The Effect of Seed Money and Matching Gifts in Fundraising: A Lab Experiment

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Abstract

Existing experimental studies find weak support for the theoretical prediction that matching leadership giving alleviates free-riding and raises more voluntary contributions for public goods relative to seed money. However, while these experimental studies use exogenous variations of the leadership gift, theoretical models allow for this choice to be made by a strategic lead donor. In order to provide a more direct test of the theoretical prediction, we conduct a laboratory experiment with three sequential strategic players: a fundraiser, a lead donor, and a follower donor. The fundraiser chooses between a matching and a seed money fundraising scheme, followed by sequential contribution decisions by the two donors. We find that matching increases overall average contributions by almost 10% relative to seed money. Moreover, under matching, there is a decrease in the lead donor's contribution, but the follower donor contributes significantly more. Interestingly, fundraisers choose the matching scheme slightly more than a third of the time. However, the probability of choosing the matching scheme gradually increases throughout the game for females subjects. This is not the case for males.

JEL Classifications: H00,H41
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1 Introduction

With the growing size of the charitable giving market, which surpassed $440 billion in 2019,[1] both practitioners and academics have turned their attention to identifying best fundraising practices. A particular area of interest has been the impact of leadership giving as a way to encourage contributions by individual donors. A leadership gift is a large public commitment to donate to a fundraising campaign, which has the goal of encouraging other potential donors to contribute. Leadership gifts are most frequently structured in the form of an unconditional lump sum called "seed money" or as a promise to match subsequent donations by a fixed ratio called "matching gift". Securing a seed money gift prior to launching a public campaign is a common recommendation among fundraising experts.[2] The prevalence of matching gift has also been growing with an estimated $2-$3 billion being donated through matching gift programs annually in the United States.[3]

There is a general consensus that leadership gifts are beneficial for fundraising. In particular, previous work has shown both theoretically (e.g., Andreoni, 1998) and experimentally (e.g., List and Lucking-Reiley, 2002; Potters et al., 2007; Rondeau and List, 2008) that seed money can increase fundraising in threshold public goods that require a minimum amount of contributions for the realization of the public project. Moreover, based on theoretical literature (e.g., Guttman, 1978; Danziger and Schnytzer, 1991) matching gifts can reduce donors' incentives to free-ride on others' contributions and alleviate public good under-provision relative to the socially optimal level. This finding has also found some support in laboratory experiments (e.g., Eckel and Grossman, 2003, Meier and Frey, 2004, Eckel and Grossman, 2006a, Eckel and Grossman, 2006b, Eckel et al., 2007, Falk, 2007, Eckel and Grossman, 2008). However, more recent field studies are far from conclusive. For instance, Karlan and List (2007) find that announcing a matching gift has a positive effect on both the response rate and the revenue per solicitation, but the magnitude of the match does not have a significant impact. Meier (2007) finds that the positive effect of a matching gift is short-lived with contributions diminishing substantially in the period after the matching donations have expired.

Furthermore, an important question regarding these two types of leadership gifts is: which one raises more contributions? A small number of studies (Rondeau and List, 2008; Huck and Rasul, 2011; Huck et al., 2015) have undertaken a direct comparison in field experimental settings and have found seed money to be the more effective scheme. In particular, Rondeau and List (2008) consider a threshold public good, in which the two schemes are theoretically equivalent.[4] In contrast, Huck

[1] Source: Giving USA 2020 report, `https://givingusa.org/tag/giving-usa-2020/`.

[2] For a discussion about the tendency of fundraising experts to recommend securing seed money as a first step in fundraising, see List and Lucking-Reiley (2002) and Andreoni (1998).

[3] Source: Double the Donation's project, `https://doublethedonation.com/tips/matching-grant-resources/matching-gift-statistics/`.

[4] In their setting, the size of the leadership gift is the same under both schemes and is realized only when the donors contribute the remainder necessary to reach the thresholds. Once the threshold is reached, the entire leadership gift is realized and no further matching takes place. Thus, the two schemes differ only in their framing and the authors hypothesize that in the absence of uncertainty about the value of the public good, the two schemes should raise the same amount of money. This would not be the case in a more general setting, in which the matching gift affects contributions beyond the threshold.

and Rasul (2011) and Huck et al. (2015) include no explicit threshold. Then, in the presence of free-riding incentives by donors, the matching gift is theoretically expected to raise more total contributions relative to seed money. Nevertheless, all studies report the opposite finding.

One plausible explanation, advanced by Rondeau and List (2008), is that the fundraising scheme in the field may carry information about the quality of the public good. Indeed, if seed money conveys a stronger signal of quality relative to matching, it would explain the relative performance of the two schemes in existing studies. Rondeau and List (2008) confirm this intuition using a lab experiment in which subjects can observe the quality of the public good and there is no need to signal quality information. Then, as theoretically predicted, the two schemes are found to be equally effective.[5]

Apart from the possible information asymmetries between the two schemes in the field, an important aspect of the field setting is the exogenous variation of the leadership gift. This is a significant departure from the existing theoretical literature. Theoretical models that compare the two schemes (e.g., Gong and Grundy, 2014; Krasteva and Saboury, 2019) allow for the leadership gift to be chosen endogenously by strategic players. Besides providing an environment that is closer to the actual economic choices of fundraisers and lead donors, this endogenous setting also allows for a comparison of the two schemes at their equilibrium leadership contributions. This feature is important because the two schemes might differ in their relative effectiveness at arbitrary levels of the leadership gift while having a consistent ranking when evaluated at their equilibrium levels.[6]

In this study, we extend the existing experimental literature by allowing the form and size of the leadership gift to be determined by strategic players. Such a setting enables us to evaluate the equilibrium incentives underlying the two schemes and measure their relative effectiveness at the equilibrium levels of giving by the lead donor. The laboratory provides an ideal environment to study the effectiveness of both schemes under an endogenous response to the scheme choice. Moreover, our study focuses on a complete information environment in which the two schemes are equivalent in the information that donors possess. This allows us to abstract from the potentially confounding factor of information signaling.

Our theoretical framework and experimental design consist of three players- one fundraiser and two donors who contribute sequentially to the public good. The lead donor's contribution plays the role of a leadership gift that is observed by the follower donor and aims to incentivize the follower donor to contribute as well. The goal of the fundraiser is to maximize the total contributions to the public good by choosing the fundraising scheme that raises more funds. The seed money scheme

[5]The signaling explanation for the success of seed money in the field is in line with the theoretical works by Vesterlund (2003), Andreoni (2006), and Krasteva and Saboury (2019). They find that the size of leadership gift may be used by the lead donor to convey information about the quality of the public good. Moreover, Krasteva and Saboury (2019) endogenize the fundraising scheme and show that in equilibrium, seed money may indeed signal higher quality relative to a matching gift.

[6]For instance, in Huck and Rasul (2011) and Huck et al. (2015), the two matching treatments of 50% and 100% result in a leadership gift contribution of only €7,853 and €14,310 respectively, which is significantly lower than the €60,000 commitment by the lead donor. Note, that it is not immediately obvious that any of these two matching levels would emerge if the match amount itself was chosen by the lead donor instead of the experimenters.

simply asks the lead donor to make a lump sum contribution to the public good. The matching scheme asks the lead donor to commit to a match ratio that amplifies the follower donor's gift by the size of the match.

We use a piece-wise linear public good with a marginal per-capita return (MPCR) less than one. This payoff structure gives rise to the standard free-riding incentives inherent in public good provision. Moreover, the MPCR falls below $\frac{1}{2}$ after some provision level G_0. This allows us to explore donors' willingness to give not only for the donors' benefit, but also for the fundraiser's benefit. Moreover, this structure also avoids situations in which the donors' giving is limited by their endowment due to a binding budget constraint. We avoid such setting since we believe that binding budget constraints (i.e., donors contributing their entire wealth to the public good) are unlikely to play a significant role in the field and thus we want to avoid such scenario impacting the comparison of the two schemes.[7]

In this setting, it is well-known that the individually payoff-maximizing strategy under seed money is to give zero. This prediction, however, fails to hold in experimental settings since there are always subjects who contribute positive amounts. To rationalize such positive contributions, we present a theoretical model of social pressure where the follower donor derives disutility from giving less than the lead donor's contribution. Since donors differ in their susceptibility to social pressure, we assume that the social pressure parameter in the population is distributed according to a known distribution function. If enough donors are sufficiently susceptible to social pressure, this theoretical model gives rise to an equilibrium, in which the lead donor contributes a positive amount to the public good. She does so to induce social pressure on the follower donor. The latter also contributes with a positive probability as a response to the social pressure exerted by the lead donor. An interesting feature of this equilibrium is that the lead donor makes a higher expected contribution relative to the follower donor. The reason is that not all donors are susceptible to social pressure and thus only a fraction of the follower donors make a contribution in equilibrium.

In contrast to seed money, the matching gift does not exert social pressure on the follower donor, but instead amplifies the marginal impact of the follower donor's gift. Thus, instead of relying on social pressure susceptibility, the lead donor can induce giving by the subsequent donor by simply offering a sufficiently high match ratio. In this case, our model predicts a positive contribution by both donors. Interestingly, under matching the lead donor ends up giving a lower amount than the follower donor since the match ratio that induces the follower donor to contribute is less than one. Thus, matching reverses the relative contribution amounts of the two donors compared to seed money.

Comparing the total contributions under matching and seed money in the equilibrium with non-zero giving, we find that matching raises (weakly) higher total contributions relative to seed money. In fact, the two schemes are equivalent only if all donors are susceptible to social pressure and match the lead donor's unconditional gift under seed money. This ranking of the two schemes occurs since while seed money induces a response to the leadership gift only by donors who are highly susceptible to social pressure, matching can induce giving by all follower donors.

[7]Section 2.1 provides a more detailed discussion about this modeling choice.

Our theoretical model gives rise to three hypotheses: 1) matching raises (weakly) higher expected contributions in equilibrium; 2) the follower donor contributes significantly more under matching than under seed money; 3) the fundraiser prefers matching over seed money. We test these three hypotheses in an induced value laboratory public good game. Our experimental design follows closely our theoretical model and consists of three treatments- *Exogenous Seed*, *Exogenous Match*, *Endogenous Scheme*. In the first two treatments, we set the scheme exogenously to seed money or matching and aim to test the first two hypotheses. In the last treatment, the scheme is endogeously chosen by the subjects who play the role of the fundraiser in our experiment.

Our laboratory experiment finds strong support for Hypotheses 1 and 2. The *Exogenous Seed* treatment results in consistently lower average contributions compared to the *Exogenous Match* treatment across the ten rounds of the contribution game. Interestingly, the difference between the two schemes is fairly small (21.73 tokens under seed money and 23.87 tokens under matching)[8], suggesting that the giving behavior under seed money is consistent with our equilibrium under significant social pressure. Analyzing the giving behavior of the lead and the follower donors, we find that seed money generates more giving by the lead donors, while matching generates significantly higher giving by the follower donors. This is also in line with our theoretical model and Hypothesis 2.

In the *Endogenous Scheme* treatment, we find that the fundraiser chooses matching 35.8% of the time. However, while in early rounds subjects are less likely to choose matching compared to seed money, females learn to choose matching more often during the experiment and in the final three rounds of the game, their probability of choosing matching is not statistically different from 50%.

In the following sections, we discuss our theoretical model, experimental design, and findings. Section 2 presents the theoretical model and testable implications emerging from the equilibrium analysis. Section 3 describes the experimental design, followed by the description of the data collection process in Section 4, and the experimental findings in Section 5. Section 6 concludes.

2 Theoretical Model and Predictions

2.1 Model

Consider the following three-person voluntary contribution environment. A fundraiser, F, sequentially solicits two donors, $i = \{1, 2\}$, for contributions to a public good. At the beginning of the game, the fundraiser has zero endowment and her payoff is simply the total contributions by the two donors, G. In contrast, each donor is endowed with wealth w, which can be allocated between private and public consumption. Donor i's monetary payoff upon contributing an amount g_i to the project is:

$$\pi_i(w, g_i, G) = w - g_i + v(G), \tag{1}$$

[8]The p-value of the basic mean comparison student's t-test is 0.0597.

where $v(G)$ denotes donor's return from the project. We depart from the standard linear public good setting by assuming that this return follows a piece-wise linear function:

$$v(G) = \begin{cases} \overline{\alpha}G & \text{if} \quad G \leq G_0 \\ \overline{\alpha}G_0 + \underline{\alpha}(G - G_0) & \text{if} \quad G > G_0, \end{cases} \tag{2}$$

where $\underline{\alpha} \leq \frac{1}{2} < \overline{\alpha} < 1$ and $\overline{\alpha}G_0 \leq w \leq G_0$. A straightforward calculation reveals that a total contribution of G_0 is jointly payoff-maximizing for the donors, while giving zero is the individually payoff-maximizing contribution for each donor. The reason for setting $\underline{\alpha} \leq \frac{1}{2}$ is two-fold. First, it allows us to experimentally explore the donors' willingness to give not only for their joint benefit, but also for the fundraiser's benefit. More importantly, as we demonstrate in our analysis in the subsequent sections, this parameter specification avoids equilibria with a binding budget constraint, in which a donor's giving is limited by her endowment. Such outcome is highly unlikely to occur in the field that typically features many potential donors.[9] Moreover, such binding constraint exogenously reduces the donors' ability to increase their giving in response to the fundraising scheme. Thus, donors' choices do not fully reveal their willingness to give, which in turn impacts the comparison between the two solicitation schemes that we study.[10] In order to avoid such a scenario, we reduce the public good's return below $\frac{1}{2}$ after the threshold G_0 is reached, making it unattractive for donors to contribute their entire endowment.

We consider sequential giving by the two donors using two solicitation schemes. Under seed money, the lead donor publicly chooses her lump sump contribution g_1, followed by a lump sum contribution g_2 by the follower donor. Under matching, the lead donor publicly commits to a match ratio m, followed by a lump sum contribution g_2 by the follower donor, giving rise to $g_1 = mg_2$. The total amount raised under each scheme is $G = g_1 + g_2$.

To understand how the two schemes impact the donor's incentives, in Section 2.2 and Section 2.3 we characterize the subgame perfect Nash equilibrium prediction under each scheme. We discuss the equilibrium choice of scheme by the fundraiser in Section 2.4.

2.2 Seed Money

Given $\overline{\alpha} < 1$, it is well-known that the unique payoff-maximizing strategy for the follower donor is to give zero. Anticipating this, the lead donor must, in turn, also contribute zero. This non-cooperative behavior is, however, inconsistent with existing experimental data. Existing studies document positive contributions by donors, with donors often increasing their own contributions as a response to higher contributions by others. In our sequential environment, such behavior can be rationalized by the lead donor's contribution creating *social pressure* on the subsequent

[9] In a setting with many donors, even if an individual donor's budget constraint is binding, the aggregate contributions are unlikely to be constrained by the donors' aggregate budget.

