Nuisance Costs and Inattention in Charitable Giving

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Abstract

Donating to charity requires time, effort and attention. If potential donors perceive the nuisance costs to give to be large, charities may lose out in cultivating donors and donations. We develop a new nonparametric test for the presence of these costs, conduct two field experiments on giving and show that nuisance costs are large and impactful. In the first experiment, over 17,200 potential donors were contacted with an offer to match any donation to the charity above a minimum amount (e.g. $1, $5 or $10) but with a constant match rate of 5:1. If preferences are convex, and nuisance costs absent, the probability of donating should decrease as the minimum amount increases. We find the opposite – donations increase as the minimum rises. Our analysis shows that donations would double if individuals did not face nuisance costs. In the second experiment, with over 100,000 potential donors, we find evidence of mistimed donations. Charities could have receive 18% more in match money had donors been more strategic in their giving. There are large barriers to increase giving on the extensive and intensive margin.

JEL codes: D64, H41, C93, D91
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1 Introduction

The act of giving to charity is not without costs. It may involve acquiring information about the candidate charity, psychological costs when contemplating whether or not to give and time and effort to complete the donation transaction. These costs could be particularly pronounced for online giving where interaction between the charity and donor is not personal and donations require revealing financial information through the internet to complete the transaction. Indeed, while online giving has grown significantly since 2000, it still represents less than one tenth of total donations (Blackbaud, 2019). In this paper, we develop a new method to assess the importance of nuisance costs to giving that does not require knowing the source of these costs (e.g. search, psychological, time).[1] This is important because we often have limited, or no, knowledge of what these costs actually are. As we show, nuisance costs to giving are substantial. Our analysis suggests that, if nuisance costs did not exist, the number of donations would be almost double and the match money received by charities would increase by 18%.

We investigate the empirical relevance of nuisance costs with two large online giving field experiments. In our first experiment, charities asked potential donors to make a gift and receive a fixed match for the charity.[2] Specifically, individuals were offered one of three matches, \$5, \$25 or \$50, if they made a donation of at least \$1, \$5 or \$10 respectively. Match offers were randomly assigned to individuals, and no individual received more than one match offer. The implicit match price was kept constant at 5:1. Absent nuisance costs, standard assumptions on preferences to give predict that donation rates will not increase as the minimum donation required rises. In other words, individuals willing to give at higher required minimums should be willing to give at lower ones as well, but those observed to give at a low minimum donation will not necessarily give at higher ones. In the presence of nuisance costs, however, donation rates could increase as required minimums rise. The findings from the field experiment, therefore, provide a simple and direct test of the relevance of nuisance costs to giving.[3]

[1] A variety of giving costs have been studied with field and laboratory experiments, focusing on reminders and the cost to complete the financial transaction (Rasul & Huck, 2010), language barriers (Meer & Rigbi, 2013) and opportunity cost of time (Knowles & Servátka, 2015).

[2] Match money is typically provided by a generous lead donor or a private foundation.

[3] Similar results are expected if donors do not have convex preferences over donations. This could occur if a donor likes to give in discrete amounts or has a pre-determined amount to donate at the time of solicitation. That individuals reduce choices to discrete and simpler amounts is, of course, a manifestation of decision costs.

Our second field experiment allows us to explore further costs to donating. Again, potential donors are asked to give and the charity receives a fixed match. In this case, there are two windows to give and receive a match, spaced a month apart, and individuals know of both windows ahead of time. In this case, we can test for costs to give by examining how donors allocated their donations across the two match windows. We compare the match money received by the charity to the amount that could have been received had the individual timed donations across the two windows to maximize the matches. This provides an additional test for nuisance costs and inattention.

The study designs and hypotheses rely on weak assumptions on the preferences for giving: monotonicity and convexity. This allows for identification of the presence of nuisance costs without needing to pinpoint the source. The sources of nuisance costs are likely to be heterogeneous and unknown, so this is advantageous. Without prior knowledge of what nuisance costs a potential donor faces, a researcher would need to exhaustively test alternatives, and not all might be easily amenable to experimental manipulation. Our field studies sidestep this issue by examining the observable implications of the existence of nuisance costs in general. The design and empirical strategy we employ might be useful in other contexts as well where nuisance costs are present.

Another important feature of our study designs is the constancy of matching rates. In our first field experiment, all conditions have an implicit matching rate of 5:1, and in the second, the rate is 1:1. Instead, if matching rates differed across conditions within each field experiment, simple comparisons of the propensity to donate and the amount donated would not necessarily identify the presence of nuisance costs in each study. Higher matching rates could generate an increase in donation rates and/or amount donated simply because the price of giving has declined. Indeed, the existence of nuisance costs is consistent with results showing that higher match rates increase donation rates while not affecting the amount donated (e.g., Karlan & List, 2007; Huck & Rasul, 2011). Importantly, by keeping the match rate constant, we minimizes the potential signaling value of different match offers.[4]

Assessing the monetary costs of these barriers to giving necessitates making additional assumptions about preferences in our analysis. We assume that preferences are iso-elastic, a common approach in empirical work (Kleven & Waseem, 2013; Hungerman & Ottoni-Wilhelm, 2018). In this case, only individuals with higher nuisance costs donate as the

[4] A higher match rate could signal greater need or higher quality of the charity.

minimum required donation increases, holding constant the match rate.[5] This implies that the underlying distribution of nuisance costs can be uncovered by offering different required minimum donations. The data from our first field experiment is used to assess this implication and estimate the nuisance costs to giving.[6] Our second field experiment, however, allow us to address this question directly by using simple revealed preference arguments.

We find that the nuisance costs for those who donate when offered a $25 match for a donation of at least $5 is between $23.60 and $38. The nuisance costs for those offered a $50 match for a donation of at least $10 is between $73.50 and $84. Not only are these costs large, but they are widespread. Between 24 to 30 percent of donors in these conditions face nuisance costs of these magnitudes.[7] The second field experiment illustrates the prevalence and costs of inattention. Together, these findings highlight the sizable hurdles that charities face when fundraising and provide strong evidence that individuals select into donating based on nuisance costs.

The first field experiment was conducted in 2015-2016 with five volunteer charities and over 17,200 unique individuals. Almost one percent of those contacted made a donation, and this donation rate is comparable to previous fundraising field experiments using direct mail (Eckel & Grossman, 2008; Karlan & List, 2007) and email communication (Castillo et al., 2018). We find a statistically significant increase in the donation rate as the minimum required donation increases. The rate in the $1:$5, $5:$25 and $10:$50 treatments are 0.52%, 0.74% and 0.97% respectively. This increasing pattern of donation is consistent with the presence of nuisance costs to giving. The average donation, conditional on making a donation, was $29.50, and this is not statistically significantly different across conditions.

