Salience, Coordination and Cooperation in Contributing to Threshold Public Goods*

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Abstract

We present results from a multiple public goods experiment, where each public good produces benefits only if total contributions to it reach a minimum threshold. The experiment allows us to compare subjects' behavior in a benchmark treatment with a single public good and in treatments with more public goods than can be funded. We show how the availability of numerous, more-efficient public goods may not make subjects better off. This is because multiple options decrease the probability of coordination and discourage contributions. The availability of several less-efficient options does not alter coordination and contributions relative to the benchmark.

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

Keywords: Threshold Public Goods, Multiple Public Goods, Salience, Efficiency, Laboratory Experiment.

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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, the executive vice-president 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 administration 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" (Light and Light, 2006, p. 59).

Although donors may like 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 projects. Fewer nonprofit organizations may improve coordination among donors, increasing the number of projects with enough funding to succeed, and decreasing the number of institutions that are only partially funded, and therefore less effective than their potential.

We present results from a public good experiment designed to provide insight into how people contribute in situations in which there are more potential recipients (e.g., nonprofit organizations 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 wasted, 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 size, and community projects may not be completed until total contributions cover the project costs. Second, in two treatments subjects face multiple public goods, with some of the goods being indistinguishable. This captures a situation in which a potential donor may know that both the Jean-Luc Picard Cancer Research Foundation and the James T. Kirk Center for Cancer Research are soliciting donations, and expect that the two organizations have the same probability of success if effectively funded.[2] Third, in the two treatments with multiple public

[1] The NonProfit Times, http://www.thenonprofittimes.com/article/detail/each-501c3-is-now-2949. "Each 5013c is now" by Todd Cohen, May 1, 2005 .

[2] Alternatively, donors may not be able to distinguish between different organizations. 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." Such concerns are not limited to small or upstart organizations. In 2010, Susan G. Komen

goods, one good is *salient* in that it offers either a higher or a lower expected benefit compared to the multiple indistinguishable options. This represents the idea that some nonprofits or projects may stand out as more or less promising options compared to the alternatives.

We show how the availability of multiple public goods introduces a coordination problem between contributors: this can discourage contributions, resulting in lower total donations, fewer organizations receiving enough funding to be effective, and lower payoffs. This is true even when the other public goods are more efficient, offering higher benefits than the salient public good. Facing numerous better options does not make donors better off if these options make coordination more difficult and discourage donations.

We find that salience may not serve as an effective focal point when it is associated with inefficiency. Subjects only coordinate their contributions on the salient public good in the treatment in which it is also the most-efficient alternative. When the salient public good is less efficient than the other options, the subjects ignore it and try to coordinate their contributions on one of the non-salient (but more-efficient) public goods. Because of the difficulty involved with achieving coordination in the presence of several non-salient alternatives, the subjects successfully fund a public good less often than in the game with a single option. Funding a project less often does not necessarily imply that the subjects are worse off, as the earnings are higher when they do succeed in reaching the threshold. However, we show that this is not the case. Total contributions, the probability of reaching the threshold, and earnings are all lower in the multiple public goods treatment in which the salient public good is the least-efficient option than in either the benchmark treatment with only single (salient) public good or the treatment in which the salient public good is the most-efficient alternative. The inclusion of numerous better public goods to which subjects may contribute decrease earnings by 30 percent. In sum, subjects would have been better off if they, as a group, ignored the more-efficient options and focused contributions on the less-efficent but salient public good. On the other hand, the availability of numerous less-efficient options does not alter coordination and contributions relative to the benchmark treatment with one public good only.

The rest of the paper proceeds as follows. Section 2 discusses the relevant literature. Section 3 illustrates the experimental setting using an example. Section 4 describes the experimental design and procedures, the theoretical foundation for the analysis and the testable hypotheses. Section 5 presents the results. Finally, Section 6 concludes and discusses possible policy implications of our findings.

2 Literature review

The benchmark setting of our experiment is a typical threshold public goods game. Starting from the theoretical contribution of Bagnoli and Lipman (1989), several experimental studies

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 Clifford Marks, "Charity Brawl: Nonprofits Aren't So Generous When a Name's at Stake," Wall Street Journal, August 5, 2010.

analyze the effects that introducing a threshold has on both contributions and the probability of reaching the threshold. As a general result, contributor behavior strongly depends on the refund condition (whether contributions are returned to subjects when the threshold is not reached) and the rebate rule (whether contributions above the threshold generate a return) used in the experiment. Isaac et al. (1989) find that a "no-money-back" refund condition significantly reduces contributions relatively to a (safer) setting in which contributions are - totally or partially - refunded to subjects when the threshold is not reached.[3] Marks and Croson (1998) compare contributions in threshold public goods games under three alternative rebate rules: a no-rebate (contributions above the threshold do not give any return), a proportional rebate (the return that a subject receives depends on her relative contribution) and an extended benefit provision rule (subject's return linearly increases in group overall contribution, not directly dependent on her own contribution). They find that the latter mechanism is the most effective in stimulating contributions.[4] In order to enhance the issue of coordinating contributions on the same public good, in our experiment we adopt the "no-money-back" condition. Nevertheless, the high risk associated with this refund condition is counterbalanced by our use of an extended benefit provision rule.

In the present study, we are mainly interested in investigating how subjects contribute and coordinate when they face more than one public good. Despite the relevance of the issue in the real world, the literature has devoted little attention to analyze how contributions are affected by introducing multiple options. A handful of recent studies analyzes contributions in settings in which subjects face 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.[5] For instance, Blackwell and McKee (2003) show that contributions to the global public good positively depend on its average per capita return. Interestingly, the authors find that when the average per capita return of the global public good exceeds that of the local 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. 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.[7]

[3] See also Bagnoli and McKee (1991), Cadsby and Maynes (1999), Coats et al. (2009).

