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TOO MANY CHARITIES? INSIGHT FROM AN EXPERIMENT WITH MULTIPLE PUBLIC GOODS AND CONTRIBUTION THRESHOLDS

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Too many charities? Insight from an experiment with multiple public goods and contribution thresholds

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Abstract

We present results from an experiment with multiple public goods, where each good produces benefits only if total contributions to it reach a minimum threshold. The experiment allows us to compare contributions in a benchmark treatment with a single public good and in treatments with more public goods than can be funded. The presence of multiple public goods makes coordination among participants more difficult, discouraging contributions, and decreasing the likelihood of any public good being effectively funded. Multiplicity decreases funding unless one public good stands out as being the most efficient alternative. Applied to the case of philanthropy, the results show how overall donations and the number of effectively funded charities may both decrease as the total number of charities increase. This is true even if the new charities offer higher potential benefits than previous options.

Keywords: Threshold public goods, multiple public goods, laboratory experiment, fundraising.

JEL: $C91$, $C92$, $H40$, $H41$.

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1 INTRODUCTION

In 2005, when the number of registered nonprofit organizations in the United States surpassed one million, a debate ensued in the popular press as to whether there were too many nonprofit organizations. Walter Sczudlo of the Association of Fundraising Professionals laid out the arguments as to why it was possible to have too many nonprofit organizations: *"This proliferation of charities is creating a huge competition for donor dollars. There are so many charities now going after so few dollars and it's getting parsed out so finely."*[1] The typical organization is significantly constrained by limited funding, and weighted down by overhead and administrative costs. Paul Light argued, *"Too many of the new nonprofits are just too weak to have much chance of moving from the organic stage of nonprofit life up the development curve to intentional action, let alone robustness. There is very little venture capital around for these young ones, and we ought to be very careful about where it gets invested."*[2]

Although donors may wish to support most nonprofits and community projects, the reality is that there are more organizations and projects than the donor base can afford to effectively fund. Having more philanthropic options can make donor coordination more difficult and lead to less-effective organizations or projects. Indeed, the lack of coordination among donors can cause funding to be spread thinly across many recipients, with the typical recipient receiving less funding than necessary to effectively provide its service or carry out its desired projects. Having fewer nonprofit organizations may improve coordination among donors, increasing the number of projects that receive enough funding to succeed, decreasing the number of underfunded organizations and improving the overall success of the non profit sector.

We present results from a public goods experiment with multiple alternatives designed to provide insight into how people contribute in situations in which there are more potential recipients (e.g., charities or specific community projects) than can be effectively funded by donors. Our experimental design presents three distinct features that relate to the real world issues involved with such funding. First, each public good provides a social benefit only if total contributions to it reach a minimum required amount (the threshold). If total contributions to one of the options falls below the threshold, then contributions to that option are forfeited, returning no benefit. This is consistent with the idea that fixed administrative costs and economies of scale may lead many nonprofits to be cost-ineffective or unsustainable until they reach a certain level of funding, and community projects may not be completed until total contributions cover the project costs. Second, in three of our treatments subjects

[1]This quote and others appears in "Each 501c3 is now" by Todd Cohen in *The Nonprofit Times*, May 1, 2005. Online at http://www.thenonprofittimes.com/article/detail/each-501c3-is-now-2949.

[2]Found in Light and Light (2006, p59).

face multiple public goods, with some of the goods being equally efficient. This captures a situation in which both the Jean Luc Picard Cancer Research Foundation and the James T. Kirk Center for Cancer Research are soliciting donations, but neither organization stands out as more promising than the other.[3] Third, in two of our three treatments with multiple public goods, one good is *salient* in that it stands out by offering either a higher or a lower expected benefit compared to three *non salient* alternatives. This captures the possibility that some nonprofits or projects may stand out as more or less promising options compared to the alternatives, and allows us to consider whether the presence of a salience alternative helps facilitate coordination.

The extension of the threshold public good experiment that includes multiple public goods is necessary to represent a real world environment in which donors can choose between a variety of alternative contribution options. In addition to deciding *how much* to give, donors must also choose *to which projects* to give. Despite its relevance in the real world, we are aware of no other experimental analysis that considers a threshold public good game with multiple alternatives.

Treatment 1G in our experiment involves a single public good. This represents an environment in which a single charitable organization is involved with a given cause (e.g., cancer research, disaster relief in Haiti, or feeding the homeless in Chicago), providing philanthropists interested in that cause only one option to direct their donations. Treatment 4G-EE involves four "equally efficient" public goods. It represents the case in which multiple charitable organizations vie for the same donor dollars. A comparison of the first two treatments illustrates the potential harm that may arise when there are "too many" charities. First, total contributions are lower in 4G-EE than in 1G. This illustrates how donors may contribute less in total to all charities as the number of charities increases. Second, the probability that funding reaches the threshold for any public good is lower in 4G-EE than in 1G. This shows how an increase in the number of charities may decrease the probability that any charity receives enough funding to effectively provide its services. Overall, these findings are consistent with the idea that the presence of "too many" charities makes contributing less

[3]Walter Sczudlo explains, *"I don't know if it's a bad thing if there are 1 million charities, but it can lead to confusion on the part of the donor."* Fundraiser Kay Sprinkel Grace echoes this concern, *"We have way to many non profits... For our donors, it's totally confusing"* (June 12, 2013 during the Nonprofit Bootcamp in Mountain View, CA).

Such concerns are not limited to small or upstart organizations. In 2010, Susan G. Komen for the Cure, the most recognized breast cancer organization in the U.S., took legal action against a number of other charities who were using the term "for the cure" in their names or to sponsor events. Komen argued that the use of the term by other groups led to donor confusion. Similarly, the Livestrong Foundation has actively prevented the use of the word "strong" and the color yellow by other organizations. Several legal battles based on the donor confusion argument are discussed in "Charity brawl: Nonprofits aren't so generous when a name's at stake," by Clifford Marks in the *Wall Street Journal*, August 5, 2010.

rewarding for philanthropists, can discourage contributions, and can decrease the success of the nonprofit sector generally. In our experiment, funding is less effective and donors are worse off in 4G-EE than in 1G.

Treatments 4G-LE and 4G-ME include a total of four public goods, with one salient public good that is identical to the one used in 1G, and three alternatives that are indistinguishable from one another but either "more efficient" or "less efficient" compared to the salient alternative. These treatments represent cases in which multiple charitable organizations vie for donor dollars, and one of the organizations stands out from the rest as being either better or worse than the others in providing its services.

In 4G-LE, the salient public good provides greater potential benefits than the less efficient alternatives. When comparing contributions in 4G-LE with those in 1G, we observe no significant differences in their levels. This illustrates how an increase in the number of charities does not necessarily lead to less effective funding and worse off donors. When one of the options stands out as being more efficient than the alternatives, donors effectively ignore the less efficient options and contribute as if the salient organization was the only alternative. In 4G-ME, the salient public good provides lower potential benefits than the more effective alternatives. In this case, we observe donors ignoring the more salient option and focusing their contributions on the more efficient, but non-salient alternatives where coordination is more difficult. This illustrates how the presence of additional charities may lead to less effective funding and worse off donors, even when the original charity remains a viable, salient alternative, and even when the additional charities offer greater potential benefits than the original option.

Although we motivate our analysis with examples of charities, nonprofit organizations, and community projects, our results have implications for other settings as well. For example, suppose each public good represents a policy reform or political movement that requires sufficient time and money invested by supporters to become a viable policy proposal. The greater the number of alternative reforms, the fewer hours supporters may put into reform efforts, and the less likely it may be that any reform becomes a viable proposal. Alternatively, suppose each public good represents an investment opportunity that requires a sufficient amount of capital to get off the ground. This means that the presence of competing investment opportunities (e.g., similar real estate projects, technology companies with similar development plans) may not only decrease the probability that a *certain* project succeeds, it may also decrease overall investment and the probability that *any* project succeeds.

The rest of the paper proceeds as follows. Section 2 discusses the relevant literature. Section 3 describes the experimental design and procedures, the theoretical foundation for the analysis, and the testable hypotheses. Section 4 presents the empirical results. Section

5 concludes with a discussion of the results and policy implications.