In the presence of nuisance costs, it might be advantageous for charities to subsidize the first dollars donated more heavily. Since donations conditional on giving do not increase across match offers in our study, and others (e.g. Karlan & List, 2007), subsidies targeted at the last dollar donated might not be cost effective. Indeed, our findings suggest

[5] The result holds more generally, but absent parametric assumptions, it is not possible to attribute a monetary value to nuisance costs.

[6] The first field experiment allows us to assess the magnitude of nuisance costs to giving, but it does not identify if donors make decision errors. Kleven & Waseem (2013) show that notches can separately identify elasticities and decision errors, however, we would . For this, however, it would be necessary to have an area of dominated choices. Our experimental designs, based on fixed matches, preclude this.

[7] In theory, the entire distribution of nuisance costs could be identified by varying the implicit match rate per dollar donated. This would require an enormous sample though. Our field experiment illustrates this method for one match rate.

that charities should adopt nonlinear matching schemes if they wish to maximize total donations.[8]

The second field experiment was conducted in 2017 with 26 volunteer charities and over 100,000 unique individuals. Almost two percent of those contacted made a donation. The average donation, conditional on making a donation, was $261. Because individuals could receive a match for their charity in two pre-announced donation windows, we can assess the impact of donor nuisance costs and/or inattention on fundraising. In particular, we calculate the match amount that charities would have attained had individuals timed their donations during the two windows to maximize the matches and compare that with the actual match amount received. We find that donors leave a sizable amount of money on the table. Roughly 18% of potential match money was left unclaimed because donors mistimed their donations.

The amount of money left on the table by donors can be related to the nuisance costs that individuals face. We find average nuisance costs of about $18.20 per donation, and this is in addition to any costs an individual may incur by merely completing the donation transaction. If we only look at individuals who incur nuisance costs (33% of donors), the average is $58.40. The existence of nuisance costs is consistent with donors minimizing the number of donations, i.e. donors facing nuisance costs would lump donations into one of the two available match windows so they only incur these costs once. Nuisance costs are a less plausible explanation for sub-optimal behavior by individuals donating in both windows. Indeed, we find that money left on the table is significantly smaller among donors who donate in both windows.

Our findings contribute to the literature on charitable giving from the demand and supply side of donations (Vesterlund, 2006; Andreoni & Payne, 2013; Ottoni-Wilhelm et al., 2017) by examining the impact of individuals' nuisance costs to giving on the fundraising practices of charities. The nuisance costs we estimate are sizable and would affect an individual's willingness to choose among charities and thus more broadly the impact of government transfers to charities (Andreoni & Payne, 2003) and competition among charities (Krasteva & Yildirim, 2013).

The findings also contribute to the burgeoning theoretical and empirical literature on decision frictions (e.g. Taubinsky & Rees-Jones, 2018; Hanna et al., 2014; Bordalo et al.,

[8]Castillo & Petrie (2019) derive optimal incentive schemes for charities under different objectives, e.g. maximizing out-of-pocket donations, increasing the strength of donor participation. Adena & Huck (2019) study personalized nonlinear match schemes.

2013; Grubb & Osborne, 2015; Bordalo et al., 2012; Abaluck & Gruber, 2011, 2016; Gabaix, 2014; Ellison & Ellison, 2009; Hortacsu & Syverson, 2004; Chetty et al., 2009; Chetty, 2012; Handel & Kolstad, 2015; Madrian & Shea, 2001; Kling et al., 2012; Jessoe & Rapson, 2014; Bhargava et al., 2017; Allcott & Taubinsky, 2015) by showing that these costs are large in the context of charitable giving. The new method we develop uncovers nuisance costs in general and does not require knowledge of the source of these costs.[9]

Decision frictions are crucial to understand for policy design, and our field experiment design allows us to directly measure nuisance costs under alternative scenarios. The act of giving is costly, and it is possible that agents purposely commit errors or become inattentive as a way to avoid giving (Andreoni et al., 2017; Exley, 2016; Exley & Petrie, 2018; Exley & Kessler, 2019). However, deliberate inattention or errors cannot completely explain our results. Our second field experiment shows that donors could have secured more money for their charities without incurring any extra nuisance costs. That is, there is evidence of suboptimal behavior on the part of donors, and lost money for charities, that is unlikely due to purposeful inattention.

The paper proceeds as follows. Section 2 outlines a decision framework for making a donation in the presence of nuisance costs and other behavioral frictions. Section 3 describes the first field experimental design and implementation. The section also presents descriptive results and parametric estimations of nuisance costs. Section 4 describes the second field experiment and results. Section 5 concludes.

2 Decision framework

2.1 Nuisance costs

Donors derive utility from consumption (c) and charitable giving (g) according to utility function $u(c, g)$. In a standard model, donors would maximize $u(c, g)$ given income (m) and prices (p_c, p_g). Donors, however, face fixed nuisance costs (γ) whenever they make a donation. For simplicity, the nuisance cost is represented as a loss in income ($m - \gamma$). The amount γ accounts for the value of time used in evaluated, searching and implementing a decision. Let $g(m, p_c, p_g)$ be the Marshallian demand of an agent facing no nuisance costs

[9] An experimental test of the relevance of nuisance costs or inattention typically manipulates the information available or the cost to implement a decision. Because researchers cannot be aware of all possible sources of decision frictions, these tests will provide a lower bound of the effects.

and let $v(m, p_c, p_g)$ be the associated indirect utility function. It follows that a donor will donate $g(m-\gamma, p_c, p_g)$ provided that $v(m-\gamma, p_c, p_g) \geq u(\frac{m}{p_c}, 0)$.