[4] Spencer et al. (2009) analyze the effects of several alternative rebate rules. In treatments based on a proportional rebate, a the winner-take-all rebate with uniform probability among all group members, and a random full-rebate with uniform probability, total contributions are virtually equal to the total benefits. On the contrary, in the remaining three settings respectively based on a winner-take-all rebate with proportional probability, a winner-take-all with uniform probability among contributors only and a random full rebate with proportional probability, total contributions exceed benefits by over 30 percent.

[5] Falk et al. (2011) analyze contributions in a setting in which each subject simultaneously belongs to two different groups of equal size. Each group is associated with a public good that benefits the corresponding members only. Subjects decide how much to contribute to each of the two group specific public goods. In their experiment, the authors find evidence of social interactions, namely the fact that the same subject makes different contributions to the two public goods, depending on the behavior of the corresponding group members.

[6] See also Fellner and Lünser (2008) for related experimental findings.

[7] 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.

These studies illustrate how the presence of multiple public goods may lead to higher contributions. Clearly, this result depends on the linear structure of the public goods used in the experiments: in the absence of a threshold, the return generated by contributions does not depend on a given threshold being reached, and therefore mis-coordination is not costly. Differently, in our setting, additional options increase the probability of mis-coordination and, therefore, the potential loss associated with contributing to the "wrong" public good.

Our study is also related to the literature on choice overload. It is well known in marketing and psychology that giving consumers more choice can reduce total consumption (Iyengar and Lepper, 2000; Scheibehenne et al. 2000). In line with these results, we find that giving donors more options can decrease total donations. However, while in the mentioned studies the decrease in consumptions is related to consumers being less than fully informed about their preferences or about the characteristics of the alternatives, in our experiment the decrease in contributions is mainly caused by the risk of mis-coordination associated with enlarging the set of alternatives.

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 papers has documented the positive effect of providing focal points in coordination games.[8] In our experiment, subjects exhibit preferences for efficiency (e.g. Engelmann and Strobel, 2004; Charness and Rabin, 2002) and coordinate their contributions to the salient public good only when there are no more-efficient options available. On the other hand, when the salient public good is not one of the most-efficient options, subjects tend to ignore it and contribute to the non-salient (but more remunerative) alternatives, even at the cost of mis-coordination in early periods.

In a recent paper, Bosch-Domènech and Vriend (2008) study the effects of providing non equilibrium and Pareto dominated focal points in a two subject, pure coordination game with a large number of equivalent equilibria. Apparently in contrast with our results, they find that subjects effectively use the inefficient focal point as a coordination device. The discrepancies between our findings and their results depend on the different experimental setting implemented. For instance, in the experiment of Bosh-Domenek and Vriend, a subject earned positive payoffs only when she successfully coordinated with the choice of the partner. In our experiment, instead, independently from the contributions of the group members, subjects always have the opportunity to free ride, financing the (safe) private good and receiving the corresponding positive payoff.

Finally, our paper relates to the recent literature on the behavioral spillovers effects in coordination games. For instance, Cason et al. (2012) consider a setting in which groups of five subjects play a median effort game and a minimum effort game either simultaneously

[8] See Mehta, Starmer, and Sugden (1994a), (1994b), Sugden (1995), Bacharach and Bernasconi (1997), Bardsley et al. (2010) for experiments involving coordination games with salient decision labels and symmetric, constant payoffs. Crawford et al. (2008) show that even minute differences in payoffs can drammatically limit subjects' attitude to use focal points to coordinate their actions.

or sequentially.[9] The authors find evidence of spillovers from the median to the minimum effort game. In particular, when the two games are played sequentially and under both a stranger and partner rematching protocol, successful coordination in the median game induces subjects to coordinate on the Pareto optimal equilibrium in the minimum game.[10] In line with Cason et al. (2012), we observe a positive association between coordination and cooperation. However, rather than being motivated by establishing the causal linkage between coordination and cooperation, we investigate how introducing multiple public goods and manipulating the salience of some options *per se* affect coordination and cooperation.

3 Multiplicity and threshold public goods: an example

A non-profit organization wants to raise funding to finance its cancer research center. Potential donors agree that having an efficient research center is socially desirable and will each personally benefit from the institute if the organization collects enough funds to conduct effective research. However, there exists a coordination problem among the donors, who want to contribute to the project only if enough others do so. If total donations are not high enough to effectively fund the center, the project may fail, the money may not exceed administrative costs, or the organization may reallocate the funds to some other, less-beneficial use. At the same time, a potential donor may prefer not to contribute and to free-ride if others provide enough funding to assure the success of the project. Thus, what really matters for a donor is the expected contributions of others, and the probability that her donation is pivotal for effectively funding the project. This situation captures the relationship between coordination and cooperation in threshold public good games with a "no-money-back" condition. In these games, if overall contributions exceed a given threshold, the public good is provided and benefits are realized independently of who contributed. If the threshold is not reached, however, then contributions are forfeited and subjects realize no benefit from the public good. Furthermore, conditional on total contributions strictly exceeding the threshold, each subject has an incentive to free-ride.

Let us extend the previous example to allow for multiple public goods. Such an extension is necessary to represent a real world environment in which donors can choose between a variety of alternative nonprofit organizations. In addition to deciding *how much* to give, donors must also choose *to which projects* to contribute. Despite its relevance in the real world, we are aware of no other experimental analysis that considers threshold public goods games with multiple alternatives.

Suppose that in addition to the first organization, which we call A, there are three other independent organizations vying for funding, B, C and D. All four organizations are collecting donations for funding their own projects (potentially, but not necessarily, their own cancer research centers). Due to a limited donor base, however, at most one of the projects can be

[9] See also Bednar et al. (2012).

[10] Savikhin and Sheremeta (2010) study the interplay between cooperation and competition in a setting in which subjects simultaneously play a lottery contest and a voluntary contribution mechanism (VCM). They find evidence that the cooperative attitude of subjects in the VCM spills over to the competitive environment, reducing the overbidding in the contest.

effectively funded. The three projects promoted by B, C and D are indistinguishable from each other, each providing the same expected benefit if funded, and none offering a characteristic that may serve as a focal point to disproportionately attract donor attention.[11] The project of A is distinguishable from those promoted by the other three organizations in the expected benefit it provides if funded.