2 LITERATURE REVIEW

Andreoni (2006) provides an overview of the literature on philanthropy and charitable fundraising, where philanthropy is typically modeled as giving to a public good. Like Andreoni (1998), we model charities as threshold public goods, incorporating a contribution threshold to account for the minimum amount of fundraising necessary for a project to succeed. Bagnoli and Lipman (1989) first incorporate a contribution threshold into a model of public goods. Several experimental studies analyze the effects that introducing a threshold has on contributions. Most of the literature focuses on the effects of alternative rebate rules (whether contributions above the threshold generate a return, e.g., Marks and Croson 1998) and refund rules (whether contributions are returned to subjects when the threshold is not reached, e.g., Isaac, Schmidtz and Walker 1989) on total contributions.[4] In contrast, we focus on the effects that increasing the number of public goods has on contributions, and leave the refund and rebate conditions fixed throughout all of our treatments.[5]

A handful of theoretical models consider fundraising by multiple charities. In Rose-Ackerman (1982), competition between alternative charities to collect donations causes charities to spend too many resources fundraising. In our paper, we abstract from fundraising efforts and costs; increasing the number of charities may be detrimental for other reasons. Other theoretical papers show how the multiplicity of public goods may lead to mis-coordination between donors, leading them to provide too much funding for some organizations and too little funding for others (Bilodeau 1992, Bilodeau and Slivinski 1997, Ghosh, Karaivanov and Oak 2007). These papers make the point that a donation-distribution organization such as the United Way may help improve coordination, and may lead to more effective funding efforts. In our setting with threshold public goods and a no money back condition, there are more significant costs associated with underfunding. However, the underlying idea that additional options make coordination more difficult are similar between this theoretical literature and our paper. We are the first experimental paper to make this point.

Despite the relevance of the issue in the real world, the experimental literature has devoted little attention to analyzing how contributions are affected by introducing multiple

[4] See also Bagnoli and McKee (1991), Cadsby and Maynes (1999), Coats, Gronberg and Grosskopf (2009) and Spencer et al. (2009).

[5] Specifically, we adopt a "no money back" condition and a linear rebate rule, assuming that any contribution is forfeited when the threshold is not reached while contributions above the threshold generate a linear return.

options. A small number of recent studies analyzes contributions in settings in which subjects are divided into several groups, each facing two linear (i.e. no-threshold) public goods: one local good that gives a return only to group members and one global good that generates a return for all participants of the session. For instance, Blackwell and McKee (2003) show that contributions to the global public good positively depend on its per capita return. Interestingly, the authors find that when the per capita return of the global good exceeds that of the group-specific public good, subjects contribute more to the former but do not reduce their contributions to the other good.[6] Bernasconi et al. (2009) show that "unpacking" a linear public good into two identical and indistinguishable parts positively affects contributions.[7] Our experimental study is the first to focus on contributions and coordination in a setting with multiple threshold public goods.

Our paper is related to the literature on choice overload. It is well known in marketing and psychology that giving consumers a larger menu of items to consider purchasing can decrease the likelihood of them purchasing *any* item (e.g., Iyengar and Lepper 2000). Our finding that total contributions are decreasing in the number of available contribution options is consistent with the choice overload results. However, we do not view choice overload as a viable explanation for our findings. First, the significant negative relationship between the number of options and total contributions in our experiment is similar in treatments 4G-EE and 4G-ME, but is not present in 4G-LE. This is evidence in favor of our argument that the decrease in contributions results because coordinating becomes more difficult, and not due to choice overload. Second, Scheibehenne, Greifeneder and Todd (2010) fail to find evidence of choice overload in a setting of charitable contributions.[8]

In our experiment, we study how providing a salient alternative facilitates coordination of contributions over multiple public goods. Starting from Schelling (1960), a large number of

[6]See also Fellner and Lünser (2008) and Falk, Fishbacher and Gaschter (2013) for related experimental findings.

[7]The authors compare results from a benchmark linear public good game with those observed in a setting with two identical linear public goods associated with the same marginal per capita return used in the benchmark. In both treatments and in every period, subjects were randomly rematched in groups of 4 and endowed with the same number of tokens. They find that contributions in the two linear public good games are significantly higher than those in the one public good game.

[8]In their experiment, participants may donate one euro to a charity on a list of alternatives, or keep the euro for themselves. They find an insignificant, positive relationship between the number of charities on the list and total contributions, which does not support the choice overload hypothesis in the context of charitable giving. This is the opposite direction of the relationship we identify in our analysis. The contrast between their findings and our own is likely due to differences in the potential impact that the donations could have on the viability of the recipient. Scheibehenne, Greifeneder and Todd (2010) considers one euro donations to major real world charities, and it is unreasonable to believe that the one euro contribution will make or break a charity. Therefore, the threshold effects that drive our results will be absent in the other study.

papers has documented the positive effect of providing focal points in coordination games.[9] Harsanyi and Selten (1988) develop a theory of equilibrium selection in games, and predict that groups will focus on either payoff dominant outcomes (which correspond to outcomes involving the most efficient public goods in our experiment) or risk dominant outcomes (which corresponds to no contributions in our experiment). The experimental literature generally supports the idea that play will converge to either payoff dominant or risk dominant outcomes, which is consistent with our finding that groups tend to ignore (at least in the long run) public goods that are neither payoff nor risk dominant. Huyck, Battalio and Beil (1990) consider a coordination game with several strictly Pareto-ranked equilibria and show that subjects quickly converges to the risk-dominant (but also payoff-dominated) equilibrium. Similar evidence of convergence to the risk-dominant option is also reported by Huyck, Battalio and Beil (1991), Cachon and Camerer (1996), Bornstein, Gneezy and Nagel (2002), and Blume and Ortmann (2007). Convergence to payoff dominant equilibria is reported in alternative settings by Rankin, Huyck and Battalio (2000), Berninghaus and Ehrhart (1998), Huyck, Cook and Battalio (1997), Schmidt et al. (2003), Clark and Sefton (2001), and Brandts and Cooper (2004, 2006). In summarizing the experimental literature, Devetag and Ortmann (2007) conclude that coordination on efficient equilibria is more likely when the game is repeated many rounds, the experiment employs a fixed partner matching protocol, participants are given feedback between rounds and the action space is more refined. The existing literature almost exclusively focuses on games with strictly Pareto ranked equilibria, while there are multiple payoff (i.e., Pareto) dominant equilibria in our setting. We find that players tend to focus on payoff dominance, even when the payoff dominant public good is not unique.

3 EXPERIMENTAL DESIGN AND TESTABLE PREDICTIONS

Our experimental design builds on experiments involving a single threshold public good and a "no money back" condition (e.g., Isaac, Schmidtz and Walker 1989) by including treatments with multiple goods. A threshold public good is often used to represent a charitable organization or community project, for which total funding must be high enough before the charity can make a difference or the project can be implemented (e.g., Andreoni 1998). The "no money back" condition refers to the assumption that money is not refunded to contributors when total funding falls below the threshold. This captures the fact that even underfunded and ineffective charities spend money on overhead and administrative costs. By

[9] Mehta, Starmer and Sugden (1994) consider a coordination game with salient decision labels and symmetric, constant payoffs. Crawford, Gneezy and Rottenstreich (2008) show that even small differences in payoffs can dramatically limit subjects' attitude to use focal points to coordinate their actions.

including multiple public goods, we capture the idea that donors not only choose whether to contribute, but also choose to which causes and organizations to contribute.

Our experiment includes four distinct treatments using a between subject design. We first consider a benchmark setting with a single threshold public good, and then we consider three treatments each with four public goods to which subjects may contribute. 48 subjects participated in each treatment, giving us a total of 192 participants across the treatments. The subjects were divided into unchanging groups of four, resulting in a total of 12 independent groups per treatment. Each group engaged in a threshold public good contribution game in each of 12 sequential periods, with participants receiving some feedback about their group's contributions between periods. We describe the four treatments in detail below.

Single Public Good Treatment. In our benchmark treatment, participants choose how much to contribute to a single threshold public good. We refer to this treatment as 1G, for "one good."

At the beginning of the experiment, each participant is randomly assigned to a group of four participants and is told that the composition of her group will remain unchanged throughout the experiment. In every period, each participant is endowed with a per-period individual endowment of 55 tokens. The participants simultaneously and independently choose how many tokens to contribute to a single threshold public good. Formally, each subject chooses how to divide her 55 tokens between a "private account" from which only the individual contributor receives a benefit, and a "collective account" to which all group members may contribute and which potentially pays a benefit to the entire group. The collective account is a public good, and each subject's allocation decision is equivalent to choosing how much to give to the public good (i.e., the collective account), and how much not to contribute (i.e., her private account).

For each token put into her private account, a subject receives a payment of two points. Each token put into the collective account returns a payment for all group members, but only if the total amount contributed by the group equals at least 132 tokens (corresponding to 60% of the total group endowment) that period. That is, 132 tokens is the contribution "threshold" necessary for the public good to be effective. If the overall number of tokens contributed to the collective account is at least 132, each group member (regardless of who contributed) receives one point for every token contributed into the collective account plus an additional bonus of 30 points.[10] If the total number of tokens contributed by the group to the collective account is lower than 132, then the subjects do not receive any points from

[10] The marginal per capita return to the collective account equals 0.5 meaning that the marginal return to a subject from making a contribution (once the threshold is reached) is half the return from the private account.

the collective account, and any contributions to the account are forfeited.

Multiple Public Goods Treatments. We consider three distinct treatments with multiple public goods. In these treatments, participants not only choose how much to contribute, they also choose where to contribute.

