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On the design of fundraising campaigns: Goal setting and information provision in dynamic fundraisers

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Abstract: This study uses a laboratory experiment to study key aspects of dynamic fundraising campaigns that utilize goals that must be met for a good or service to be provided. We compare campaigns characterized by a final goal only, an intermediate goal and a known final goal, and a third setting where the final goal is unknown at the beginning of the campaign. The design further varies whether an individual's payoff from reaching a goal is uncertain or certain, which is intended to capture the effects of providing vague or precise information on the good or service to be provided. We find that adding an intermediate goal *decreases* both the likelihood of reaching the final goal and the amount of money raised. Even for successful campaigns, introducing an intermediate goal slows the timing of contributions and alters contribution strategies. For the one-goal case, value uncertainty decreases the likelihood the goal is reached.

JEL Classifications: H41; H42; C72; C92; D80

Keywords: fundraising; choice architecture; provision points; goal setting; stretch goals; uncertainty; lab experiment

1. Introduction

With technological advancements and the emergence of online crowdfunding platforms, such as Kickstarter, GoFundMe, and Indigo, there are relatively low barriers for individuals, organizations, and even government agencies to implement fundraising campaigns. Consequently, there have been a proliferation of fundraising campaigns and campaign organizers. Importantly, campaign architects face numerous choices related to fundraising design. For example, the number of campaign goals and their levels, the timing of when these goals are revealed, and whether precise information about the good or service to be funded is provided could all impact contribution behavior. This is especially true in crowdsourced fundraising where potential donors have real-time information on funds raised, and individual donors can make multiple contributions. However, there is little causal evidence on how these design choices affect fundraising success. To help fill this knowledge gap, we use theory and a laboratory experiment to investigate two key issues faced by the designers of online fundraising campaigns – goal setting and information provision – using a real-time, continuous donation interface.

Many fundraising campaigns make use of goals (i.e., provision points) that must be reached for a good or service to be provided. However, how high should a goal be set? And is it better to use a single goal or multiple goals? Multiple goals are commonly used by nonprofit organizations and online platforms such as Kickstarter but are less common on websites like GoFundMe. In addition, "stretch" goals can be introduced during the campaign, perhaps as a strategic move, whereby the campaign designer extends the campaign past the initial goal to a new, higher funding goal (and associated good provision) that was not announced at the beginning of the campaign.

In some settings, there may be discretion over the quality or quantity of the good, which may alter the desired funding goal. Moreover, strategies on determining goals may be context specific. In the case of a nonprofit organization, the provision point is likely to reflect the actual cost of providing a good or service. For instance, a university might decide on two possible goals to fundraise for a new library: a lower provision point to renovate an existing library, and a higher provision point to build a new one. For entrepreneurs raising capital, the goal(s) might not only cover the cost of product development but also provide a profit margin. An entrepreneur may strategically set the goal low to capture market share, or to hook consumers with a base model before bringing a more profitable version to market.

As another consideration, the value of the proposed good or service to potential contributors may be uncertain. Problems related to asymmetric information are widespread on crowdfunding platforms (Belleflamme, Omroni, and Peitz 2015; Lambert 2024). Value uncertainty might be expected for a new market good but is also likely to characterize many public goods for which donors have little experience or where there is little transparency. Importantly, information provision is at the discretion of the campaign designer. For instance, an aspiring artist on Kickstarter can reduce uncertainty by providing one song for free from a proposed album. Similarly, a university raising funds for a new library can release an architectural rendering of the proposed structure. However, is providing better information conducive to fundraising success?

Motivated by the above issues, our experimental design varies the goal structure, specifically whether there is only a final goal (i.e., one provision point), an intermediate and a final goal (i.e., two provision points) that are known at the start of the campaign, and an intermediate and a final goal case where the final goal is revealed only when the intermediate goal is reached. For treatments with goal uncertainty, some of the scenarios further introduce uncertainty over *whether* there is a second goal. This is intended to capture the effects of “stretch” goals, as such goals are often unknown to potential donors at the start of a campaign. The design further varies where the intermediate and final goals are set while holding donor valuations for meeting these goals fixed, i.e., we alter benefit-cost ratios; this variation has the potential to provide insight on the tradeoffs of strategically altering provision points. Along with these goal structures we vary whether donor valuations for the good provided when a goal is reached are certain or uncertain. This is intended to capture the effects of asymmetric information about the quality of the goods or services provided once the contribution goal is reached. All of these features are captured using an experimental fundraising platform that allows people to contribute at their discretion during a fixed-length campaign – participants are free to decide when, how much, and how often to contribute while receiving continuous updates on campaign progress.

We find that including an intermediate goal, regardless of whether the final goal is unknown at the start of the campaign, decreases the likelihood of meeting the (efficient) final goal and the average revenue generated from the campaign. In two-goal campaigns, after the intermediate goal is reached, a donor's subsequent contributions depend on the contributions of others; this behavior is not present in counterfactual one-goal campaigns. Further, inclusion of an intermediate goal slows the accumulation of contributions early in the campaign, regardless of whether the campaign is ultimately successful. While the two-goal fundraising campaigns we study are overall less successful, the observed provision and contribution rates are nevertheless high relative to related, static games with multiple thresholds. This suggests that the real-time contribution setting may overcome some of the coordination failures documented in prior research.

While ours is the first study to examine the effects of varying these design features within a dynamic and continuous fundraising game, this work has connections with several strands of existing literature. We discuss these links below.

A handful of studies (e.g., Chewning, Coller, and Laury 2001; Normann and Rau 2015; Liu, Swallow, and Anderson 2016; Hashim, Kannan, and Maximiano 2017) have tested static multi-threshold provision mechanisms where players (either simultaneously or sequentially) make a single contribution choice. Bagnoli, Ben-David, and Mckee (1991) test the multi-stage mechanism proposed by Bagnoli and Lipman (1989). In each stage, players simultaneously choose how much to contribute towards the next level of the good, and the game ends whenever contributions fall short of the next threshold. In most implementations, excess contributions are not refunded. The general conclusions reached from these studies are that the efficient level of the good is infrequently realized; and when it is, contributions usually exceed the threshold.

While results from static multi-threshold games are not encouraging overall, evidence from related voluntary contributions mechanism (VCM) and single-threshold games suggest that moving from a one-shot game to one with either multiple contribution stages or a real-time contributions interface can increase contributions (e.g., Dorsey 1992; Goren, Kurzban, and Rapoport 2003; Goren, Rapoport, and Kurzban 2004; Duffy, Ochs, and Vesterlund 2007; Choi, Gale, and Kariv 2008; He and Zhu 2023). Of particular relevance, Cason and Zubrickas (2019) study a dynamic contributions game with a single provision threshold. They find that, in their treatment without refund bonuses, the provision success rate (58 percent) is much higher than the 20 to 30 percentage rates observed in an earlier experiment (Cason and Zubrickas 2017) that involved a static provision point game. In contrast, pledged contributions in our game are only collected when the provision goal is reached. Therefore, contributions in excess of the goal are not possible. Eliminating the risk of wasting excess contributions should increase campaign success.

There is limited evidence on the effects of adding an intermediate goal. Chewning, Coller, and Laury (2001), in the context of a static game with one contributions stage, examine the effects of introducing an intermediate goal. In their game, reaching the final goal is efficient, but introducing the intermediate goal leads to only inefficient Nash Equilibria.[2] Consistent with the theory, they find that including the intermediate goal reduces contributions. We show in the theory section that in our continuous time game, Markov Perfect Equilibria (MPE) are not affected by the introduction of an intermediate goal. However, the rate of contributions early in the game may be slower under a trembling hand refinement of the equilibrium concept.

Related experimental papers have examined how uncertainty about the provision point level in a single threshold game affects contributions and success rates. Wit and Wilke (1998) find that threshold uncertainty decreases contributions, whereas Suleiman, Budescu, and Rapoport (2001) find that uncertainty increases contributions for a relatively low (mean) threshold but that it decreases contributions for a relatively high (mean) threshold. The theoretical literature likewise provides mixed predictions on the effects of threshold uncertainty (Nitzan and Romano 1990; McBride 2006). Regardless, the nature of the uncertainty that we explore is different. In prior designs, there is uncertainty over the (final) goal, and this uncertainty is not resolved until after all contributions are made; this feature does not characterize most crowdfunding campaigns. In our setting, uncertainty over the final goal is resolved if/when an intermediate goal is reached. This reflects a situation where the campaign designer introduces a "stretch" goal and is motivated by the common use of stretch goals in contemporary fundraising campaigns.

Previous research on value uncertainty in the public goods context is limited to linear VCM games (e.g., Gangadharan and Nemes 2009; Levati, Morone, and Fiore 2009). By changing either the marginal per-capita return from donating or the marginal value of money kept, uncertainty has little to no effect on contributions (Levati, Morone, and Fiore 2009; Levati and Morone 2013;

[2] Bagnoli and Lipman (1989) argue that, for a static one-stage game involving multiple provision points, none of the Nash Equilibria will be efficient.

Gangadharan and Nemes 2009). However, in a linear VCM, the uncertainty is multiplicative (i.e., uncertainty increases with contributions), whereas in the provision point case it is common to model uncertainty as additive. Therefore, the effects of value uncertainty may not be inferable from prior VCM games.

2. Theoretical framework

In this section we formally describe a family of fundraising games, analyze their theoretical properties, and derive hypotheses that will later be tested with an experiment. All games studied are variations of the following set up:

1) Players, strategy space and payoffs

- *N* players are each endowed with the same number of tokens, *E*. They can contribute some or all tokens towards the provision of a public good.
- Individual contributions can be made at any time $t \in [0, T]$, where *T* is the maximum length of the fundraising campaign. Each contribution a_{it} is an integer between 1 and *E*, but the sum of a player i's contributions, $g_i(t)$ can never exceed her initial endowment.
- If, at any time in the game, the sum of contributions by all players, $G(t)$, reaches the provision cost, *C*, the game ends immediately. In this case, each player receives an equal benefit v from the provision of the public good and foregoes the sum of all her contributions for a payoff of $U_i = u_i\big(E + v - g_i(t)\big)$.
- If the sum of contributions at terminal time *T* is below *C*, no public good is provided but each player gets a full refund of her contributions. In this case, the payoff is $U_i = u_i(E)$.