In the most-interesting possibility, the donors expect any one of the three indistinguishable promoted by B, C or D, to provide a higher potential benefit than that of A. For instance, organizations B, C and D may have more favorable reputations, better leadership, access to more-advantageous locations, or otherwise more desirable development plans than organization A. Compared to the initial example in which only A's project exists, donors now have more and better philanthropic options to which they may contribute. These options, however, do not necessarily lead to donors being better off. Indeed, the presence of numerous better options makes it more difficult for donors to coordinate their contributions, resulting in them partially funding multiple projects, but failing to effectively fund any one of them. In this way, facing a multiplicity of better philanthropic options may significantly decrease the probability that any one of the projects is funded, and could weaken the incentive to donate. This is the main focus of our experiment.

A second possibility is that organizations B, C, and D are less efficient than A. As before, because of the (higher) probability of mis-coordination, donating money to one of the four organizations is riskier. On the other hand, differently from the previous case, it is reasonable to expect the higher risk of mis-coordination to be counterbalanced by the salience of A. Since A is the *most-efficient* organization, it provides a natural focal point to donors as it prescribes to coordinate donations on the best option.

4 Experimental design, procedures and testable predictions

Our experimental design is based on the threshold public good game with "no-money-back" condition (e.g., Isaac et al, 1989). We depart from the original one-public good setting to study the effects of the availability of multiple public goods on subjects' contributions. In particular, in a between-subject design, we compare results from three treatments: a benchmark setting with one threshold public good, and two settings with a total of four public goods each. For each of the three treatments, we run two sessions of 24 participants, for a total of 144 subjects. Each session consists of 12 periods.

The benchmark treatment consists of a repeated threshold public good game with a *single* public good. We label this treatment S, denoting the fact that it involves only a single public good. At the beginning of the experiment, each participant is randomly assigned to a group of four participants. The composition of the group remains unchanged throughout the experiment and this is common knowledge. In every period, each participant decides how to divide her per-

[11] Assuming that the three projects are completely indistinguishable is most convenient for our analysis. The assumption represents the idea that the donor base may prefer any of the alternatives to A, (or vice-versa, A to any of the alternatives) but has no clear preference among the three alternatives. For instance, as noticed in footnote 2, this might be simply the consequence of donors' confusion.

period endowment of 55 tokens between a *private* and a *collective* account. For each token put in the private account, the subject receives 2 points. Tokens in the collective account generate a return in points if and only if the sum of the contributions made by the four group members reaches a threshold of 132 tokens (corresponding to the 60% of the overall number of tokens assigned to the group). If the overall number of tokens allocated by the group to the collective account is lower than the threshold, subjects do not receive any points from contributions to the collective account. If the overall number of tokens contributed to the collective account is higher than the threshold, each group member (regardless of who has contributed) receives one point for each token allocated to the collective account ($MPCR = 0.5$) and a bonus of 30 tokens.

In the second and third treatments, the subjects have one private account and a total of four collective accounts to which they may contribute. The private account and one of the collective accounts are identical to those in the S treatment, and therefore the novel aspect of these treatments involves the three additional collective accounts. These collective accounts are indistinguishable from each other, but distinguishable from the other, salient collective account that provides either a higher or lower bonus when the threshold is reached. Except for the size of the bonus and the labels, the collective accounts in the experiment are identical on every other dimension. That is, each collective account pays out one point per contribution if and only if total contributions to it reach the threshold of 132 tokens. In treatment S, the bonus equals 30 points for each participant when the threshold is reached. In treatment M_{1i}, the bonus equals 30 points for the salient collective account and 40 points for each of the three non-salient accounts. Thus, the salient public good in M_{1i} is *more inefficient* than the other three non-salient options. In treatment M_{1e}, the bonus equals 30 points for the salient collective account and 20 points for each of the three non-salient options. Thus, the salient public good in M_{1e} is *more efficient* than the other three non-salient options.

4.1 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 M_{1e} 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 S, five in M_{1e} and M_{1i}). In order to avoid frame effects, the four collective accounts in M_{1e} and M_{1i} were presented to subjects using neutral geometric names: square, rectangle, trapezoid and diamond. Also, subjects in M_{1e} and M_{1i} 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 bonus assigned. Moreover, following each period, subjects learned the number of points they received from each account and in total. At the end of the last period, subjects were informed about their total earnings both in points and in euros. At the end of the experiment, subjects were privately paid using a payment rate of 100 points per euro. On average, they earned 20.29 euro for sessions lasting about 50 minutes, including the time for instructions. The experiment took place in December 2011 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 computerised using the $z - Tree$ software (Fischbacher, 2007).

4.2 Theoretical framework and testable predictions

In each period of the S treatment, a group of four subjects, $N = \{1, 2, 3, 4\}$, simultaneously and non-cooperatively choose how much to contribute to the unique threshold public good. Let $b > 0$ be the endowment assigned to each subject in each period. Given her endowment, in period t subject i chooses her contribution $c_{i,t}$ to the public good, with $c_{i,t} \in [0, b]$. Let $C_t = \sum_{j \in N} c_{j,t}$ denote the total contribution made by group N to the public good in period t. Let τ be the (time invariant) contribution threshold. We assume τ to be strictly greater than half of the total group budget, that is $\frac{1}{2} \sum_{i \in N} b < \tau \leq \sum_{i \in N} b$.[12] The payoff for subject i in period t is[13]

$$u_{i,t} = \begin{cases} b - c_{i,t} + \alpha C_t + \beta & if\ C_t \geq \tau \\ b - c_{i,t} & if\ C_t < \tau, \end{cases}$$

where $\alpha \in (\frac{1}{N}, 1)$ is the marginal per capita return ($MPCR$) of i's contribution and $\beta > 0$ is the bonus received by i when total contributions of her group reach the threshold.