In all three treatments, there are four public goods. Formally, participants divide their per period endowments across a private account and four collective accounts (representing four alternative public goods). The private account is identical to that in 1G, the single public good treatment. The collective accounts are identical to the collective account in 1G along every dimension except for the bonus paid when the threshold is reached. They all have a threshold of 132 tokens, above which they pay one point to each group member for each token contributed. By limiting consideration to differences in bonus payments, comparing the efficiency of the alternative collective accounts is straightforward. The most efficient alternative is the one that pays the highest bonus.

In treatment 4G-EE, all four collective accounts are "equally efficient," each identical to the single collective account in 1G and paying a bonus of 30 points when the threshold is reached. In treatment 4G-ME, one collective account is identical to the single collective account in 1G, and the three additional collective accounts are "more efficient," each offering a bonus of 40 points. In treatment 4G-LE, one collective account is identical to the single collective account in 1G, and three additional collective accounts are "less efficient" offering a bonus of 20 points.

3.1 PROCEDURES

Upon their arrival, subjects were randomly assigned to a computer terminal. At the beginning of the experiment, instructions were distributed and read aloud (see Appendix B for the instructions of the 4G-LE treatment). Before the first period started, subjects were asked to answer sample questions at their terminal. When necessary, answers to the questions were privately checked and explained. At the beginning of each period, the computer showed each subject a number of boxes equal to the total number of private and collective accounts (two in 1G, five in 4G-EE, 4G-ME and 4G-LE). In order to avoid frame effects, the four collective accounts in 4G-EE, 4G-ME and 4G-LE were presented to subjects using neutral geometric names: SQUARE, TRAPAZOID, RECTANGLE, and DIAMOND. Also, subjects in 4G-ME and 4G-LE were told that the order of the boxes of the collective accounts on their screen was randomly determined by the computer in every period, although the shape representing each account did not change between periods. Each of the four boxes of the collective accounts showed the threshold and the size of the corresponding bonus. At the end of every period, each subject was informed about the number of tokens allocated by the group to (each of) the collective account(s), whether the corresponding threshold was reached, and any bonus paid. Additionally, following each period subjects learned the number of points they received from each account and in total. At the end of the experiment, subjects were privately paid using a payment rate of one euro per 100 points. On average, they earned 19.51 euro for sessions lasting about 50 minutes, including the time for instructions. The experiment took place in December 2011 and March 2013 in the Bologna Laboratory for Experiments in Social Science (*BLESS*) of the University of Bologna. Participants were mainly undergraduate students and they were recruited using *ORSEE* (Greiner 2004). The experiment was computerized using the $z-Tree$ software (Fischbacher 2007).

3.2 GENERAL THEORETICAL FRAMEWORK

Consider a contribution game with N public goods, indexed by $n \in \{1, ..., N\} \equiv \mathcal{N}$. There are J players, indexed by $j \in \{1, ..., J\} \equiv \mathcal{J}$, each endowed with a budget $y_j > 0$. The players simultaneously and independently choose contributions to each of the N public goods. Variable $c_{j,n}$ denotes the contribution of player j to good n, where $c_{j,n} \in [0, y_j]$ and $\sum_{n \in \mathcal{N}} c_{j,n} \leq y_j$, $\forall j \in \mathcal{J}$. Let $C_n = \sum_{j \in \mathcal{J}} c_{j,n}$ represent the total contribution to public good n.

Let $B_n(C_n)$ denote the benefit that public good n provides to *each* player conditional on total contribution C_n, where

$$B_n(C_n) = \begin{cases} 0 & \text{when } C_n < \tau_n, \\ \alpha_n C_n + \beta_n & \text{when } C_n \geq \tau_n. \end{cases}$$

Parameter τ_n allows for *threshold* public goods, which provide a benefits only when total contributions exceed a given threshold. We refer to parameter $\alpha_n \in (\frac{1}{J}, 1)$ as the *marginal per capita return* ($MPCR$) and parameter $\beta_n \geq 0$ as the *bonus* assigned to the subjects when the threshold is reached.[11]

The players independently and simultaneously choose how much to contribute to each of the n public goods, then payoffs are realized. The total payout earned by player j is given

[11] Above the threshold, the public good provides marginal returns as if it were a linear public good. This is in contrast to Bagnoli, Ben-David and McKee (1992) who consider a setting in which multiple thresholds are associated with a single good.

by:[12]

$$u_j(c) = y_j + \sum_{n \in \mathcal{N}} \left(B_n(C_n) - c_{j,n} \right).$$

This formulation is quite general, and when $\tau_n = 0$ and $\beta_n = 0$ it captures the typical public good environment. Our analysis, however, focuses on the case where both τ_n and β_n are positive. We assume

(1) $$\sum_{j \in \mathcal{J}} \frac{y_j}{2} < \tau_n < \sum_{j \in \mathcal{J}} y_j, \ \forall n \in \mathcal{N},$$

which implies that thresholds are sufficiently large that subjects in a group can afford to fund only one of the public goods. We also assume that each subject has a large enough budget to fund a $\frac{1}{J}$th portion of any threshold: $y_j \leq \tau_n / J$ for all $j \in \mathcal{J}$ and $n \in \mathcal{N}$. This final assumption guarantees the existence of the entire set of symmetric equilibria we describe below.

The setting admits a (large) number of symmetric and asymmetric pure-strategy Nash equilibria.[13] There are $N + 1$ symmetric Nash equilibria: one equilibrium in which no contributions are provided to any of the public goods, $c_{j,n} = 0$, $\forall j, n$, and one equilibrium defined on each of the public goods such that $c_{j,n} = \tau_n / J$ and $c_{j,m} = 0$, $\forall j \in \mathcal{J}$ and $\forall m \neq n$. There are also many asymmetric equilibria in which players contribute unequal amounts to the same public good such that total contributions exactly equal the threshold, and contribute nothing to the other $N - 1$ goods. In each of these equilibria, $C_n = \tau_n$ for one $n \in \mathcal{N}$, and $C_m = 0$, $\forall m \neq n$.

Our experimental treatments simplify the general model on a number of dimensions. In each of our experimental treatments, players have identical budgets and public goods share a common threshold value and MPCR: $y_j = y$, for all $j \in \mathcal{J}$, and $\tau_n = \tau$ and $\alpha_n = \alpha$ for all $n \in \mathcal{N}$. The only difference comes in terms of the bonus β_n associated with the public goods in the different treatments. The efficiency of a public good is determined solely by its bonus, with public good n being "more efficient" than public good m when $\beta_n > \beta_m$.

The equilibria of our experimental treatments can be categorized according to the concepts of *risk dominance* and *payoff dominance* formulated by Harsanyi and Selten (1988). Loosely speaking, in a risk dominant equilibrium each player chooses the strategy that maximizes her expected payoff, given the uncertainty about others' choices. In the general

[12]For simplicity, we rescale earnings in such a way one token contributed to a public good (and conditional on the threshold being reached) gives α (utlity) points, while one token in the private account generates a return of one (utility) point. Of course, this assumption does not affect the theoretical results as implied by the specific parameters used in our experimental setting.

[13]Throughout the paper we focus on pure strategy equilibria. Mixed strategy equilibria also exist.

framework presented above, contributing nothing to the public goods represent the unique risk dominant equilibrium. An equilibrium is said to payoff dominate another outcome when it assigns Pareto superior payoffs to every player. Due to the large number of asymmetric solutions, ranking all the equilibria described above in terms of payoff dominance is not possible. However, for our purposes there are two considerations that are worth noticing. First, both (1) and the existence of the bonus parameter guarantee that any equilibrium such that the threshold is reached payoff dominates the "no contribution" equilibrium. Second, consider an equilibrium payment profile c^* such that $C_n \geq \tau_n$. If public good n is one of the most efficient public goods (i.e., $\beta_n = \max\{\beta_m\}_{m \in \mathcal{N}}$), then this c^* equilibrium payoff dominates any equilibrium involving the same payment profile applied to any other, less efficient public good.

In our experimental treatments, participants repeat a threshold public good contribution game T times with the same partners. The fixed partner matching protocol used in our paper (and in much of the literature) best resembles a setting in which philanthropists choose to which charities to direct their contributions year after year. It means, however, that a complete theoretical model of our public good framework must account for the one shot game being repeated across T rounds. When we take into account the dynamic structure of the game, the set of subgame perfect equilibria significantly increases. In all periods but the last, a range of contribution profiles that result in total contributions at or above the threshold are consistent with subgame perfect equilibria. Total contributions in excess of the threshold is consistent with equilibrium because subgame perfect strategies can credibly threaten to revert to no contributions in future periods if anyone fails to contribute their share in an earlier period.[14] In the last period, however, the equilibrium profiles of contributions coincide with those of the one-shot game described above.[15] It is worth noticing that the considerations about risk dominance and payoff dominance made above to compare the no-contribution equilibrium with any of the payoff dominant positive contribution outcome can be easily extended to the dynamic setting.