Consider now a donor is offered a fixed match of βx if she donates at least amount x. Formally, the donor's problem is now:

$$max_{c,g} u(c, g)$$
$$\text{subject to:}$$
$$p_c c + p_g g \leq m - \gamma 1[g > 0] \text{ if } max\{g - \beta x, 0\} < x$$
$$p_c c + p_g(g - \beta x) \leq m - \gamma 1[g > 0] \text{ if } max\{g - \beta x, 0\} \geq x$$

In the formulas above, $g - \beta x$ is the out-of-pocket donation and g is the amount of money received by the charity. Only when an out-of-pocket donation exceeds threshold x is the fixed match given. The corresponding demand equation for charitable donations is:

$$g(m, p_c, p_g, \gamma, x) = \begin{cases} g(m-\gamma+p_g(\beta x), p_c, p_g) \; if \; \text{g(m-}\gamma + p_g(\beta x), p_c, p_g) \geq (\beta + 1)x \;\&\; v(m-\gamma+p_g(\beta x), p_c, p_g) > u(\frac{m}{p_c}, 0) \\ g(m-\gamma, p_c, p_g) \; if \; \text{g(m-}\gamma, p_c, p_g) \geq 0 \;\&\; v(m-\gamma, p_c, p_g) \geq max\{u(\frac{m}{p_c}, 0), u(m-\gamma-x, x+\beta x)\} \\ 0 \; otherwise \end{cases}$$

Figure 1 illustrates the potential effect of a match for a donor facing nuisance costs. The interior budget line represents the situation a donor faces when matches are not available. In this case, the donor decides not to donate at all. This occurs because the nuisance costs creates a discontinuity in the choice set faced by the donor because any donation imposes a fixed cost of γ. The outer budget line represents the donor's choice set when a match of βx is received if a donation to the charity of at least x is made. The graph illustrates the possibility that the match might pay for itself, i.e. the total amount donated is greater than $(\beta + 1)x$. How is it possible that a small match generates such a large change in behavior? As the example illustrates, even large nuisance costs might be overcome with small match subsidies by shifting out the budget line. Similarly, minute nuisance costs might prevent giving. The actual effect of the nuisance cost depends on the shape of the indifference curve.

The model suggests that a subsidy on the first few dollars donated can increase donations and even more so as the incentives increase. To test for the presence of nuisance costs, we would then like to manipulate these incentives but make sure that we do not trivially increase donations due to income effects. To accomplish this, in our experimental designs, all the fixed match incentives belong to the same budget line and therefore income effects are not possible. In particular, we offered incentives of the form: "the charity will receive a match of $\beta \times x$ if a donation is at least as large as x."

As an example, an individual might be offered a match of \$5 if she makes a donation of at least \$1, and another individual might be offered a match of \$25 if she makes a donation of at least \$5. These two offers belong to a budget line where the price of giving is $\frac{1}{6}$. If the donor's preferences are convex, she would make a sufficiently large enough donation to receive the first match for the charity whenever she would make a donation large enough to receive the second, higher, match offer. This is because the first match offer is just a linear combination of the second match offer and not donating at all.

This means that we can directly test for the presence of nuisance costs separate from income effects if we accept the standard assumption that preferences are convex. A testable implication of this is that as the minimum required donation increases it is less likely a donor will make a donation of the minimum required amount or larger. However, if there are nuisance costs, the opposite could occur. Donors are more likely to make a donation of at least the minimum required amount as the minimum increases. We directly test this hypothesis in our first study.[10]

2.2 Intertemporal behavioral frictions

We explore other testable hypotheses of convexity. Let (g_1, g_2) represent donations made in the present and the future. In the context of our second experiment, these will be donations made within a month.[11] Let $\succeq$ be the binary relation representing the donor's preferences over consumption pairs with $\succ$ representing the strict preferences and $\sim$ equivalence. Suppose the following conditions hold: (i) $(x, y) \sim (y, x)$, (ii) $\succeq$ is monotone and convex. Condition (i) says that donors are indifferent between donations made early or

[10]On the intensive margin of giving, price incentives could be effective but become ineffective as donations pass a certain level. Consider a simple model where $u(c, g) = c^{1-\beta}(g+\alpha)^{\beta}, \alpha > 0$. For large enough nuisance costs, the individual will consume all her income, but there might be a price of giving $\hat{p_g}$ low enough for which donations are positive. These preferences, however, predict that the share of income devoted to donations will increase proportionally to $\frac{(1-\beta)\alpha}{m}$ as p_g decreases. This suggests that charitable donations would be unresponsive to matches or be price inelastic.

[11]These restricted preference relations assume that consumption in both periods does not change. This is not an overly demanding assumption for individuals who are not cash constrained.

later. This is a reasonable assumption if the time between donations is short. The results below can be adjusted to account for discounting.

Proposition. Let $B \subset \mathbb{R}^2$ be the choice set available to a donor and let the donor choose according to $\succeq$. If conditions (i) and (ii) hold then it is not possible that a donor chooses $(z, 0)$ or $(0, z)$ if there is a $(x, y) \in B$ such that $x + y > z$.

Proof. Let $t \in [0, 1]$ such that $(x, y) \gg t(z, 0) + (1 - t)(0, z)$. Such a t exists given that $x + y > z$. We conclude that $(x, y) \succ t(z, 0) + (1 - t)(0, z) \succeq (0, z) \sim (z, 0)$. The first part of the inequality follows from monotonicity, the second part follows from convexity and the last follows from (i).

The proposition establishes that donors should not leave money on the table, unless they are not able to substitute donations between short time periods. For instance, suppose that each donation incurs a nuisance cost of magnitude τ. This means that allocation $(z, 0)$ is equivalent to allocation $(z - \tau, 0)$ and allocation (x, y) is equivalent to allocation $(x - \tau, y - \tau)$ once nuisance costs are accounted for. It is then possible that $x + y > z$ but $x - \tau + y - \tau < z - \tau$ which vitiates the conclusion from the proposition.

Next, we derive a measure of nuisance costs. Let $(x^*, y^*) = argmax_{(x,y) \in B}\{x + y\} - z$. The number $\lambda = \frac{z}{x^* + y^*}$ is the minimum rate at which (x^*, y^*) has to be shrunk to be weakly preferred to $(z, 0)$ under conditions (i) and (ii). So, $\tau = (1 - \lambda)min\{x^*, y^*\}$ gives a simple measure of nuisance costs. For computational simplicity, we will approximate nuisance costs by estimating $\lambda = \frac{z}{0.5x^* + 0.5y^*}$ and $\tau = (1 - \lambda)(0.5x^* + 0.5y^*)$.

We note that condition (i) is essential for Proposition 1. Convexity alone does not imply that money will not be left on the table. However, convexity alone does bound the size of nuisance costs. Indeed, a donor preferring $(z, 0)$ to $argmax_{(x,y) \in B}\{x + y\}$ will prefer any allocation (x_1, x_2) on the hyperplane supporting $(z, 0)$ and $argmax_{(x,y) \in B}\{x + y\}$. For example, an individual who makes a donation of \$200 in one donation window when \$100 donations are matched with \$100 in both windows reveals a preference for $(300, 0)$ over $(200, 200)$. If preferences are convex, this also reveals that $(300, 0)$ is preferred to $(0, 600)$.[12] This is equivalent to having a discount factor of 0.5 for a period of less than a month. Using the proposed measure above, we calculate that nuisance costs must be at least \$50 since $\lambda = \frac{300}{400} = \frac{3}{4}$ and $(1 - \frac{3}{4})200 = 50$. We submit that nuisance costs provide a more realistic explanation than discounting.