Consider first a one-period game. Although the socially-efficient outcome involves $c_{i,t} = b$ for all $i \in N$, there does not exist a Nash equilibrium in which such contributions are made. There are two types of Nash equilibria. First, there is a Nash equilibrium in which $c_{i,t} = 0$ for all $i \in N$ and $C_t = 0$. Second, there exists equilibria for a range of contribution profiles given which total contributions equal the threshold, $C_t = \tau$, and no one benefits from deviating from her contribution, which is the case when $c_{i,t} \leq \alpha\tau + \beta$ for all i. Notice that, as is typical in linear public good games, subjects do not have any incentive to contribute more than what is necessary to reach the threshold.

When we take into account the dynamic structure of the game, the fact that groups are kept constant throughout the experiment implies that the set of subgame perfect equilibria significantly increases.[14] Roughly speaking, in all periods but the last, a range of contribution profiles that result in total contributions above the threshold, often including full contributions,

[12] This assumption plays a crucial role in M_{1i} and M_{1e} where it implies that, in every period, each group can reach the threshold of one public good only.

[13] For simplicity, in order to write the payoff function, we re-scale earnings in points in such a way each token in the collective account is equal to 1. Of course, this assumption does not affect the theoretical results as implied by the specific parameters used in our experimental setting.

[14] 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.

are consistent with a subgame perfect equilibrium. This is because subgame perfect strategies can credibly threaten to revert to no contributions in future periods if anyone fails to contribute a certain amount in an earlier period. In the last period, however, the equilibrium profiles of contributions coincide with those of the one-shot game.[15]

In M_{1e} and M_{1i}, there are four threshold public goods and, in every period, subjects choose how much to contribute to each of them. We index a public good by $h \in \{A, B, C, D\}$, where good A is identical to the single public good in S and goods B, C, D differ from good A only in the bonus, β_h they pay out when their threshold is reached. That is $\beta_A = \beta$ and $\beta_B = \beta_C = \beta_D = \hat{\beta}$. It follows that $\hat{\beta} < \beta$ in M_{1e}, and $\beta < \hat{\beta}$ in M_{1i}. Since each of the four public goods admits the same equilibrium profiles of contributions discussed above, the set of equilibria in the one-shot game in M_{1e} and M_{1i} has multiplicity four with respect those in S. In the repeated game, the set of equilibria will even be larger.

In games with multiple equilibria, it is not always obvious on which equilibrium subjects will attempt to coordinate. In our games, subjects may put all tokens in their private account, or they may contribute some tokens to one or more public goods in an attempt to coordinate with others to reach the threshold for one of the public goods. As in experiments involving other coordination games (e.g., Crawford and Haller, 1990), we do not expect subjects to achieve coordination in the initial periods of the game. Rather, we expect that subjects will attempt to coordinate for a number of periods before either achieving coordination (and generating a pattern of contributions that is consistent with a subgame-perfect equilibrium) or giving up on aligning contributions to the same public good. We are interested in whether subjects are more focused on efficiency or salience when choosing to which public goods to contribute in the initial periods of the game when they first attempt to achieve coordination.

We offer two alternative hypotheses on how subjects choose which public good to contribute to. The first possibility is that subjects focus their attempts to coordinate on the salient public good. In both treatments M_{1e} and M_{1i}, a "focus on salience" means that the subjects tend to contribute to the public good that offers a bonus of 30 points, and not to the other non-salient public options, regardless of whether they offer higher or lower bonuses compared to the salient option. A focus on salience is consistent with the idea that coordination is more-easily achieved when one of the equilibria stands out from the others due to the existence of a focal point (Bosch-Domenech and Vriend, 2008; Mehta et al, 1994a, 1994b; Young, 1993) that leads subjects to formulate reasonable expectations that others will also attempt to coordinate on a specific option.

H1 (Coordination on salience). *Subjects in M_{1e} and M_{1i} contribute more to the salient public good than any of the non-salient alternatives. Contributions, the frequency of groups that reach the threshold and earnings are not significantly different across all three treatments, S, M_{1e} and M_{1i}.*

[15] For example, a subgame perfect equilibrium strategy in the final period of the game, T, may involve "contribute enough to achieve the threshold if the group has contributed at least $\widetilde{C}_{T-1}$ in $T-1$, with $\widetilde{C}_{T-1} \geq \tau$, and contribute nothing, $c_{i,T} = 0$, otherwise."

While coordinating on salience seems to be a natural strategy in M_{1e}, its validity to address subjects' contributions in M_{1i} is questionable as it prescribes to contribute to the least-efficient public good. Thus, the second hypothesis is that subjects focus their attempts to coordinate on (one of) the most-efficient public good(s). In treatment M_{1e}, a "focus on efficiency" means that subjects tend to contribute to the salient public good that offers a bonus of 30 tokens, and not to the three identical, non-salient, public goods that offer bonuses of 20 tokens. In treatment M_{1i}, a focus on efficiency means that subjects tend to contribute to any one of the three identical public goods that offer bonuses of 40 tokens, and not to the salient public good that offers a bonus of 30 tokens.

H2 (Coordination on efficiency). *Subjects in M_{1e} and M_{1i} contribute more to (one of) the most-efficient public good(s) than to any less-efficient alternative. Contributions, the frequency of groups that reach the threshold, and earnings are not significantly different between M_{1e} and S.*

It is possible that both $H1$ and $H2$ are rejected. Instead, the subjects may not distinguish between public goods regardless of their salience or efficiency, or they may focus on either non-salience or inefficiency. We do not explicitly present hypotheses for these possibilities, as we find them less reasonable.

Both hypotheses $H1$ and $H2$ predict that contributions and payoffs will be similar in treatments S and M_{1e}. Under hypothesis $H1$, contributions and earnings will also be similar under M_{1i}. Under hypothesis $H2$, on the other hand, the relative size of contributions and earnings in M_{1i} will depend on the trade off between the greater efficiency and the increased difficulty of coordination. The third hypothesis extends $H2$ to consider the possibility that subjects focus on efficiency and that this focus decreases their payoffs compared to if they instead focused on salience.