[10] Since $\underline{\alpha} < \frac{1}{2}$, joint payoff maximization caps donors' willingness to give to G_0. Without the kink at G_0, such that $\underline{\alpha} = \overline{\alpha} > \frac{1}{2}$, a donor's willingness to give may exceed her budget w. This may adversely impact the matching scheme more than seed money. This is because the lead donor's ability to use a higher match ratio to encourage more giving by the follower donor is limited by the follower donor's budget. Thus, in this case, it is possible for seed money to result in higher total contributions, but this is entirely due to the follower donor's binding budget constraint. A formal proof is available upon request.

contributor to match the lead donor. In particular, following DellaVigna et al. (2012) and Name-Correa and Yildirim (2016), we allow for the follower donor to derive disutility from falling short of the contribution made by the lead donor. Thus, the utility of the follower donor is given by:

$$u_2(\pi_2, s_2) = \pi_2 - s_2 \max\{g_1 - g_2, 0\}. \tag{3}$$

The parameter s_2 captures the extent of social pressure that the follower donor feels about cooperating with the lead donor and matching the lead donor's contribution. We denote by $F(\cdot)$ the distribution of s_2 in the population. Straightforward differentiation of eq. (3) yields the following best response function for the follower donor:

$$g_2^*(g_1) = \begin{cases} 0 & \text{if} \quad s_2 \leq 1 - \overline{\alpha} \\ \min\{g_1, G_0 - g_1\} & \text{if} \quad s_2 \in (1 - \overline{\alpha}, 1 - \underline{\alpha}] \\ g_1 & \text{if} \quad s_2 > 1 - \underline{\alpha} \end{cases} \tag{4}$$

To understand the above best response, note first that the follower donor's contribution can never exceed that of the lead donor since then the marginal value of contributing is at most $-1+\overline{\alpha} < 0$. Given $g_2 < g_1$, if $g_2 < G_0 - g_1$, the follower donor's marginal value of contributing is $-1+\overline{\alpha}+s_2$, while for $g_2 > G_0 - g_1$ it is $-1+\underline{\alpha}+s_2$. Therefore, it is clear that for $s_2 \leq 1-\overline{\alpha}$, the social pressure is sufficiently weak and the utility maximizing strategy coincides with the payoff-maximizing strategy of 0. For $s_2 \in (1-\overline{\alpha}, 1-\underline{\alpha}]$, the follower donor feels sufficient social pressure to match the lead donor's contribution as long as the total giving does not exceed G_0, since at that point the MPCR drops to $\underline{\alpha}$. This implies a giving of g_1 for $g_1 \leq \frac{G_0}{2}$ and $G_0 - g_1$ for $g_1 > \frac{G_0}{2}$. Finally, for $s_2 > 1-\underline{\alpha}$, the social pressure is significant enough for the follower donor to always match the lead donor's gift.

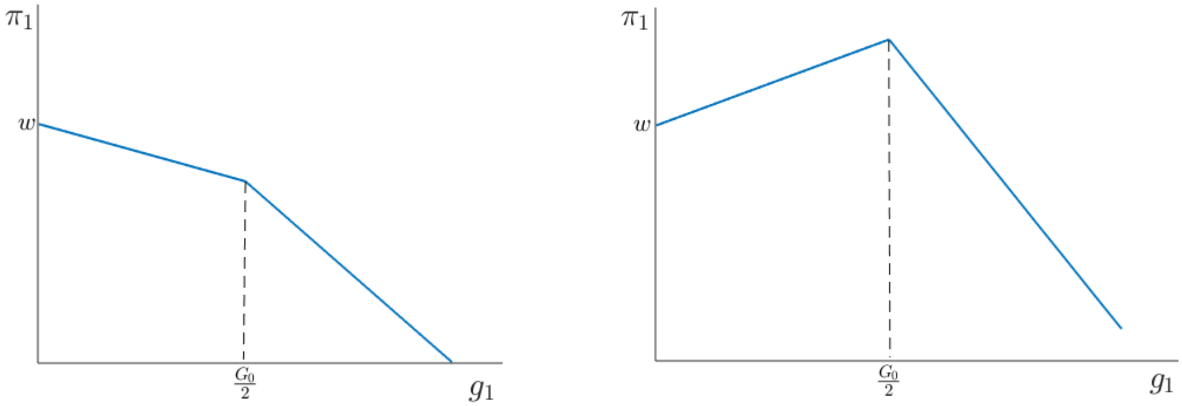
Given eq. (4) and the distribution $F(\cdot)$, the expected contribution of the follower donor is given by:

$$E[g_2^*|g_1] = \begin{cases} (1 - F(1-\overline{\alpha}))\, g_1 & \text{if} \quad g_1 \leq \frac{G_0}{2} \\ (F(1-\underline{\alpha}) - F(1-\overline{\alpha}))\,(G_0 - g_1) + (1 - F(1-\underline{\alpha}))g_1 & \text{if} \quad g_1 > \frac{G_0}{2} \end{cases} \tag{5}$$

For $g_1 \leq \frac{G_0}{2}$, the follower donor either experiences low social pressure ($s_2 \leq 1-\overline{\alpha}$) and gives nothing or high social pressure ($s_2 > 1-\overline{\alpha}$) and gives g_1. Thus, for $g_1 \leq \frac{G_0}{2}$, the expected contribution by the follower donor is always increasing in g_1. For $g_1 > \frac{G_0}{2}$, the follower donor's response is decreasing in g_1 if the social pressure is moderate (i.e., $s_i \in (1-\overline{\alpha}, 1-\underline{\alpha}]$) and increasing in g_1 if the social pressure is strong (i.e., $s_i > 1-\underline{\alpha}$). Thus, the expectation of the follower donor's response to increasing g_1 beyond $\frac{G_0}{2}$ depends on the relative likelihood of moderate and strong social pressure. The following lemma summarizes this observation.

Lemma 1 *If* $\underline{\alpha} > 1 - F^{-1}\left(\frac{F(1-\overline{\alpha})+1}{2}\right)$, $E[g_2^*|g_1]$ *is strictly increasing in* g_1. *Otherwise,* $E[g_2^*|g_1]$ *is non-monotonic in* g_1*: it is increasing in* g_1 *for* $g_1 < \frac{G_0}{2}$ *and (weakly) decreasing in* g_1 *for* $g_1 > \frac{G_0}{2}$.

Given the above characterization of the follower donor's best response, we can turn to the lead donor's optimal giving. In particular, the lead donor chooses g_1 to maximize:



(a) $\overline{\alpha}(2 - F(1-\overline{\alpha})) < 1$ (b) $\overline{\alpha}(2 - F(1-\overline{\alpha})) > 1$

Figure 1: Lead donor's expected payoff

$$\pi_1(w, g_1, g_1 + E[g_2^*|g_1]) = \begin{cases} w - g_1 + (2 - F(1-\overline{\alpha}))\overline{\alpha} g_1 & \text{if} \quad g_1 \leq \frac{G_0}{2} \\ \\ w - g_1 + F(1-\overline{\alpha})\overline{\alpha} g_1 + (1 - F(1-\overline{\alpha}))\overline{\alpha} G_0 & \text{if} \quad g_1 > \frac{G_0}{2} \\ \quad +(1 - F(1-\underline{\alpha}))\underline{\alpha}(2g_1 - G_0) & \end{cases} \tag{6}$$

The above payoff is illustrated in Figure 1. For $g_1 \leq \frac{G_0}{2}$, the total giving never exceeds G_0 and from the above expression, the lead donor's payoff is increasing in g_1 if $F(1-\overline{\alpha}) < \frac{1}{\overline{\alpha}} - 2$ and decreasing otherwise. For $g_1 > \frac{G_0}{2}$, the total giving exceeds G_0 only in the event of $s_2 > 1 - \underline{\alpha}$, in which case there is an incremental value of $\underline{\alpha}(2g_1 - G_0)$. However, since $\underline{\alpha} \leq \frac{1}{2}$, the marginal value of increasing g_1 beyond $\frac{G_0}{2}$ is always negative. Thus, $\pi_1(w, g_1, g_1 + E[g_2^*|g_1])$ is always decreasing beyond $\frac{G_0}{2}$. As a result, as Figure 1 illustrates, there are two possible candidates for an equilibrium, mainly $g_1 \in \{0, \frac{G_0}{2}\}$. The following proposition formalizes this finding.

Proposition 1 *The equilibrium expected total contributions G^s and the individual expected contributions g_1^s and g_2^s are as follows:*

- *If $F(1-\overline{\alpha}) > \frac{1}{\overline{\alpha}} - 2$, then $G^s = g_1^s = g_2^s = 0$.*
- *If $F(1-\overline{\alpha}) < \frac{1}{\overline{\alpha}} - 2$, then $G^s = G_0(2 - F(1-\overline{\alpha}))/2$ with $g_1^s = \frac{G_0}{2}$ and $g_2^s = (1 - F(1-\overline{\alpha}))\frac{G_0}{2}$.*

The above proposition states that the equilibrium giving under seed money will depart from the payoff-maximizing strategy of free-riding and contributing zero as long as $F(1-\overline{\alpha})$ is sufficiently small. That is, the lead donor contributes $\frac{G_0}{2}$ as long as the lead donor expects that the follower donor is sufficiently susceptible to social pressure and likely to match the lead donor's contribution. Conversely, if the likelihood of free-riding behavior by the follower donor is sufficiently strong, the equilibrium giving will revert to the non-cooperative outcome of no giving.

Notice that in the giving equilibrium, the lead donor leads by example and ends up giving a higher equilibrium amount relative to the follower donor's expected contribution. As $\overline{\alpha} \to 1$, so that the individual cost of giving disappears, or $F(1-\overline{\alpha}) \to 0$, so that the free-riding behavior by the follower donor vanishes, the two donors converge to coordinating on the jointly payoff-maximizing giving of G_0. Thus, stronger social pressure tends to increase giving up to G_0.

Next, we turn to the matching scheme to understand donors' contribution incentives induced by matching and compare them to the equilibrium giving under the seed money scheme given by Proposition 1.

2.3 Matching

Under the matching scheme, the lead donor's contribution is conditional on the follower donor's giving. Thus, this contribution no longer creates social pressure for the follower donor. Instead, it increases the marginal impact of the follower donor's gift by the size of the match m. Formally, the follower donor's payoff is given by:

$$\pi_2(w, g_2, (1+m)g_2) = w - g_2 + v((1+m)g_2). \tag{7}$$

Substituting for $v(G)$ given by eq. (2), the marginal value of increasing g_2 is:

$$\frac{\partial \pi_2(w, g_2, (1+m)g_2)}{\partial g_2} = \begin{cases} -1 + (1+m)\overline{\alpha} & \text{if} \quad g_2 \leq \frac{G_0}{1+m}, \\ -1 + (1+m)\underline{\alpha} & \text{if} \quad g_2 > \frac{G_0}{1+m}. \end{cases}$$

Taking into account the above marginal value, it immediately follows that the follower donor's optimal gift is:

$$g_2^*(m) = \begin{cases} 0 & \text{if} \quad m < \frac{1}{\overline{\alpha}} - 1, \\ min\{\frac{w}{m}, \frac{G_0}{1+m}\} & \text{if} \quad m \in [\frac{1}{\overline{\alpha}} - 1, \frac{1}{\underline{\alpha}} - 1), \\ \frac{w}{m} & \text{if} \quad m \geq \frac{1}{\underline{\alpha}} - 1. \end{cases} \tag{8}$$

A match ratio lower than $\frac{1}{\overline{\alpha}} - 1$ would always result in a negative marginal value of giving and thus the follower donor would never contribute to the public good. For an intermediate match ratio, i.e., $[\frac{1}{\overline{\alpha}} - 1, \frac{1}{\underline{\alpha}} - 1)$, the follower donor has incentives to contribute until the total contribution $(1+m)g_2$ reaches G_0. This would induce giving of $\frac{G_0}{1+m}$ by the follower donor, except when the lead donor's wealth is exhausted at a total contribution level bellow G_0. In the latter case, the follower donor will give $\frac{w}{m}$ that is just enough to induce the lead donor to give everything. Finally, for a high match ration of $m > \frac{1}{\underline{\alpha}} - 1 > 1$, the follower donor will always contribute $\frac{w}{m}$ to exhaust the lead donor's wealth. Any giving beyond that would not be matched and thus would be sub-optimal for the follower donor to further increase her contribution.

It is clear from eq. (8) that the match ratio plays a similar role as the social pressure parameter in eq. (4) by inflating the perceived return from the public good. Thus, offering a high enough match ($m \geq \frac{1}{\overline{\alpha}} - 1$) will induce giving by the follower donor. Interestingly, however, the follower donor's gift amount is not necessarily increasing in m. In fact, within each of the matching intervals, the follower donor's contribution is decreasing in the match ratio. This is because a higher match ratio requires a lower contribution by the follower donor in order to meet the threshold of G_0 or exhaust the lead donor's budget. Thus, from the lead donor's point of view, a match is potentially advantageous only to the extent that it incentivizes the follower donor to move to a higher interval. This is evident in the lead donor's payoff:

$$\pi_1(w, mg_2^*(m), (m+1)g_2^*(m)) = \begin{cases} w & \text{if} \quad m < \frac{1}{\overline{\alpha}} - 1 \\ w + (\overline{\alpha} - \frac{m}{1+m})G_0 & \text{if} \quad m \in [\frac{1}{\overline{\alpha}} - 1, min\{\frac{1}{\underline{\alpha}} - 1, \frac{w}{G_0 - w}\}) \\ \frac{\overline{\alpha}(1+m)}{m} w & \text{if} \quad w \leq (1-\underline{\alpha})G_0 \ \& \ m \geq \frac{w}{G_0 - w} \\ \frac{\underline{\alpha}(1+m)}{m} w + (\overline{\alpha} - \underline{\alpha})G_0 & \text{if} \quad w > (1-\underline{\alpha})G_0 \ \& \ m \geq \frac{1}{\underline{\alpha}} - 1. \end{cases} \tag{9}$$

From above equation, it can be seen that the lead donor's payoff is (weakly) decreasing in m in each interval. Therefore, there are only four candidates for the equilibrium match ratio: $m^* \in \{0, \frac{1}{\overline{\alpha}} - 1, \frac{1}{\underline{\alpha}} - 1, \frac{w}{G_0 - w}\}$. Comparing the payoffs of these matching levels leads to the following proposition.

Proposition 2 *The optimal match ratio for the lead donor is* $m^* = \frac{1}{\overline{\alpha}} - 1$*, giving rise to total contributions of* $G^m = G_0$ *and individual contributions of* $g_1^m = (1 - \overline{\alpha})G_0$ *and* $g_2^m = \overline{\alpha}G_0$*.*

Similar to the seed money case, the lead donor under matching aims to implement the jointly payoff-maximizing contribution of G_0. However, comparing Propositions 1 and 2, it is evident that the lead donor is able to induce coordination by the follower donor more easily under matching than seed money. That is, under matching the equilibrium contribution to the public good is G_0, while under seed money it is below G_0 apart from the knife-edge case in which the follower donor is susceptible to social pressure with probability 1 (i.e., $F(1 - \overline{\alpha}) = 0$). This is because under matching, the lead donor can induce giving by the follower donor regardless of the follower donor's susceptibility to social pressure. In contrast, under seed money, the lead donor's ability to encourage contribution by the follower donor explicitly relies on the follower donor's response to social pressure.

Given our characterization of the equilibrium behavior under the two schemes, a few testable implications emerge that we discuss in the following section.

2.4 Testable Implications

Our theoretical analysis reveals that both seed and matching may alleviate free-riding incentives by the follower donor. Nonetheless, while there always exists a match ratio that induces giving by the follower donor, under seed money the lead donor's contribution only impacts follower donors that are susceptible to social pressure. Thus, matching is more effective in avoiding a non-cooperative giving of zero by the follower donor. Consequently, as revealed by Propositions 1 and 2, matching always (weakly) outperforms seed money in terms of total contributions to the public good.

Observation 1: *Matching raises (weakly) higher total contributions relative to seed money. The difference between the two depends on the degree to which the follower donor is susceptible to social pressure and willing to match the lead donor's contribution under seed money.*

Comparing the individual giving amounts, it is evident that seed money induces higher giving by the lead donor as compared to the follower donor, while the reverse is true for matching. This again goes back to the fact that matching is more effective at incentivizing giving by the follower donor compared to seed money. Moreover, while by Proposition 2, the lead donor's giving under matching is fixed at $(1-\overline{\alpha})G_0$, by Proposition 1, under seed money she gives either zero (non-giving equilibrium) or $\frac{G_0}{2}$ (giving equilibrium). Thus, since $\overline{\alpha} > \frac{1}{2}$, conditional on giving, the leader gives more under seed money than matching and vice versa. Nonetheless, regardless of which equilibrium occurs under seed money, the follower donor, always contributes more to the public good when the fundraising scheme employed is matching.