As in any game with multiple equilibria, there exists a coordination problem among the players. A public good provides a benefit only if participants collectively contribute enough to reach the good's threshold. Contributing to a public good alone or with too few donations from others results in failure to reach the threshold and payments being forfeited. A player

[14] For example, a subgame perfect equilibrium strategy in the final period of the game, T, may involve contributing τ_n/J, if the group has contributed at least $\widetilde{C}_{T-1}$ to good n in $T-1$, where $\widetilde{C}_{T-1} > \tau_n$ is possible, and contributing nothing in period T otherwise.

[15] Offerman (1997) offers an insightful discussion of learning and strategic adaptation in dynamic settings, including linear and threshold public goods games. See Kreps et al. (1982) for application of the "Tit-for-Tat" equilibrium strategy in finitely repeated prisoners' dilemma.

has an incentive to contribute to a public good only if her donation is pivotal in reaching the threshold in the current round, or if her giving in some way facilitates coordination in future rounds.

The severity of the coordination problem depends on the number of available public goods that participants view as viable alternatives. If only one public good is viewed as viable, then conditional on the group contributing enough, the contributions are certain to go towards the same (only) public good. This is by default the case in 1G, but may also be the case in a multiple public goods setting if one of the goods stands out as being the only viable alternative. Compare this to treatments where multiple public goods are viable. Now, successful funding not only requires that each player contributes enough, but also requires that they each contribute to the *same* viable alternative.

In settings with multiple alternatives, it may take a group several periods to successfully fund a public good, even the group consistently contributes enough to achieve a threshold. This is because it may take several repetitions before contributions converge to the same public good. This means that the availability of multiple public goods can increase the difficulty of coordination. In expectation, an increase in the number of viable public goods will increase the expected number of periods it takes to achieve coordination, decrease the probability that successful coordination is ever achieved and decrease the average benefits paid out by the public goods. The resulting decrease in expected payoffs from contributing may in turn undermine the willingness of participants to contribute. Our experiment is designed to test these predictions, which we formulate in the context of our treatments in the following subsection.

3.3 TESTABLE PREDICTIONS

Treatment 1G serves as a benchmark throughout the analysis. It involves a single public good that offers a bonus $\beta_1 = 30$. 1G provides prima facie evidence on groups' attitude to contributing above the threshold and attempting coordination when there is only a single public good.

Treatment 4G-EE is designed to illustrate the potential detrimental effects of additional contribution options. The treatment includes four public goods, each identical to the public good in 1G. The public goods provide the same bonus, eliminating the possibility that any of the goods stands out as the unique viable alternative; this guarantees that the additional contribution options increase the severity of the coordination problem, without changing the payoffs when coordination is successful. As we describe above, we expect that increasing the number of viable public goods will decrease the probability of successful coordination and the average benefits paid out by the public goods, and may discourage contributions. We summarize these claims in the first hypothesis.

Hypothesis 1. Increasing the number of public goods has detrimental effects when the new goods are similar to previous options: total contributions, the probability of any threshold being reached, and total payoffs are lower in 4G-EE than in 1G.

Treatments 4G-LE and 4G-ME extend the analysis to consider settings in which one public good offers a unique level of efficiency compared to the alternatives. We refer to the unique good as "salient," and to goods that are ex ante identical to other available goods as "non salient." These treatments allow us to consider whether the availability of a salient alternative can help solve the coordination problem associated with an increase in the number of public goods.

Theory suggests that the availability of a salient public good may fully solve the coordination problem if it stands out as the unique viable alternative. But, it may not solve the coordination problem if other options continue to be viewed as viable. Treatment 4G-LE allows us to test the first possibility in a setting where the salient public good is also most efficient. Coordinating on any of the three non salient alternatives is more difficult and offers lower payoffs when the threshold is achieved. In this environment, there is no obvious reason why any player would focus on one of the non salient alternatives rather than the more efficient, salient alternative.

Hypothesis 2. The availability of a salient public good solves the coordination problem when the salient public good is viewed as the unique viable alternative: total contributions, the probability of any threshold being reached, and total payoffs are equal in 4G-LE and 1G.

When the salient alternative is less efficient than the non salient alternatives, it is not obvious whether the presence of the salient alternative will help solve the coordination problem. It depends on whether the group views the salient alternative as the clearly dominant option compared to the non salient alternatives.

If the entire group views the salient public good as the only viable alternative, then we expect to observe contributions similar to those in 1G and 4G-LE, where salient good is identical to that in 4G-ME. If, however, some or all subjects attempt coordination within the set of more efficient alternatives, then the presence of the additional options will compound the coordination problem. We see this later possibility as the more likely possibility, given the past literature on equilibrium selection where groups tend to focus on payoff dominant options. In this case, the presence of the three more efficient but non salient alternatives will increase the expected number of rounds it takes before contributions converge to the same public good.

Even if the additional public goods in 4G-ME make coordination more difficult, it is not guaranteed that the total contributions will be lower or subjects will be worse off. This is because the additional public goods are more efficient than the salient alternative. The higher potential payoff from achieving coordination may in fact encourage additional contributions, and may result in higher payoffs over the 12 rounds. We therefore test whether the detrimental effects from Hypothesis 1 apply in 4G-ME. That is, could the availability of additional, more efficient contribution options discourage contributions and decrease payoffs, even when the initial public good remains a salient, viable alternative?

Hypothesis 3. Increasing the number of public goods has detrimental effects, even when the additional alternatives are payoff dominant, and the original option remains salient: total contributions, the probability of any threshold being reached, and total payoffs are lower in 4G-ME than in 1G.

Hypothesis 3 illustrates that the presence of more, better contribution options may make subjects worse off. If payoffs are lower in 4G-ME than in 1G, then it is evidence that contributors would be better off if, as a group, they ignored the more efficient but non salient alternatives and focused solely on the salient alternative on which it is easier to coordinate.

Evidence in favor of Hypothesis 3 will also rule out the possibility that the presence of the salient public good in 4G-ME solves the coordination problem that arises from the multiplicity of public goods. We can still look for evidence that this less efficient salient public good helps solve the coordination problem. To do this, we assess whether contributions, coordination and payoffs are higher in 4G-ME than in 4G-EE. However, this possible obervation is inconclusive, as such effects may be driven either by the availability of a less efficient salient alternative, or by the fact that the three non salient goods offer higher potential payoffs compared to any good in 4G-EE potentially encouraging greater contributions.

4 EXPERIMENTAL RESULTS

In presenting the experimental results, we first look at differences in overall contributions between treatments. Then, by focusing on 4G-LE and 4G-ME only, we study the effects of manipulating salience on addressing subjects' contributions to one of the four alternative public goods. Third, we look at differences between treatments in the probability that a group reaches the threshold. Finally, we analyze differences between treatments in subjects' profits.

The non parametric tests discussed below are based on 12 independent observations at the group level per treatment. Similarly, in order to account for potential dependence across periods, the estimated coefficients in the parametric regressions are based on standard errors clustered at the group level.

4.1 OVERALL CONTRIBUTION

Figure 1 shows the mean contribution to the collective account(s) over periods for each treatment.

[Figure 1 about here]

Averaging over all periods, subjects contribute 37.44 tokens in 1G, 36.16 tokens in 4G-LE, 27.18 tokens in 4G-ME and 28.318 in 4G-EE. Contributions in 4G-ME and 4G-EE are lower than in the other two treatments, 1G and 4G-LE. We do not observe any remarkable difference in contributions between 1G and 4G-LE. Similarly, contributions in 4G-ME and 4G-EE follow a similar pattern over repetitions. Finally, in all treatments, contributions tend to decline over periods, with this effect being particularly pronounced in 4G-LE. These preliminary observations are confirmed by Table 1, that reports results from parametric, random effects panel regressions.[16]

[Table 1 about here]

Column (1) compares contributions in 1G with those observed in 4G-EE to assess the pure effect of additional identical public goods. The negative and significant ($p < 0.05$) coefficient of the treatment dummy 4G-EE indicates that multiplicity reduces contributions. Column (2) pools data and compares contributions in 1G with those in the other three treatments with multiple public goods. Again, the coefficient of the treatment dummy 4G-EE is negative and significant ($p < 0.05$). Contributions in 4G-ME are significantly lower than those observed in the baseline, while no difference is detected by comparing 1G with 4G-LE. According to a Wald test, we can reject the hypothesis of equality of contributions between 4G-LE and 4G-ME ($\chi^2(1) = 3.59$, $p = 0.058$) as well as between 4G-LE and 4G-EE

[16] All the regressions in Table 1 are run by pooling data. We do not observe relevant differences when the analysis is conducted by using data from each treatment separately.