H3 (Detrimental coordinating on efficiency) *In addition to the requirements of H2, contributions, earnings and the frequency of groups that reach the threshold in M_{1i} are lower than in treatment S.*

5 Experimental results

In presenting the experimental results, we first look at differences in overall contributions between treatments. Then, by focusing on M_{1e} and M_{1i} 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 group level observations per treatment.[16] Similarly, in order to account for potential dependence across periods,

[16] The only exceptions are the tests of proportions and the non parametric tests conducted on data of the first period.

the estimated coefficients in the parametric regressions are based on standard errors clustered at group level.

5.1 Overall contribution

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

[Figure 1 about here]

Contributions in M_{1i} are substantially lower than in the other two treatments, while we do not find any remarkable difference in contributions between S and M_{1e}. Moreover, in all treatments, contributions tend to decline over periods. These preliminary observations are confirmed by Table 1, that reports differences in mean contributions between treatments for different subsets of periods.

[Table 1 about here]

Over all periods, contributions in S and M_{1e} do not exhibit significant differences, while they are significantly higher than those in M_{1i} ($p < 0.05$, according to a Mann–Whitney rank-sum test, two-sided). As shown by the Table, the strongest difference between treatments is detected in the first part of the experiment, though numerically it continues being substantially large over all periods. This leads us to the first result.

Result 1. Subjects make larger contributions to public goods in S and M_{1e} than in M_{1i}.

It is worth noticing that while in the present study introducing multiplicity has either no effect or discourages contributions, in Bernasconi et al (2009) it stimulates cooperation. As pointed out in Section 2, this is explained by the different nature of the public goods in the two experiments, being linear in Bernasconi et al (2009) while presenting a threshold in the present study.

Moving to the determinants of subjects' overall contributions, columns (1) and (2) of Table 2 report results from parametric panel regressions.[17]

[Table 2 about here]

[17] All the regressions in Table 2 are run by pooling data. We do not observe relevant differences when the analysis is conducted by using data from each treatment, separately.

As suggested by the negative and highly significant coefficient of *Period*, contributions decrease over time in all treatments. In line with other public good experiments (Fischbacher et al, 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 of the non parametric tests reported in Table 1. Indeed, by looking at the first pooled regression, relative to the baseline treatment, S, and after controlling for the other covariates, contributions in M_{1i} are significantly lower while no difference is detected in treatment M_{1e}. A test for linear combinations rejects the hypothesis that the coefficients of M_{1e} and M_{1i} are the same ($p < 0.05$). Interestingly, when we replace $Others(t-1)$ with $Coord(t-1)$, the difference between the estimated coefficients of M_{1e} and M_{1i} becomes marginally significant ($p < 0.1$). Thus, differences in overall contributions between M_{1e} and M_{1i} are mainly (though not completely) driven by the higher ability of subjects to reach the threshold in the former treatment.

The previous analysis suggests that multiplicity reduces contributions only in M_{1i} and provides evidence in favor of $H2$ and $H3$. Below, we show that this result depends on the interplay between salience and efficiency. Indeed, salience is effectively used as a coordination device in M_{1e} and subjects contribute to the salient and most-efficient public good. On the contrary, subjects in M_{1i} are reluctant to contribute to the public good that assigns the lowest bonus and try to achieve coordination on one of the non-salient, but more-efficient, alternatives. As a consequence, relatively to the other two treatments, subjects in M_{1i} experience less coordination and higher losses from disaligned contributions. This implies that contributing to public goods in M_{1i} is less profitable than in the other two treatments.

5.2 Do subjects contribute to the salient public good?

The following table reports mean contributions to the salient and non-salient public goods in M_{1e} and M_{1i}.

[Table 3 about here]

As shown by Table 3, subjects in M_{1e} effectively coordinate their contributions on the salient public good. On the contrary, in M_{1i}, where the salient public good is associated with the lowest bonus, subjects contribute significantly more to the other (non-salient) public goods. The difference in the level of contributions to the salient public good between M_{1e} and M_{1i} is positive and highly significant (according to a Mann–Whitney rank-sum test, two-sided, $p < 0.01$ for any subset of periods).

Following the theoretical considerations in Section 4, we further investigate subjects' contributions in two steps. First, we look at whether subjects in M_{1i} and M_{1e} tend to polarize their contributions on one public good, or if they split their resources over the four options. Table

4 reports, for each treatment and over periods, the frequencies of subjects who contribute to zero, one or more than one public good.

[Table 4 about here]

As clearly shown, the proportion of subjects who contribute to more than one public good is significantly higher in M_{1i} than M_{1e}, 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, once the salient option is ignored, subjects in M_{1i} 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 M_{1i} is about four times higher than in any other treatment.

Second, by focusing on the two treatments with multiple public goods, M_{1i} and M_{1e}, we classify subjects' contributions according to the following two categories.

1. *"Focus on salience"*: subjects only make positive contributions to the salient public good.
2. *"Focus on efficiency"*: subjects only make positive contributions to the most-efficient public good(s).

Table 5 reports the frequencies of the two categories as observed in the experiment.

[Table 5 about here]

As indicated by Table 5, by averaging over all periods, the proportion of subjects focusing on salience in M_{1e} is higher than the the proportion of subjects focusing on either salience or efficiency in M_{1i}. Moreover, in line with results in Table 3, subjects in M_{1i} tend to focus significantly more on efficiency than on salience ($p < 0.01$, according to a proportion test for any subgroup of periods and overall). Thus, the previous results support $H2$.

Result 2. Subjects coordinate their contributions on the salient collective account in M_{1e}. On the other hand, subjects in M_{1i} prefer to contribute to one of the non-salient, but more-efficient, collective accounts. Finally, the number of subjects contributing nothing is significantly higher in M_{1i} than in S and M_{1e}.