Observation 2: *The follower donor is expected to contribute a higher amount under matching relative to seed money.*

Finally, considering the two schemes from the fundraiser's point of view, it is clear that matching should be the preferred scheme by the fundraiser since it always (weakly) outperforms seed money.

Observation 3: *Fundraisers are more likely to choose matching over seed money when soliciting the two donors.*

This last observation relies on the fundraiser's ability to correctly anticipate the donors' behavior and respond optimally by choosing the matching scheme. Since the difference between the two depends on the extent to which the follower donor responds to social pressure, it is not obvious that the fundraiser will be able to easily anticipate the outcome from the contribution game.

In the next section, we present our experimental design and the hypotheses corresponding to Observations 1-3.

3 The Experiment

3.1 Design

Our experimental design follows closely the theoretical model presented in Section 2. It consists of three players- Player 1 (the fundraiser), Player 2 (the lead donor), and Player 3 (the follower donor). The fundraiser is initially endowed with 0 tokens and seeks contributions for a "group project" (the public good) from the other two players. Her payoff is the sum of all contributions. The game played by the lead donor and the follower donor depends on the "contribution form" (i.e., the fundraising scheme) that can be either "matching" or "lump sum" (seed money). As we explain later in this section, depending on the treatment, the contribution form may occur exogenously (i.e., chosen by the experimenter) or endogenously (i.e., chosen by the fundraiser).

The lead donor and the follower donor are initially given an endowment of 40 tokens each, i.e., $w = 40$. After observing the contribution form chosen by the fundraiser (or set by the experimenter in the exogenous treatments), the lead donor and the follower donor make sequential decisions about how much to contribute to the group project. The follower donor, who moves last, also observes the lead donor's contribution decision. The payoff for each donor is the sum of tokens not contributed by her and the returns from the group project. The group project's returns are publicly known to be a piece-wise linear function of the total tokens contributed (G) as in eq. (2) with parameters set to $\overline{\alpha} = 0.7$, $\underline{\alpha} = 0.1$, and $G_0 = 40$:

$$v(G) = \begin{cases} .7G & \text{if} \quad G \leq 40 \\ 28 + .1(G - 40) & \text{if} \quad G > 40 \end{cases} \tag{10}$$

Note that the maximum possible total contribution is 80 tokens, but contributions are jointly payoff-maximizing for the donors only up to 40 tokens. The fundraiser's payoff, however, is monotonically increasing in total contributions up to 80 tokens.

In order to avoid computationally burdensome decisions by the subjects in the lab, we discretize the choice sets of the lead donor and the follower donor by only allowing contributions in multiples of 10. Therefore, under both schemes, the total contributions are between 0 and 80 in increments of 10. This allows us to present the returns from the group project (i.e., $v(G)$) to the subjects in the form of the table shown in Figure 2.

TOTAL CONTRIBUTIONS TO GROUP PROJECT (PLAYER 2 + PLEYER 3)	Individual return for each of PLAYER 2 and PLEYER 3	Additional return from just the last 10 tokens for each of PLAYER 2 and PLEYER 3
0	0	--
10	7	7
20	14	7
30	21	7
40	28	7
50	29	1
60	30	1
70	31	1
80	32	1

Figure 2: Group Project Payoff Table

Under the seed money contribution form, each donor is allowed to make a lump sum contribution in multiples of 10 up to their endowment of 40 tokens. This results in five possible actions for each player given by the set $\{0, 10, 20, 30, 40\}$. Under matching, the follower donor's choice set remains the same as in the seed money contribution form, but the lead donor makes a commitment to match a percentage of the follower donor's contribution. To keep the number of choices consistent across the two treatments, we allow for five possible match ratios in the set $\{0\%, 25\%, 50\%, 75\%, 100\%\}$. Furthermore, in order to keep the set of possible contribution amounts of the lead donor the same across the two schemes and avoid dealing with fractions or decimals, the resulting matching contribution by the lead donor is rounded down to the nearest multiple of 10.[11]

[11] For example, if the lead donor chooses 50% and the follower donor contributes 30 tokens to the group project, then 50% of 30 tokens is equal to 15 tokens, but the lead donor's contribution will be rounded down to be 10 tokens. The reason for rounding down the lead donor's contribution is to avoid a situation where simple rounding forces the lead donor to give more than she intended. In the above example, for instance, simply rounding 15 to the nearest multiple of 10 results in the lead donor contributing 20 tokens that is more than the 50% match they chose.

While the fundraiser has only two choices in the endogenous treatment and none in the exogenous treatments, each donor has five choices that make a total of 25 choice combinations under each scheme. Moreover, calculating the payoffs for the matching contribution form might be slightly more complicated for the subjects than seed money.[12] Therefore, to further simplify the decision making process for the subjects and avoid calculation errors or complexity impacting subjects' choices, we provide them with pre-calculated "earnings tables" depicted in Figure 3. The matrix on the left (right) provides the total tokens earned by each group member for every possible contribution to the group project under seed money (matching). The top number in each square (orange on the game screen) corresponds to the earnings for the fundraiser, the bottom left number (blue on the game screen) corresponds to the earnings for the lead donor, and the bottom right number (yellow on the game screen) corresponds to the earnings for the follower donor.

Player 2 \ Player 3	0	10	20	30	40
0	0 40 40	10 47 37	20 54 34	30 61 31	40 68 28
10	10 37 47	20 44 44	30 51 41	40 58 38	50 59 29
20	20 34 54	30 41 51	40 48 48	50 49 39	60 50 30
30	30 31 61	40 38 58	50 39 49	60 40 40	70 41 31
40	40 28 68	50 29 59	60 30 50	70 31 41	80 32 32

Player 2 \ Player 3	0	10	20	30	40
0%	0 40 40	10 47 37	20 54 34	30 61 31	40 68 28
25%	0 40 40	10 47 37	20 54 34	30 61 31	50 59 29
50%	0 40 40	10 47 37	30 51 41	40 58 38	60 50 30
75%	0 40 40	10 47 37	30 51 41	50 49 39	70 41 31
100%	0 40 40	20 44 44	40 48 48	60 40 40	80 32 32

Figure 3: Earnings tables for seed money (left) and matching (right) with equilibrium payoffs marked with a black box for the payoff-maximizing equilibrium prediction and a gray box for the social pressure equilibrium prediction.

3.2 Hypotheses

Examining the seed money earnings table in Figure 3 reveals that with purely payoff-maximizing players, no contributions (marked by the black box) would be the subgame perfect Nash equilibrium of the game. Moreover, by Proposition 1, this would also be the outcome if the lead donor is pessimistic and believes that the follower donor is not very likely to respond to social pressure. More formally, if $F(0.3) > \frac{4}{7}$ or the social pressure parameter s_2 for the follower donor is below 0.3 with a probability higher than 57%, then the lead donor will be pessimistic about the follower donor's response to her contribution. Consequently, the lead donor will contribute nothing and so will the follower donor, resulting in no overall contributions. In contrast, if the lead donor is optimistic about the likelihood of the follower donor responding to social pressure, i.e. $F(0.3) < \frac{4}{7}$, then by Proposition 1, she will contribute 20 tokens and in response, the follower donor will choose to give either 20 tokens if she is susceptible to social pressure or zero if she is not. These two possible outcomes are marked by the two gray boxes in the seed money payoff table in Figure 3. In this case, the expected total contribution is $20F(0.3) + 40(1 - F(0.3)) \in [20, 40]$.

[12]The reason is that in the matching contribution form, subjects have to take an additional step of estimating the expected contribution amount of the lead donor from the match ratio and the contribution amount of the follower donor.

Even though in a theoretical analysis, it is standard to assume that in equilibrium all players correctly infer the distribution of the follower donor's types, in the context of a laboratory game, it is more realistic to assume that not all subjects assigned to the role of lead donor will have the correct (or even similar) perception about the type distribution. In other words, we should expect to observe a variation in the lead donor's behavior based on different conjectures about the distribution $F(s_2)$. As a result, the expected total contribution under the seed money contribution form depends not only on $F(s_2)$, but also on the distribution of the lead donor's beliefs about $F(s_2)$. Suppose that the lead donor is optimistic and believes $F(0.3) < \frac{4}{7}$ with probability γ. Then, the expected total contribution to the public good would be:

$$E(G^s) = \gamma[20F(0.3) + 40(1 - F(0.3))] \in [0, 40]. \tag{11}$$

Eq. (11) states that any contribution between zero and 40 tokens is possible under some distribution of types. Nonetheless, mid-range predictions are probably more reasonable. For example, if we use the distribution of types found in Krupka and Weber (2013) and set $F(0.3) = \frac{1}{3}$ and further assume that the lead donor is optimistic with probability $\gamma = \frac{2}{3}$, then the expected contributions by the lead donor and the follower donor would be 13.33 and 8.89 tokens respectively.[13] This will result in total expected contributions of 22.22 tokens.

Under the matching contribution form, the equilibrium prediction is rather straightforward as marked by the black boxes on the matching earnings table in Figure 3. The optimal match ratio for the lead donor is 50% or 75% and the best response of the follower donor is to contribute 20 tokens. This results in the lead donor giving 10 tokens and total contributions of 30 tokens.[14] Comparing this prediction to Proposition 2 that allows for a continuous choice set reveals that the optimal match ratio is $m^* = \frac{1}{.7} - 1 \approx 42.86\%$, giving rise to total contributions of 40 tokens. Thus, discretization and rounding puts matching at a disadvantage. Given the nature of matching and our emphasis on designing a game that is simple enough for a lab setting made this deviation from a continuous game unavoidable. Nevertheless, 30 tokens is still greater than our expected contributions under seed money as long as the social pressure effect is not too strong. Thus, we expect the qualitative comparison between the two schemes to be consistent with our theoretical analysis and the fundraiser's optimal choice to be the matching contribution form.

Turning to the individual behavior, the numerical conjectures reveals that consistent with our continuous theoretical model in Section 2, the bigger contribution share shifts from the lead donor to the follower donor when switching from seed money to matching. Furthermore, while the lead donor is always expected to contribute 10 tokens under matching, her expected contribution under seed money varies between zero and 20 tokens depending on the probability γ. For example, as discussed above, for $\gamma = \frac{2}{3}$, the lead donor's expected contribution is 13.33 tokens, which is higher than matching. Their order would reverse for $\gamma < \frac{1}{2}$. Finally, the follower donor's expected

[13] Krupka and Weber (2013) report that almost a third of their study population were pure payoff maximizers and did not respond to social pressure. The rest were susceptible to social pressure to some extent. Hence, assuming $F(0.3) = \frac{1}{3}$ is a rather conservative lower bound.

[14] The existence of two equilibria that are payoff-equivalent for all players, is a result of discretization and rounding.

contribution under seed money that varies between 0 and 20 tokens depending on the probabilities γ and $F(0.3)$ is always lower than the 20 tokens that she contributes in the matching equilibrium.

In order to test our theoretical predictions, we implement a between subjects design, in which participants are randomly assigned to one of three treatments: *Exogenous Seed*, *Exogenous Match*, *Endogenous Scheme*. In the first two treatments, the contribution form is exogenously set by the experimenter to seed money or matching, respectively. In both of these treatments, the fundraiser is non-strategic and simply collects a payoff based on the contributions of the other two players. In the *Endogenous Scheme* treatment, we allow the fundraiser to choose the fundraising contribution form prior to the contribution choices of the other two players. We expect the following hypotheses to hold:

- **Hypothesis 1**: Total contributions in the *Exogenous Seed* treatment do not exceed total contributions in the *Exogenous Match* treatment.
- **Hypothesis 2**: The follower donor contributes more in the *Exogenous Match* treatment than the *Exogenous Seed* treatment.
- **Hypothesis 3**: The fundraiser is more likely to choose matching than seed money in the *Endogenous Scheme* treatment.

3.3 Experimental Procedures

As explained in Subsection 3.2, the study has a between subjects design, in which each session is assigned to one of the three treatments: *Exogenous Seed*, *Exogenous Match*, *Endogenous Scheme*. The order of play, actions, and payoffs are summarized in Table 1.

Table 1: Game Summary
g_1 and g_2 correspond to the contributions of the lead donor and the follower donor, respectively; $G = g_1 + g_2$ corresponds to the total contributions; and $v(G)$ is the payoff function given by eq. (10).

Players in order of play	Initial Endowment	Choice Set *Exogenous Seed*	Choice Set *Exogenous Match*	Choice Set *Endogenous Scheme*	Payoff
Player 1 (fundraiser)	0	None	None	{matching, seed money}	$g_1 + g_2$
Player 2 (lead donor)	40	$\{0, 10, 20, 30, 40\}$	$\{0\%, 25\%, 50\%, 75\%, 100\%\}$	If matching $\{0\%, 25\%, 50\%, 75\%, 100\%\}$ If seed money $\{0, 10, 20, 30, 40\}$	$40 - g_1 + v(G)$
Player 3 (follower donor)	40	$\{0, 10, 20, 30, 40\}$	$\{0, 10, 20, 30, 40\}$	$\{0, 10, 20, 30, 40\}$	$40 - g_2 + v(G)$

At the beginning of each session, subjects are seated at study stations equipped with eye-tracking devices and the system is calibrated using a 9-point calibration procedure. The instructions are read by the experimenter while subjects follow them on their computer screens. Following the instructions, three test questions are presented to ensure that the subjects understand the game.

They must answer all the questions correctly before proceeding to the game. Subjects are then randomly assigned to the three possible roles: Player 1 (the fundraiser), Player 2 (the lead donor), or Player 3 (the follower donor).

During the game, in all three treatments, after the contribution form is chosen by the fundraiser or the experimenter, the lead donor observes it before making her contribution decision. She either chooses a lump sum amount (under the seed money scheme) or a percentage of the follower donor's contribution (under the matching scheme) to contribute to the group project. Then, the follower donor who observes the contribution form and the lead donor's choice, decides on her own lump sum contribution. As explained in Subsection 3.1, subjects see the earnings tables depicted in Figure 3 during the instructions and also during the game whenever they need to make a decision. So they do not need to make any calculations.

All players know in which treatment they are participating. More specifically, the lead donor and the follower donor know whether the contribution form was set by the experimenter or chosen by Player 1. Furthermore, we deliberately avoid the use of terms such as donation, public good, charity, fundraising, seed money, and matching gift, in order to avoid priming the subjects by the fact that this is a study about charitable giving.

Subject play the game for 3 practice and 10 incentivized rounds. One of the incentivized rounds is randomly chosen to determine the monetary payments based on the choices made in that round. In each round subjects are randomly and anonymously (re)matched into groups of 3 with one of each role, but their roles remain the same throughout the session. After the last round of the game, subjects fill out a survey about demographics, educational background, math skills, Cognitive Reflection Test (CRT), family background, and charitable activity. At the end of the experiment, subjects are paid (in cash and privately) a $10 show-up compensation fee plus 20 cents per token earned in the randomly chosen round of the game.

4 Data Collection

We recruited 396 subjects from the undergraduate student population at Texas A&M University via university-wide bulk email to participate in 46 sessions of the lab experiment during April and November, 2019 at the TAMU Human Behavior Laboratory. Table 2 summarizes the number of sessions and subjects per treatment.