($\chi^2(1) = 2.74$, $p = 0.098$).[17] Finally, no significant differences are detected by comparing contributions in 4G-ME with those in 4G-EE ($\chi^2(1) = 0.06$, $p = 0.810$).

Columns (3) and (4) qualifies the previous results by controlling for additional determinants of contributions to the public good(s). As suggested by the negative and highly significant coefficient of *Period*, total contributions generally decrease over time. According to the negative and significant coefficient of the interaction term, *Period* $\times$ (4G-LE), contributions in 4G-LE exhibit a more pronounced decaying pattern relative to the other treatments. In line with other public good experiments (e.g., Fischbacher, Gachter and Fehr 2001), we find evidence of positive reciprocity among group members. Indeed, the coefficient of $Others(t-1)$ is positive and highly significant. Moreover, the sign and the (high) significance of $Coord(t-1)$ suggests that contributions positively respond to the group having reached the threshold in the previous period. Finally, the coefficients of the treatment dummies confirm the results reported in columns (1) and (2). Indeed, by looking at the first pooled regression, relative to the baseline treatment, 1G, and after controlling for the other covariates, contributions in 4G-ME and 4G-EE are significantly lower than those in 1G and 4G-LE. In particular, according to two Wald tests, we can reject the hypothesis of equality of contributions between 4G-LE and 4G-EE ($\chi^2(1) = 4.24$, $p = 0.040$) as well as between 4G-LE and 4G-ME ($\chi^2(1) = 6.03$, $p = 0.014$). No difference is detected in between 1G and 4G-LE as well as between $4G - ME$ and 4G-EE ($\chi^2(1) = 0.18$, $p = 0.668$). Interestingly, by looking at column (4), when we replace $Others(t-1)$ with $Coord(t-1)$, differences in overall contributions across treatments become less significant. Indeed, the significance of both the coefficients of 4G-ME and 4G-EE drops substantially. Similarly, the difference between the estimated coefficients of 4G-LE and 4G-ME becomes marginally significant ($\chi^2(1) = 3.43$, $p = 0.064$) while the difference between the estimated coefficients of 4G-LE and 4G-EE vanishes ($\chi^2(1) = 2.62$, $p = 0.106$). Thus, differences in overall contributions are mainly (though not completely) driven by the higher ability of subjects to reach the threshold in the former treatment. This evidence leads us to the first result.

Result 1. Subjects make larger contributions to public goods in 1G and 4G-LE than in 4G-ME and 4G-EE. There is no significant difference between 1G and 4G-LE or between 4G-EE and 4G-ME.

[17] These results are confirmed by non parametric tests. According to a two-side Mann–Whitney rank-sum test, mean contributions (over all periods) in 1G do not differ from those in 4G-LE ($z = 0.115$, $p = 0.908$), while they are significantly higher than those in 4G-ME ($z = 2.021$, $p = 0.043$). Moreover, mean contributions are significantly higher in 4G-LE than in 4G-ME ($z = 1.992$, $p = 0.046$).

4.2 DO SUBJECTS CONTRIBUTE TO THE SALIENT PUBLIC GOOD?

The following table reports mean contributions to the salient and non-salient public goods in 4G-LE, 4G-ME and 4G-EE.[18]

[Table 2 about here]

As shown by Table 2, subjects in 4G-LE effectively coordinate their contributions on the salient public good. On the contrary, in 4G-ME, where the salient public good is associated with the lowest bonus, subjects contribute significantly more to the (non-salient) alternatives. The difference in the level of contributions to the salient public good between 4G-LE and 4G-ME is positive and highly significant (according to a Mann-Whitney rank-sum test, two-sided, $p < 0.01$ for any subset of periods). Finally, in 4G-EE, where public goods do not differ in the size of the bonus assigned in case of successful contribution, subjects do not exhibit any significant preference across public goods.

Following the theoretical considerations in Section 3, we further investigate subjects' contributions in two steps. First, we look at whether subjects in the treatments with multiple public goods tend to polarize their contributions on one public good, or if they split their resources over the four alternatives. Table 3 reports, for each treatment and over periods, the frequencies of subjects who contribute to zero, one or more than one public good.

[Table 3 about here]

The frequency of subjects who contribute to more than one public good is significantly higher in 4G-ME and 4G-EE than 4G-LE, with this effect being more pronounced in the first four periods of the experiment. In a sense, the previous result is coherent with the idea that, in treatments in which salience does not represent an effective coordination device (4G-ME and 4G-EE), subjects try to minimize the risk of miss-coordination in initial periods by spreading contributions over more than one alternative. Finally, the proportion of subjects that contribute nothing in 4G-ME and 4G-EE is about four times higher than in any of the remaining two treatments.

Second, by focusing on 4G-ME and 4G-LE, we classify subjects' contributions according to the following two categories.

[18] The mean contribution made by the subject to the non-salient public goods in a period is given by the ratio between the subject's overall contribution to the non-salient alternatives and the number of public goods to which the subject allocated strictly positive amounts in that period. In 4G-EE no public good can be distinguished from the others in terms of salience and efficiency. In order to compare contributions across treatments, we consider the "square" public good as the salient alternative in 4G-EE.

1. *"Contribute based on salience"*: subjects only make positive contributions to the salient public good.

2. *"Contribute based on efficiency"*: subjects only make positive contributions to the most efficient public good(s).

Table 4 reports the frequencies of the two categories as observed in the experiment.

[Table 4 about here]

As indicated by Table 4, by averaging over all periods, the frequency of subjects focusing on salience in 4G-LE is higher than the frequency of subjects focusing on either salience or efficiency in 4G-ME. Moreover, in line with results in Table 2, subjects in 4G-ME tend to focus significantly more on efficiency than on salience (according to a two-sided Wilcoxon signed-rank test, $p < 0.05$ for any subgroup of periods and $p < 0.01$ overall periods).

Result 2. Subjects coordinate their contributions on the salient collective account in 4G-LE. Subjects in 4G-ME tend to contribute to one of the non-salient, but more-efficient, collective accounts. The number of subjects contributing nothing is significantly higher in 4G-ME and 4G-EE than in 1G and 4G-LE.

4.3 USING SALIENCE TO COORDINATE CONTRIBUTIONS

If subjects had used salience to coordinate their contributions, the expected proportion of groups that reach the threshold would have been the same in 1G, 4G-LE and 4G-ME and lower in 4G-EE. However, as observed in Subsection 4.2, while subjects in 4G-LE contribute more to the salient public good, the opposite occurs in 4G-ME where participants seek to coordinate on one of the non-salient alternatives. Thus, it is reasonable to expect coordination to be more difficult to achieve in 4G-ME and 4G-EE than in the remaining two treatments. This is confirmed by the experimental data. First, we have already noticed that the proportion of subjects who contribute nothing is four times higher in 4G-ME and 4G-EE than in 1G and 4G-LE. Second, Table 5 reports the number of groups reaching the threshold in each period (and overall) in the four treatments.

[Table 5 about here]

Over all periods, almost 80.5 percent of groups in 1G and 4G-LE contributed more than the threshold to one collective account while this percentage drops to 37.5 percent in 4G-ME and 47.92 percent in 4G-EE, respectively. This evidence is confirmed by Table 6 which shows the mean proportions of successful provisions in the four treatments over periods.

[Table 6 about here]

A Mann–Whitney rank-sum test (two-sided) confirms that the mean number of periods a group reaches the threshold is significantly lower in 4G-ME and 4G-EE than in any other treatment (in all cases, $p < 0.01$), while no significant difference is detected between 1G and 4G-LE as well as between 4G-ME and 4G-EE.

It is worth noticing that the proportion of groups that reach the threshold in our experiment is (relatively) higher than what is reported by other similar studies. For instance, in their no money back treatments, Isaac, Schmidtz and Walker (1989) observe that the proportion of groups that contribute above the threshold is 31 percent in their low-provision condition (in which the threshold is equal to 44 percent of the group endowment), 27 percent in their medium-provision condition (in which the threshold is 87 percent of the group endowment) and 15 percent in their high-provision condition (in which the threshold coincides with the entire group endowment). This difference might be explained by the (relatively high) bonus that subjects in our experiment receive when their group reaches the threshold.

By looking at Table 5, it is interesting to notice that while the proportion of groups in 1G and 4G-LE that reach the threshold is greater than 50 percent in every period, in 4G-ME and 4G-EE it is more volatile. Indeed, in 4G-ME it remains below 50 percent in the first 4 periods, goes above 50 percent between period 5 and 10, and drops back to less than 50 percent in the last 2 periods. Similarly, in 4G-EE it remains below 50 percent in the first 4 periods and goes strictly above 50 percent between period 5 and 12. According to recursive partitioning, in 4G-ME two splitting periods, 5 and 11, explain the greatest change in the probability of a group to reach the threshold (both the splitting periods are highly significant, $p - value < 0.01$). Similarly, in 4G-EE we find only one significant splitting period, namely $t = 5$ ($p - value < 0.01$). By applying the same methodology to 1G and 4G-LE, we do not find any significant splitting period.