2) Information

- At all times during the game, players can observe their own cumulative contributions, their own balance of tokens, as well as the aggregate contributions made by all players. They do not observe other players' individual contributions.

- All of the rules of the game described thus far (as well as the rules for additional variations introduced below) are known and common knowledge.

Throughout, we restrict the theoretical analysis to players who are risk neutral and maximize expected utility over monetary payoffs; thus, in the case of a successful campaign, utility is $U_i = v - g_i(t)$.[3] This follows the tradition of most work in differential games (Dockner et al. 2000). Our analysis builds upon Cason and Zubrickas (2019) and Cason, Tabarrok, and Zubrickas (2021), who consider very similar games. The major difference is that in those studies, players randomly draw a private value for the good, introducing uncertainty about player types. In ours, it is common knowledge that all players stand to receive the same benefit.

Admitting the possibility that players could have incomplete information about other players' preferences (certainly regarding v, but also possibly from different risk attitudes or other-regarding preferences, etc.) leads to infinitely many possible equilibria and largely intractable solutions that would have little or no bearing on the analysis of the experimental data. This is why we limit our analysis to a characterization of MPE (Maskin and Tirole 2001). MPE is a commonly used solution concept in differential games, primarily because alternatives (e.g., closed loop equilibria) are extremely difficult to find (Dockner et al. 2000).

The central assumption of MPE is that at each point in time, the history of the game is entirely summarized by its current state. In the contribution game, the only relevant information is $G(t)$, the cumulative amount pledged by the group up to time t. The identities of other players and the timing of their contributions are irrelevant to a player's choice of future contributions. The

[3] To simplify notation we abstract from the initial endowment, E, since it plays no role in the analysis.

number of MPE's can still be very large but it excludes entire families of more sophisticated equilibria. For instance, MPE's ignore equilibria in which players time their contributions strategically as signals to induce other players to contribute more.

2.1 Dynamic fundraising game with one known goal and no value uncertainty

The fundraising game is a dynamic game in continuous time. The derivation of Markov equilibria by Cason and Zubrickas (2019, pp 455-457) applies if we are mindful of two differences: (1) we do not consider refund bonuses (i.e., only their analysis where $r = 0$ applies); and (2) we consider a game where v is the same for all players, rather than privately drawn from a known distribution.

We follow Cason and Zubrickas' notation with only minor changes. Denote time in the game by $t, t' \in [0, T]$. At each instant, player i chooses the rate at which she makes new contributions to the campaign: $a_i(G(t), g_i(t), v, t) \geq 0$. In the MPE, player i's contributions are a function of her own contributions up to time t, $g_i(t)$, the sum of contributions by all players up to time t, $G(t)$, and the gross benefits, v, that she stands to receive when the funding goal is reached. Since $G(t) = \sum_{j=1}^{N} g_j(t)$, the sum of contributions at time t embodies the strategies of all players.

At any time t, player i chooses her contributions to maximize the expected value function

[1] $$MAX_{a_i} \ \mathbb{E} J_i\left(a_i(\cdot), \{a_j(\cdot)\}_{j \neq i}\right) = \int_t^T -a_i(G(t'), g_i(t'), v, t')dt' + [Pr(G(T) < C|G(t))]\big(g_i(T) - g_i(t)\big) + [1 - Pr(G(T) < C|G(t))]\big(v - g_i(t)\big)$$

The integral term is the sum of player i's future contributions (from t to T). A game only ends before T when the goal is reached, and thus this cannot decrease a player's payoff. Hence, there is no loss of generality from interpreting T as the time at which the game ends.

Given total contributions $G(t)$, there is a probability $Pr(G(T) < C|G(t))$ that the threshold contribution level C will not be met before the end of the campaign. When this is the case, all future contributions are refunded. When the goal is reached (i.e., with probability $[1 - Pr(G(T) < C|G(t))]$), the player receives a net continuation benefit $v - g_i(t)$.

This maximization problem is subject to two constraints:

[2] $dg_i(t') = a_i(G(t'), g_i(t'), v, t')dt'$

[3] $dG(t') = \sum_{j=1}^{N} a_j\big(G(t'), g_j(t'), v, t'\big)$

Note that given the linear utility function in monetary payoff, the optimal solution must have $g_i(T) \leq v$, with players contributing no more than they stand to gain from the public good. We refer to this as a basic rationality condition.

Equation (2) follows directly from the definitions of g_i and a_i. Integrating both sides between t and T gives the sum of all future contributions by player i: $g_i(T) - g_i(t) = \int_t^T a_i(\cdot)\, dt' \equiv g_i^{T-t}(G(t), g_i(t), v, t)$. Using this result in (3) yields final contributions $G(T) = G(t) + \sum_{j=1}^{N} g_j^{T-t}$.

As contributions are fully refundable when the goal is not met, (1) can be rewritten as player *i* choosing g_i^{T-t}. That is, the player chooses *at time* t the total amount of continuation contributions to be made until the end of the game. This must be true at any time in the game (including $t = 0$).

As Cason and Zubrickas (2019) establish, pure strategy MPE can therefore be distilled to a choice of final contributions by each player, regardless of how this is achieved. In other words, the final vector of players' contributions must itself be an equilibrium of the equivalent static game where each player simultaneously chooses a single contribution level, $g_i(T)$. Players must also hold beliefs that are consistent with the chosen equilibrium but before discussing beliefs, it is worthwhile to characterize the equilibrium properties of vectors of final contributions $\left(g_1(T), g_2(T), \ldots, g_N(T)\right)$.

The equilibria of the static game where failed campaigns result in a loss of contributions are found in Bagnoli and Lipman (1989) and further discussed in Bagnoli and McKee (1991). Equilibria with a money back guarantee (refund of contributions when the threshold is not met) are considered in Rondeau, Schulze and Poe (1999) among others. However, in our dynamic setup, the game ends immediately when aggregate contributions reach the goal, $G(T) = C$. It is therefore impossible for the group to exceed the goal. This simplifies the analysis since only the contribution profiles where $G(t) \leq C$ need to be considered.[4]

Under the maintained assumption that the aggregate value of the good exceeds its costs ($Nv \geq C$), vectors of final individual contributions can be grouped into three distinct categories:

1. Efficient equilibria where the goal is reached. Players contribute an aggregate amount equal to the goal of the campaign, $G(T) = C$, subject to the individual rationality condition that no player contributes more than her value for the good: $g_i \leq v \; \forall i$.
2. Inefficient equilibria where the goal is not met. In these equilibria, $G(T) < C$. In such equilibria, it must be true that no single player could rationally increase her contribution to reach the threshold. Zero contributions by all players is an inefficient equilibrium, but there is a multitude of other such inefficient equilibria because of the refund provision.
3. Non-equilibrium contributions. The sum of contributions falls short of the goal, $G(T) < C$, but at least one player could rationally and unilaterally increase her contributions to reach the threshold, i.e., $G(T) - C < MAX_i[v - g_i(T)]$ for at least one i.

[4] Marks and Croson (1998) discuss rebate mechanisms for excess contributions in the static game.

Let us now return to the beliefs required to support MPE. In the game of complete information (where the game form is known and common knowledge), the only belief required is that the sum of contributions by all other players will cover the funding gap between the goal, the current total and player i's own intended future donations:

[4] $$\int_t^T \sum_{n\neq i} a_n^*(t)\, dt' = C - G(t) - \left(g_i(T) - g_i(t)\right)$$

These beliefs support efficient Markov strategies that are entirely forward looking and completely agnostic about *how* $G(t)$ was reached and *how* $G(T)$ will be reached. Cason and Zubrickas establish formally (their Hypothesis 3, which applies here) that even when there is incomplete information about player types, the timing of contributions by others has no impact on a player's own rate of contributions. In addition, only the sum of player i's contributions matters (this is their Hypothesis 4, which also applies here). Future contributions by player i are negatively correlated with the player's own past contributions. Having previously contributed a greater amount means that less is required in the future to achieve one's intended total contribution.

2.1 Value uncertainty

Next, we consider an extension where players face uncertainty over the benefits they stand to receive when the goal is reached. Specifically, players know that when the public good is funded, all players will receive one of two possible values, v_1 or v_2, with equal probabilities. In this situation, equation (1) becomes

[1'] $$MAX_{a_i}\, \mathbb{E}\, J_i\left(a_i(\cdot), \left\{a_j(\cdot)\right\}_{j\neq i}\right) = \int_t^T -a_i(G(t'), g_i(t'), v, t')dt' + [1 - Pr(G(T) < C|G(t))]\left(\frac{v_1+v_2}{2} - g_i(t)\right) + [Pr(G(T) < C|G(t))]\left(g_i(T) - g_i(t)\right)$$

Under the maintained assumption that players have a linear utility function in monetary payoffs, value uncertainty only affects the outcome through the rationality assumption. A rational player should commit at most $g_i(T) \leq (v_1 + v_2)/2$. Otherwise, all previous results hold.

2.2 Markov equilibria with intermediate and final goals

We finally turn to fundraising campaign with two goals, which we refer to as Goal 1 (or the intermediate goal), and Goal 2 (or final goal). It is common knowledge that if Goal 1 is reached, contributions made up to that point become binding, and players will receive intermediate benefits associated with this first provision level. When Goal 1 is reached, players are informed in real time, and the game continues with additional contributions going towards the final goal. If Goal 1 is reached but Goal 2 is not, all contributions made after Goal 1 was reached are refunded. As in the single goal case, if neither goal is reached, all contributions are refunded.

We assume throughout the analysis that the incremental benefits to the group of reaching "the next goal" always exceed the incremental group costs required. In other words, both goals have a benefit cost ratio greater than one. Most importantly, making the incremental donations from Goal 1 to Goal 2 is efficient (reaching only Goal 1 in a 2 Goal game is inefficient). This implies that an efficient MPE of this game must reach Goal 2, but also that Goal 1 is necessarily achieved along any efficient equilibrium path to Goal 2.[5]

In all cases considered in this study, Goal 1 is always known with certainty at the beginning of the game. For the final goal, however, we consider two separate conditions. In the first, Goal 2

[5] If one were to think in terms of discrete subgames, the argument is simply that in all Markov equilibrium strategies, all the subgames leading to terminal payoffs in which Goal 2 is achieved must necessarily include a point in the game where Goal 1 was achieved.

is also known at the outset of the game. In the second condition, players know that Goal 2 will be drawn from a known probability distribution and announced as soon as Goal 1 is reached.