Suboptimal behavior due to nuisance costs is a less-compelling explanation when ineffi-

[12] Note that $(200, 200) = \frac{1}{3}(0, 600) + \frac{2}{3}(300, 0)$. Since $(300, 0) \succeq (200, 200)$, we have that $(300, 0) \succeq (0, 600)$.

ciencies exist and a donor donates in both windows. In such cases, the donor has incurred nuisance costs twice already or has revealed that the costs are not large enough to prevent multiple donations. The logic outlined in the previous paragraphs shows that all nuisance costs would cancel in this case. Suboptimal behavior when multiple donations are made is more likely due to a failure in rationality proper.

3 Study 1: uncovering nuisance costs

3.1 Design

Individuals were offered one of three "fixed" match opportunities if they made a donation to the charity. Each match option was drawn from a budget line with the same implicit price of giving (the same cost to the donor per dollar received by the charity). Thus, all individuals who received a match offer from the charity faced the same price of giving, and the only difference across offers was the minimum donation that needed to be made for the charity to receive the match.

The match offer was communicated to an individual by email and was one of the following three:

1. Donate at least $1, charity receives a $5 matching donation ($6 or more in total)
2. Donate at least $5, charity receives a $25 matching donation ($30 or more in total)
3. Donate at least $10, charity receives a $50 matching donation ($60 or more in total)

We partnered with five different charities to implement the study. Each charity ran a one-time, week-long fundraising campaign in which supporters on their email list were randomly assigned to receive one of the three match offers. Each supporter received an email with only one match offer, and no supporter was informed of the other two offers. The offer could only be redeemed by the individual and could not be shared. Thus, we measure the responsiveness of an individual to an exogenous change in the price of giving and minimum donation amount.

Each charity designed its fundraising campaign to be consistent with its mission and image, but the call to action in the email message sent by each charity was the same: "When you give through [giving platform] by [date], your gift of at least [$1, $5, $10] will be matched with [$5, $25, $50], for a total contribution of [$6, $30, $60] or more."[13] All email messages sent by a particular charity contained the same subject line and were identical in content except for the minimum donation amount and corresponding match.

In total, 17,237 emails were sent to unique individuals, with roughly 5,700 emails sent per match offer condition. Each charity experienced all three offers, and the charities varied in size, with the smallest having a list of 476 members and the largest having a list of 6,764 members.[14]

3.2 Results

The main outcomes of interest are percent of emails opened, donation rates and amount donated by match offer condition.

Roughly 21% of emails were opened, and the open rate is similar and not significantly different across match offers.[15] This provides evidence that emails containing different offers drew similar attention and that individuals were not aware of the content of the offer in the email prior to opening it.

The donation rate is the percent of emails sent that resulted in a donation. We observe that as the minimum donation needed to receive a match increases, donation rates increase as well. Table 1 shows that the total number of donations is 30, 42 and 56 at the minimum donation levels of $1, $5 and $10 respectively, resulting in donation rates of 0.52%, 0.74% and 0.97%. We test whether the observed increase in donation rates is significant. Comparing the donation rate at the $1 to the $5 threshold yields a p-value of 0.071, comparing the $5 to the $10 threshold yields a p-value of 0.084, and comparing the $1 to the $10 threshold yields a p-value of 0.010.[16] These significant differences can be attributed to the appeal of different match offers since emails were opened at similar rates.

If potential donors do not experience nuisance costs, we would have expected the opposite pattern in donation rates across conditions. Donation rates should decrease as the minimum donation threshold increases. The presence of nuisance costs suppresses dona-

[13] Figure A.1 in the Appendix shows the text of an email message sent by one of the charities in the study.

[14] Charity 1 had 6,130 members, Charity 2 had 6,764, Charity 3 had 476, Charity 4 had 2,882 and Charity 5 had 985 members.

[15] Condition $1:$5 v. $5:$25, p-value = 0.463. Condition $5:$25 v. $10:$50, p-value = 0.199. Condition $1:$5 v. $10:$50, p-value = 0.599.

[16] One-sided tests are appropriate, given the theoretical prediction derived in Section 2. In a two-sided test, the difference between condition $1 and $10 thresholds remains significant, but the other comparisons are not significant at conventional levels.

tions. Our results show that if individuals did not experience these costs, donations would be at least double, based on the donation rate in the \$10:\$50 condition compared to the \$1:\$5 condition.

Table 1 also presents detailed information on the amount individuals donated to the charity and the amount received by the charity (donation + match) for all positive, non-zero donations by match condition. While donation rates increase with the minimum required donation, the average amount donated to the charity does not. Mean amounts given to the charity are \$47.60, \$21.20 and \$26.00 across match conditions \$1:\$5, \$5:\$25 and \$10:\$50, and these are not significantly different.[17]

To illustrate the distribution of donations by experimental condition, Figure 2 presents donations across the 3 conditions (labelled \$1:\$5, \$5:\$25 and \$10:\$50). The figure makes clear that the number of donations above the maximum required donation across all 3 conditions (>\$10) is the same. That is, the donation threshold for the match does not have an effect on larger donations. Instead, we observe an increasing amount of bunching at the minimum required donation as the threshold rises.[18]

Regression analysis presented in Table 2 confirms the results presented so far. The regressions control for the assigned match condition and include a dummy variable for each charity. Column 1 confirms emails were opened at the same rate across conditions. Column 2 shows that the probability of making a donation increases as the minimum donation threshold rises, and Column 3 confirms this for those who opened the email. Column 4 shows that the amount donated does not differ across conditions, and Column 5 confirms this for those who opened the email.

3.3 Estimating a model of nuisance costs

To quantify the size of the nuisance costs that potential donors face, we first estimate a model with nuisance costs and assume that an individual's preferences can be represented by an iso-elastic utility function as follows,

$$u_i(g_i, c_i) = \frac{\theta_i + \epsilon}{1 + 1/e} \left[\left(\frac{g_i + T_k(g_i) + \epsilon}{\theta + \epsilon} \right)^{(1+1/e)} - 1 \right] + c_i - \gamma_i 1[g_i > 0].$$

[17] The p-value of the test that donations are smaller in condition \$5:\$25 than \$1:\$5 is 0.9774, comparing \$10:\$50 to \$5:\$25 is 0.2160 and comparing \$10:\$50 to \$1:\$5 is 0.9472.

