: Log of Donation Amount (net)	*β*	*SE*	*t*	*p*
(Intercept)	-0.210	0.094	-2.23	0.026
Condition = 1:1 + Credit framing vs. 1:1	0.179	0.132	1.36	0.174
Log Largest Donation Amount	0.065	0.017	3.96	<.001
Condition x Log Largest Donation Amt.	-0.046	0.023	-1.99	0.046

Online Table 7: For high total lifetime transaction amount (mean +1SD), credit framing decreased average net contribution much more than when total lifetime transaction amount is low (mean - 1SD).

DV: Log of Donation Amount (net)	*β*	*SE*	*t*	*p*
(Intercept)	-0.353	0.078	-4.52	<.001
Condition = 1:1 + Credit framing vs. 1:1	0.207	0.111	1.87	0.062
Log Lifetime Transaction Amount	0.082	0.012	6.69	<.001
Condition x Log Lifetime Transaction Amt.	-0.046	0.017	-2.66	0.008

Online Table 8: For high total lifetime transaction count (mean + 1SD), credit framing decreased average net contribution, whereas for low total lifetime transaction count (mean - 1SD) there was a small increase with credit framing.

DV: Log of Donation Amount (net)	*β*	*SE*	*t*	*p*
(Intercept)	0.018	0.021	0.87	0.384
Condition = 1:1 + Credit framing vs. 1:1	-0.018	0.029	-0.60	0.545
Lifetime Transaction Count	0.030	0.002	12.73	<.001
Condition x Lifetime Transaction Count	-0.013	0.003	-4.03	<.001

Online Table 9: When days from last donation is less (mean - 1SD), credit framing decreased average net contribution much more than when days from last donation is more (mean + 1SD).

DV: Log of Donation Amount (net)	β	*SE*	*t*	*p*
(Intercept)	0.289	0.028	10.41	<.001
Condition = 1:1 + Credit framing vs. 1:1	-0.146	0.039	-3.72	<.001
Days from Last Donation	-0.0001	0.00001	-6.20	<.001
Condition x Days from Last Donation	0.00006	0.00002	2.49	0.013

The above results suggest that the "giving credit" framing was more harmful for donors who are more engaged with the charity. These donors potentially did value acknowledgement for someone else's conrtibution. The results indicate the potential for field testing a more targeted campaign with the "giving credit" framing.

Snapshot of Field Experiment 2 pre-registration from *aspredicted.org*

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Matching Field Study 2018 (#11631)

Created: 06/06/2018 11:13 AM (PT)
Shared: 09/08/2018 11:37 PM (PT)

This pre-registration is not yet public. This anonymized copy (without author names) was created by the author(s) to use during peer-review. A non-anonymized version (containing author names) will become publicly available only if an author makes it public. Until that happens the contents of this pre-registration are confidential.

1) Have any data been collected for this study already?
No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?
A matching solicitation that gives donors credit for dollars obtained via matching ("giving-credit" intervention) will perform no better than a standard matching solicitation, although standard theories of impure altruism will predict at least a weakly better performance of the giving-credit intervention. We predict that the giving-credit intervention will perform worse than standard matching.

3) Describe the key dependent variable(s) specifying how they will be measured.
We will track three DVs: participation, average non-zero contribution, and average money raised per mail

4) How many and which conditions will participants be assigned to?
Two between-subject conditions:

Condition 1: Standard 1:1 matching.
The operative text in the solicitation letter will say: "So, for each dollar you give, the Center will receive two dollars in support of our programs "your dollar and a dollar from this supporter."

Condition 2: Giving-Credit matching.
The operative text in the solicitation letter will say: "The supporter will add $1 to your contribution for every $1 you give. So, for each dollar you give, we will receive two dollars on your behalf in support of our programs."

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
This field study is meant to collect fresh data and replicate the results of a prior field study that we ran. So, we intend to run the same set of analyses with the new data.

Primary Analysis: We will do a t-test comparing the mean values of money raised per mail in the two experimental conditions. We will do a t-test comparing the mean values of non-zero contributions in the two experimental conditions. Finally, we will compare the average participation in the two experimental conditions using a Chi-Square test.