2.2.1 Final goal is known at the beginning of the game

Where both goals are known with certainty from the beginning of the game, the existence of an intermediary goal does not alter the fundamental properties of efficient MPEs. This is true because we limit our analysis to cases where it is always efficient to reach the final goal. Since MPEs do not prescribe nor are they affected by different rates of contributions, introducing an intermediate goal does not introduce any strategic advantage or disadvantage. It remains true that only the sum of an individual's continuing contributions between any t and T matters.

There is, however, a behaviorally relevant refinement worth considering. A MPE does not require specifying strategies off the equilibrium path since all players simply choose their own contribution rate and assume that others similarly do so to achieve the final goal. A potentially relevant idea – especially when considering experimental data - arises from considering Markov Trembling Hand Perfect Equilibria (MTHPE) (Acemoglu, Egorov, and Sonin 2009). The central idea of the Trembling Hand refinement (Selten 1975) is that players sometimes make small mistakes in implementing their equilibrium strategy, resulting in outcomes off the path of play predicted by the error-free strategies. Trembling hand equilibria are robust to those errors.

It is beyond the scope of this paper to explore the full theoretical ramifications of MTHPE as this requires speculating on the nature and statistical properties of such mistakes. However, it is worth noting that the presence of a binding Goal 1 would almost certainly alter the set of equilibria. Consider a rational player who believes that Goal 2 might not be reached because of trembling-hand deviations from efficient Markov strategies by other players. If so, this player should rationally limit her contributions towards Goal 1 to be no more than the intermediate benefits, v^{Int}, she stands to receive at Goal 1. Otherwise, she runs the risk of a negative payoff if Goal 2 is not reached. Contributing more than v^{Int} before Goal 1 is reached entirely avoids the risk of losses at zero cost to the player. This is because under Markovian strategies in a continuous time game, reaching Goal 1 at any time arbitrarily close to T always leaves enough additional time to adjust contributions and reach Goal 2. Waiting until Goal 1 is reached to commit intended contributions above v^{Int} makes these additional contributions fully refundable and, under Markov strategies, does not alter other players' choices.

We therefore hypothesize that the introduction of an intermediate goal would, if anything, slow down contributions early in the game (i.e., prior to reaching Goal 1). As an example, consider games with final value v^F, and a parallel game with an added intermediate value $v^{Int} < v^F$. In a single goal game, contributing an amount $g_i \leq v^F$ at any time in the game can be part of an efficient MPE strategy. However, in a two goal game, shifting the portion of any intended contributions in the range $v^{Int} < g_i \leq v^F$ from before to after Goal 1 does not affect the efficient MPE to Goal 2 but avoids the risk of losses. Without formal analysis, we conjecture that $v^{Int} < g_i \leq v^F$ before Goal 1 is reached is dominated by $g_i < v^{Int}$ in MTHPE. Hence, strategies containing high early contribution rates would be removed from the set of MTHPE equilibria.

2.2.2 Final goal is uncertain until Goal 1 is reached

We next consider the case where the level of Goal 2 is uncertain, but its value is revealed as soon as Goal 1 is reached. At the beginning of the game, it is common knowledge that Goal 2 can take one of two values with equal probabilities. It is also possible that one of those possibilities is that there is no final goal, in which case the game stops when Goal 1 is reached. This is tantamount to the stretch goal of some campaigns, where donors do not know for sure whether a new goal will be announced once Goal 1 is met. This case provides the clearest example yet of why it would be suboptimal for a player to pledge more than her Goal 1 (expected) benefits. Otherwise, all previous results hold because in all variants of the game considered, threshold costs and benefits levels always make it efficient to reach the final goal in an MPE.

2.3 Testable hypotheses

We state as testable hypotheses the main predictions that can be gathered from the theoretical framework. These hypotheses are derived under the assumption that players adopt Markov Perfect strategies (or Markov Trembling Hand Proof Strategies in the case of Hypothesis 6) that reach efficient equilibrium provision levels.[6]

Hypothesis 1. Including an intermediate goal has no effect on revenue or the likelihood of reaching the final goal.

Hypothesis 2. Uncertainty over the individual benefits received from reaching a goal has no effect on revenue or the likelihood of reaching the final goal.

Hypothesis 3. Within the two-goal framework, making the final goal uncertain at the start of the campaign has no effect on revenue or the likelihood of reaching the final goal.

Hypothesis 4. Future contributions from an individual are inversely related to past own contributions.

Hypothesis 5. Past contributions from other donors do not affect an individual's future contributions.

Hypothesis 6. Introducing an intermediate goal with binding contributions and benefits can only slow down the rate of contributions in the early part of the game.

The first three hypotheses relate to group-level outcomes. Given the payoff structures employed, it is always efficient to reach the (final) goal, and the introduction of an intermediate goal is not expected to alter total contributions in efficient MPE. With value uncertainty, funding the good not only maximizes expected group net benefits, but results in an efficient ex-post

[6] Our hypotheses are specific to the assumptions we make regarding the relationship between goal levels, benefit levels and the specific forms of uncertainty considered. We make no claim as to their generality.

outcome even when the low value draw arises. Hypotheses 4 and 5 relate to expected contribution dynamics; they mirror Hypotheses 3 and 4 of Cason and Zubrickas (2019) in the absence of a refund bonus. Hypothesis 6 is implied by the theory, given that the inclusion of a payoff relevant intermediate goal is expected to deter people from making contributions that exceed their intermediate valuations before the intermediate goal is reached.

3. Experimental Design

Participants are randomly matched into groups of $N = 4$, with four to six groups in an experimental session. Depending on the treatment, there are 15 or 16 decision rounds (i.e., fundraising scenarios) in a session. Participants remain in the same group throughout the experiment, a fact that they are informed of.[7] In each scenario, each participant is endowed with $E = 8$ eight tokens that they can contribute towards a group "project" at any time in a fundraising campaign lasting at most $T = 120$ seconds.[8] Tokens not contributed are kept by participants.

As per the games described in the theoretical framework, each project has one goal (a final goal) or two goals (an intermediate and a final goal) that trigger provision when reached. If a group contributes enough tokens to reach a goal, all members of the group receive the same payoff. In treatments with two goals, the group receives a payout for reaching either goal.

3.1 Treatments

We implement a 3x2 between-subjects design, as depicted in Table 1. There are three goal structures: one final goal (1Goal); an intermediate and known final goal (2Goal); and an

[7] Since participants are engaged in a repeated game without knowing how many rounds they would be playing, it is conceivable that one of the types of strategic equilibria that we do not study derive from some folk theorem that could perhaps be constructed for such a game.
[8] All money amounts are denominated in tokens with a conversion rate of 10 tokens to 1 US dollar.

intermediate and an unknown final goal (2GoalUnk). When the final goal is unknown, participants are told at the beginning of the game that two values are possible and that each one has an equal chance of being selected. They also know that the randomly selected value of the final goal will be revealed to them as soon as the first goal is reached. In some scenarios, one of two possible values is "no goal", which immediately ends the fundraising campaign and reflects situations where it is unknown whether the campaign organizer will introduce a "stretch" goal.

Across all three goal structures, we vary whether the final payoff values are certain or uncertain (when there are two goals, intermediate benefits are always known). When final values are certain, the payoff for reaching the final goal is known at the beginning of the game (regardless of whether the final goal level is known or not). Specifically, all sessions with a certain value have $v^F = 10$. Where there is an intermediate goal, $v^{Int} = 5$. It is worth nothing that in two-goal treatments, these payoffs are not additive (i.e., the payout for the final goal is not in addition to the payout for the intermediate goal). Layers secure v^{Int} if they reach Goal 1 and get v^Fas they total payoff if the group reaches the final goal.

In value uncertainty treatments, the individual payoff from reaching a goal can take two possible values. At the beginning of a round, participants are told what the two possible values are and that each one has a 50 percent chance of being chosen. In all treatments with uncertain values, the possibilities are 3 and 7 for the intermediate goal, and 8 or 12 for the final goal. We chose these values so that their respective expected values are equal to the equivalent benefits in the known value treatments (5 and 10 respectively). This maintains comparability across treatments. Moreover, while the theory assumed risk neutral players, groups with risk averse players are nevertheless expected to reach the final goal. Specifically, even under the extreme assumption that the low value draw is the actual value, reaching the final goal remains efficient.

Contributions are only binding if a goal is met, and any contributions towards an unattained goal are refunded. In other words, contributions are best characterized as pledges. In two-goal treatments, if the intermediate goal is not met, all contributions are refunded to contributors; and if the intermediate goal is met but the final goal is not, all contributions made after the intermediate goal was reached are refunded. Using refunds lowers the risk associated with contributing tokens and increases the likelihood of meeting the final goal (Cason and Zubrickas 2019).

Parameters for each scenario and each treatment are detailed in Table 2. With these parameters we can carefully identify treatment effects of interest using both within- and between-subject variation. Across scenarios there is significant variation in the final goals: we use 8, 10, 12, 14, and 16 tokens. Moreover, the same final goal values are used regardless of goal structure. For the uncertain goal structure, we further investigate whether the riskiness of the final goal matters. In particular, the difference between the low and high final goal values is eight for the first four scenarios and is four for the next four scenarios. For half of the scenarios of the uncertainty goal structure treatments, there is uncertainty over whether there *is* a final goal; there is a 50 percent chance that the final goal will be a known value and a 50 percent chance that there is no final goal. Varying across these scenarios is the level of the stretch goal, when it is activated.

In all scenarios, reaching the final goal results in an efficient outcome. This is true even when there are two goals since the increase in total benefits between Goals 1 and 2 always exceeds the incremental contributions needed for the group to go from Goal 1 to Goal 2.