[18] We do not know how much those donating the minimum amount would have donated in the absence of the match and nuisance costs. For instance, if preferences are separable, donations could be as high as the minimum required plus the match.

where e ($e < 0$) is the price elasticity of giving, g_i is the out-of-pocket donation (not including the match), $c_i = M - g_i$ is consumption, θ_i is the underlying willingness to donate, ϵ is a Stone-Geary parameter reflecting the minimum donation amount, and γ_i is nuisance cost parameter.[19] We assume that θ_i is distributed lognormal $(\mu_\theta, \sigma_\theta)$ and $\gamma_i \sim N(0, \sigma_\gamma)$. Further, we assume that an individual donates a positive amount with probability p and donates 0 with probability $1 - p$. The function $T_k(.), k = 1, 2, 3$ captures the match incentives in each of the experimental conditions. The model is estimated using Maximum Likelihood.

Table 3 presents estimates of the model under two different assumptions on the propensity to donate. The first specification assumes the propensity to donate (p) is constant across conditions, and the second allows this propensity to vary. Note that the estimates are similar across the two.

The price elasticity in both specifications is precisely estimated at -1.04. This estimate is closer to those found in the literature on charitable giving using tax data (Auten et al., 1992; Peloza & Steel, 2005; Andreoni & Payne, 2013) and comparable to those found in the experimental literature (Eckel & Grossman, 2008; Karlan & List, 2007; Huck & Rasul, 2011; Castillo & Petrie, 2019). While these estimates of the price elasticity are based on parametric assumptions, remarkably similar results are found by calculating bounds on these elasticities using the amount of bunching in each treatment. For this purpose, we take the distribution of donations in the $1:$5 condition to estimate the implicit elasticities in the $5:$25 and $10:$50 treatments and use bootstrap methods to assess precision.[20] Similar to the summary results on donation rates presented in Table 1, Specification 2 shows that the propensity to donate increases significantly as the minimum donation required for a match increases.

3.4 Quantifying the size of nuisance costs

In this section, we estimate the implicit nuisance costs faced by donors. Given the extant evidence on donations, we approximate the utility function over consumption and donations as: $\theta ln(g + 1) + M - p_g g$, where M is income.

[19] Without the ϵ parameter, an individual would always donate a positive amount, regardless of the size of the nuisance cost. Adding this parameter, therefore, allows for zero donations.

[20] We use similar methods as in Kleven & Waseem (2013). Specifically, we estimate elasticities from excess bunching at the required minima. We note that these methods rely on a large number of observations, and we have few donations per condition. So, these estimates should be viewed with caution. Details of calculations are available upon request.

We illustrate the logic of our calculations with an example. Consider an individual with a propensity to donate θ_i and a nuisance cost γ_i who donates \$10 in the match condition \$10:\$50 but does not make a donation in the match condition \$5:\$25. This implies that $u_i(60, M-10-\gamma_i, \theta_i) \geq u_i(0, M, \theta_i)$ and $u_i(30, M-5-\gamma_i, \theta_i) \leq u_i(0, M, \theta_i)$. Note that if the donor has convex preferences, and nuisance costs were zero, a donation would have also been made in the \$5:\$25 condition.

The implications of nuisance costs are further refined using revealed preference arguments. First, consider that without the match opportunity, the individual could donate a positive amount. That is, if we observe the individual donating \$10 in the \$10:\$50 condition, it must be true that $u_i(60, M-10-\gamma_i, \theta_i) \geq max\{u_i(0, M, \theta_i), max_g u_i(g + T(g), M-g-\gamma_i, \theta_i)\}$. Second, the individual could have sorting preferences. Suppose the individual prefers condition \$5:\$25 to condition \$10:\$50, or $u_i(30, M-5-\gamma_i, \theta_i) \geq u_i(60, M-10-\gamma_i, \theta_i)$. If offered a \$5:\$25 match, this individual would donate \$5.[21] Taken together, these two observations show that individuals who donate only when there is a higher minimum required donation, and a larger match, should have larger nuisance costs. Otherwise, they would have donated when the minimum required donation was lower. The distribution of nuisance costs can be assessed from the probability of donating across our three conditions, even though a donor faced only one condition.

An example shows our reasoning. Suppose we observe more donors in condition \$10:\$50 than in condition \$5:\$25. By the argument above, $u_i(30, M-5-\gamma_i, \theta_i) \leq u_i(60, M-10-\gamma_i, \theta_i)$. Using the preferred parametric assumptions and noting that the individual donates in condition \$10:\$50, we have that $\theta ln(60+1)+M-10-\gamma \geq M$. Since the individual would have not donated in condition \$5:\$25, we have that $\theta ln(30+1)+M-5-\gamma \leq M$. Putting the two conditions together, we obtain that $\theta ln(30+1)-5 \leq \gamma \leq \theta ln(60+1)-10$. Moreover, since $u_i(30, M-5-\gamma_i, \theta_i) \leq u_i(60, M-10-\gamma_i, \theta_i)$ we have that $\theta \geq \frac{10-5}{ln(60+1)-ln(30+1)}$.[22]

The actual distribution of nuisance costs depends on the underlying distribution of willingness to donate (θ). We calculate the average nuisance costs based on the estimates

[21] We know this because if a donation of \$10 was made in condition \$10:\$50, and this condition gives a lower utility than \$5:\$25 and nuisance costs are constant, then condition \$5:\$25 must dominate condition \$10:\$50.

[22] For example, an individual with a propensity to donate $\theta = 8$ who donates only in condition \$10:\$50 has nuisance costs between \$22.50 and \$22.90. An individual with a propensity to donate $\theta = 25$ who donates only in condition \$10:\$50 has nuisance costs between \$80.80 and \$92.70. A similar exercise can be done for condition \$5:\$25 using condition \$1:\$5 as a benchmark. Given our design, we do not have such a benchmark for the \$1:\$5 condition. If we assume preferences are linear over donations, the calculations are simplier. Nuisance costs are between \$25 (\$30-\$5) and \$50 (\$60-\$10).

of the underlying distribution of donations from the previous section. We restrict the data to those in conditions $5:$25 and $10:$50 and acknowledge that those who bunch at the required minimum donation in these conditions would have a maximum willingness to donate of $30 and $60.