5.3 Salience and coordinating contributions on one public good

If subjects had used salience to coordinate their contributions, the expected proportion of groups that reach the threshold would have been the same in the three treatments. However, as observed in Subsection 5.2, while subjects in M_{1e} contribute more to the salient public good, the opposite occurs in M_{1i} where participants seek to coordinate on one of the non-salient options. Thus, it is reasonable to expect coordination to be more difficult to achieve in

M_{1i} than in any other treatment. 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 M_{1i} than in the other two treatments. Second, Table 6 reports the number of groups reaching the threshold in each period (and overall) in the three treatments.

[Table 6 about here]

Over all periods, almost 80.5 percent of groups in S and M_{1e} contributed more than the threshold to one collective account while this percentage drops to 37.5 percent in M_{1i}. A Mann–Whitney rank-sum test (two-sided) confirms that the mean number of periods a group reaches the threshold is significantly lower in M_{1i} than in any other treatment (in both cases, $p < 0.01$), while no significant difference is detected between S and M_{1e}.

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 et al. (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 6, it is interesting to notice that while the proportion of groups in S and M_{1e} that reach the threshold is greater than 50 percent in every period, in M_{1i} it is more volatile. Indeed, 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. According to recursive partitioning, in M_{1i} 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, $p - value < 0.01$). By applying the same methodology to S and M_{1e}, we do not find any significant splitting period. Overall, these results provide evidence in favor of $H3$.

Result 3. The proportion of groups that reach the threshold in S and M_{1e} is higher than in M_{1i}. Moreover, while in S and M_{1e} the proportion is above 50 percent in every period, in M_{1i} it occurs between periods 5 and 10 only.

Moving to the determinants of the probability of reaching the threshold in the three treatments, columns (3) and (4) of Table 2 report Probit marginal effect estimates. The probability that a group contributes above the threshold strongly increases with the overall contribution made by group members in the previous period, $Others(t-1)$. Furthermore, as shown by the coefficient of $Coord(t-1)$, we find that the probability of contributing above the threshold strongly and positively depends on past successful coordination. Finally, confirming the previous non parametric analysis, relative to the baseline treatment, S, the probability of reaching the threshold significantly decreases in M_{1i} while it remains virtually unchanged in M_{1e}. The difference between M_{1e} and M_{1i} is significant as confirmed by a linear combination test between the coefficients of the treatment dummies ($p < 0.01$, in the specification including $Others(t-1)$; $p < 0.05$, in the specification including $Coord(t-1)$).

5.4 Subjects' earnings

The last question we explore is whether subjects' earnings differ between treatments. As pointed out in Section 4.2 and confirmed by the previous analysis, subjects that try to coordinate their contributions on one of the efficient collective accounts in M_{1i} experience miss-coordination in early periods. Thus, it is reasonable to expect earnings in M_{1i} to be lower than in any of the other two treatments. Figure 2 shows mean earnings (expressed in points) in the three treatments over periods.

[Figure 2 about here]

Earnings in M_{1i} are lower than those in S and M_{1e}, with the difference being more pronounced in early periods. As shown by the next table, the mean of the earnings in M_{1i} is significantly lower than that in S and M_{1e}. In terms of final monetary earnings, subjects earn (on average) 7 euro less in M_{1i} than in the other two treatments.

[Table 7 about here]

Table 7 also compares the mean of the earnings in the three treatments with 110, namely the level of earnings when a subject contributes nothing to public goods. Interestingly, in the first four periods, subjects in M_{1i} earn (on average) significantly less that 110. This is consistent with the idea that subjects in M_{1i} are willing to sacrifice initial earnings to achieve coordination in subsequent periods. Furthermore, by considering the mean over all periods of subjects' earnings, we find that 35.42 percent of subjects in M_{1i} earn less than 110, with this percentage dropping to 10.41 percent in S and 6.25 percent in M_{1e}. We summarize this result as follows.

Result 4. Subjects' earnings are significantly higher in S and M_{1e} than in M_{1i}. Moreover, more than 1/3 of subjects in M_{1i} earn less than what implied by the "zero-contribution" equilibrium.

6 Conclusion

We report results from public goods experiments in which participants can contribute to alternative public goods, each of which becomes effective only if the total contributions to it reach a certain threshold. Such a setting approximates the quest for funding in the nonprofit sector, where there are more causes than the donor base can afford to effectively fund. Our analysis gives insight into how donors behave when they face numerous nonprofits, community projects, or charities each vying for donations.

We show that the multiplicity of public goods can make it more difficult for donors to coordinate over alternative options, which also discourages donations.[18] As our results clearly suggest, facing multiple and better options can decrease total contributions and earnings compared to a setting with only one alternative.[19]

Although we motivate our analysis with examples of charities, nonprofits, and community projects, our results are suggestive of behavior and welfare in other settings as well. The public goods might represent fringe neighborhoods with the potential for revitalization. Enough people need to invest in any neighborhood for their revitalization efforts to succeed. Our analysis suggests that having more neighborhoods in a community that are apt for redevelopment may decrease the probability that any one of the neighborhoods is redeveloped.

Additionally, each public good may represent a policy reform or political movement which requires sufficient time and money invested by supporters to become a viable policy alternative. The greater the number of alternative reforms, the fewer hours supporters may put into any individual reform, and the less likely it may be that any reform becomes a viable policy proposal.

Finally, each public good may represent an investment opportunity which 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 is carried out.

Our analysis highlights the benefits of policies, public attention, or other factors that may help to coordinate the actions of potential contributors on the same option.[20] 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, donation distribution organizations such as the United Way, and nonprofit rating organizations such as Charity Navigator. In the same light, efforts to draw public attention to certain organizations through telethons, celebrity endorsements, and

[18] We have also run one session (with 24 subjects partitioned into 6 groups) of an additional treatment with four identical public goods. The four identical options presented same threshold, bonus and $MPCR$ of the public good in S. In line with the previous evidence, contributions as well as the proportion of groups that reach the threshold in this treatment are lower than those in S.