3.2 Power analysis

To determine sample sizes, we conducted a paid pilot experiment with 24 participants in the 2Goal treatment. The power calculations focus on relatively lower-powered hypothesis tests, which are based on group-level outcomes. In the power calculations, we assume that the estimated within and between-subject variances from the pilot session are representative of all treatments. Moreover, we assume that tests are based on a linear regression model with standard errors clustered at the group-level. Based on calculations using 80 percent power and a 5 percent significance level, this led to a target sample size of 15 groups per treatment. This allows one to detect a minimum detectable effect (MDE) of about 11 percentage points when testing whether two treatments have the same likelihood of reaching a fundraising goal, and a MDE of approximately 0.6 tokens when testing whether two treatments yield the same revenue.

3.2 Participants and procedures

Three-hundred and sixty-four undergraduate students enrolled at a large public university participated in the experiment. All sessions were conducted in a designated experimental economics laboratory, and participants were recruited from an existing subject pool. The pool resembles the general population of students at the university with respect to gender, age, etc. In total, there are nineteen sessions with an average of 20 participants per session. Sessions lasted approximately 90 minutes and individual earnings averaged $23.73.

Decisions were entered on networked computers using a program coded with the software z-Tree (Fischbacher 2007). Written instructions were provided to participants, which were read aloud by a moderator. The experiment included three separate tasks. First, participants faced a multiple-price-list risk elicitation procedure popularized by Holt and Laury (2002). Second, participants engaged in the main fundraising experiment. This began with an unpaid practice round. All subsequent decision rounds were paid. The order the fundraising scenarios were faced varied across groups. The experiment concluded with a post-experiment questionnaire. Representative instructions and computer screenshots are provided in Appendix B.

4. Results

The main outcome measures, treatment-related variables, and participant characteristics are summarized in Table 3. The top panel of Figure 1 presents the final goal success rate by treatment, which ranges from 72.6 to 92.5 percent. Overall, these rates are quite high when compared to findings from the related threshold public goods experiments. The bottom panel of Figure 1 displays the revenue generated, on average, by treatment. Overall, revenue ranges from 9.6 to 11.0. To place this into perspective, when evaluated as a percentage of the final goal, this corresponds to collection rates of 80.2 to 91.7 percent.

As may be gleaned from the figure, relative to the benchmark 1Goal treatment, there is a clear drop in campaign success and revenue when one introduces either value uncertainty or an intermediate goal. Relative to the 1Goal case, decreases in final goal success rates range from 5.8 (1Goal-Unc) to 19.9 (2GoalUnk) percentage points, and decreases in revenue range from 0.7 to a 1.4 tokens. The effects of other moving parts in the design, including value uncertainty and final goal uncertainty are less pronounced. In the first part of the data analysis that follows, we will test the first three hypotheses which relate to these outcome variables.

When analyzing group-level outcomes using models that include data from all treatments, we make two adjustments to place treatments on equal footing. First, observations from 2GoalUnk and 2GoalUnk-Unc where no stretch goal was possible are excluded, as the realized (final) goals in these cases are lower than those encountered in the other treatments. Second, we make use of sampling weights to correct imbalances in the observed frequencies of final goal levels across treatments.[9] These adjustments have been applied to obtain the estimates presented in Figure 1.

In the second part of the analysis, we analyze individual continuation contributions, which are relevant for tests of Markov strategies and relate to Hypotheses 4 and 5. In the third part of the analysis, we analyze the timing of contributions, which includes a test of Hypothesis 6. The section concludes with a brief discussion of supplemental analysis.

4.1 Group Behavior

4.1.1 Final goal reached

Table 4 presents regressions for the outcome *Final Goal Reached*. For both regressions, the indicator for the 1Goal treatment is omitted, and as a result all treatment effects are measured relative to 1Goal. The main findings are: (1) including an intermediate goal decreases the probability of reaching the final goal, which contrasts with Hypothesis 1; (2) value uncertainty decreases final goal success only for the one-goal case, which indicates mixed support for Hypothesis 2; and (3) making the final goal uncertain at the start of the campaign has no effect, consistent with Hypothesis 3.

For the case of value certainty, and based on specification (1), the coefficients on 2Goal and 2Goal indicate that introducing an intermediate goal decreases final goal success rates by 17.8 and 19.9 percentage points, respectively. In contrast, introducing value uncertainty along with a two-goal structure tends to increase success rates, although the effects are not significant. In part

[9] The sampling weights mirror those used for stratified random sampling. Here, a stratum is defined by a final goal level, and the sampling weight for observations within a stratum is calculated as the expected number of observations (for the case of an equal distribution of levels) divided by the actual number of observations. Observations in regressions are then weighted by (i.e., multiplied by) the inverse of the sampling weight. Applying sampling weights has virtually no effect on conclusions drawn from hypothesis tests.

due to this contrast, introducing an intermediate goal when values are uncertain leads to less pronounced effects of 6.8 to 9.8 percentage points. There is a significant difference when comparing 1Goal-Unc with 2Goal-Unc only.

For the one-goal structure, there is a reasonable decline in the success rate attributable to value uncertainty; in particular, the success rate declines by 5.8 percentage points and this decrease is marginally significant. The differences in success rates across the four two-goal treatments are small in magnitude and are not statistically significant.

Comparisons of two-goal treatments with and with final goal uncertainty suggests that this distinction makes little difference to the group-level results. For the case of value certainty, the estimated difference is 2.1 percentage points. For value uncertainty, the difference is 3.0 percentage points. In neither case is the difference statistically significant.

Specification (2) in Table 4 extends the regression model specification to include participant characteristics, and indicators that distinguish the order in which the scenarios were presented. Whether the final goal is reached is statistically correlated with the proportion of males in the donor group (a 4.1 percentage point decrease for each male) and the proportion of risk averse donors (a 4.2 percentage point decrease per risk averse person). The indicators related to order effects are not significant, either individually or jointly. Adding in these controls generally increases the differences between the baseline 1Goal treatment and the others. Treatment effects are overall more precisely estimated with controls, although none of the conclusions drawn pivot on the inclusion or exclusion of control variables.

For a more granular investigation of campaign design, Table 5 presents treatment-specific models that include as covariates the final goal level and, when applicable, the intermediate goal level. For uncertain goal treatment models, we include an indicator for scenarios where there was a 50 percent chance that no stretch goal (i.e., final goal) would be implemented. We also include an indicator that equals 1 for Scenarios 1 to 4, which reflects a higher degree of goal uncertainty among scenarios for which there was always a stretch goal. While the reported models do not include additional control variables, the basic conclusions we draw are robust to their inclusion.

The regressions indicate that the level of the final goal has a small effect in one-goal treatments: Increasing the level of the final goal by 1 token decreases the success rate by about 1 percentage point. In contrast, the final goal level has a large effect for all two-goal treatments, with effects ranging from -4.8 to -6.1 percentage points for a one-token increase. The results also suggest that the effects of a particular scenario characteristic depend on what other "moving parts" are present. First, in the 1Goal treatment, increasing the level of the final goal has a small but significant and negative effect on the likelihood of reaching the final goal. However, when value uncertainty is introduced (1Goal-Unc) the level of the final goal is insignificant. Since uncertainty decreases the success rate, this suggests that participants focus on this uncertainty rather than the final goal level. Second, the level of the intermediate goal does not matter in 2Goal, but has a pronounced and negative effect of 4.4 percentage points per one-token increase when threshold uncertainty is introduced in 2GoalUnk. Thus, there is some evidence that more focus is placed on the intermediate goal when the final goal is unknown. Third, while both the level of the intermediate goal and whether no stretch goal is possible matter when values are certain, neither design variable has a significant effect (and magnitudes are also small) when values are uncertain.

4.1.2 Revenue

Columns (3) and (4) of Table 4, and Table 6, present regression models using *Revenue* as the dependent variable. Overall, the results are similar to those based on the final goal success rate in that introducing the intermediate goal decreases revenue (rejecting Hypothesis 1), value uncertainty decreases revenue in the one-goal case only (mixed support for Hypothesis 2), and introducing final goal uncertainty does not affect revenue (consistent with Hypothesis 3).

From Table 4, relative to the 1Goal baseline, money raised by the campaign is statistically different, and lower, for all treatments except for 1Goal-Unc. The decrease in donations for the two-goal designs when values are certain is somewhat modest nevertheless, ranging from 1.1 to 1.4 tokens. Thus, even though the two-goal designs allow for provision at a lower level and thus have a practical advantage, the introduction of an intermediate goal in fact *lowers revenue*.

With value uncertainty, including an intermediate goal lowers contributions by 0.3 to 0.4 tokens on average, although these differences are not statistically significant. Thus, value uncertainty, except for some marginal evidence (when covariates are included) related to the one-goal structure, has no statistically significant effect on donations. Donations collected are also very close in magnitude, and not statistically different, when comparing 2GoalUnk to 2GoalUnk-Unc. This suggests there is no effect of introducing threshold uncertainty, on average. Therefore, the analysis of revenue yields similar insights as does the analysis of final goal campaign success. This includes the effects of control variables, as we find that increasing either the proportion of males or the proportion of risk averse individuals decreases revenue.

Table 6 reports treatment-specific regressions that highlight how revenue varies with characteristics of the campaign design. For the one-goal treatments, about 0.8 more tokens are collected when the final goal is raised by 1 token. These regressions provide some additional evidence that adding complexity has pronounced effects. When values are certain, introducing an intermediate goal decreases the sensitivity of the amount collected to the level of the final goal. Threshold uncertainty does influence revenue, with donations ultimately collected decreasing with both the extent of the threshold uncertainty and whether at the beginning of the campaign it was possible for no stretch goal to be implemented. Adding value uncertainty to the 2Goal structure increases the sensitivity of donations to the level of the final goal, but the level of the intermediate goal no longer matters. Adding value uncertainty to 2GoalUnk increases the focus on the intermediate goal, and less focus on the availability of a stretch goal.