Our estimates show that the bounds on the nuisance costs for donors bunching at $5 in condition $5:$25, and who would have not donated at the lower minimum ($1:$5), are [$23.60, $38.00]. For those bunching at $10 in condition $10:$50, and who would have not donated at the previous minimum ($5:$25), are [$73.50, $84.00]. Thirty percent of donors in the $5:$25 condition and 24% of donors in the $10:$50 conditions have nuisance costs in the ranges presented. Overall 46% of donors in our study have nonzero nuisance costs.

4 Study 2: donation mistiming

4.1 Design

The design of the second field experiment, as the first, includes a fixed match offer if a donation was at or above a certain threshold. Individuals were offered this type of match for two different donation windows spaced four weeks apart (i.e. Nov 1-3 and Nov 28). A donor could make a gift during the first window and get a match for the charity and could also donate during the second window and get a match. There were nine different conditions for the first match opportunity, and each individual was offered only one of the nine. The second match opportunity was identical for everyone. Each match opportunity had three threshold-match pairs (e.g. "the charity will receive a $25 match if your donation is between $25-$99, $100 match if your donation is between $100-$499 and $500 match if your donation is $500 or above").[23]

The nine match conditions all included a threshold-match pair at a donation of $500 or above. The conditions then differed only by the first and second pairs. For example,

[23] The exact text is as follows (the numbers in brackets change depending on the match offer), "We have two great match offers in November - one that starts today and one on Giving Tuesday (Nov 28). Thanks to a generous supporter, any donation of at least [$50] between now and November 3 will be matched. [charity name] will receive a [$50] match if your donation is between [$50] - [$149], [$150] match if your donation is between [$150] - [$499], $500 match if your donation is $500 or above. On Giving Tuesday, a donation between $25-$99 will receive a $25 match, a donation between $100-$499 will receive a $100 match, and a donation of $500 or above will receive a $500 match. If you are able to give [$50] or more today, your gift will be matched, and any donation of $25 or more on Giving Tuesday will still be matched." Matching funds for the November campaigns were capped at $10,000 per charity, and donors could only receive one match per donation window. This information was included in the email text.

condition 25-100 included a match of $25 for donations between $25-$99 and a match of $100 for donations between $100-$499. Other conditions include 35-100, 50-100, 25-75, 25-150 and 50-150. Three conditions had the same thresholds as other conditions (i.e. 25*-100, 35*-100 and 50*-100) but included a match at the lowest threshold equal to the threshold + $10.[24]

The field experiment was embedded into a standard fundraising campaign in partnership with 26 charities and a private foundation in November 2017. Personalized emails were sent on Nov 1 to roughly 100,000 unique individuals in which they were offered one of the nine match offers for the Nov 1-3 donation window and informed of the match offer available on Nov 28. Each charity designed the fundraising email to be consistent with its image, and we included identical match offer wording for each charity. The nine match offers were randomized across supporters within each charity, and the charity was blind to condition assignment.[25]

4.2 Results

Similar to the low donation rate in the first field experiment, 1.9% of individuals who were sent a match offer in this study made a donation. The average donation, conditional on giving, was $295. Most donors (93%) only gave in one of the donation windows, either Nov 1-3 or Nov 28.

Strategic donors might want to take advantage of the incentives offered on Nov 1-3 and Nov 28 to maximize the match received for their total donation. They can either choose the time frame with the lowest price of giving to make a donation or split their intended donation between the two periods. This type of behavior allows us to assess the importance of inattention to incentives and nuisance costs. We calculate the amount of money donors "left on the table" by not optimally allocating their donation across the two periods.

As an example, for a donor who received the 50-100 match condition, a single donation of $200 on Nov 1-3 or Nov 28 produces a match of $100. However, a donation of $100 on Nov 1-3 and $100 on Nov 28 produces a match of $200 in total. It is possible that the donor prefers the charity receives $300 on Nov 1-3 and $0 on Nov 28 (or $0 on Nov

[24]We note that the analysis in this section is valid even if income effects are possible since we are looking at efficiency only.

[25]The charities varied in size in terms of supporters, ranging from 500 to 57,000, with most having around 2,500. Because of this, we did not have enough power to detect effects across all nine treatments within each charity. Thus, all charities were assigned the first six of the nine treatments, and four large charities (>3,500 supporters) were assigned all nine conditions.

1-3 and \$300 on Nov 28) to \$200 in each period. Donors might be extremely impatient (first case), inattentive (second case) or face nuisance costs. We take the distance between the maximum attainable match and the match actually attained as a simple measure of behavioral frictions in giving.[26]

Figure 3 illustrates the difference between the potential match a donor could have received had the donation been allocated across the two periods to maximize the match received and the match the donor actually received. Each dot represents a donor, and dots along the 45-degree line are donors who maximized the potential match (i.e. the attained match is equal to the potential match). While many donors attained the potential match, many did not. Those who only gave once were the ones most likely to leave money on the table.

Matches received by the charities are 18% below the maximum attainable, and on average, over \$18 per donor is lost in matches. Twenty percent of donors could have doubled their matches had they allocated their donation across the two periods. In total, about \$60,000 was lost by charities in match money. This loss in dollars is important because some charities did not meet the match cap per charity of \$10,000, so they could have raised more money had their donors been more strategic.

We calculate nuisance costs using the logic of Section 2. The average nuisance cost across all donors is \$18.20. The average nuisance costs among donors who did not maximize total donations to the charity (31% of donors) is \$58.40.

These results require further interpretation. The nuisance costs calculations are in addition to any costs an individual incurs by completing a donation at all. To see this, note that if a nuisance cost of τ rationalizes choices in the second field experiment then a nuisance cost of $\tau + \epsilon$, $\epsilon > 0$, also rationalizes choices provided ϵ is not so large as to prevent an individual from making a donation. These nuisance costs are associated with allocative efficiency and are net of the costs associated with making at least one donation. The previous section provides strong evidence of selection into giving based on nuisance costs. So, we should expect that the costs to an individual to make optimal decisions are relatively more important for these donors.

Section 2 provides a testable hypothesis of the importance of nuisance costs by comparing individuals who gave in only one window and those who gave in both windows. The

[26]Section 2 provides a justification for this measure. Note that behavioral frictions are likely underestimated, as they are based solely on actual donation behavior. Donors may want to donate in both periods, anticipate this friction and reduce their donation in one period to maximize the match.

latter donors incur nuisance costs in each period, and thus, these costs should not affect the optimality of their decisions. In other words, donors who lump donations in one period and miss matching opportunities may do so to avoid or minimize nuisance costs. However, nuisance costs are a less likely explanation of suboptimal behavior by those who donate in both windows.