Result 3. The proportion of groups that reach the threshold in 1G and 4G-LE is higher and less volatile than in 4G-ME and 4G-EE. There is no significant difference between 1G and 4G-LE or between 4G-EE and 4G-ME.

4.4 SUBJECTS' EARNINGS

The last question we explore is whether subjects' earnings differ between treatments. As predicted by the theory and confirmed by the previous analysis, subjects that try to coordinate their contributions on one of the efficient collective accounts in 4G-ME and 4G-EE experience miss-coordination in early periods. Thus, it is reasonable to expect earnings in 4G-ME and 4G-EE to be lower than in any of the other two treatments. Figure 2 shows mean earnings (expressed in points) in the four treatments over periods.

[Figure 2 about here]

Profits in 4G-ME and 4G-EE are lower than those in 1G and 4G-LE, with the difference being more pronounced in early periods. As shown by the next table, the mean of the earnings in 4G-ME and 4G-EE is significantly lower than that in 1G and 4G-LE. In terms of final monetary earnings, subjects earn (on average) 6 euro less in 4G-ME and 4G-EE than in the other two treatments.

[Table 7 about here]

Table 7 also compares the mean profits in the three treatments with 110, namely the profits when a subject contributes nothing to public goods. Interestingly, in the first four periods, subjects in 4G-ME and 4G-EE earn (on average) significantly less than 110. This is consistent with the idea that it takes a number of rounds for groups to achieve coordination when no salient alternative stands out as a focal point. Furthermore, by considering the mean over all periods of subjects' earnings, we find that 35.42 percent of subjects in 4G-ME and 33.33 percent of subjects in 4G-EE earn less than 110, with this percentage dropping to 10.41 percent in 1G and 6.25 percent in 4G-LE. We summarize this result as follows.

Result 4. Mean total earnings are significantly higher in 1G and 4G-LE than in 4G-ME and 4G-EE. There is no significant difference between 1G and 4G-LE or between 4G-EE and 4G-ME.

4.5 SUPPORT FOR OUR PREDICTIONS

Taken together the results presented above provide supporting evidence in favor of the three hypotheses formulated in Section 3.3.

Hypothesis 1 predicts that total contributions, the probability of funding any public good, and payoffs would be lower in 4G-EE compared to 1G. We expect coordination would become more difficult as the number of indistinguishable alternatives increase, and the results support this conjecture. When the number of identical public goods increases, we observe a decrease in the probability of successful coordination and a decrease in average earnings. The third effect predicted by the hypothesis—that total contributions would decrease—is less intuitive. It comes from the idea that the additional options make attempting to coordinate more risky (in the sense of Harsanyi and Selten 1988) in early periods, and would therefore make the risk-less strategy of not contributing relatively more attractive. We were uncertain whether this effect would be strong enough to cause a significant decrease in contributions. The empirical analysis confirms this prediction as well, showing that an increase in the number of contribution options causes total contributions to decline.

Hypothesis 2 predicts no differences in contributions between 4G-LE and 1G. In 4G-LE, there is a salient public good that offers higher payoffs than the three non salient alternatives. We were fairly certain that the presence of a salient alternative would help overcome the coordination problem that arises with multiple public goods (i.e., we expected coordination to be more likely in 4G-LE than in 4G-EE). Although supported by the theoretical model, we were less certain that the availability of the salient alternative would *fully* overcome the coordination problem.[19] However, our results clearly support this conjecture.

Hypothesis 3 predicts that total contributions, the probability of funding any good, and payoffs would be lower in 4G-ME compared to 1G. This is more interesting than Hypothesis 1 in that the additional contribution alternatives are individually preferable to the original public good, while the original public good remains a viable, salient option. The most interesting aspect of this hypothesis is the prediction that payoffs would be lower in 4G-ME compared to 1G. If groups in 4G-ME simply ignored the more efficient but non salient alternatives, expected payoffs would be the same as in 1G. By attempting to coordinate based on efficiency, rather than focusing on the salient alternative, groups are made worse off. The addition of better alternatives decreases payoffs, even when the salient public good offered the same payoffs as in 1G. This is because in the case of multiplicity, the focal point

[19] It was possible that the additional alternatives, even though they were less efficient, could confuse or intimidate contributors, or otherwise discourage contributions. It was also possible that the presence of less attractive alternatives would cause the salient alternative to appear more attractive and encourage additional contributions. We observe neither of these effects.

of the group shifts to the more efficient alternatives; subjects contribute based on efficiency rather than salience.

5 DISCUSSION AND CONCLUSION

There is debate in the nonprofit sector about whether there are too many charities. Arguments in support of this view include claims that multiple charities attempt to provide similar services, with each charity having its own overhead, administrative costs, and expertise. Consolidating similar charities under a single roof would allow the charities to save on administrative costs and overhead. Moreover, it would induce experts and service providers of different philanthropic institutions to work together and to most effectively provide services to the community. In the current environment, too much of the nonprofit sector's limited budgets is spent running the organizations, and too little is spent effectively providing the services they are set up to provide. We capture these considerations by modeling the nonprofit organizations as threshold public goods, which provide benefits only after their total funding surpasses a minimum threshold for them to be effective.

Our contribution to the debate about whether there are too many charities comes from our analysis of how the presence of multiple charities vying for contributions affects the behavior of contributors. Our framework clearly illustrates how additional charities may increase the severity of the coordination problem between donors, causing contributions to be spread too thinly across organizations for them to be effective. What's more, we find that this can discourage giving. When the number of potential recipients increases, total donations decrease. We show that these results hold even when the additional recipients are clearly preferable to the original option, and even when the original option continues to stand out as a viable, salient alternative.

Both theory and the experimental evidence suggest that the detrimental effects arise when the additional options make coordination more difficult for contributors. Additional charities will not have the same detrimental effects if they do not change the severity of the coordination problem (as in our treatment 4G-LE), or if they make coordination easier (consider a setting in which one uniformly better alternative is added to a group of three non salient mediocre alternatives). In reality, however, charities often share objectives with other charities, and rarely does one organization stand out as clearly the more effective alternative. For example, Charity Navigator lists 12 "four-star" (plus many lower rated) non governmental organizations as "building roadblocks to human trafficking," seven four-star organizations that collect funds to help with Syrian disaster relief, and 43 four-star organizations that collect funds to assist victims of the 2010 Haitian earthquake.[20] Our analysis suggests that the multiplicity of organizations can decrease total contributions and the overall impact of the non profit sector.

Our analysis highlights the benefits of policies, public attention, or organizations that may help to coordinate the actions of potential contributors.[21] We discuss a number of factors which may help philanthropic coordination, which our analysis suggests will can increase total contributions and improve the success of the non profit sector. First, the non profit sector may benefit from organizations designed to organize philanthropic activity. For example, the United Way collects contributions from individuals and then distributes these contributions within communities to fund specific projects and community organizations. As Bilodeau (1992) recognized, such an organization can reduce the possibility of mis-coordination among donors, and can help ensure the most-effective distribution of donations. Service clubs such as Rotary International, Kiwanis and the Junior League, as well as churches and other community groups, often play similar rolls. Local chapters of these organizations organize volunteers and capital to complete selected projects or support specific causes. These organizations helps ensure that enough philanthropic effort is devoted to a specific initiative to succeed, and increases the likelihood that an individual's philanthropic efforts focus on projects on which others also focus. Our analysis suggests that such organizations can increase monetary donations and volunteerism. Second, anything that helps an existing organization stand out as effective may help overcome the coordination problem. In this way, the nonprofit sector may benefit from the presence of recognizable nonprofit brands such as Susan G. Komen for the Cure and Livestrong, or nonprofit rating organizations such as Charity Navigator. In the same way, telethons, celebrity endorsements, and positive media attention may facilitate coordination among donors and may increase overall contributions as well as the number of viable, effective organizations.

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[20] www.charitynavigator.org

[21] The results suggest that it is not enough that one alternative stands out from the others, unless that alternative is seen as the most-efficient option. The subjects in our experiment displayed little willingness to use salience as a focal point if that meant focusing on one of the less-ideal options.