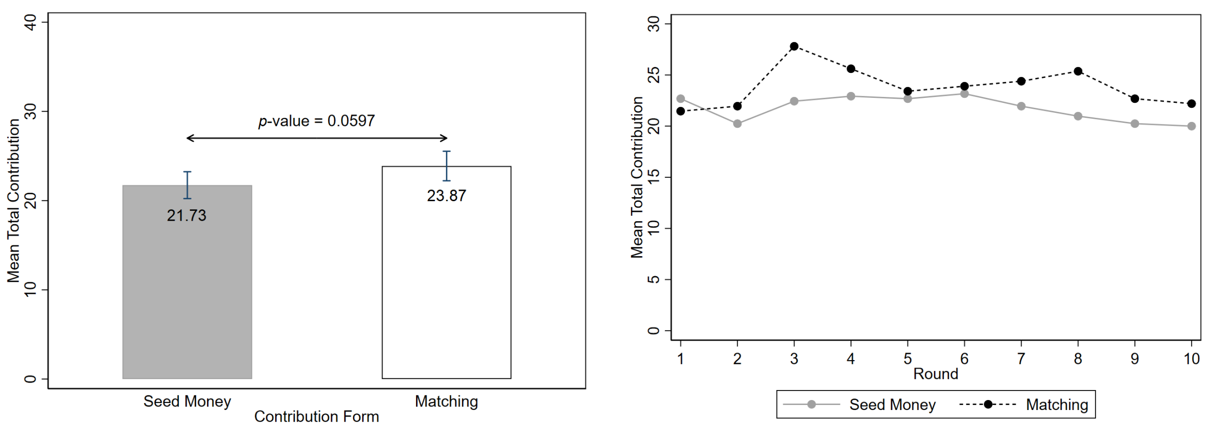
Table 2: Subjects and Sessions per Treatment

Treatment	Sessions	Subjects
Exogenous Seed	14	123
Exogenous Match	15	123
Endogenous Scheme	16	150

We collected data on the lead donor and the follower donor's contribution decisions in each round in all treatments. In the *Endogenous Scheme* treatment we also collected data on the fundraiser's choice of contribution form. All decision times are also recorded. Additionally, we elicited incentivized beliefs by the fundraiser and the lead donor regarding the decisions made by downstream players by asking them to make a guess about these decisions. Correct guesses were compensated by a bonus of 4 tokens. We also collected eye-tracking data using Tobii Spectrum eye-tracking devices to reveal visual attention to information presented. The eye-tracking devices collect at a rate of 60 data points per second. The information collected includes the time to first fixation or how long it takes participants to look at an area of interest for the first time; fixation duration or how long they look at each area; and fixation count or how many times they look at an area. All data collection was synchronized and recorded simultaneously to obtain a complete behavioral picture of the participants' decision process.

5 Main Findings

5.1 Total Contributions under each Contribution Mechanism



(a) Average fundraising (with 95% confidence intervals) (b) Fundraising over time

Figure 4: The comparison between matching and seed money contribution forms

Figure 4, Panel (a) summarizes contributions under each of the exogenous scheme treatments. Consistent with Hypothesis 1, the average contributions to the group project under the *Exogenous Seed* treatment (21.73 tokens) was about 10% lower than those under the *Exogenous Match* treatment (23.87 tokens). Furthermore, the gap between matching and seed money was somewhat persistent over time as presented in the graph in Figure 4, Panel (b).

Mean comparison tests, support Hypothesis 1. Specifically, the p-value, corresponding to the student's t-test of the null hypothesis that total fundraising is higher under seed money than matching is 0.0298. Moreover, the two-sided test p-value, which represents the probability of observing the difference between the two schemes under the null hypothesis that there is no difference between matching and seed money, is 0.0597 for student's t-test and 0.0538 for MannWhitney U-test. Thus, total fundraising under seed money does not exceed that of matching.

We estimate the effect of contribution form on total contributions, controlling for a time trend (rounds of the game) and individual characteristics. The results are presented in Table 3. Matching is the coefficient of interest that measures the increase in fundraising due to matching compared to

Table 3: Effect of contribution scheme on total contributions to the public good

	(1)	(2)	(3)
Matching	2.146 (2.756)	2.003 (2.661)	3.019 (2.526)
Round	-0.114 (0.123)	-0.114 (0.124)	-0.119 (0.133)
Week 2		3.350 (4.003)	3.533 (4.062)
Week 3		6.599* (3.333)	6.382* (3.356)
Small Group		-0.235 (3.146)	0.449 (3.319)
Female Player 2			-3.888 (2.505)
Female Player 3			-0.978 (2.386)
Year 3+ Player 2			-0.327 (2.645)
Year 3+ Player 3			-5.303** (2.125)
Income<$75K Player 2			0.0570 (2.349)
Income<$75K Player 3			4.984** (2.069)
Experience above mean			1.255 (2.146)
Found it Easy			2.457 (2.586)
5+ Math Courses			-1.726 (4.174)
Math Question			3.982 (3.682)
CRT Score			0.555 (1.759)
Constant	22.36*** (1.928)	18.46*** (3.159)	16.04*** (5.298)
Observations	820	820	820

Standard errors in parentheses are clustered at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

seed money, which is the baseline.[15]

We use two-way clustering to adjust the standard errors for correlations between observations that either share the same lead donor or the same follower donor. After correcting the standard errors, the effect of matching does not appear to be statistically significant. Nonetheless, this is not inconsistent with our Hypothesis 1, which requires matching to weakly dominate seed money in fundraising.

Based on our theory, the fact that fundraising under seed money is close to that of matching, suggests that a large number of observations in the *Exogenous Seed* treatment must entail positive contribution by the lead donor. The latter occurs if a large number of subjects assigned to the role of lead donor expect the follower donor to respond to social pressure. Then, by Propositions 1 and 2, if the lead donor under seed money contributes a positive amount, her contribution under seed money exceeds the one under matching. Thus, in the presence of significant giving by the lead donor under seed money, we would expect the lead donor's giving under seed money to be larger than the one under matching. The same two propositions also state that the opposite is true for

[15]The controls Week 2 and Week 3 refer the second and third weeks of the experiments that lasted for 2 weeks in April 2019 and 1 week in November 2019. Small Session indicates that the session had 6 (as opposed to 9-12) participants. Year 3+ indicates that the student was a junior or higher. Income refers to family income. Experience above mean indicates that the average number of experimental studies the lead donor and the follower donor in a group had participated in, prior to this study was above the average of the sample. Found it Easy indicates the lead donor and follower donor (on average) rated this study to be easier than 2 out of 10. 5+ Math Courses indicates that on average the lead donor and the follower donor had taken more than 4 math courses. Math Question is 1 if both the lead donor and the follower donor answered the math question correctly in the survey, 0.5 if only one answered correctly, and 0 if neither did. CRT Score is the average Cognitive Reflection Test score (out of 3) of the lead donor and the follower donor.

the follower donor who contributes a higher amount under matching than seed money. In the next section, we turn to the individual contributions by the lead donor and the follower donor in the experiment in order to investigate these predictions.

5.2 Individual Contributions under each Contribution Mechanism

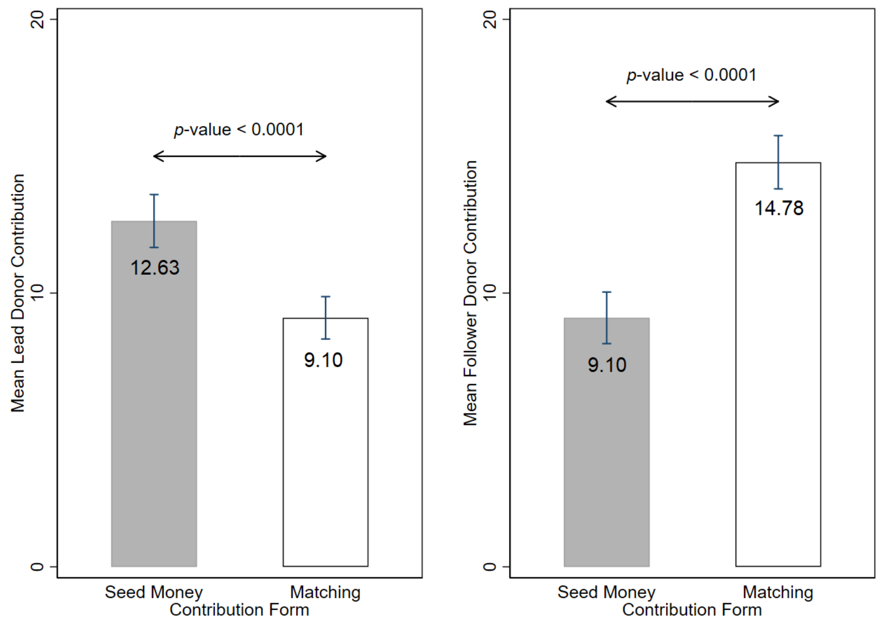


Figure 5: Average individual contributions (with 95% confidence intervals)

In line with our theoretical analysis, the lead donor contributes more in the *Exogenous Seed* treatment (12.63 tokens) compared to the *Exogenous Match* treatment (9.10 tokens) and the p-value is below 0.0001 for both student's t-test and Mann-Whitney U-test (Figure 5 left). The opposite is true for the follower donor's contribution with 9.10 tokens in the *Exogenous Seed* treatment and 14.78 tokens in the *Exogenous Match* treatment and a p-value below 0.0001 for both student's t-test and Mann-Whitney U-test (Figure 5 right). Thus, while the lead donor has the biggest share of contributions under seed money, the follower donor contributes the most under matching. The fact that the follower donor's average contribution under matching is 62% higher than her average contribution under seed money strongly supports Hypothesis 2. Moreover, these effects are persistent in all rounds of the game (Figure 6).

The distributions of contribution choices by the lead donor (Figure 7, Panel (a)) corroborate our explanation for higher leadership giving under seed money. Under matching, the contribution choices have a single-peaked distribution with the match ratio of 50% as the mode. Recall the earnings tables in Figure 3 to verify that 50% is a payoff-maximizing choice and encourages the follower donor to contribute 20 tokens ($\frac{G_0}{2}$), leading to the lead donor contributing half of that or 10 tokens. Under seed money, however, the distribution of the lead donor's choices has two peaks at zero and 20 tokens, with the latter being the most popular choice. As depicted in Figure 3,

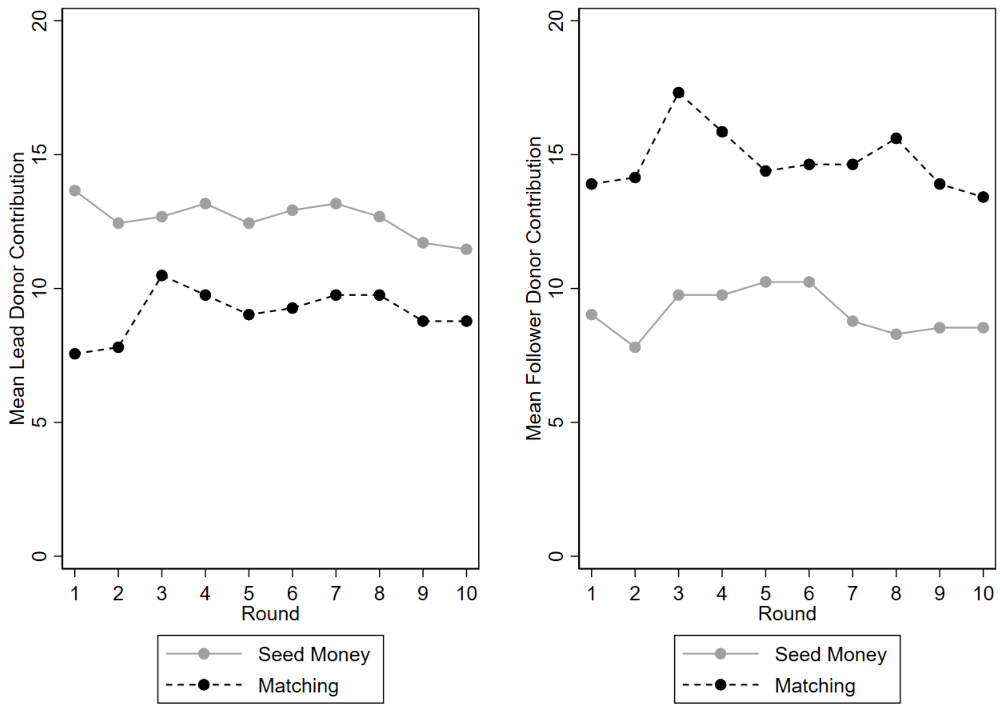
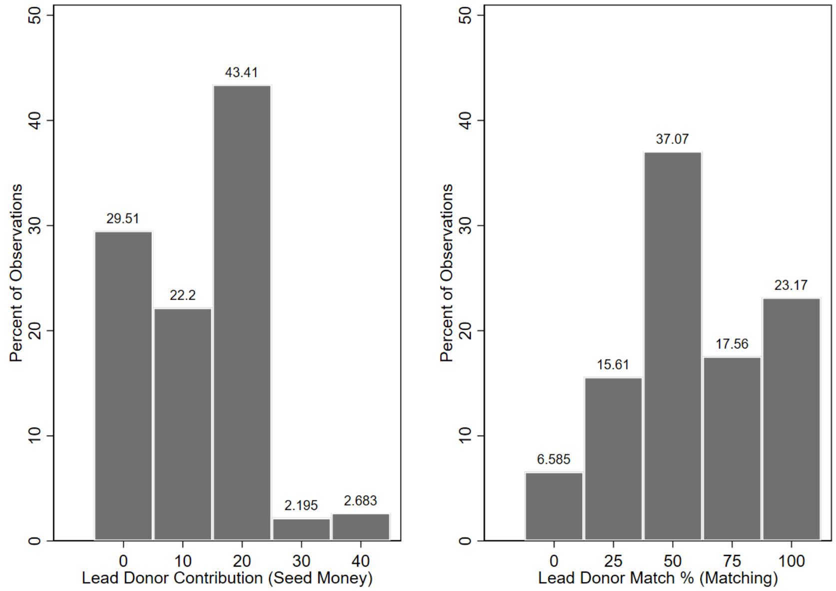


Figure 6: Individual contributions over time

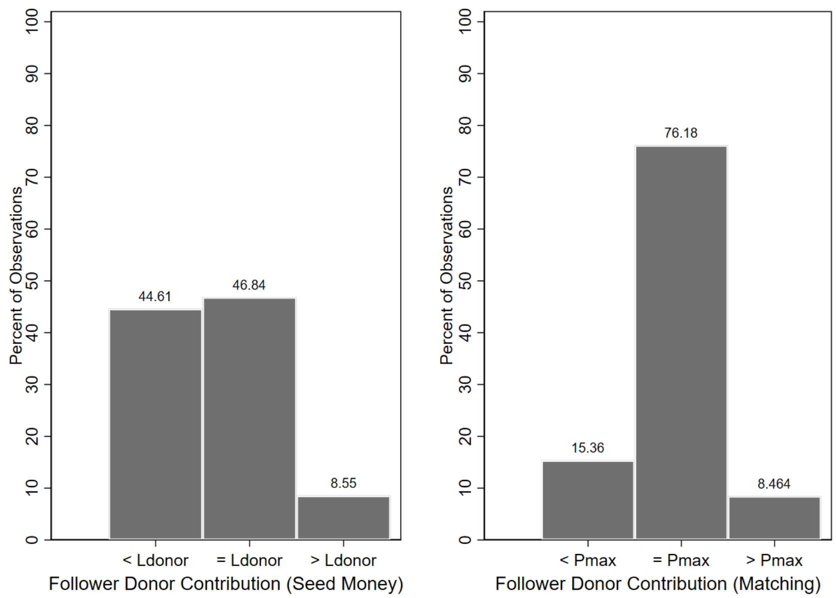
and explained in the corresponding discussion, 20 tokens is payoff-maximizing for the lead donor if she is optimistic and believes that the follower donor is likely to respond to social pressure with a probability of 43% or higher. The other peak of the distribution, which is contributing nothing, is payoff-maximizing for the lead donor if she is pessimistic about the likelihood of the follower donor responding to social pressure. In order to verify that the lead donor's most popular choice of 20 tokens is consistent with our theory, we need to estimate the probability that the susceptibility of the follower donor to social pressure, i.e. s_2, is below 0.3. Recalling that $F()$ is the distribution of s_2, this probability can be simply written as $F(0.3)$.