[19] This is in contrast to the "love for variety" (Rolls et al. 1981; Lancaster, 1991; Kahn and Wansink, 2004) inherent in most decision problems, where more options to choose from makes rational consumers, investors, or other agents better off. With threshold public goods, however, payoffs not only depend on the characteristics of the public goods to which participants direct their donations. Payoffs also depend on whether the participants manage to coordinate their contributions on any one of the public goods.

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

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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Appendix A. Figures and Tables

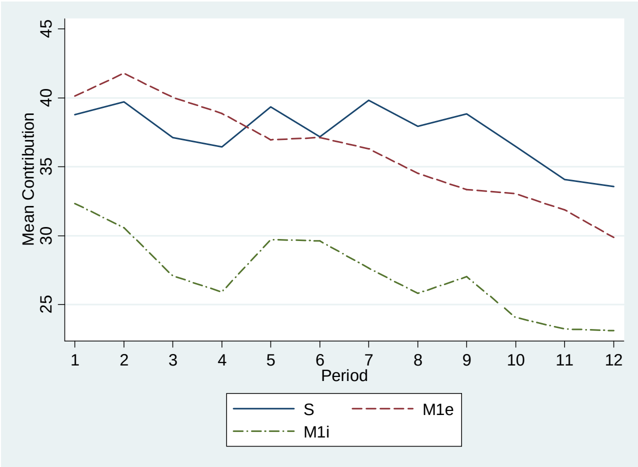

Fig.1. Overall contributions over periods, by treatment.

Table 1. Overall contributions in S, M_{1e} and M_{1i}

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
S	38.792	38.016	38.578	35.740	33.563	37.444
M_{1e}	40.125	40.208	36.229	32.036	29.875	36.158
M_{1i}	32.333	28.979	28.198	24.354	23.104	27.177
$S-M_{1e}$	−1.333	−2.192	2.349	3.704*	3.688	1.286
$S-M_{1i}$	6.459**	9.037**	10.380	11.386*	10.459*	10.267**
$M_{1e}-M_{1i}$	7.792**	11.229***	8.031	7.682	6.771	8.981**
Obs. (per treat.)	48	12	12	12	12	12

Notes. This table reports mean contributions (overall public goods) over periods in the three treatments. The table also shows significance levels from a nonparametric (two-sided) Mann–Whitney rank-sum test for the null hypothesis that the mean contribution in two treatments is the same. Significance levels are denoted as follows: * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 2. Parametric regressions and contributions in S, M_{1e} and M_{1i}

	Overall Contributions		Reaching the threshold	
	(1)	(2)	(3)	(4)
$Others(t-1)$	0.110***		0.009***	
	(0.013)		(0.001)	
$Coord(t-1)$		6.113***		0.603***
		(0.786)		(0.070)
$Period$	−0.489***	−0.807***	0.017*	−0.011*
	(0.085)	(0.083)	(0.009)	(0.006)
M_{1e}	−1.171	−1.571	0.031	0.005
	(3.050)	(3.837)	(0.088)	(0.079)
M_{1i}	−7.216**	−7.974**	−0.262***	−0.187**
	(3.076)	(3.852)	(0.083)	(0.083)
$Constant$	28.216***	38.016***		
	(2.773)	(2.824)		
$lrl(lpl)$	−6124.138	−6.119.331	−617.992	−633.524
$Wald-\chi^2$	159.51	142.37	119.51	115.55
$Prob > \chi^2$	0.000	0.000	0.000	0.000
$Obs.$	1584	1584	1584	1584

Notes. Columns (1) and (2) report coefficient estimates (standard errors in parentheses) from a two-way linear random effects model accounting for both potential individual dependency over periods and dependency within group. Columns (3) and (4) report Probit marginal effect estimates (standard errors clustered at group level in parentheses) at the medians of all covariates over all periods. $Others(t-1)$ 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; M_{1e} and M_{1i} are treatment dummies. Significance levels are denoted as follows: * p<0.1, ** p<0.05, *** p<0.01.

Table 3. Contributions to the (non-) salient public goods in M_{1e} and M_{1i}

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
M_{1e}						
Salient pg	34.792	38.188	36.208	32.031	29.875	35.476
Non-Salient pgs	5.333	2.021	0.021	0.005	0.000	0.682
diff.	29.459***	36.167***	36.187***	32.026***	29.875***	34.794***
M_{1i}						
Salient pg	10.729	5.750	3.469	3.818	3.875	4.345
Non-Salient pgs	21.604	23.229	24.729	20.536	19.229	22.832
diff.	−10.875***	−17.479***	−21.260**	−16.718**	−15.354**	−18.487***
Obs. (per treat.)	48	12	12	12	12	12

Notes. This table reports the mean contribution to the salient public good (square) and to the three non-salient options (diamond, rectangle, trapezoid) in M_{1e} and M_{1i} over periods. Moreover, the table shows significance levels from a 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 4. Contributions to 0, 1 or more than 1 public good

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
No contribution						
S	2	10	10	16	6	36
M_{1e}	2	9	10	19	6	38
M_{1i}	4	35	51	61	18	147
$S-M_{1e}$	0	1	0	-3	0	-2
$S-M_{1i}$	-2***	-25***	-41***	-45***	-12***	-112***
$M_{1e}-M_{1i}$	-2	-26***	-41***	-42***	-12***	-109***
Contributions to 1 public good						
S	46	182	182	176	42	540
M_{1e}	32	160	180	172	42	512
M_{1i}	20	100	130	129	29	359
$S-M_{1e}$	14***	22***	2	4	0	28***
$S-M_{1i}$	26***	82***	52***	47***	13***	181***
$M_{1e}-M_{1i}$	12**	60***	50***	43***	13***	153***
Contributions to more than 1 public good						
M_{1e}	14	23	2	1	0	26
M_{1i}	24	57	11	2	1	70
$M_{1e}-M_{1i}$	-10**	-34***	-9**	-1	-1	-44***
Obs. (per treat.)	48	192	192	192	48	576