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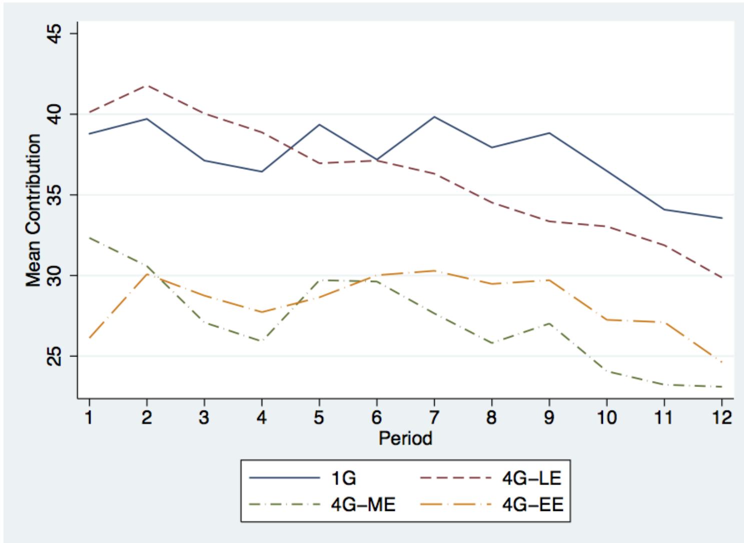

Figure 1: Mean contribution per period by treatment

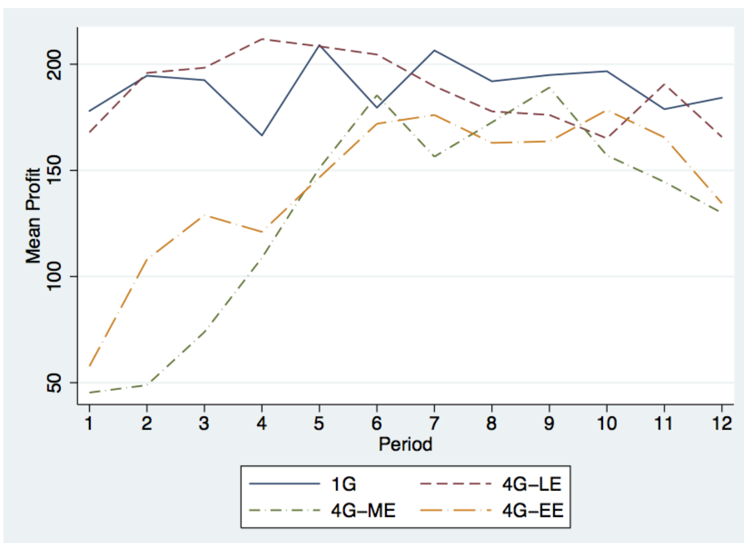

Figure 2: Mean earnings per period by treatment

Table 1: Determinants of contributions

	Overall Contributions			
	(1)	(2)	(3)	(4)
$Others(t-1)$			0.121^{***}	
			(0.011)	
$Coord(t-1)$				7.242^{***}
				(0.713)
$Period$			-0.327^{***}	-0.706^{***}
			(0.085)	(0.089)
$Period \times$ (4G-LE)			-0.412^{**}	-0.320^{*}
			(0.170)	(0.173)
4G-LE		-1.286	1.745	0.662
		(4.737)	(3.496)	(4.374)
4G-ME		-10.267^{**}	-6.903^{**}	-7.486^{*}
		(4.737)	(3.303)	(4.214)
4G-EE	-9.127^{**}	-9.126^{*}	-5.495^{*}	-6.446
	(4.628)	(4.737)	(3.300)	(4.209)
$Constant$	37.444^{***}	37.444^{***}	25.932^{***}	36.395^{***}
	(3.272)	(3.350)	(2.711)	(3.056)
lrl	-4603.056	-9133.169	-8241.344	-8240.104
$Wald - \chi^2$	3.89	7.44	228.18	193.73
$Prob > \chi^2$	0.049	0.059	0.000	0.000
Obs.	1152	2304	2112	2112

Notes. This table reports coefficient estimates (standard errors in parentheses) from two-way linear random effects models accounting for both potential individual dependency over periods and dependency within group. $Others(t-1)$ is the sum of other group members' contributions in the previous period; $Period$ is the time trend; $Coord(t-1)$ is a dummy that assumes value 1 if subject's group reached the threshold of one public good in the previous period; 4G-LE, 4G-ME and 4G-EE are treatment dummies; $Period \times$ (4G-LE) is an interaction term to control for the different time trend as observed in 4G-LE. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Contribuitons to the salient and non salient public goods in the 4G treatments

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
4G-LE						
Salient (square)	34.792	38.188	36.208	32.031	29.875	35.476
Non-salient	1.865	0.845	0.008	0.003	0.000	0.285
difference	32.927***	37.343***	36.200***	32.028***	29.875***	35.191***
4G-ME						
Salient (square)	10.729	5.750	3.469	3.818	3.875	4.345
Non-salient	12.076	16.752	23.699	20.513	19.188	20.321
difference	−1.347	−11.002***	−20.230**	−16.695**	−15.313*	−15.976**
4G-EE						
Square	10.708	12.714	18.302	16.427	14.854	15.814
Other options	8.368	11.066	10.439	10.130	9.104	10.545
difference	2.340	1.648	7.863	6.297	5.750	5.269
Obs. (*per treat.*)	48	12	12	12	12	12

Notes. This table reports the mean contribution to the salient (square) and non-salient public goods in $4G-LE$, 4G-ME and 4G-EE over periods. Moreover, the table shows significance levels from a (two-sided) Wilcoxon signed-rank test for the null hypothesis that the difference between the contribution to the salient public good and the contribution to the non-salient options is null. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Frequencies of contributions to zero, one or multiple public goods

Period	1	1 − 4	5 − 8	9 − 12	12	*All*
No contribution						
1G	0.042	0.052	0.052	0.083	0.125	0.063
4G-LE	0.042	0.047	0.052	0.099	0.125	0.066
4G-ME	0.083	0.182	0.266	0.318	0.375	0.255
4G-EE	0.229	0.188	0.266	0.266	0.271	0.240
1G – (4G-LE)	0.000	0.005	0.000	−0.016	0.000	−0.003
1G – (4G-ME)	−0.041	−0.130**	−0.214	−0.235	−0.250	−0.192
1G – (4G-EE)	−0.187***	−0.136**	−0.214	−0.183	−0.146	−0.177
(4G-LE) – (4G-ME)	−0.041	−0.135**	−0.214*	−0.219	−0.250*	−0.189**
(4G-LE) – (4G-EE)	−0.187***	−0.141***	−0.214**	−0.167	−0.146	−0.174**
(4G-ME) – (4G-EE)	−0.146*	−0.006	0	0.052	0.104	0.015
Contributions to 1 public good						
1G	0.958	0.948	0.948	0.917	0.875	0.938
4G-LE	0.667	0.833	0.938	0.896	0.875	0.889
4G-ME	0.417	0.521	0.677	0.672	0.604	0.623
4G-EE	0.292	0.521	0.656	0.693	0.688	0.623
1G – (4G-LE)	0.292***	0.115**	0.010	0.021	0	0.049
1G – (4G-ME)	0.542***	0.427***	0.271**	0.245*	0.271	0.314***
1G – (4G-EE)	0.667***	0.427***	0.292**	0.224	0.188	0.314***
(4G-LE) – (4G-ME)	0.250**	0.313***	0.260***	0.224*	0.271*	0.266***
(4G-LE) – (4G-EE)	0.375***	0.313***	0.281***	0.203	0.188	0.266***
(4G-ME) – (4G-EE)	0.125	0	0.021	−0.021	−0.083	0
Contributions to more than 1 public good						
4G-LE	0.292	0.120	0.010	0.005	0	0.045
4G-ME	0.500	0.297	0.057	0.010	0.021	0.121
4G-EE	0.479	0.292	0.078	0.042	0.042	0.137
(4G-LE) – (4G-ME)	−0.208**	−0.177*	−0.047	−0.005	−0.020	−0.076*
(4G-LE) – (4G-EE)	−0.188*	−0.172**	−0.068*	−0.036	−0.042	−0.092***
(4G-ME) – (4G-EE)	0.021	0.005	−0.021	−0.031	−0.020	−0.016
Obs.(per treat.)	48	12	12	12	12	12

Notes. This table reports, for each treatment, the (mean) frequencies of subjects who did not contribute, contributed to 1 threshold public good or contributed to more than one public good over periods. The table also provides results from a (two-sided) Mann–Whitney rank-sum test for the null hypothesis that the frequency of one category in two treatments is the same. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Contributions based on salience and efficiency in 4G-LE and 4G-ME

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
4G-LE	0.667	0.828	0.938	0.896	0.875	0.887
4G-ME(eff)	0.146	0.467	0.625	0.589	0.521	0.561
4G-ME(sal)	0.354	0.104	0.057	0.083	0.083	0.082
(4G-LE)-(4G-ME(eff))	0.313***	0.359***	0.313***	0.308***	0.354***	0.326***
(4G-LE)-(4G-ME(sal))	0.521***	0.724***	0.880**	0.813*	0.792**	0.806***
(4G-ME(eff))-(4G-ME(sal))	0.208**	0.365***	0.568***	0.505**	0.438**	0.479***
Obs. (per treat.)	48	12	12	12	12	12