First, note that the follower donor's choice fully reveals her type, i.e. $s_i > 0.3$ or $s_i < 0.3$, only when the lead donor's contribution is positive and not above 20 tokens.[16] The distribution of the follower donor's choices based on how she responds to the lead donor when the latter chooses to contribute 10 or 20 tokens is depicted in Figure 7, Panel (b). Consistent with our theoretical analysis, contributions exceeding that of the lead donor are very rare (8.55% of observations). The proportion of observations, where the follower donor contributes less than the lead donor, is 44.61%, which is a good estimate for $F(0.3)$ or the likelihood that the follower donor is not

[16] As discussed in Section 2.2, when the lead donor chooses zero, the best response by the follower donor is zero regardless of whether or not she is susceptible to social pressure. Also, when the lead donor chooses 40 tokens, the follower donor should contribute nothing unless she is extremely susceptible to social pressure ($s_i > 0.9$). Finally the best response to 30 tokens is only 10 tokens for those who are susceptible to social pressure and zero otherwise, unless $s_i > 0.9$. Therefore, the observations of the follower donor's contribution in these cases do not reveal whether $s_i > 0.3$ or $s_i < 0.3$.



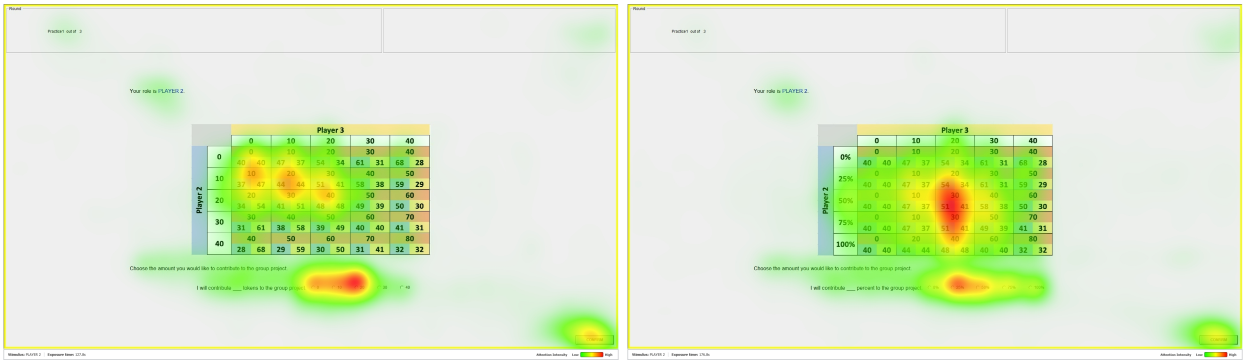
(a) Distribution of the lead donor's decision



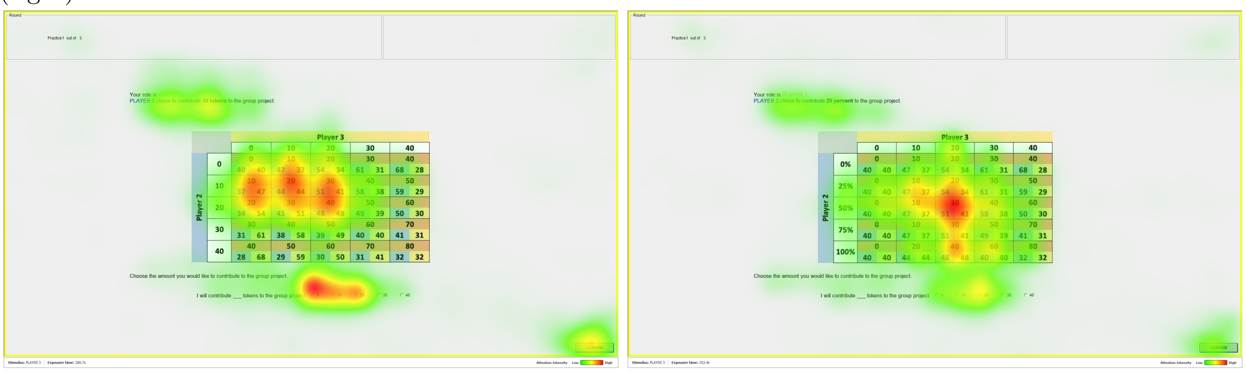
(b) Distribution of the follower donor's decision under seed money when the lead donor contributes 10 to 20 tokens and under matching when the lead donor chooses a 50% or higher match ratio. Ldonor is short for lead donor contribution and Pmax is short for payoff-maximizing choice.

Figure 7: Distributions of individual choices under each contribution form

susceptible to social pressure. This estimate has a standard error of 0.0303. Thus, the threshold of 57%, calculated in Section 3.2, is outside the 95% confidence interval of $[0.3867, 0.5055]$. Therefore, the likelihood that the follower donor is susceptible to social pressure is high enough for the lead donor to contribute 20 tokens ($\frac{G_0}{2}$), which in turn is consistent with the observation that 20 tokens



(a) Heat maps of the lead donor's eye fixations in their decision screen under seed money (left) and matching (right)



(b) Heat maps of the follower donor's eye fixations in their decision screen under seed money (left) and matching (right)

Figure 8: The comparison between matching and seed money contribution forms

is the most popular choice.

In fact, under the assumption that all subjects are aware of this distribution, one would expect the lead donor to choose to contribute 20 tokens all the time. However, as discussed in Section 3.2, it is more realistic to expect some subjects in the role of lead donor to be pessimistic and overestimate $F(0.3)$, especially in light of the fact that both 44.61% and the threshold of 57% are close to 50%. The pessimistic types' perceived payoff-maximizing choice is to contribute nothing, which creates the second peak at zero in the distribution depicted in Figure 7, Panel (a).

Figure 7, Panel (b) also presents the distribution of the follower donor's behavior under matching based on her response to a match ratio of 50% or more.[17] A very strong majority (76.18%) choose the theoretically predicted payoff-maximizing contribution.

We also collected eye-tracking data on visual attention that corroborates our theoretical predictions. Figure 8, Panel (a) shows the heat maps of the aggregate eye fixations of the lead donor. The results reveal that under both contribution forms, the lead donor's visual attention focused mostly on the equilibrium boxes. Similarly, the follower donor's eye fixations in Figure 8, Panel (b)

[17]The reason for focusing on a match ratio of 50% or more is that for lower match ratios, the optimal response for the follower donor is to contribute zero. Thus, there are no choices below the optimal level for the follower donor. As a result, the observed distribution would underrepresent those who prefer to give below the payoff-maximizing level.

are also mostly focused on the equilibrium boxes. The eye-tracking data supports the notion that subjects made decisions with an understanding of the game and the payoffs associated with their choices.

Table 4: Effect of contribution scheme on the lead donor's contribution

	(1)	(2)	(3)
Matching	-3.537** (1.469)	-3.565** (1.355)	-2.598* (1.447)
Round	-0.0303 (0.0736)	-0.0303 (0.0737)	-0.0303 (0.0741)
Week 2		1.657 (2.286)	1.895 (2.242)
Week 3		2.579 (2.548)	1.442 (2.437)
Small Session		-0.721 (2.051)	-0.357 (2.045)
Female			-1.572 (1.723)
Year 3+			0.908 (1.807)
Income<$75K			0.270 (1.486)
Donated >$5 past month			-1.870 (1.779)
Experience above mean			1.358 (1.668)
Found it Easy			2.801* (1.409)
5+ Math Courses			-1.319 (2.375)
Math Question			-1.145 (1.957)
CRT Score			1.032 (1.005)
Constant	12.80*** (1.237)	11.37*** (2.786)	9.558*** (3.281)
Observations	820	820	820

Standard errors in parentheses are clustered at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect of contribution scheme on the follower donor's contribution

	(1)	(2)	(3)
Matching	5.683*** (1.648)	5.568*** (1.630)	5.965*** (1.555)
Round	-0.0835 (0.0821)	-0.0835 (0.0822)	-0.0835 (0.0827)
Week 2		1.693 (2.347)	1.823 (2.294)
Week 3		4.020* (2.065)	5.215** (2.098)
Small Session		0.486 (2.055)	1.382 (1.960)
Female			0.543 (2.009)
Year 3+			-4.507** (1.739)
Income<$75K			3.197* (1.609)
Donated >$5 past month			0.283 (1.931)
Experience above mean			-1.408 (2.005)
Found it Easy			3.249 (2.062)
5+ Math Courses			2.258 (2.531)
Math Question			2.219 (1.762)
CRT Score			0.200 (0.840)
Constant	9.557*** (1.325)	7.090*** (1.934)	2.757 (3.889)
Observations	820	820	820

Standard errors in parentheses are clustered at the individual level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We end this section by presenting regression estimates of the effect of the contribution form on individual contributions, controlling for a time trend (rounds of game) and individual characteristics. The results are presented in Tables 4 and 5. Matching is the coefficient of interest that measures the increase in contribution due to matching compared to seed money, which is the baseline. The effect on the lead donor's contribution (Table 4) is negative. In contrast, we estimate a positive, large (almost 6 tokens), and statistically significant effect of matching on the follower donor's contribution (Table 5).[18] Hence, for the same (or a smaller) leadership gift, the follower donor contributes more under matching, which is consistent with our theoretical predictions and further supports Hypothesis 2.

5.3 The Endogenous Choice of Contribution Mechanisms

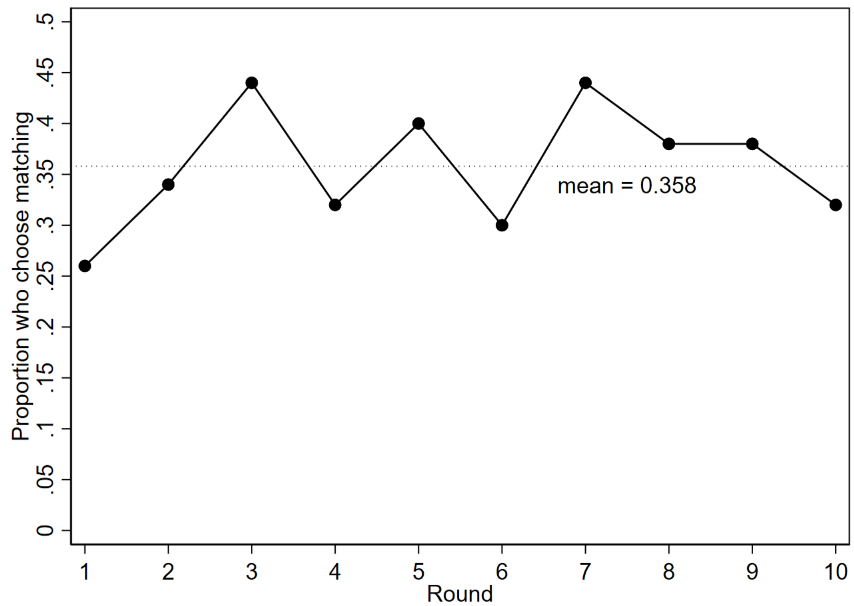


Figure 9: Probability of choosing matching by the fundraiser

In the *Endogenous Scheme* treatment, the fundraiser chooses matching in 35.8% of observations. Moreover, when compared to 0.5 in a one-sample proportions test, the p-value is below 0.0001 that strongly rejects the null hypothesis that the fundraiser is equally likely to choose matching or seed money. Figure 9 depicts the proportion of donors who choose matching in each round. It reveals that many subjects alternate between matching and seed money during the 10 rounds of the game.

We do not find any evidence that subjects' attention is focused only on one scheme. In fact, the eye-tracking data suggests that subjects pay equal attention to both schemes, since there is no imbalance between fixations and the amount of time spent on the seed money and matching earnings tables. Also, there is no statistically significant difference between time to first fixation on the two tables, meaning that subject are equally likely to start looking at either table. The

[18]In the controls Week 2, Week 3, Small Session, Year 3+, and Income are defined as before. Experience above mean indicates that the number of experimental studies the lead donor (or the follower donor) had participated in, prior to this study was above the average of the sample. Found it Easy indicates the lead donor (or the follower donor) rated this study to be easier than 2 out of 10. 5+ Math Courses indicates that the lead donor (or the follower donor) had taken more than 4 math courses. Math Question indicates that the lead donor (or the follower donor) answered the math question correctly in the survey. CRT Score is the Cognitive Reflection Test score (out of 3) of the lead donor (or the follower donor).

Figure 10: Heat map of the fundraiser's eye fixation in their decision screen

relevant heat maps are presented in Figure 10.

Interestingly, we find that females are much more likely to choose matching than males. While females choose matching in 41.88% of observations, males do so in only 25.00% of observations. The difference is statistically significant with the p-value of the two-sample proportions test at 0.0002. Furthermore, as depicted in Figure 11, the average choice of the two groups is very similar

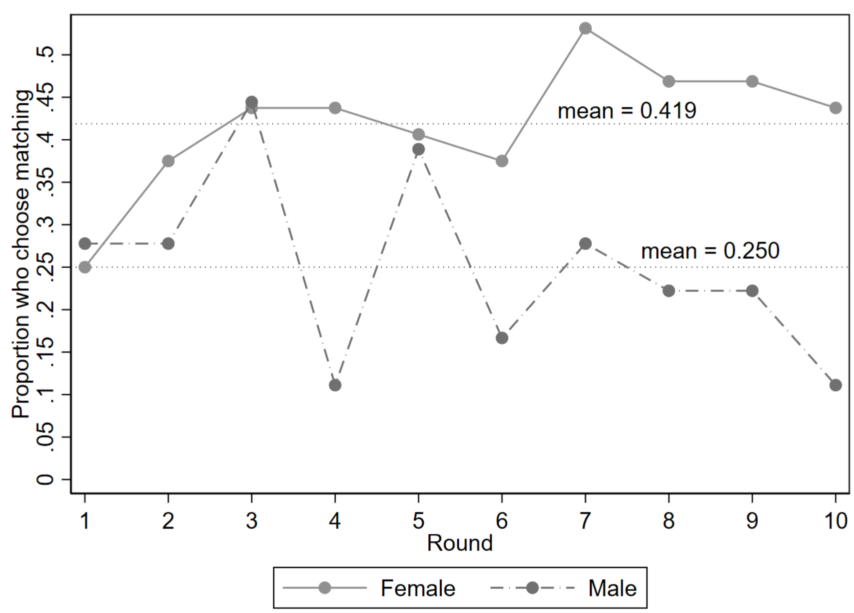


Figure 11: Probability of choosing matching by the fundraiser by gender

Table 6: Effect of fundraiser gender and round on the portability of choosing matching

	Linear	Probit	Logit
Female	0.0846 (0.116)	0.229 (0.352)	0.357 (0.597)
Round	-0.0165 (0.0114)	-0.0573 (0.0381)	-0.0980 (0.0681)
Female*Round	0.0332** (0.0141)	0.105** (0.0452)	0.176** (0.0786)
Week 2	0.182* (0.101)	0.534* (0.320)	0.888 (0.546)
Week 3	0.115 (0.122)	0.339 (0.346)	0.561 (0.590)
Small Session	-0.0929 (0.0976)	-0.292 (0.288)	-0.486 (0.470)
Year 3+	0.0785 (0.0952)	0.274 (0.273)	0.422 (0.487)
Income<$75K	-0.143** (0.0646)	-0.405** (0.193)	-0.703** (0.332)
Donated >$5 past month	0.165** (0.0720)	0.490** (0.209)	0.787** (0.350)
Experience above mean	-0.160** (0.0753)	-0.473** (0.217)	-0.762** (0.366)
Found it Easy	-0.0347 (0.0817)	-0.126 (0.258)	-0.192 (0.453)
5+ Math Courses	0.188 (0.122)	0.578 (0.368)	0.926 (0.664)
Math Question	-0.119 (0.0937)	-0.326 (0.263)	-0.552 (0.434)
CRT Score	0.0679* (0.0388)	0.182 (0.118)	0.313 (0.208)
Constant	0.215 (0.180)	-0.809 (0.527)	-1.290 (0.860)
Observations	500	500	500

Standard errors in parentheses are clustered at the individual level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

in earlier rounds. For example, in the first three rounds 33.33% of males and 35.42% of females choose matching and the p-value of the two-sample proportions test is 0.7969. However, as the experiment progresses, the proportion of females choosing matching steadily increases. Males in contrast, alternate between the two schemes and remain more likely to choose seed money. For instance, in the last three rounds, 18.52% of males and 45.83% of females choose matching and the p-value of the two-sample proportions test is 0.0008. Moreover, the proportion of females choosing matching in the last three rounds is not statistically different than 0.5 in a one-sample proportions test with a p-value of 0.4142. Thus, we fail to reject the null hypothesis that females are equally likely to choose matching or seed money in later rounds of the game. The same test for males however, strongly rejects the null hypothesis with a p-value below 0.0001.