Figure 4 presents the proportion of money left on the table as a proportion of the maximum match attainable for donors donating in the first window (Nov 1-3), in the second window (Nov 28) or during both windows. As predicted by the presence of nuisance costs, individuals who donate only once are more likely to leave money on the table.[27] Importantly, suboptimal behavior is common for those who only donated during Nov 1-3 or on Nov 28. This contradicts the hypothesis that missing match money is because of impatience.[28]

5 Conclusions

We investigate the presence and magnitude of nuisance costs and inattention to online charitable giving with two large field experiments. Nuisance costs are large and impactful and suggest that donors face barriers to giving that extend beyond the desire to make a donation. Our approach to measure nuisance costs does not require knowing where they originate – a daunting task in itself. Rather, our test to detect these frictions in charitable giving uses mild assumptions on how individuals face the decision to give. We find strong evidence that those who face high nuisance costs are less likely to give.

Estimates from our first field experiment suggest that close to half of individuals have mean nuisance costs to give around \$50. This represents a large barrier for charities seeking to expand donations from small donors and is consistent with a charitable sector that favors large donations. Our results suggest that the number of donations could almost double if individuals did not face nuisance costs to give.

The second field experiment documents the importance of inattention in giving – donors leave money on the table. Roughly 18% of potential match money for a charity was lost because donors did not time their gifts optimally. This missed opportunity for revenue is

[27] The difference between the percent left on the table for those donating only once compared to those donating twice is statistically different from each other (t-test = 4.9418, p-value < 0.001).

[28] These results can also be attributed to inattention. We consider costly information acquisition to be part of nuisance costs.

important, especially given the precarious financial status of many charities. We estimate that individuals face an average nuisance cost of \$18.20 to make a donation, and those who do not act strategically have nuisance costs of \$58.40. These costs are sizeable and prevent donors from allocating their donations in a manner that is most beneficial for the charity. These costs are in addition to costs an individual faces to make a donation at all.

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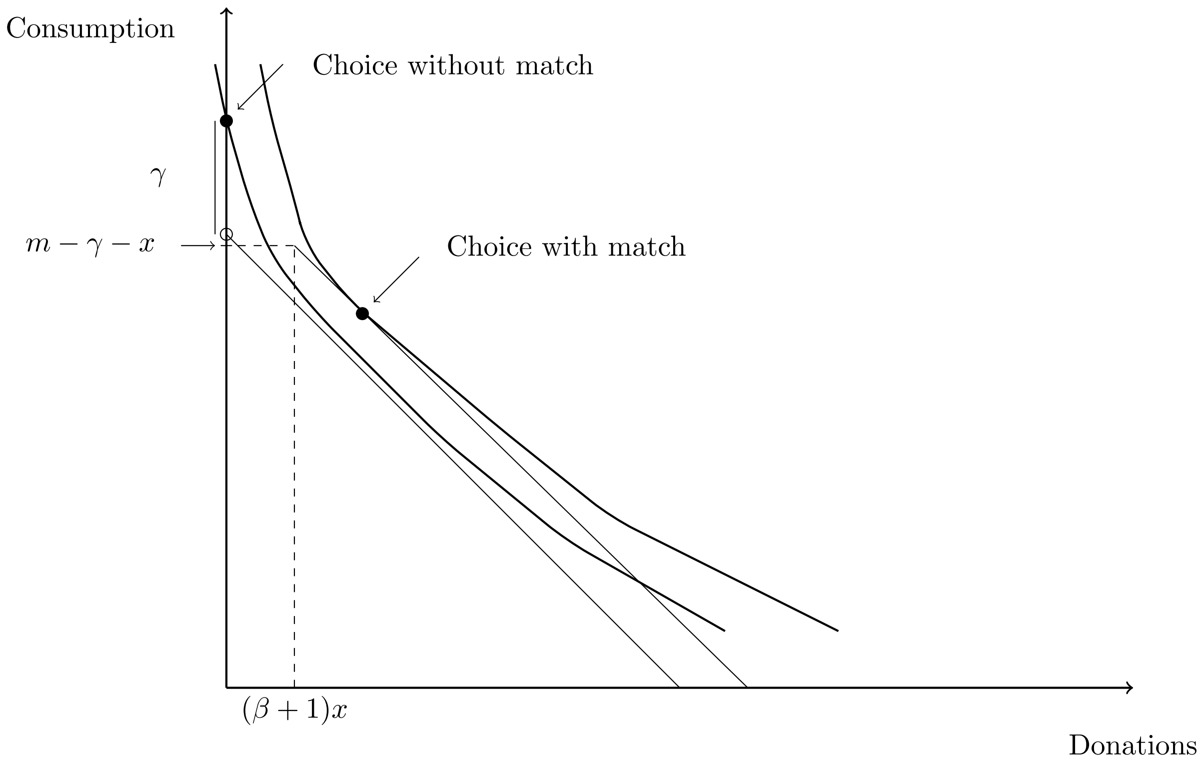