Notes. This table reports the frequencies of subjects in 4G-LE and 4G-ME who contributed according the "focus on efficiency" and "focus on salience" strategies over periods. The table also provides results from both a (two-sided) Mann–Whitney rank-sum test for the null hypothesis that the frequency of one category in 4G-LE and 4G-ME is the same and a (two-sided) Wilcoxon signed-rank test for the null hypothesis that the difference between the frequencies of the two strategies in 4G-ME is null. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Number of groups that reach the threshold by treatment

Period	1	2	3	4	5	6	7	8	9	10	11	12	*All*
1G	9	10	10	8	11	9	11	10	10	10	9	9	116
4G-LE	9	10	10	11	11	11	10	9	9	8	10	8	116
4G-ME	0	0	1	3	6	8	6	7	8	6	5	4	54
4G-EE	0	4	5	4	6	8	8	7	7	8	7	5	69
1G – (4G-LE)	0	0	0	-3	0	-2	1	1	1	2	-1	1	0
1G – (4G-ME)	9***	10***	9***	5**	5**	1	5**	3	2	4*	4*	5**	62***
1G – (4G-EE)	9***	6**	5**	4	5**	1	3	3	3	2	2	4*	47***
(4G-LE) – (4G-ME)	9***	10***	9***	8***	5**	3	4*	2	1	2	5**	4*	62***
(4G-LE) – (4G-EE)	9***	6**	5**	7***	5**	3	2	2	2	0	3	3	47***
(4G-ME) – (4G-EE)	0	-4**	-4*	-1	0	0	-2	0	1	-2	-2	-1	-15*

This table reports, in each treatment and in each period, the number of groups (from 0 to 12) reaching the threshold. The table also provides results from a two-sample test of proportions for the null hypothesis of equality of frequency of groups reaching the threshold in two treatments. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Mean proportion of successful provision by treatment

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
1G	0.750	0.771	0.854	0.792	0.750	0.806
4G-LE	0.750	0.833	0.854	0.729	0.667	0.806
4G-ME	0.000	0.083	0.563	0.479	0.333	0.375
4G-EE	0.000	0.271	0.604	0.563	0.417	0.479
1G – (4G-LE)	0.000	-0.062	0.000	0.063	0.083	0.000
1G – (4G-ME)	0.750^{***}	0.688^{***}	0.291^{*}	0.313^{*}	0.417^{**}	0.431^{***}
1G – (4G-EE)	0.750^{***}	0.500^{***}	0.250^{*}	0.229	0.333	0.327^{***}
(4G-LE) – (4G-ME)	0.750^{***}	0.750^{***}	0.291^{*}	0.250	0.334	0.431^{***}
(4G-LE) – (4G-EE)	0.750^{***}	0.562^{***}	0.250^{*}	0.166	0.250	0.327^{***}
(4G-ME) – (4G-EE)	0.000	-0.188	-0.041	-0.084	-0.084	-0.104
Obs.(per treat.)	12	12	12	12	12	12

Notes. This table reports mean proportions of successful provision (namely, reaching the threshold of one public good) over periods in the four treatments. The table also shows significance levels from a nonparametric (two-sided) Mann–Whitney rank-sum test for the null hypothesis that the proportion in two treatments is the same. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Subject earnings by treatment

Period	1	1 – 4	5 – 8	9 – 12	12	*All*
1G	178.000	182.885	196.760	188.667	184.208	189.438
1G – 110	68.000***	72.885***	86.760***	78.667***	74.208***	79.438***
4G-LE	167.917	193.500	195.104	174.385	165.750	187.663
(4G-LE) – 110	57.917**	83.500***	85.104***	64.385***	55.750*	77.663***
4G-ME	45.333	69.208	166.396	155.146	129.958	130.250
(4G-ME) – 110	−64.667***	−40.792***	56.396*	45.146***	19.958	20.250*
4G-EE	57.750	103.927	142.962	160.531	134.500	142.962
(4G-EE) – 110	−52.250***	−6.073	32.962***	50.531***	24.500	32.962***
1G – (4G-LE)	10.083	−10.615	1.656	14.282	18.458	1.775
1G – (4G-ME)	132.667***	113.677***	30.364	33.521	54.250	59.118***
1G – (4G-EE)	120.250***	78.958***	53.798	28.136	49.708**	46.476***
(4G-LE) – (4G-ME)	122.584***	124.292***	28.708	19.232	35.792	57.413***
(4G-LE) – (4G-EE)	110.167***	89.573***	52.142	13.857	31.250	44.706**
(4G-ME) – (4G-EE)	−12.417*	−34.719*	23.434	−5.385	−4.542	−12.712
Obs. (*per treat.*)	12	12	12	12	12	12

Notes. This table reports mean earnings over periods in the four treatments. For each treatment, the table reports results of a Wald test for the null hypothesis that estimates of treatment intercepts from a two-way linear random effects model (accounting for both potential individual dependency over periods and dependency within group) on the corresponding sub-sample of periods are equal to 110. Finally, the table shows results from a nonparametric (two-sided) Wilcoxon rank sum test for the null hypothesis that the mean earnings in two treatments is the same. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A INSTRUCTIONS (TREATMENT 4G-LE)

Note to reader: The instructions were originally written in Italian. The only difference between 4G-LE and 4G-ME is the size of the bonus of the three identical public goods TRAPAZOID, RECTANGLE and DIAMOND (20 in 4G-LE, 40 in 4G-ME). The only difference between 1G and the three remaining treatments (4G-EE, 4G-ME and 4G-LE) concerns the number of public goods and the corresponding bonuses. The bonus from meeting the threshold in 1G is the same of that associated with all the public goods in 4G-EE and the collective account SQUARE in 4G-LE and 4G-ME.

Instructions

Welcome. Thanks for participating in this experiment. If you follow the instructions carefully you can earn an amount of money that will be paid to you in cash at the end of the experiment. During the experiment you are not allowed to talk or communicate in any way with other participants. If you have questions raise your hand and one of the assistants will come to you. The rules that you are reading are the same for all participants.

General rules

In this experiment there are 24 persons who will interact for 12 periods. At the beginning of the experiment you will be randomly and anonymously assigned to a group of four people. Therefore, of the other three people in your group you will know neither the identity nor the earnings. Finally, the composition of your group will remain unchanged throughout the experiment.

How your earnings are determined

In each of the 12 periods you and each other subject in your group will be assigned an endowment of 55 tokens. Thus, the group will have a total of 220 tokens. In each period of the experiment, you have to decide how to allocate your endowment of tokens between a PRIVATE ACCOUNT and four COLLECTIVE ACCOUNTS denominated SQUARE, TRAPAZOID, RECTANGLE and DIAMOND. The five accounts generate a return expressed in points according to the following rules.

PRIVATE ACCOUNT: For each token allocated by you to the PRIVATE ACCOUNT, you receive 2 points.

COLLECTIVE ACCOUNTS (SQUARE, TRAPAZOID, RECTANGLE, DIAMOND): You receive points from any of the four COLLECTIVE ACCOUNT if and only if the number of tokens allocated to it by your group is greater than a pre-specified number that is called "threshold". The threshold is the same across collective accounts and is represented by 132 tokens. In particular:

- If the number of tokens allocated to a COLLECTIVE ACCOUNT by your group is lower than the threshold of 132 tokens, then you do not receive any point from those tokens.
- If the number of tokens allocated to a COLLECTIVE ACCOUNT by your group is equal to or greater than the threshold of 132 tokens, then:
    1. for each token allocated to the COLLECTIVE ACCOUNT by you or any other group member, you receive 1 point;
    2. you receive an additional number of points as "bonus." The size of the bonus depends on which COLLECTIVE ACCOUNT your group allocate tokens to. In particular, it is 30 points for the collective account SQUARE while it is equal to 20 points for the remaining three collective accounts, TRAPAZOID, RECTANGLE and DIAMOND.

At the beginning of each period, the computer will display your endowment and four input fields, one for the one for the PRIVATE ACCOUNT, one for the collective account SQUARE, one for collective account RECTANGLE, one for collective account TRAPAZOID, and one for collective account DIAMOND. For each subject in the group, the order in which the four input fields for the four COLLECTIVE ACCOUNTS are displayed on the screen is randomly determined by the computer. The number of tokens you allocate to each of the accounts cannot be greater than your endowment and your allocations must add up to 55 tokens.

At the end of each period the computer will display how many tokens you have allocated to the PRIVATE ACCOUNT, how many tokens you have allocated to each of the four COLLECTIVE ACCOUNTS, how many tokens have been allocated by your group to each of the four COLLECTIVE ACCOUNTS, how many points you have obtained from the PRIVATE ACCOUNT, how many points you have obtained from each of the four COLLECTIVE ACCOUNTS, and how many points you have obtained in total in the period.

At the end of the experiment the total number of points you have obtained in the 12 periods will be converted into Euro at the rate 100 points = 1 Euro.