The observation that males' and females' choice of scheme is initially similar but they diverge in later rounds of the game, suggests that female subjects learn more during the experiment compared to their male counterparts. Another possible explanation for the gender difference, may be attention. However, after analyzing the eye-tracking data, we do not find any statistically significant difference between males and females in visual attention to any of the important elements in the instructions or decision screens.[19] A third possible explanation may be differences in cognitive reflection but interestingly, females on average score almost 1 point (out of 3) less than males in the Cognitive Reflection Test (CRT). Furthermore, higher CRT score does not predict a higher probability of choosing matching or even higher probability of forming a correct belief about what the lead donor or the follower donor would do.

[19]We measured eye fixations, amount of time spent fixating, and percentage of time spent fixating on the payoff table and earnings tables in the instructions and the earnings tables in the decision screen.

To conclude, we present the regression estimates of the effects of gender, round, and their interaction on the probability of choosing matching in Table 6. We control for various characteristics.[20] The coefficient Female represents the effect of gender (with male as the baseline) excluding any learning and it is not statistically significant. Thus, there does not seem to be any difference between males and females in the first round of the experiment. Round that represents the effect of repetitions on the probability of choosing matching by males is also not statistically significant. However, the interaction of Round and Female is positive and statistically significant, which shows while males' choice does not change over time, females become increasingly more likely to choose matching. Overall, our findings suggest that even though initially subjects seem to be less likely to choose matching compared to seed money, females learn over the course of the experiment and become more likely to choose matching.

6 Conclusion

In this paper, we consider a public good fundraising game with known returns and find that a matching fundraising scheme (weakly) outperforms a seed money fundraising scheme. Moreover, we find that a matching gift scheme alleviates the downstream donor's free-riding incentives, resulting in significantly higher contribution by the follower donor under matching as compared to seed money. Therefore, the matching gift scheme is found to be more effective per each dollar of leadership giving. This might not seem very important in a lab setting, where there is only on follower donor. But, in a fundraising campaign, there are usually a large number of such donors that donate after the lead donor. Thus, the effect of scheme on downstream donors becomes very important, which in turn points to the value of a matching gift. Moreover, while in the lab, soliciting the lead donor is automatic, asking a rich donor in the field for contributions is costly, which further highlights the importance of a matching gift's ability to make those hard obtained dollars go a longer way in attracting donations from subsequent donors. We, however, should emphasize that our study has been conducted in a context of information symmetry, and as discussed in Section 1, informational frictions can affect the relative effectiveness of the two leadership gift schemes. Hence, investigating the effects of informational environment on the relative performance of the two types of leadership giving is an area that requires more experimental and empirical research.

We also find that interestingly, despite the observed superiority of the matching scheme, slightly above one third of fundraisers choose it. However, female subjects become more likely to choose matching as the experiment progresses. Based on our findings, learning is a plausible explanation. Nonetheless, the fundraisers' behavior is a rather understudied area, and we believe that there is definitely a need for more research.

[20] All controls are defined as before.

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Appendix A

Proofs

Proof of Lemma 1

Differentiating eq. (5) yields:

$$\frac{\partial E[g_2^*|g_1]}{\partial g_1} = \begin{cases} 1 - F(1-\overline{\alpha}) & \text{if} \quad g_1 < \frac{G_0}{2} \\ 1 + F(1-\overline{\alpha}) - 2F(1-\underline{\alpha}) & \text{if} \quad g_1 > \frac{G_0}{2} \end{cases} \tag{A-1}$$

Thus, since $F(1-\overline{\alpha}) < 1$, if $\underline{\alpha} > 1 - F^{-1}\left(\frac{F(1-\overline{\alpha})+1}{2}\right) \Rightarrow 1 + F(1-\overline{\alpha}) - 2F(1-\underline{\alpha}) > 0$ then $\frac{\partial E[g_2^*|g_1]}{\partial g_1} > 0$ for all g_1 and otherwise $\frac{\partial E[g_2^*|g_1]}{\partial g_1} > 0$ for $g_1 < \frac{G_0}{2}$ and $\frac{\partial E[g_2^*|g_1]}{\partial g_1} \leq 0$ for $g_1 > \frac{G_0}{2}$. ■

Proof of Proposition 1

Differentiating eq. (6) yields:

$$\frac{\partial \pi_1(w, g_1, g_1 + E[g_2^*|g_1])}{\partial g_1} = \begin{cases} (2 - F(1-\overline{\alpha}))\overline{\alpha} - 1 & \text{if} \quad g_1 < \frac{G_0}{2} \\ \\ -1 + F(1-\overline{\alpha})\overline{\alpha} + 2(1 - F(1-\underline{\alpha}))\underline{\alpha} & \text{if} \quad g_1 > \frac{G_0}{2} \end{cases} \tag{A-2}$$

Since $\overline{\alpha} < 1$ and $\underline{\alpha} < \frac{1}{2}$ it holds that $F(1-\overline{\alpha})\overline{\alpha} + 2(1-F(1-\underline{\alpha}))\underline{\alpha} < 1$. Hence, $\frac{\partial \pi_1}{\partial g_1} < 0$ for all $g_1 > \frac{G_0}{2}$. Thus, if $F(1-\overline{\alpha}) > 2 - \frac{1}{\overline{\alpha}} \Rightarrow (2 - F(1-\overline{\alpha}))\overline{\alpha} - 1 < 0$ then $\frac{\partial \pi_1}{\partial g_1} < 0$ for all g_1. As a result, the lead donor chooses $g_1^s = 0$ and by eq. (4) $g_2^s = g_2^*(g_1^s) = 0$. Otherwise, if $F(1-\overline{\alpha}) < 2 - \frac{1}{\overline{\alpha}}$ then $\frac{\partial \pi_1}{\partial g_1} > 0$ for all $g_1 < \frac{G_0}{2}$. As a result, the lead donor chooses $g_1^s = \frac{G_0}{2}$ and by eq. (5) $g_2^s = E[g_2^*|g_1^s] = (1 - F(1-\overline{\alpha}))\,\frac{G_0}{2}$. ■

Proof of Proposition 2

Differentiating eq. (9) yields:

$$\frac{\partial \pi_1(w, m g_2^*(m), (m+1) g_2^*(m))}{\partial m} = \begin{cases} 0 & \text{if} \quad m < \frac{1}{\overline{\alpha}} - 1 \\ \frac{-G_0}{(1+m)^2} & \text{if} \quad m \in [\frac{1}{\overline{\alpha}} - 1, min\{\frac{1}{\underline{\alpha}} - 1, \frac{w}{G_0 - w}\}) \\ \frac{-\overline{\alpha} w}{m^2} & \text{if} \quad w \leq (1-\underline{\alpha})G_0 \ \& \ m \geq \frac{w}{G_0 - w} \\ \frac{-\underline{\alpha} w}{m^2} & \text{if} \quad w > (1-\underline{\alpha})G_0 \ \& \ m \geq \frac{1}{\underline{\alpha}} - 1. \end{cases} \tag{A-3}$$

Thus, the maximum of π_1 occurs at one of the four values in the set $\{0, \frac{1}{\overline{\alpha}} - 1, \frac{1}{\underline{\alpha}} - 1, \frac{w}{G_0 - w}\}$. From eq. (9), the lead donor's payoff at each of these values is:

$$\pi_1(w, (0) g_2^*(0), g_2^*(0)) = w \tag{A-4}$$

$$\pi_1(w, (\frac{1}{\overline{\alpha}} - 1) g_2^*(\frac{1}{\overline{\alpha}} - 1), (\frac{1}{\overline{\alpha}}) g_2^*(\frac{1}{\overline{\alpha}} - 1)) = w + (2\overline{\alpha} - 1)G_0 \tag{A-5}$$

$$\pi_1(w, (\frac{w}{G_0 - w}) g_2^*(\frac{w}{G_0 - w}), (\frac{w}{G_0 - w} + 1) g_2^*(\frac{w}{G_0 - w})) = \overline{\alpha} G_0 \tag{A-6}$$

$$\pi_1(w, (\frac{1}{\underline{\alpha}} - 1) g_2^*(\frac{1}{\underline{\alpha}} - 1), (\frac{1}{\underline{\alpha}}) g_2^*(\frac{1}{\underline{\alpha}} - 1)) = \frac{\underline{\alpha}}{1 - \underline{\alpha}} w + (\overline{\alpha} - \underline{\alpha})G_0 \tag{A-7}$$

Comparing eqs. (A-4) and (A-5) and noting that by assumption $\overline{\alpha} > \frac{1}{2} \Rightarrow 2\overline{\alpha} - 1 > 0$ reveals that $m^* > 0$. Moreover, consider two cases:

Case 1: If $w \leq (1 - \underline{\alpha})G_0$, then since by assumption $w \geq \overline{\alpha}G_0$ and $\overline{\alpha} > \frac{1}{2}$ with some algebraic manipulation one can see that: $w + (\overline{\alpha} - 1)G_0 > 0$. Comparing the last result with eqs. (A-5) and (A-6) reveals that $m^* = \frac{1}{\overline{\alpha}} - 1$.

Case 2: If $w > (1 - \underline{\alpha})G_0$ consider the function $f(\underline{\alpha}) = 1 + \frac{2\underline{\alpha}-1}{1-\underline{\alpha}} \frac{w}{G_0} - \underline{\alpha}$. Then $f'(\underline{\alpha}) = \frac{1}{(1-\underline{\alpha})^2} \frac{w}{G_0} - 1 > 0$ for all $\underline{\alpha} < \frac{1}{2}$. Moreover, $f(\frac{1}{2}) = \frac{1}{2}$. Thus, $f(\underline{\alpha}) \leq \frac{1}{2} < \overline{\alpha}$ that with some algebraic manipulation gives: $w + (2\overline{\alpha} - 1)G_0 > \frac{\underline{\alpha}}{1-\underline{\alpha}} w + (\overline{\alpha} - \underline{\alpha})G_0$. Comparing the last result with eqs. (A-5) and (A-7) reveals that $m^* = \frac{1}{\overline{\alpha}} - 1$.

Consequently, in both cases, by eq. (8) $g_2^m = \overline{\alpha}G_0$ and $g_1^m = (1 - \overline{\alpha})G_0$. ■

Appendix B

Eye-tracking Data

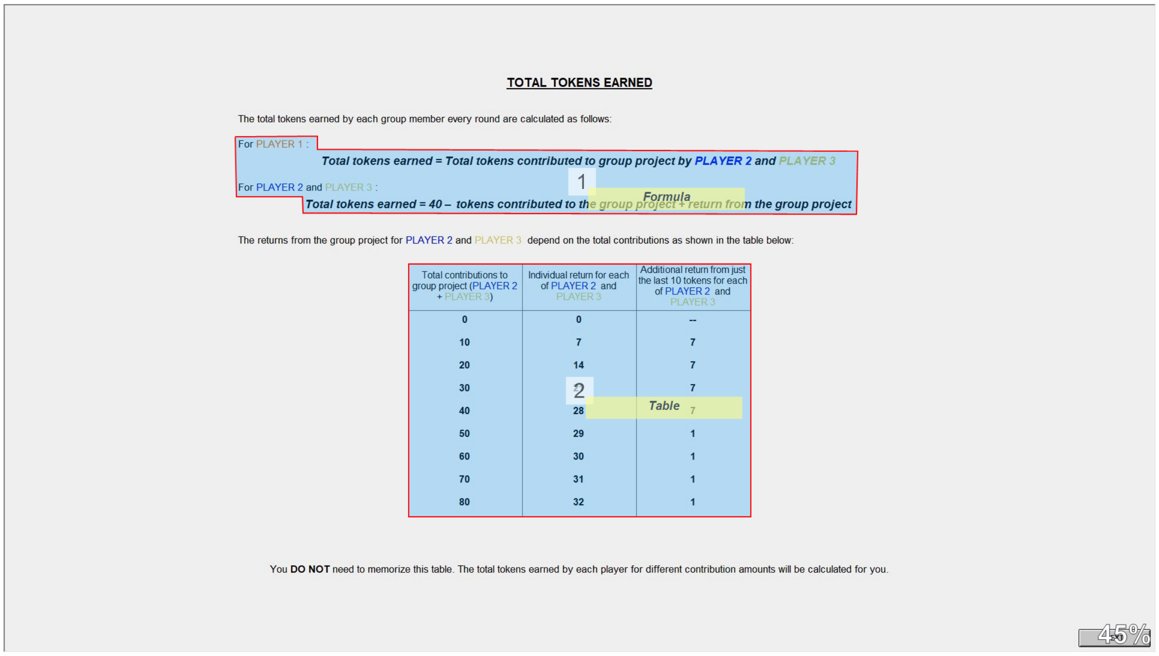

Figure B-1: Areas of interest on the instruction page explaining payoff calculations (Area 1 is earnings formula explanations and area 2 is the group project payoff table.)