Secondary Analysis: We will collect information on covariates that might be good predictors of the DVs of interest. These covariates include last donated amount, last donation date, median income (based on zip code), total lifetime donation amount, the total number of prior donations. We will examine the effect of experimental conditions controlling for these variables, and the potential moderating effect of these variables on the effect of experimental conditions.

In addition, we are trying to get data from our partner on a few additional covariates like the first donation amount (and date) and the largest donation amount (and date). If we get this data, we will also run the above analyses with these variables.

Finally, unlike our previous field experiment, in this experiment, we will have prior-donors as well as a smaller group of non-donors. We will examine the potential moderating effect of this variable (i.e., donor type) on the effect of experimental conditions. We will also analyze these two groups separately since many of the covariates will be absent for non-donors.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
We will log-transform all donation amounts before analysis. Our partner has excluded high-stake potential donors from the campaign who are generally targeted using individually customized strategies, however, we will still plan to examine the distribution of past donation amounts, and make sure there are no outliers.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.
Around 3600 mailers will be sent - around 3000 will be prior donors and the rest will be non-donors. We will track responses for around 3 months before looking at the data.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

Additional Study: Incentive-compatible Survey Experiment as Guidance to the Fundraiser

We consider a feasible (i.e., low-cost) internal "marketing research" study or survey experiment as an additional source of guidance that a charity might rely on in making decisions about how to formulate their matching offer. Some charities conduct internal research, particularly using low-cost methods, to learn about donors and better anticipate their reactions to the charity's activities. Typical research methods range from simply monitoring donor feedback to structured qualitative interviews with small numbers of donors to simple surveys of potential donors. We test one such research method, conducting an incentive-compatible survey experiment to measure the effect of each type of matching offer on intentions to donate.

Design

Online survey respondents (N=524) were recruited from Amazon's Mturk employment marketplace to participate in a decision-making study. This approach was chosen to enable best practices (e.g, incentive compatibility) under the constraint of using low-cost methods feasible for typical charities. The sample chosen was motivated by the widespread reluctance among charities to contact their donors more than necessary, particularly when doing so would reveal tactical considerations in fundraising that might leave their donors feeling manipulated.

Respondents were informed that they at the end of the survey, five people would be selected at random and be given a real $20 lottery reward. The Mturk platform allows this claim to be made with reasonable credibility, as the funds would be paid as an Mturk bonus within two days of study completion, from a highly-rated requester account with a track record of paying bonus incentives.

A key challenge in this kind of survey experiment with a publicly-recruited sample is how to replicate the "warm donor" mindset of the prior donors who would be targeted in an actual fundraising appeal. We asked respondents to select their favorite from a list of 20 well-known charities, to ensure that

they had a baseline level of interest in the charity analogous to the motives of a charity's prior donors. We then randomly assigned respondents to one of five between-subject conditions, in which they were shown offers to pre-commit an amount (up to $20) to be deducted from their bonus and donate to their selected charity, in case they later won the lottery.

The control condition involved no matching amounts. The four other conditions proposed a match from the experimenter's funds (e.g., "we will donate an extra $1 for every $1 you give), with differing contingencies and framing matching the interventions under discussion (1:1; 1:1 + "give credit" framing; 1:Δ; 1:Δ + "give credit" framing). In the incremental matching conditions, respondents were told that the match would apply to amounts over $3.00.

Respondents were then asked to choose how much of their $20 bonus they would donate to their favorite charity, between $0 and $20, should they win. As described to the respondents, five winners were selected at random, the amount they chose as their donation was deducted from their bonus payment, the remainder was paid via Mturk bonus and we sent their donation amount to the selected charity, along with any applicable matching amount.

Results

The overall participation rate (i.e. survey respondents choosing to commit more than $0) was 80% (see Fig. 1; left-panel) and there were no significant difference in participation rates between any of the pairs of conditions (all p's >.25).