Notes. This table reports, for each treatment, the number of times (in every period, from 0 to 48) in which subjects did not contribute, contributed to 1 threshold public good or contributed to more than one public good. The table also provides results from a two-sample test of proportions for the null hypothesis of equality of frequency of a contribution strategy in two treatments. Significance levels are denoted as follows: * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 5. "Focus on salience" and "focus on efficiency" in M_{1e} and M_{1i}

Period	1	1 − 4	5 − 8	9 − 12	12	*All*
M_{1e}	32	159	180	172	42	511
$M_{1i}(eff)$	17	90	120	113	25	323
$M_{1i}(sal)$	7	20	11	16	4	47
$M_{1e} - M_{1i}(eff)$	15***	69***	60***	59***	17***	188***
$M_{1e} - M_{1i}(sal)$	25***	139***	169***	156***	38***	464***
$M_{1i}(eff) - M_{1i}(sal)$	10*	70***	109***	97***	21***	276***
Obs. (per treat.)	48	192	192	192	48	576

Notes. This table reports the number of times (in every period, from 0 to 48) in which subjects in M_{1e} and M_{1i} contributed according to one of the following strategies: "focus on efficiency" and "focus on salience". The table also provides results from a two-sample test of proportions for the null hypothesis of equality of frequency of a contribution strategy in the two treatments. Significance levels are denoted as follows: * p<0.1, ** p<0.05, *** p<0.01.

Table 6. Number of groups that reach the threshold in S, M_{1e} and M_{1i}

Period	1	2	3	4	5	6	7	8	9	10	11	12	*All*
S	9	10	10	8	11	9	11	10	10	10	9	9	116
M_{1e}	9	10	10	11	11	11	10	9	9	8	10	8	116
M_{1i}	0	0	1	3	6	8	6	7	8	6	5	4	54
$S - M_{1e}$	0	0	0	-3	0	-2	1	1	1	2	-1	1	0
$S - M_{1i}$	9***	10***	9***	5**	5**	1	5**	3	2	4*	4*	5**	62***
$M_{1e} - M_{1i}$	9***	10***	9***	8***	5**	3	4*	2	1	2	5**	4*	62***

Notes. 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.

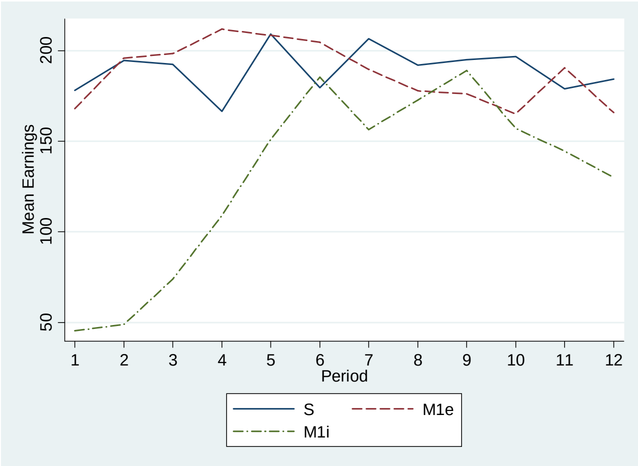

Fig. 2. Mean earnings in S, M_{1e} and M_{1i}.

Table 7. Subjects' earnings in S, M_{1e} and M_{1i}

Period	1	$1-4$	$5-8$	$9-12$	12	*All*
S	178.000	182.885	196.760	188.667	184.208	189.438
$S-110$	68.000***	72.885***	86.760***	78.667***	74.208***	79.438***
M_{1e}	167.917	193.500	195.104	174.385	165.750	187.663
$M_{1e}-110$	57.917**	83.500***	85.104***	64.385***	55.750*	77.663***
M_{1i}	45.333	69.208	166.396	155.146	129.958	130.250
$M_{1i}-110$	−64.667***	−40.792***	56.396*	45.146***	19.958	20.250*
$S-M_{1e}$	10.083	−10.615	1.656	14.282	18.458	1.775
$S-M_{1i}$	132.667***	113.677***	30.364	33.521	54.250	59.118***
$M_{1e}-M_{1i}$	122.584***	124.292***	28.708	19.232	35.792	57.413***
Obs. (per treat.)	12	12	12	12	12	12

Notes. This table reports mean earnings over periods in the three treatments. For each treatment, the table reports results of a Wald test for the null hypothesis that estimates of treatment intercepts from a (panel) dummy regression (with clustered standard errors) on the corresponding sub-sample of groups and 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.

Appendix B. Instructions (M_{1e}).

[The instructions were originally written in Italian. The only difference between M_{1e} and M_{1i} is the size of the bonus of the three identical public goods, trapezoid, rectangle and diamond (20 in M_{1e}, 40 in M_{1i}). The only difference between M_{1e} and S is in the number of public goods. The bonus from meeting the threshold in S is the same of that associated with the collective account "SQUARE" in M_{1e} and M_{1i}.]

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", "RECTANGLE", "TRAPEZOID" 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", "DIAMOND", "TRAPEZOID" AND "RECTANGLE" You receive points from any of the four COLLECTIVE ACCOUNTS 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 subject in your group, 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 "DIAMOND", "TRAPEZOID" and "RECTANGLE".

At the beginning of each period, the computer will display your endowment and four input fields, one for the PRIVATE ACCOUNT, one for the COLLECTIVE ACCOUNT "RECTANGLE", one for the COLLECTIVE ACCOUNT "SQUARE", one for the COLLECTIVE ACCOUNT "TRAPEZOID" and one for the COLLECTIVE ACCOUNT "DIAMOND". For each subject in the group, the order in which the four input fields for the 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 great 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 in Euro at the rate 100 points = 1 Euro.