4.2 Contribution dynamics

4.2.1 Continuation contributions

We next test whether individual contribution decisions are consistent with Markov strategies (Hypotheses 4 and 5). We employ the following regression specification, which is similar to Cason and Zubrickas (2019):

[5] $$g_{it}^{T} = \beta_0 + \beta_1 g_{it} + \beta_2 G_{-it} + \beta_3 t + \alpha_i + \epsilon_{it},$$

where g_{it}^{T} denotes donor i's continuation contributions in decision round t, g_{it} are prior contributions from the same donor within the same round (campaign), and G_{-it} are prior contributions from all other group members. The α_i are participant fixed effects and including t allows for a time trend. Hypotheses 4 and 5 imply that $\beta_1 < 0$ and $\beta_2 = 0$, respectively.

For a one goal setting, Cason and Zubrickas (2019) divide the decision round in halves and define g_{it}^{T} as the contributions made in the second half of the round. We structure the analysis differently to accommodate the two-goal cases. We first divide the decision round into two stages: before (stage 1) and after (stage 2) a group reaches the intermediate goal. Then, we divide each stage in half and define continuation contributions as those made in the second half of the respective stage. A separate regression model then applies to each stage. The stages are irrelevant from a theory perspective, as Markov strategies are not a function of timing within a game.

However, this division allows us to examine whether strategies may be shifting due to the presence of the intermediate goal.

To allow for an apples-to-apples comparison, we analyze the data from the one-goal treatments in a similar manner. Specifically, we construct counterfactual stages by assuming the same scenario-specific intermediate goals in effect for the two-goal (known) treatments are also in effect for the one-goal treatments. For example, for scenario 3 campaigns we assume an intermediate goal of six and then define the end of stage 1 (beginning of stage 2) as the time when the sixth token is contributed.

Table 7 and 8 present the regressions of continuation contributions for one and two goal treatments, respectively. The estimation sample is restricted to campaigns for which the final goal was reached. In all cases, the coefficient on prior own contributions (β_1) is negative and statistically significant, consistent with Markov strategies (Hypothesis 4). However, while the prior contributions of others are strategically irrelevant under MPE (Hypothesis 5), the evidence is mixed. Interestingly, we fail to reject Hypothesis 5 for stage 1 contributions for all treatments, as well as for stage 2 contributions for the one-goal treatments. We note that Cason and Zubrickas (2019) also find statistical support for Markov strategies for a related one-goal case: one contribution goal and no refund bonus.

The fact that continuation contributions in stage 2 are increasing in others' contributions for two-goal treatments potentially provides insight into why two-goal campaigns were generally less successful: donors do not appear to be playing Markov strategies after Goal 1 is reached. Note that if we extend the estimation sample to include campaigns where the final goal is not reached, this does not change our main findings.[10] In fact, when unsuccessful campaigns are added, the coefficient on others' contributions increases in magnitude.

4.2.2 Timing of contributions

In Figure 2 we display the timing of contributions at five-second intervals for all campaigns (regardless of whether the final goal was reached). Nearly 33 percent of the pledges are made within the first 10 seconds of the campaign. Contribution rates then decline over the 11 to 60 second range, remain flat over the 61 to 110 range, and then increase over the last 10 seconds. Over 12 percent of pledges are made in those last 10 seconds. This U-shape dynamic contributions pattern mirrors that of many crowdfunding campaigns conducted in the field (Strickler 2011; Lambert 2024). Consistent with the messaging from Figure 2, most successful campaigns are funded as the campaign timer runs down. In fact, Figure 3 shows that, more than 60 percent of the time, the final goal is met within the last five seconds of the round.

Figure 4 presents cumulative average contributions, by treatment, over the course of a fundraising campaign. Clear from this figure is that contributions accumulate faster in the one-goal treatments. This includes cumulative contributions in the two to eight token range, which spans the levels of the intermediate goal. To formally examine whether the inclusion of an intermediate goal impacts contribution rates, which relates to Hypothesis 6, we estimate regression models where the dependent variable is the time it takes to reach the intermediate goal. To provide the relevant counterfactual, and as we did when analyzing continuation contributions, we calculate timing for the one-goal treatments by assuming the scenario-specific intermediate goals in place for the two-goal (known) treatments were in effect for the one-goal treatments.

[10] For this robustness check, we use the end of the decision round to define the end of stage 2, rather than the time at which the final goal is reached.

Regression results are reported in Table 9. Specifically, we estimate a linear regression to identify the average treatment effects and quantile regressions to examine differences in timing at the 25th, 50th (median), and 75th percentiles of the conditional outcome distributions. The mere inclusion of the intermediate goal slows the timing of contributions. Average differences relative to the 1Goal baseline range from 13.7 to 33.2 seconds, which translate into 55.2 to 133.6 percent increases. These effects persist at other points in the outcome distribution, indicating that these effects are systematic and not driven by a handful of extreme cases. The effects are smaller at the 25th percentile (4.0 to 20.5 seconds) and are quite large at the 75th percentile (28.9 to 58.3 seconds). The overall results are consistent with Hypothesis 6.

Hypothesis 6 is motivated by the fact that, under MTHPE, participants should not contribute an amount toward the intermediate goal that exceeds their value of reaching the goal. For all treatments, such large donations are rare. However, for our design parameters, such large donations would imply substantial deviations from the average individual contribution required to reach even the *final* goal. The average cost is likely to serve in part as a focal point, and deviations could run against a possible social norm of a relatively equitable distribution of costs. Nevertheless, the inclusion of the intermediate goal significantly alters the distribution of contributions and notably leads to a lower frequency of relatively high donations.[11] Across all two-goal treatments, 8.0 percent of participants make cumulative contributions of 3 tokens, and 2.1 percent have pledged 4 tokens when the intermediate goal is reached. In the (counterfactual) one-goal treatments, the comparable figures are 17.1 and 10.4 percent.

[11] We conducted pairwise Fisher's exact tests across comparable one and two-goal treatments on a scenario by scenario basis (e.g., a test between 1Goal-Unc and 2Goal-Unc for Scenario 1). In nearly all cases (50 of 62 tests) we reject at the 5 percent level the null hypothesis of equal frequencies across observed contribution amounts.

4.3. Supplemental analysis

We have undertaken additional analysis and briefly summarize the findings here. Figures A1 and A2 in Appendix A plot treatment-specific time-series of the final goal success rate and revenue. There is little evidence of systematic trends. As seen in Figure A3, the main difference across decision rounds is the time it takes to meet the final goal. Across all treatments, in the first round successful groups reach the goal in approximately 74 seconds. However, over the next five rounds, this time increases to an average of 104 seconds and then stabilizes thereafter.

We also analyzed intermediate goal success rates (Table A1) and group pledged (i.e., intended) contributions (Table A2). For the two-goal treatments, we find that the intermediate goal is met in 98.2 percent of cases, with very little variation across treatments (97.3 to 99.2 percent). Coinciding with this lack of variation, there are neither any differences across treatments, nor are there differences within a treatment based on other variations in campaign design (Table A3). Group-level pledged contributions are statistically different, and lower, for each of the two-goal treatments relative to the one-goal treatment when values are uncertain. In the case of revenue, recall that two-goal treatments lead to lower revenue for both certain and uncertain values.

It is possible that the various group-level analyses mask important differences within groups. To investigate this, we analyze a measure of within-group variation in pledged donations. Specifically, we define a variance measure for donor i in group g and scenario s as the squared deviation from the average pledges from the group in this same scenario:

[6] $$Contribution\ Variance_{igs} = \left(x_{igs} - \bar{x}_{gs}\right)^2$$

Regressions with this outcome variable are presented in Table A4 and Table A5. Table A4 reveals that, for any given treatment, the within-group variance is statistically equal to the benchmark treatment, 1Goal. The 2Goal treatment has the highest within-group variance, and it is statistically different from both 2GoalUnk and 2Goal-Unc. Participants classified as risk averse are less likely to deviate from the average group pledges. Table A5 relays that within-group variance increases with the level of the final goal for all treatments. As players in the game are symmetric, this indicates that increasing the final goal increases inequality. Otherwise, the only other significant determinant is whether no stretch goal was possible in the 2GoalUnk treatment.

As a special case of within-group variation, we also examined free riding among individuals. For this purpose, we define a free rider as an individual who contributes nothing in a particular campaign. Overall, the incidence of free riding is quite low at 7.6 percent. Table A6 and A7 show that while there are no differences in free-riding behavior across treatments on average, free-riding decreases with the level of the final goal in the one goal treatment. Males have a 2.2 percentage point higher probability of free riding.

5. Discussion

In this study, we test whether certain design features of dynamic fundraising campaigns influence campaign success. Specifically, we examine whether the introduction of an intermediate goal, goal uncertainty, and value uncertainty influence provision rates and revenue raised using a continuous-time dynamic fundraising game. Our main finding is that inclusion of an intermediate goal decreases both the likelihood that a (final) goal is reached, and the average revenue raised. These results are counterintuitive given that including an intermediate goal provides an opportunity to collect some revenue in the event of a campaign failure.

Our analysis reveals that the intermediate goal both altered the timing of contributions and contributions strategies. Even in successful campaigns (i.e., when the final goal was reached), inclusion of an intermediate goal slowed contributions in the early part of the game. A slowdown in early contributions is consistent with the possibility of small deviations from Markov Perfect Equilibrium (MPE) strategies under the trembling hand refinement whereby donors rationally shift their contributions to a latter part of the campaign to avoid the risk of negative (or lower) earnings when only the first goal is reached. Furthermore, continuation contributions after the intermediate goal has been reached are no longer consistent with MPE strategies. Specifically, contributions in the latter stage of the game depend on the prior contributions of other players. There are many possible reasons for this behavior, including that players are timing their contributions strategically as signals to induce additional contributions from others, and that players have social preferences (e.g., players care about fairness). While the reasons for this behavior are unclear, the implication is that in one-goal campaigns, donors are less likely to be waiting on others to donate, which ultimately leads to a higher success rate.