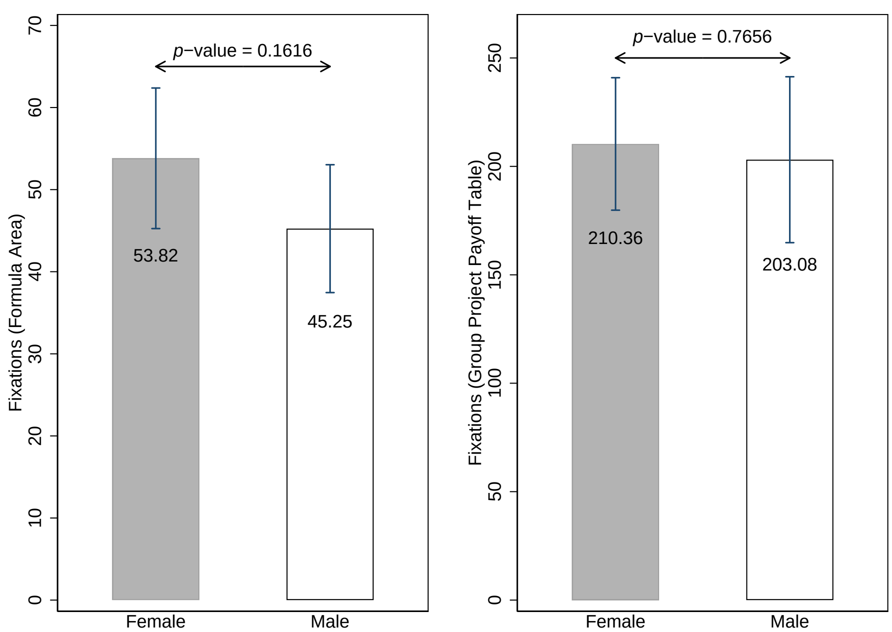

Figure B-2: Number of eye fixations on earnings formula (area 1 on Figure B-1) and group project payoff table (area 2 on Figure B-1) by gender

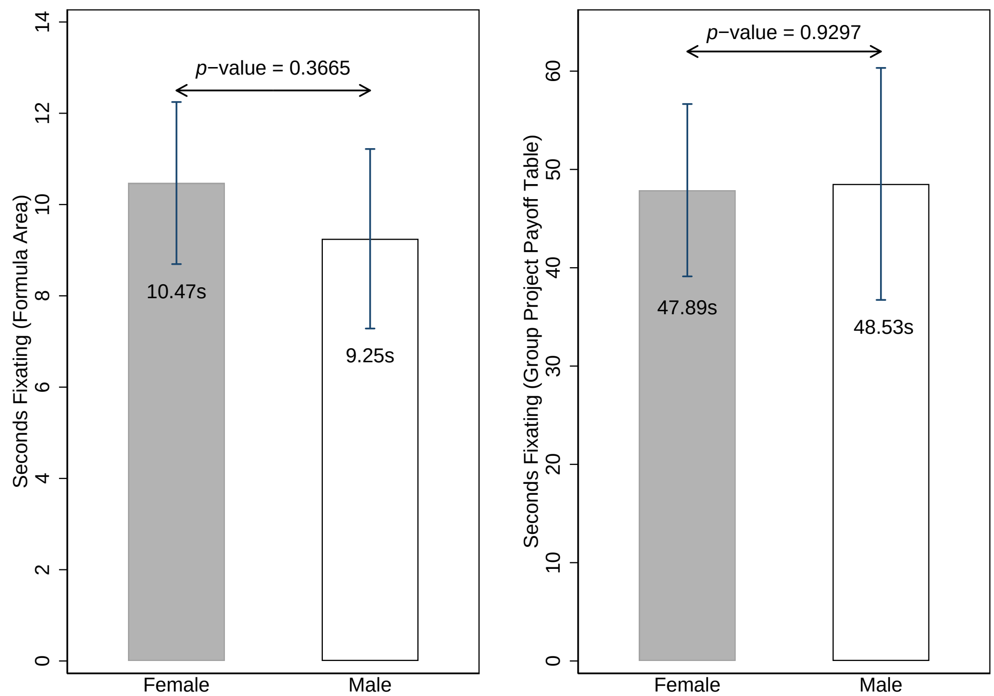

Figure B-3: Time (in seconds) spent fixating on earnings formula (area 1 on Figure B-1) and group project payoff table (area 2 on Figure B-1) by gender

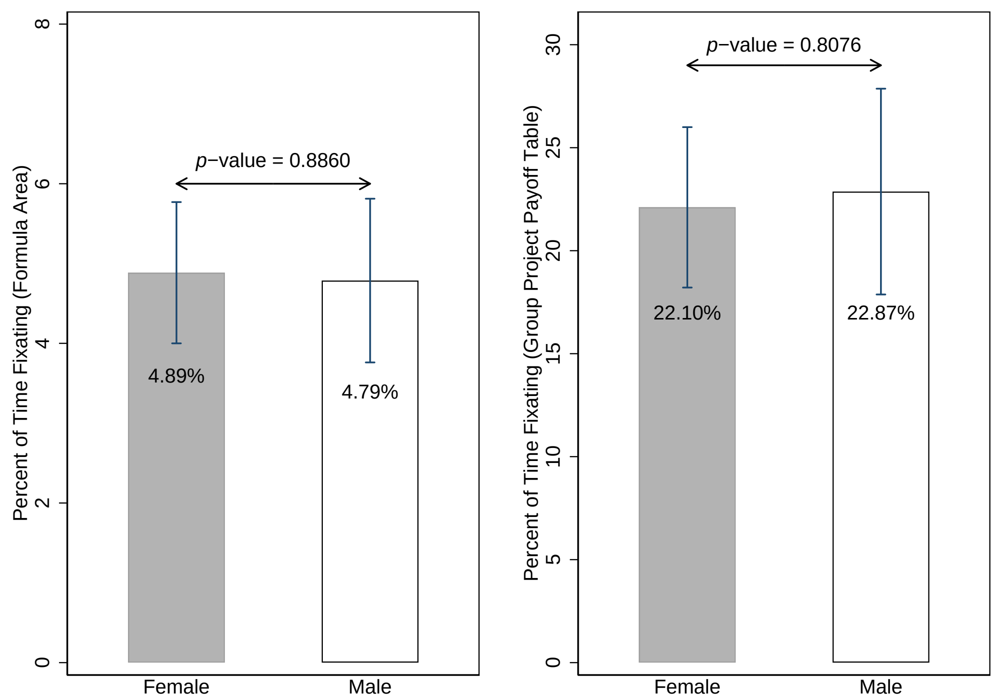

Figure B-4: Percent of time spent fixating on earnings formula (area 1 on Figure B-1) and group project payoff table (area 2 on Figure B-1) by gender

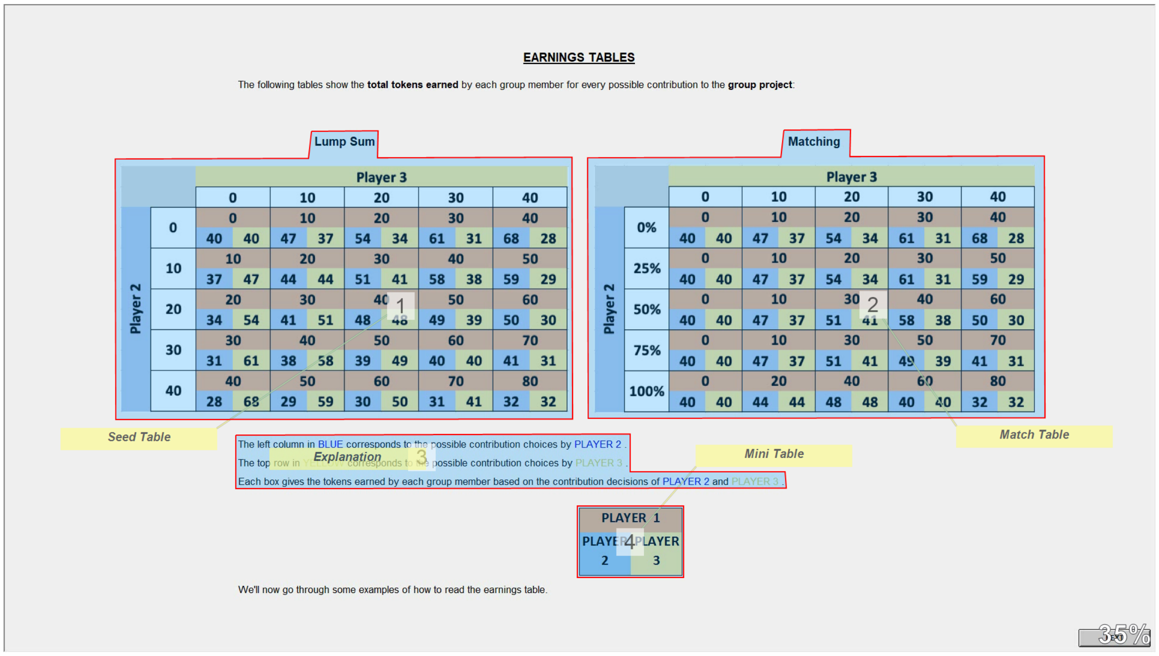

Figure B-5: Areas of interest on the instruction page explaining earnings tables (Areas 1 and 2 are seed money and matching earnings tables, area 3 is the explanation, and area 4 explains each player's earnings in each box on earnings tables.)

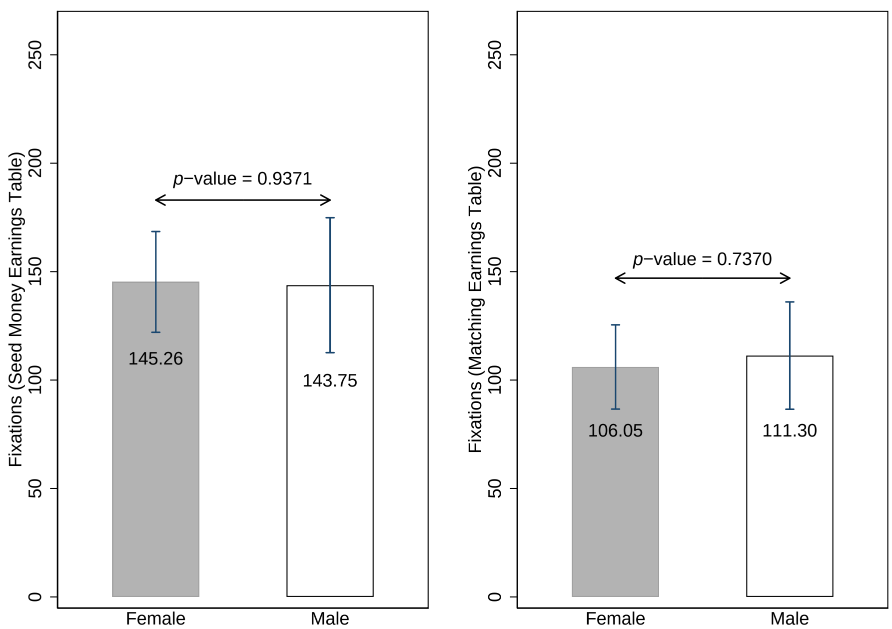

Figure B-6: Number of eye fixations on seed money earnings table (area 1 on Figure B-5) and matching earnings table (area 2 on Figure B-5) by gender

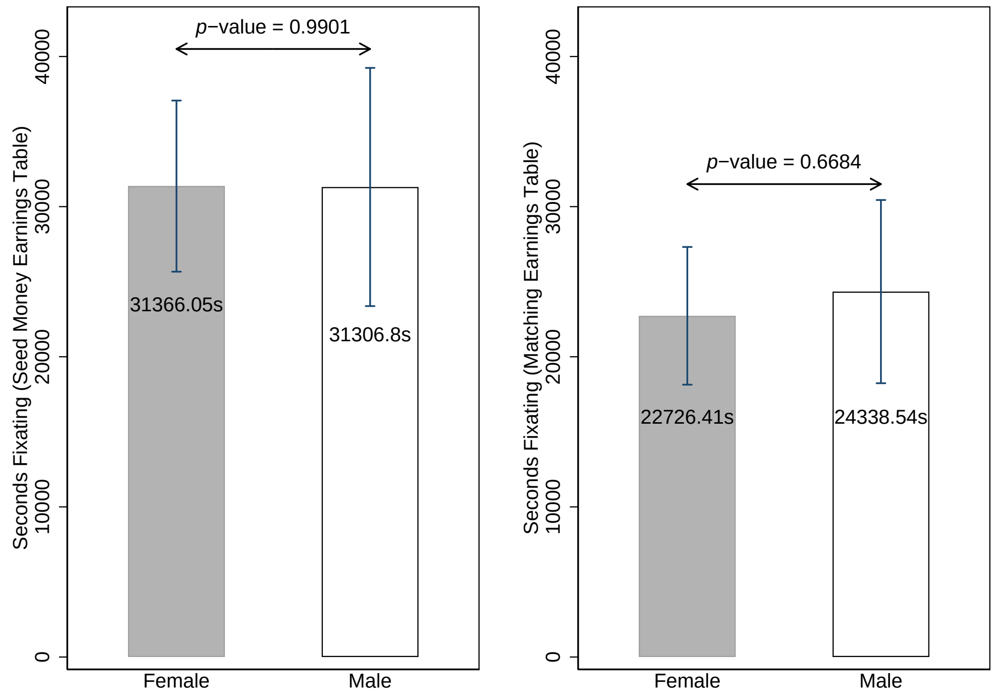

Figure B-7: Time (in seconds) spent fixating on seed money earnings table (area 1 on Figure B-5) and matching earnings table (area 2 on Figure B-5) by gender

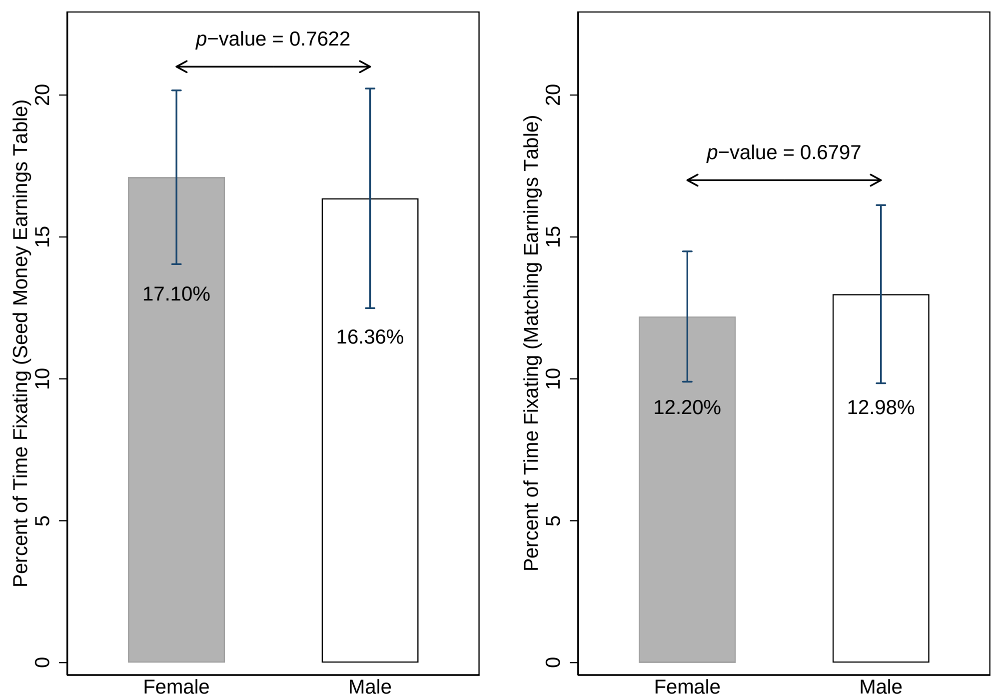

Figure B-8: Percent of time spent fixating on seed money earnings table (area 1 on Figure B-5) and matching earnings table (area 2 on Figure B-5) by gender

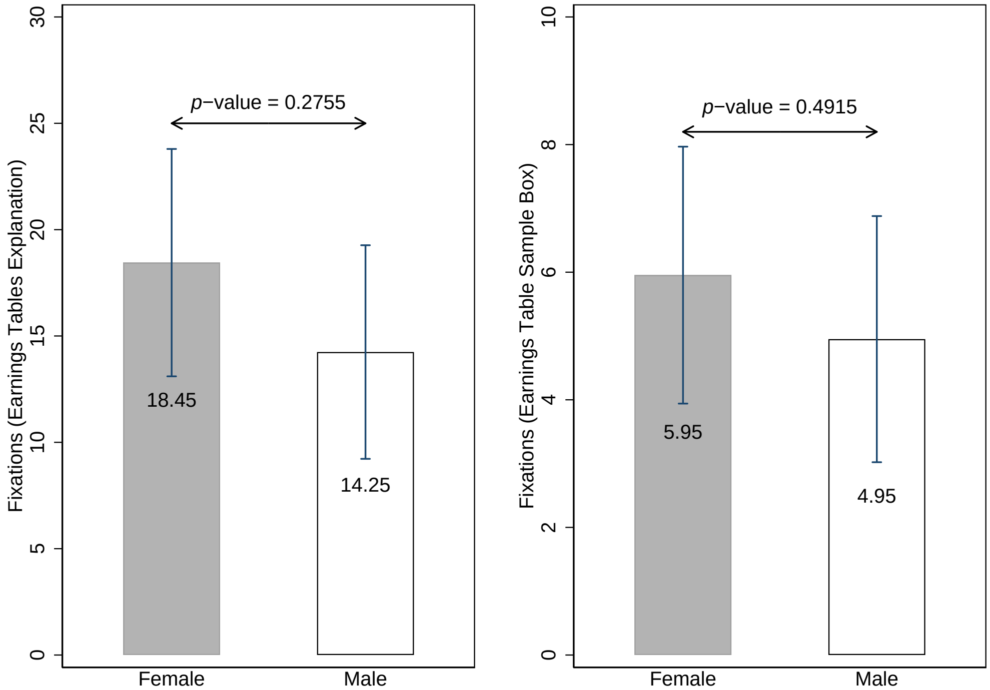

Figure B-9: Number of eye fixations on the explanation (area 3 on Figure B-5) and players' earnings sample box (area 4 on Figure B-5) by gender