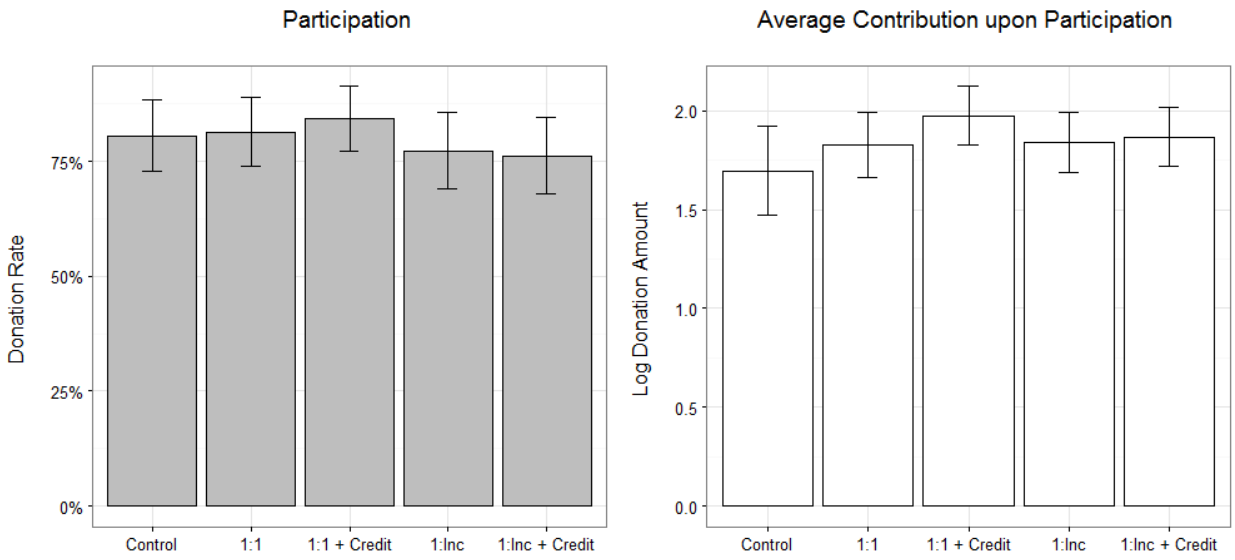

Figure 1: Results for survey experiment. The vertical bars are 95% CI.

The survey experiment also revealed similar levels of average contribution amount among participating donors (i.e., among those who committed some non-zero amount) across conditions. None of the comparisons between pairs of conditions were significant (all p's > .18) except for one: standard matching with "give credit" framing received significantly higher conditional contributions compared to the no-match control (p=.037).

Overall, the survey experiment was largely inconclusive as to whether one version would perform significantly better. There was no significant difference in net contribution between pairs of conditions. A fundraiser might either treat these non-significant results as irrelevant to their decision, or perhaps as evidence that the decision of which version to use would be of little consequence. Alternatively, a fundraiser might interpret these results as suggestive evidence that the "give credit" framing with a standard match has the highest likelihood of success, particularly in terms of average contribution, largely consistent with the model implications and expert opinions.

Experimental Stimuli: Incentive-compatible Survey Experiment as Guidance to the Fundraiser

Choice of favorite charity

In this survey, you will be making some decisions about a charity. Please choose which of the following charities you would be most interested in donating to.

- ○ Direct Relief International
- ○ United Way
- ○ Feeding America
- ○ Catholic Charities USA
- ○ Goodwill
- ○ Food for the Poor
- ○ American Cancer Society
- ○ YMCA
- ○ World Vision
- ○ St. Jude Children's Research Hospital
- ○ Boy's and Girl's Clubs of America
- ○ American Red Cross
- ○ Habitat for Humanity
- ○ Feed the Children

Illustrative example of a question with piped choice (of favorite charity) soliciting donation in the 1:1 matching with credit framing condition

If you are randomly selected to receive the $20 surprise reward as part of this survey, you could choose to donate to ${q://QID80/ChoiceGroup/SelectedChoices}, if you wish.

A matching grant is available. We will add an extra $1 to your donation for EVERY $1 you give. So, for every dollar you give, ${q://QID80/ChoiceGroup/SelectedChoices} will receive two dollars on your behalf in support of their programs.

If you do choose to donate, we will deduct the amount you specify from your $20 winnings if you win and donate it to ${q://QID80/ChoiceGroup/SelectedChoices}. You would then receive the remainder via Mturk as a bonus.

You need to make your decision about donating now. Please select below how much money, in dollars, if any, you would donate to ${q://QID80/ChoiceGroup/SelectedChoices}, in case you win.