γ = Nuisance cost

x = Minimum required donation

β = Match rate

Figure 1: Effect of match on donor with nuisance costs

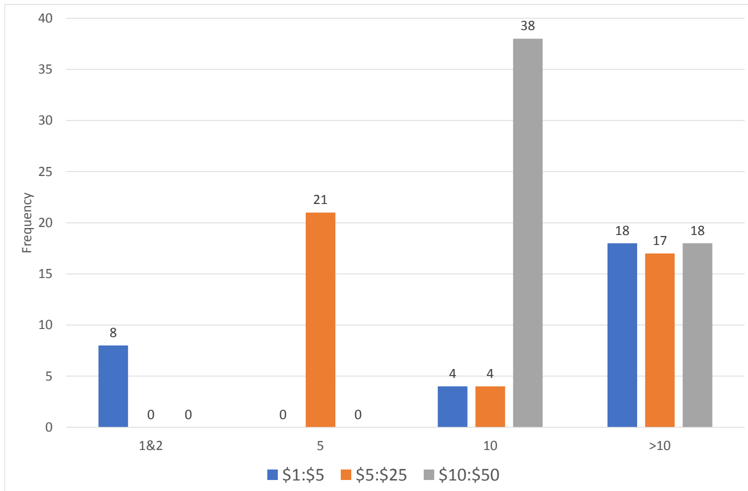

Figure 2: Distribution of out-of-pocket donations by match offer

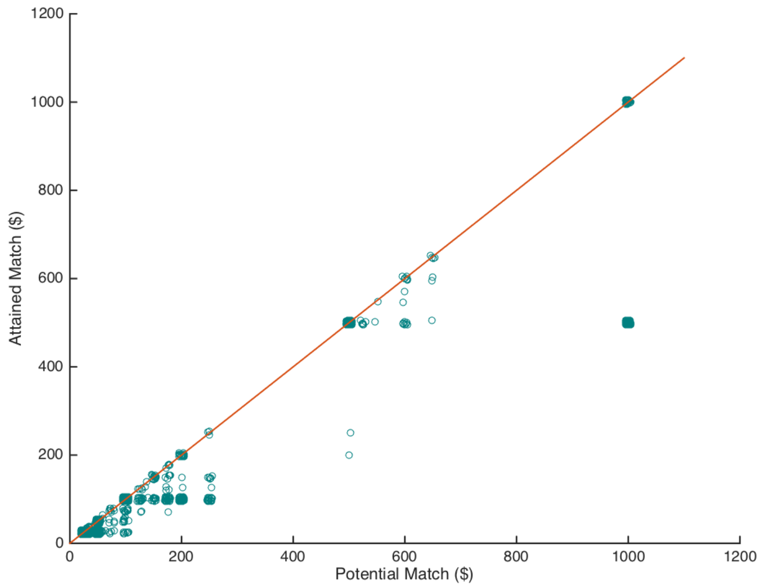

Figure 3: Loss in match money due to mistiming

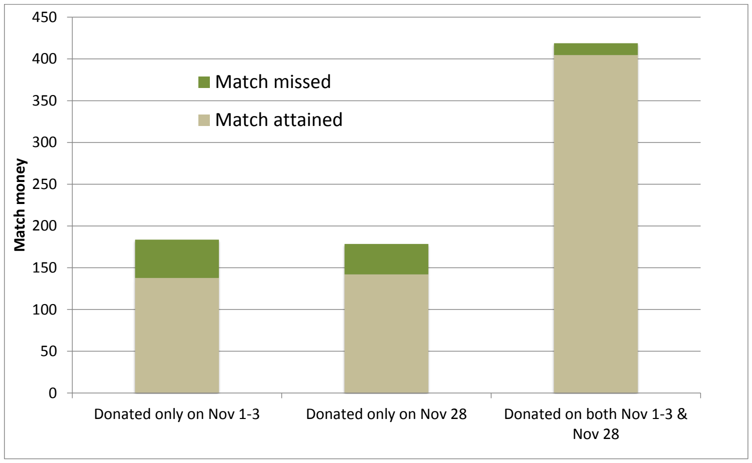

Figure 4: Match money attained and lost by donation timing

Table 1: Study 1 - Donations and emails by match offer

	Match offer		
	$1:$5	$5:$25	$10:$50
Emails sent	5,774	5,707	5,756
Emails opened	1,206	1,202	1,281
Number of donors	30	42	56
Donors as percentage of emails sent	0.52%	0.74%	0.97%
Donors as percentage of emails opened	2.49%	3.49%	4.37%
Amount charity receives (out-of pocket donation + match)			
Mean	$53.6	$46.3	$76
Median	$25	$32.5	$60
Amount donor gives (out-of-pocket donation only)			
Mean	$47.6	$21.2	$26.0
Median	$20	$7.5	$10
Mode	$1	$5	$10
Minimum	$1	$5	$10
Maximum	$300	$100	$200

Donations included in table are all positive (non-zero).

Table 2: Ordinary Least Squares Regression Analysis

VARIABLES	(1) Opened email	(2) Made a donation	(3) Made a donation after opening email	(4) Amount donated	(5) Amount donated of those opening emails
$5:$25 treatment	0.000	0.001+	0.006	-0.093	-0.490
	[0.007]	[0.001]	[0.005]	[0.083]	[0.388]
	(1.000)	(0.157)	(0.202)	(0.265)	(0.207)
$10:$50 treatment	0.000	0.003***	0.013**	0.004	-0.088
	[0.007]	[0.001]	[0.005]	[0.083]	[0.382]
	(1.000)	(0.004)	(0.010)	(0.960)	(0.817)
Charity dummies?	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	17,625	17,232	3,689	17,232	3,689
Pseudo R-squared	0.0724	0.1343	0.1707		
R-squared				0.007	0.026

s.e. in brackets, p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 3: NUISANCE COST MODEL ESTIMATES

	Specification 1		Specification 2	
Variable	Coefficient	s.e.	Coefficient	s.e.
Elasticity (e)	-1.043	0.001	-1.037	0.001
Mean (log) donation (μ_θ)	2.670	0.111	2.663	0.113
Variance of (log) donation (σ_θ)	1.202	0.087	1.205	0.088
Variance of nuisance cost (σ_γ)	1.311	1.532	1.542	1.531
Propensity to donate (p)	0.007	0.001		
Propensity to donate ($1:$5)			0.005	0.001
Propensity to donate ($5:$25)			0.008	0.001
Propensity to donate ($10:$50)			0.010	0.001
Stone-Geary parameter	0.141	0.000	0.156	0.000

A Appendix

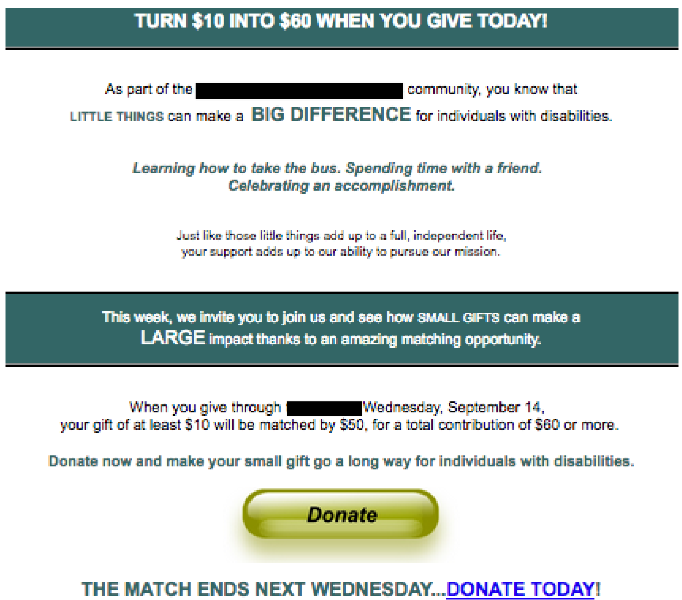

Figure A.1: Study 1 - Example of message sent