Provision rates, at the efficient level, in both the one goal (~90 percent) and two goal (~76 percent) settings are very high compared to related studies, although the benefit-cost ratios to participant groups from efficient provision in this experiment are similar to most provision point games, as well as VCM games. Choi, Gale, and Kariv (2008) compare two variants of a sequential game with a single fundraising goal – one with two contribution stages and the other with five – to a one-shot game and find that provision rates increase with the number of contribution stages. Using their baseline treatments with a benefit-cost ratio of 3-to-1 (ours is 3.33-to-1, on average), they report provision rates of 74.4 and 81.1 percent in two and five-stage games, respectively. They use three-player instead of four-player groups, which makes it easier for participants to coordinate, which implies that had they used four-player games their provision rates would have been lower. We speculate that the additional number of opportunities to contribute afforded by our continuous dynamic mechanism, and the fact that the Choi, Gale, and Kariv (2008) game allowed for excess contributions (without refunds) help to explain our higher provision rates. Cason and Zubrickas (2019) study a related continuous dynamic mechanism (with a single goal) and report a success rate of 58 percent for the case of no refund bonus and no alternative projects. We suspect that a considerable portion of the gap between their success rate and our own is due to the fact that they use lower benefit-cost ratios, and ten-player groups. Nevertheless, their own comparison to a related but static game (Cason and Zubrickas 2017) illustrates the potential for dynamic fundraising mechanisms to increase contributions relative to static mechanisms.

We find that goal uncertainty has no effect on provision rates. However, goal uncertainty does influence revenue when values are certain. Revenue decreases as the level of threshold uncertainty increases and if the possibility of no stretch goal exists. While the lack of observed effects could be due to high provision rates mentioned previously, it could also be due to the resolvability of the uncertainty midgame. In previous studies, subjects never know the goal until the decision round ends. In our experiment, the goal uncertainty is resolved mid-game as the final goal is known once the intermediate goal is met. It is perhaps unsurprising that uncertainty resolved during a campaign has no effect on the likelihood of meeting the goal but could influence within campaign contribution behavior.

Value uncertainty has a negative significant effect on reaching the (final) goal in campaigns without an intermediate goal but has no effect in treatments with an intermediate goal. In addition, we find value uncertainty has a negative effect on revenue in campaigns with one goal, but no effect in two-goal treatments. This could be due to the large group-level welfare gains to achieving fundraising goals, or the fact that only half of our participants are characterized as risk averse (~52 percent). Thus, further study of goal structure and dynamic fundraising is warranted.

As more businesses, nonprofits, and individuals engage in dynamic fundraising, it is important to investigate best practices and incorporate them into campaign design. These results suggest that fundraisers might find success in deploying either of the following goal-setting strategies: (1) set a single goal, or (2) if using multiple goals, set the most desired funding level as the first goal. This experiment shows that donors are more effective at reaching the first goal. Therefore, the use of "stretch" goals is only optimal if the first goal corresponds to the primary objective of the fundraiser, with additional contributions being welcomed but carrying a lesser probability of success. It is further germane to highlight another negative consequence of deploying an intermediate goal as a safety valve: The intermediate goal, and the value of the associated good, can result in the intermediate goal yielding a higher net benefit to donors than meeting the final goal. In such cases, we should expect that at best the intermediate goal will be reached. Nevertheless, as long as reaching the final goal (versus not) is welfare-enhancing then dropping the intermediate goal would increase the chance the final goal is met.

This paper addresses some important dimensions of dynamic fundraising campaigns including goal setting, goal uncertainty, and value uncertainty. There are other interesting and related questions to be explored, such as the effects of multiple intermediate goals, and the effects of comparing one and two-goal cases where the intermediate goal in the latter equals the final goal in the former. Other work has examined refund bonuses, multiple fundraising campaigns, challenge gifts, and decoy projects (Cason and Zubrickas 2019; Cason, Tabarrok, and Zubrickas 2021; Ansink et al. 2022). There remain many important research questions in this broader domain, including donor recognition, minimum contribution levels, recommended contribution levels, and campaign length, among others.

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Tables and Figures

Table 1. Experimental Design

	Final goal only	Intermediate and final goal	Intermediate and unknown final goal
Certain values	1Goal	2Goal	2GoalUnk
Uncertain values	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc

Table 2. Fundraising scenarios by goal structure

	One Goal	Two Goals, Known		Two Goals, 2nd Unknown	
	Final	Intermediate	Final	Intermediate	Final
Scenario 1	8	2	8	4	8 or 16
Scenario 2	8	4	8	4	8 or 16
Scenario 3	8	6	8	6	8 or 16
Scenario 4	10	4	10	6	8 or 16
Scenario 5	10	6	10	4	10 or 14
Scenario 6	10	8	10	4	10 or 14
Scenario 7	12	4	12	6	10 or 14
Scenario 8	12	6	12	6	10 or 14
Scenario 9	12	8	12	4	12 or no goal
Scenario 10	14	4	14	4	12 or no goal
Scenario 11	14	6	14	6	12 or no goal
Scenario 12	14	8	14	6	12 or no goal
Scenario 13	16	4	16	4	16 or no goal
Scenario 14	16	6	16	4	16 or no goal
Scenario 15	16	8	16	6	16 or no goal
Scenario 16				6	16 or no goal

Note: In cases where the final goal is uncertain, the two outcomes have a 50 percent chance of being drawn. When "no goal" is chosen, the fundraising campaign stops after the intermediate goal is reached.

Table 3. Data Description

Variable name	Description	Mean	Std. Dev.
Final Goal Reached	=1 if final goal is reached; missing if No Stretch Goal = 1	0.795	0.404
Revenue	Amount collected in donations from participant's group, in tokens	9.717	4.332
Continuation Contributions (Stage 1)	Contributions in second half of stage 1	0.745	1.112
Continuation Contributions (Stage 2)	Contributions in second half of stage 2	0.626	0.980
Time to Goal1	Time, in seconds, for participant's group to reach the intermediate goal; includes quasi-measurements for one-goal treatments	40.474	37.778
Intermediate Goal Reached	=1 if intermediate goal is reached; missing if one-goal treatment	0.982	0.133
Group Contributions	Amount in pledged contributions from participant's group, in tokens	10.636	3.547
Contribution Variance	Measure of within-group variation in pledged tokens. See equation [7]	1.539	3.061
Free Rider	=1 if participant pledged zero tokens	0.076	0.264
1Goal	=1 if one goal, certain values treatment	0.170	0.376
2Goal	=1 if two goals, certain values treatment	0.159	0.366
2GoalUnk	=1 if two goals, unknown final goal, and certain values treatment	0.170	0.376
1Goal-Unc	=1 if one goal, uncertain values treatment	0.159	0.366
2Goal-Unc	=1 if two goals, uncertain values treatment	0.159	0.366
2GoalUnk-Unc	=1 if two goals, unknown final goal, and uncertain values treatment	0.181	0.385
No Stretch Goal	=1 if "no goal" option selected	0.100	0.300
Final Goal	Number of tokens needed to reach final goal; missing if No Stretch Goal = 1.	11.55	3.539
Intermediate Goal	Number of tokens needed reach intermediate goal; includes quasi-goal for one-goal treatments	5.285	1.479
No Goal Possible	=1 if scenario includes "no goal" as an option	0.176	0.381
High Variance	=1 if Scenario 1 – 4 and unknown final goal	0.040	0.195
Own Prior Contributions (Stage 1)	Contributions in first half of stage 1	0.651	0.916
Own Prior Contributions (Stage 2)	Contributions in first half of stage 2	0.634	1.045
Prior Contributions from Others (Stage 1)	Contributions from other group members in first half of stage 1	1.952	1.641
Prior Contributions from Others (Stage 2)	Contributions from other group members in first half of stage 2	1.903	2.061
Round	Decision round, 1 to 16	8.176	4.431
Age	Participant's age, in years	20.133	1.683
Male	=1 if participant self-identifies as male	0.593	0.491
GPA	cumulative GPA; midpoint of selected range	3.333	0.459
Risk Averse	=1 if number of safe choices >5 in risk MPL	0.518	0.500

Notes: Summary statistics calculated from experiment panel data set with participant by decision round observations.

Table 4. Analysis of final goal success rates and revenue

	(1) Final Goal Reached	(2) Final Goal Reached	(3) Revenue	(4) Revenue
Two goals, certain values (2Goal)	-0.178*** (0.051)	-0.202*** (0.051)	-1.145*** (0.432)	-1.296*** (0.422)
Two goals, unknown final goal (2GoalUnk)	-0.199*** (0.056)	-0.226*** (0.056)	-1.376** (0.539)	-1.515*** (0.572)
One goal, uncertain values (1Goal-Unc)	-0.058* (0.033)	-0.095** (0.038)	-0.662 (0.426)	-0.850* (0.432)
Two goals, uncertain values (2Goal-Unc)	-0.156*** (0.048)	-0.199*** (0.048)	-1.033** (0.449)	-1.295*** (0.440)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	-0.126*** (0.044)	-0.158*** (0.048)	-0.960** (0.415)	-1.140*** (0.428)
Age		-0.006 (0.017)		0.017 (0.164)
Male		-0.163*** (0.060)		-1.199** (0.550)
GPA		0.041 (0.066)		0.115 (0.604)
Risk Averse		-0.169*** (0.063)		-1.071* (0.593)
Intercept	0.925*** (0.018)	1.124** (0.448)	11.008*** (0.248)	11.714*** (4.360)
Controls for order effects?	No	Yes	No	Yes
Observations	1,270	1,270	1,270	1,270
R^2	0.033	0.054	0.012	0.020

Notes: Standard errors clustered by group in parentheses. *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table 5. Effects of scenario characteristics on final goal success rates

	1Goal	2Goal	2GoalUnk	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc
Final Goal	-0.011* (0.006)	-0.055*** (0.012)	-0.048*** (0.011)	-0.007 (0.007)	-0.051*** (0.012)	-0.061*** (0.010)
Intermediate Goal		0.014 (0.018)	-0.044*** (0.017)		-0.001 (0.013)	0.020 (0.025)
No Stretch Goal Possible			-0.236** (0.109)			-0.020 (0.060)
High Variance			0.017 (0.054)			0.036 (0.070)
Intercept	1.062*** (0.064)	1.323*** (0.117)	1.586*** (0.153)	0.947*** (0.092)	1.382*** (0.113)	1.416*** (0.143)
Observations	240	225	162	225	225	193
R^2	0.015	0.125	0.173	0.003	0.122	0.187

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Standard errors, in parentheses, are computed using the cluster bootstrap with 10,000 replications. The dependent variable for all regressions is *Final Goal Reached*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table 6. Effects of scenario characteristics on revenue