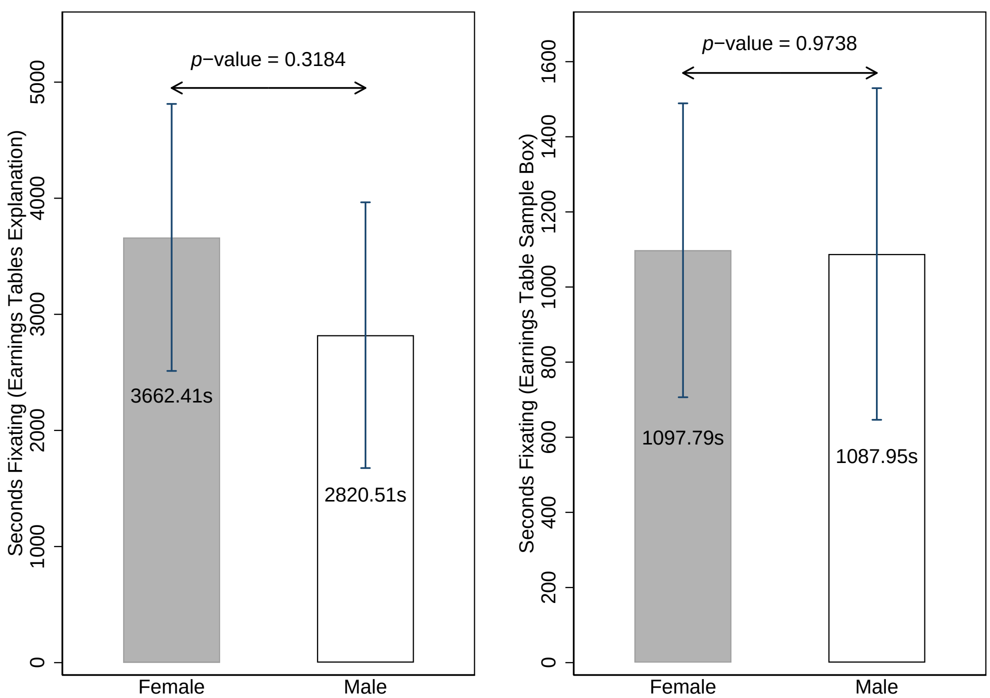

Figure B-10: Time (in seconds) spent fixating on the explanation (area 3 on Figure B-5) and players' earnings sample box (area 4 on Figure B-5) by gender

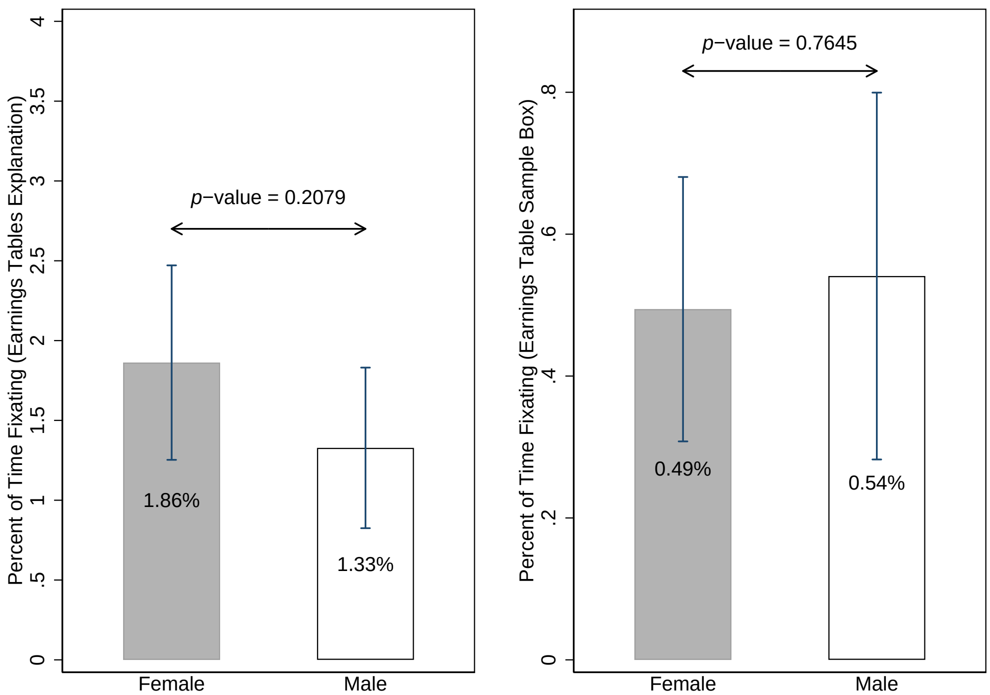

Figure B-11: Percent of time spent fixating on the explanation (area 3 on Figure B-5) and players' earnings sample box (area 4 on Figure B-5) by gender

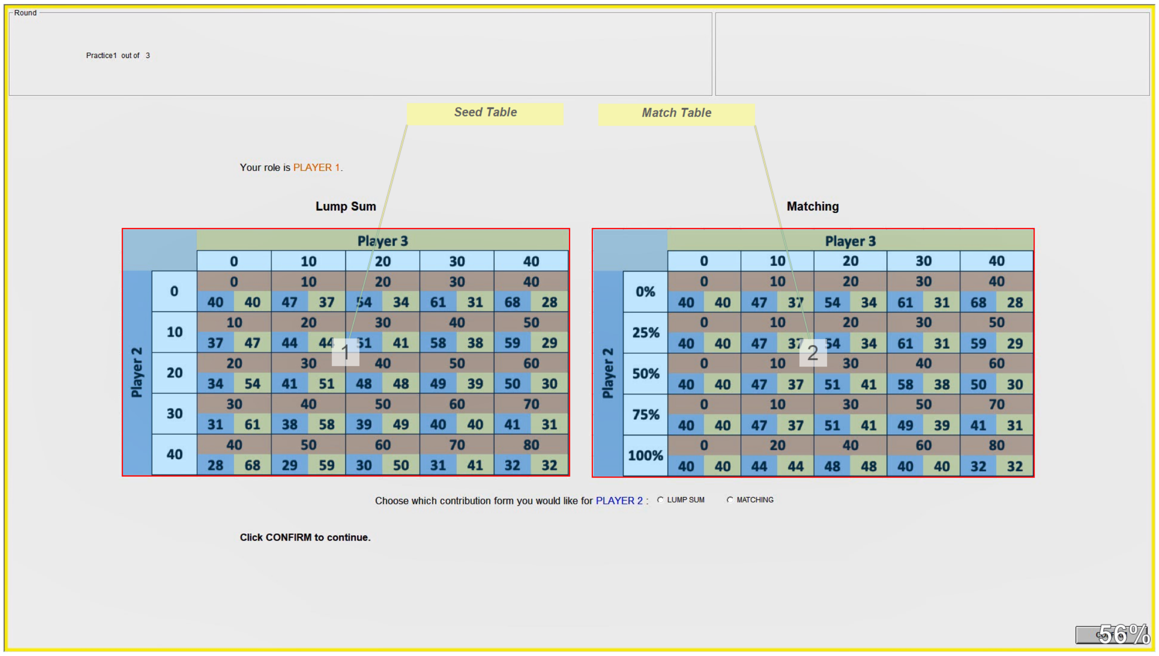

Figure B-12: Areas of interest on the fundraiser's decision screen (Areas 1 and 2 are seed money and matching earnings tables respectively.)

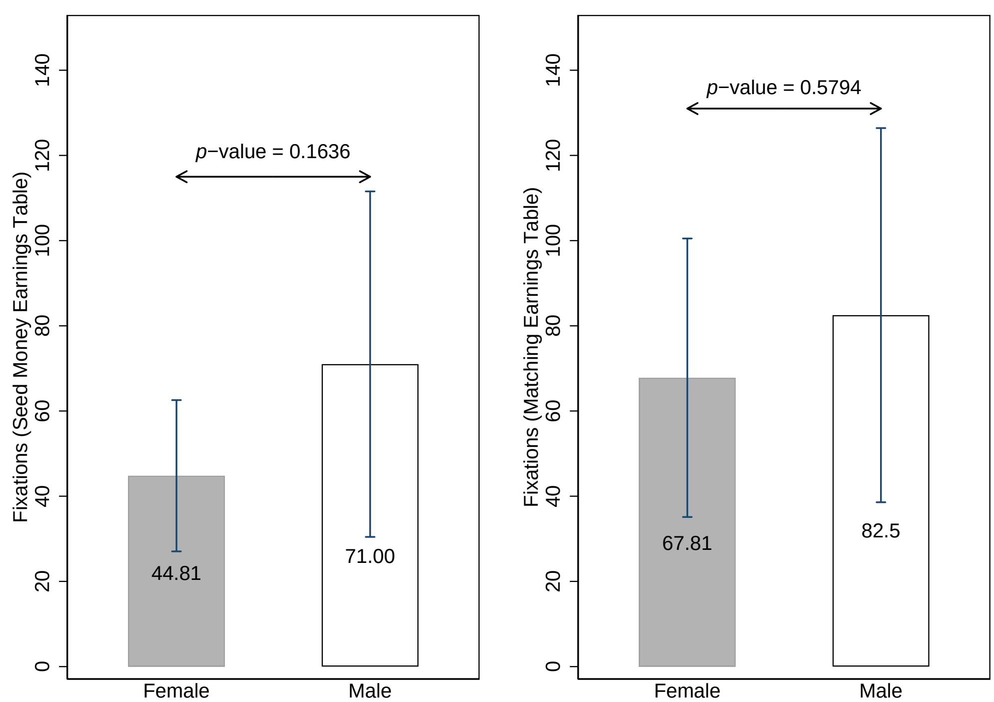

Figure B-13: Number of eye fixations on seed money earnings table (area 1 on Figure B-12) and matching earnings table (area 2 on Figure B-12) by gender

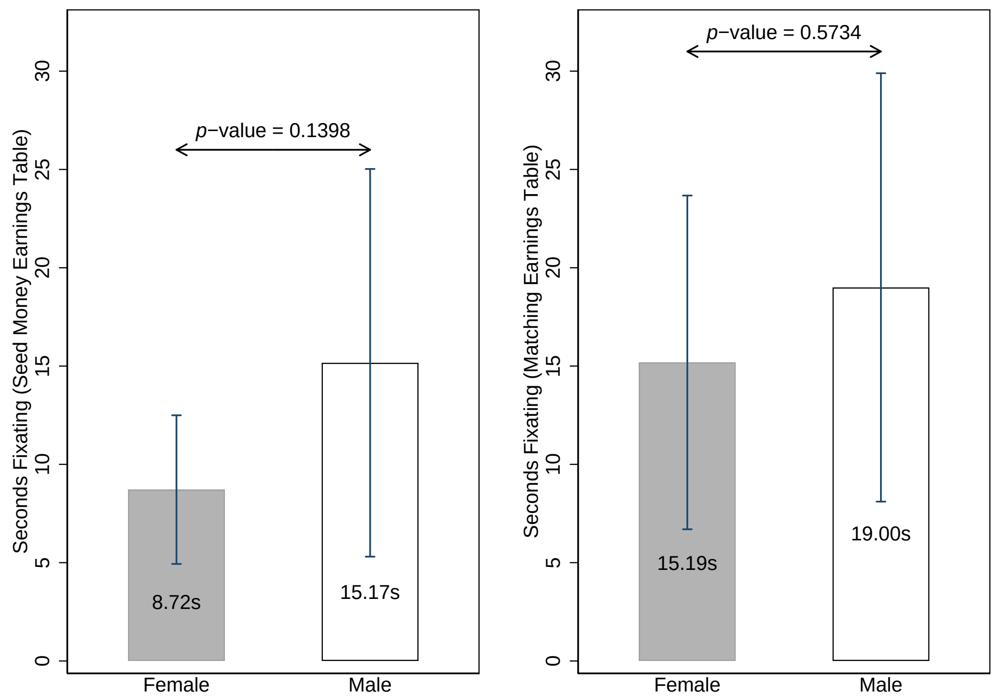

Figure B-14: Time (in seconds) spent fixating on seed money earnings table (area 1 on Figure B-12) and matching earnings table (area 2 on Figure B-12) by gender

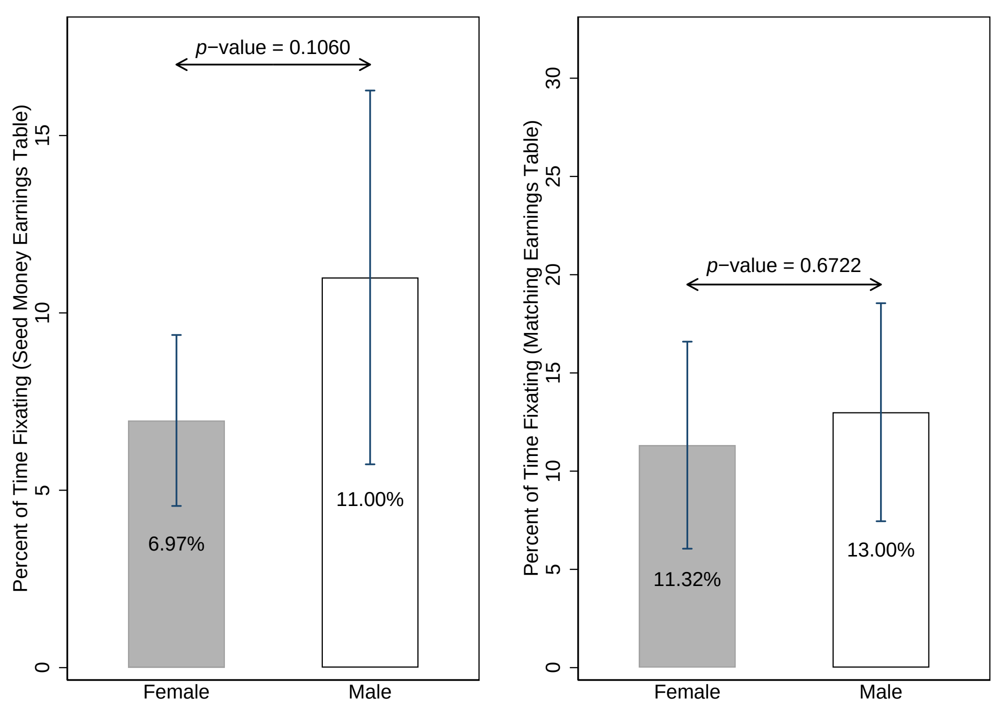

Figure B-15: Percent of time spent fixating on seed money earnings table (area 1 on Figure B-12) and matching earnings table (area 2 on Figure B-12) by gender