	1Goal	2Goal	2GoalUnk	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc
Final Goal	0.815*** (0.092)	0.254** (0.118)	0.416*** (0.115)	0.796*** (0.101)	0.383*** (0.122)	0.316*** (0.113)
Intermediate Goal		0.468*** (0.143)	-0.148 (0.211)		0.126 (0.139)	0.499* (0.262)
No Stretch Goal Possible			-2.314** (1.007)			-0.227 (0.581)
High Variance			-0.500 (0.497)			-0.034 (0.755)
Intercept	1.233 (0.925)	4.129*** (0.860)	6.147*** (1.429)	0.800 (1.114)	4.627*** (0.900)	3.807*** (1.426)
Observations	240	225	162	225	225	193
R^2	0.304	0.108	0.104	0.216	0.097	0.066

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Standard errors, in parentheses, are computed using the cluster bootstrap with 10,000 replications. The dependent variable for all regressions is *Revenue*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table 7. Individual continuation contributions, one-goal treatments

	1Goal		1Goal-Unc	
	Quasi-Stage 1	Quasi-Stage 2	Quasi-Stage 1	Quasi-Stage 2
Own prior contributions (β_1)	-0.695*** (0.043)	-0.110*** (0.026)	-0.658*** (0.037)	-0.176*** (0.043)
Prior contributions from others (β_2)	-0.001 (0.023)	0.001 (0.008)	0.025 (0.024)	0.002 (0.010)
Decision Round (β_3)	0.060*** (0.008)	-0.019*** (0.004)	0.048*** (0.007)	-0.032*** (0.008)
Intercept	0.934*** (0.030)	0.941*** (0.063)	0.980*** (0.055)	1.151*** (0.119)
Observations	888	888	780	780
R^2	0.386	0.242	0.331	0.358

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Dependent variable is *Continuation Contributions*, defined as the amount contributed by an individual in the second half of the indicated stage of the decision round. Standard errors, in parentheses, are computed using the cluster bootstrap (cluster by group) with 10000 replications. All regressions include participant fixed effects. Estimation sample only includes observations for which *Final Goal Reached* = 1.

Table 8. Individual continuation contributions, two goal treatments

	2Goal		2GoalUnk		2Goal-Unc		2GoalUnk-Unc	
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2
Own prior contributions (β_1)	-0.403***	-0.274***	-0.526***	-0.354***	-0.424***	-0.091**	-0.522***	-0.331***
	(0.068)	(0.052)	(0.046)	(0.048)	(0.028)	(0.036)	(0.066)	(0.049)
Prior contributions from others (β_2)	0.026	0.051***	0.020	0.121***	0.019	0.048**	-0.031*	0.079***
	(0.024)	(0.014)	(0.015)	(0.029)	(0.014)	(0.020)	(0.017)	(0.014)
Decision Round (β_3)	0.000	-0.007	-0.007*	-0.011	-0.008	-0.001	0.002	-0.003
	(0.004)	(0.006)	(0.004)	(0.015)	(0.006)	(0.005)	(0.003)	(0.013)
Intercept	0.908***	0.924***	0.919***	0.952***	0.955***	0.618***	1.004***	0.935***
	(0.067)	(0.068)	(0.039)	(0.145)	(0.047)	(0.076)	(0.041)	(0.126)
Observations	664	664	440	440	684	684	584	584
R^2	0.322	0.292	0.454	0.395	0.366	0.174	0.421	0.312

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Dependent variable is *Continuation Contributions*, defined as the amount contributed by an individual in the second half of the indicated stage of the decision round. Standard errors, in parentheses, are computed using the cluster bootstrap (cluster by group) with 10000 replications. All regressions include participant fixed effects. Estimation sample only includes observations for which *Final Goal Reached* = 1. Observations where *No Stretch Goal*=1 are also excluded.

Table 9. Time to reach intermediate goal (or its equivalent)

	Linear regression	Quantile regressions		
		25%	50%	75%
Two goals, certain values (2Goal)	24.562***	9.093***	27.422***	50.016***
	(6.436)	(3.166)	(8.539)	(14.479)
Two goals, unknown final goal (2GoalUnk)	33.241***	20.468***	43.422***	58.281***
	(6.395)	(5.099)	(6.667)	(14.207)
One goal, uncertain values (1Goal-Unc)	-0.346	0.077	0.843	-8.844
	(6.047)	(1.062)	(2.256)	(15.884)
Two goals, uncertain values (2Goal-Unc)	13.747**	4.031***	13.093***	28.938*
	(5.762)	(1.459)	(4.456)	(15.014)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	21.808***	9.922***	27.984***	42.250***
	(6.942)	(3.432)	(7.769)	(15.154)
Intercept	24.886***	5.516***	9.516***	32.250***
	(4.034)	(0.733)	(1.394)	(10.396)
Observations	1,394	1,394	1,394	1,394
R^2	0.109	0.056	0.110	0.089

Notes: *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Standard errors reported in parentheses. For the linear regression model, standard errors are clustered by group. For the quantile regressions, standard errors are estimated using a cluster bootstrap (cluster by group) with 10000 replications. Dependent variable is *Time to Goal1*. Estimation sample excludes two-goal treatment observations where the intermediate goal was not reached.

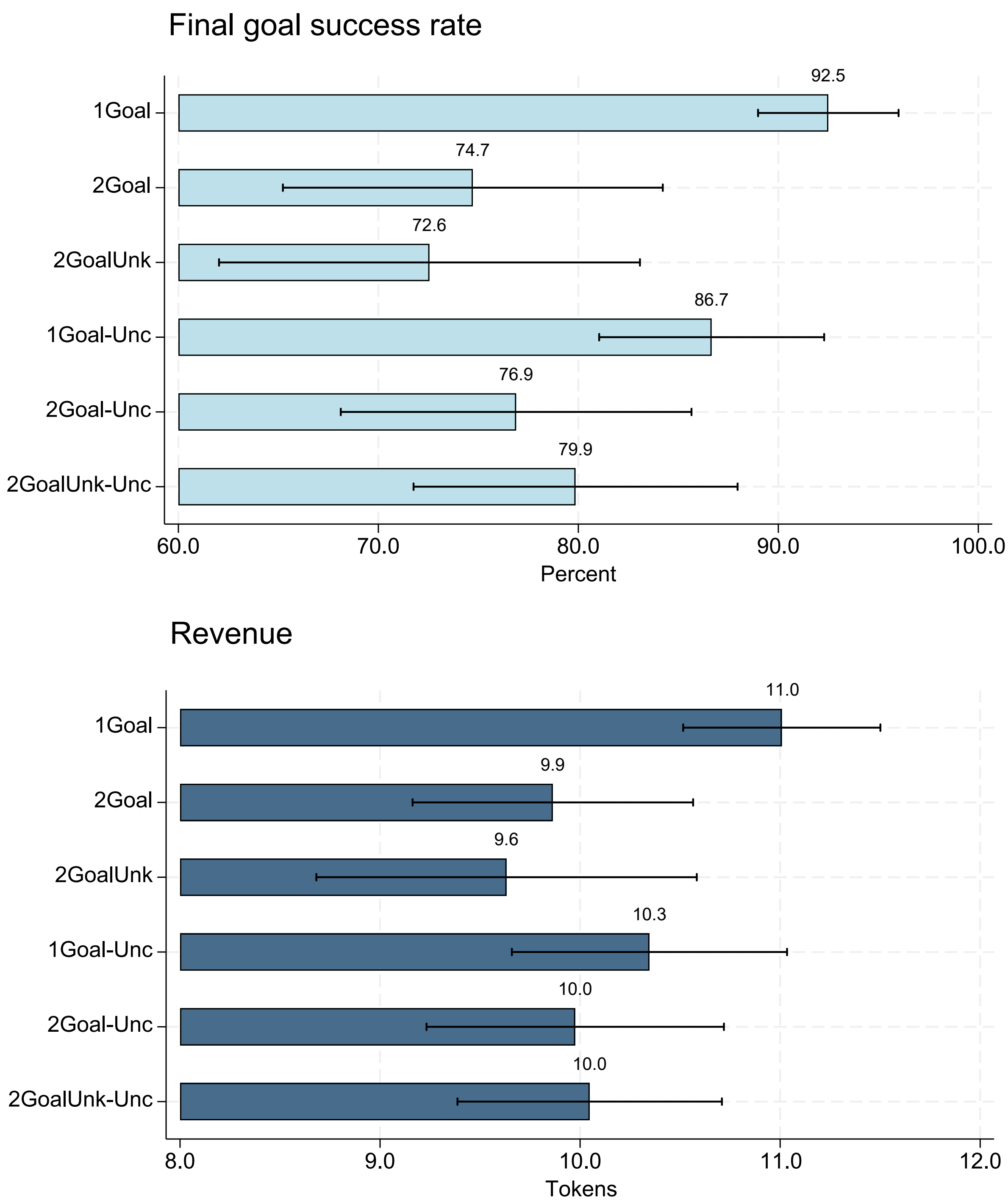


Figure 1. Final goal success rates and revenue

Notes: Observations for which *No Stretch Goal*=1 are not directly comparable and are excluded in the calculations. Sampling weights are used to correct for imbalances in the observed frequencies of final goal levels across treatments. Ninety-five percent confidence intervals are obtained from a panel regression of the respective outcome variable on a full set of treatment indicators, with standard errors clustered at the group-level.

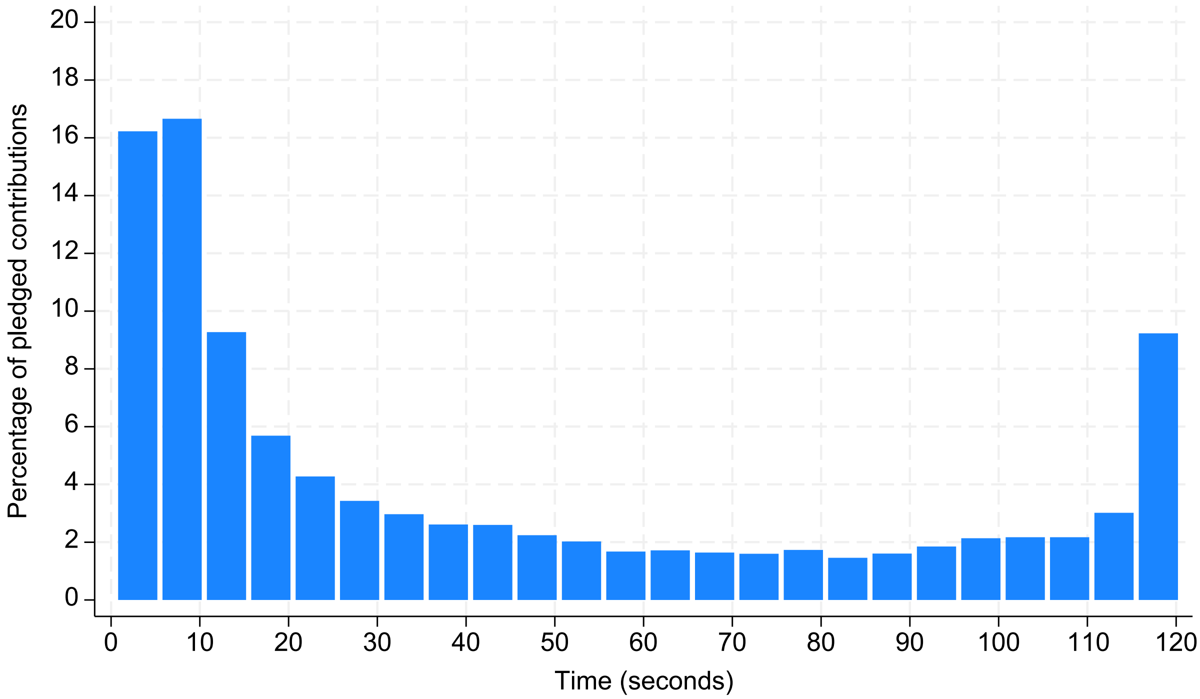


Figure 2. The timing of pledges within a fundraising campaign

Notes: Percentage of pledged contributions is calculated by taking the pledges made within a five-second interval and dividing by total campaign pledges. Observations for which *No Stretch Goal*=1 are excluded in the calculations.

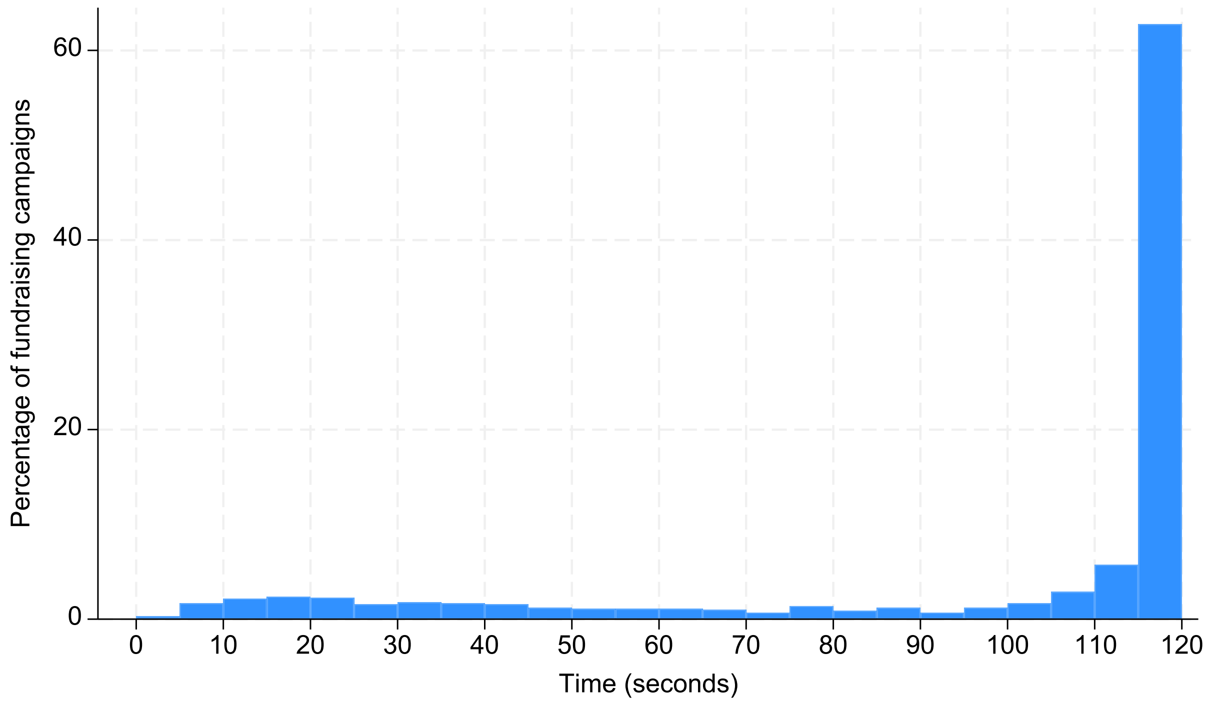


Figure 3. Distribution of time needed to reach final goal.

Notes: Sample includes all campaigns for which *Final Goal Reached*=1.

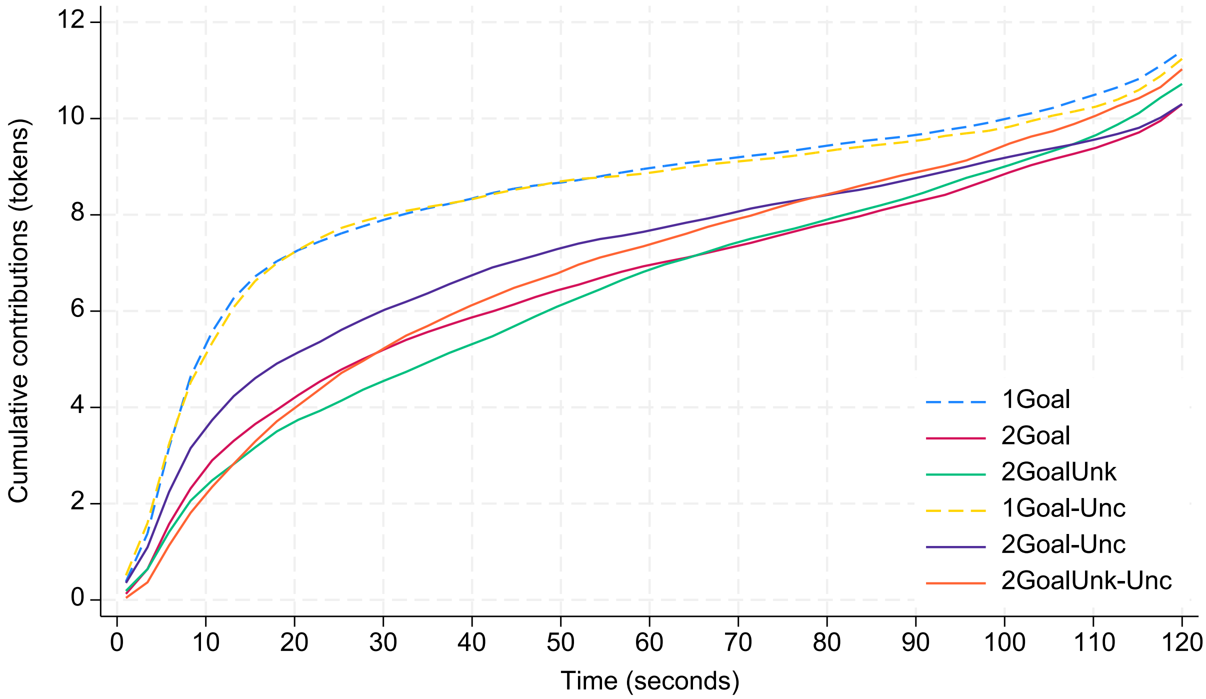


Figure 4. Cumulative average contributions

Notes: Observations for which *No Stretch Goal*=1 are excluded in the calculations.

Appendix A. Supplemental data analysis

Table A1. Analysis of intermediate goal success rates

	(1)	(2)
Two goals, unknown final goal (2GoalUnk)	0.014 (0.017)	0.012 (0.016)
Two goals, uncertain values (2Goal-Unc)	-0.000 (0.020)	-0.006 (0.017)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	0.019 (0.016)	0.015 (0.015)
Age		-0.003 (0.005)
Male		-0.017 (0.021)
GPA		0.033 (0.023)
Risk Averse		-0.018 (0.017)
Intercept	0.973*** (0.015)	0.939*** (0.134)
Controls for order effects?	No	Yes
Observations	946	946
R^2	0.004	0.015

Notes: *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Standard errors clustered by group in parentheses. The dependent variable for all regressions is *Group Contributions*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A2. Analysis of group pledged contributions

	(1)	(2)
Two goals, certain values (2Goal)	-1.189*** (0.271)	-1.304*** (0.304)
Two goals, unknown final goal (2GoalUnk)	-1.289*** (0.439)	-1.279*** (0.482)
One goal, uncertain values (1Goal-Unc)	-0.112 (0.071)	-0.255 (0.161)
Two goals, uncertain values (2Goal-Unc)	-1.171*** (0.324)	-1.264*** (0.343)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	-0.934*** (0.263)	-1.025*** (0.270)
Age		0.114 (0.129)
Male		-0.489 (0.401)
GPA		0.419 (0.474)
Risk Averse		-0.815* (0.430)
Intercept	11.858*** (0.041)	8.869** (3.399)
Controls for order effects?	No	Yes
Observations	1,270	1,270
R^2	0.031	0.037

Notes: *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Standard errors clustered by group in parentheses. The dependent variable for all regressions is *Group Contributions*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A3. Effects of scenario characteristics on group pledged contributions

	1Goal	2Goal	2GoalUnk	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc
Final Goal	0.972*** (0.016)	0.531*** (0.086)	0.638*** (0.099)	0.964*** (0.025)	0.606*** (0.097)	0.661*** (0.063)
Intermediate Goal		0.209** (0.084)	-0.207 (0.173)		0.054 (0.078)	0.149 (0.247)
No Stretch Goal Possible			-2.146** (0.847)			-0.639 (0.466)
High Variance			-0.333 (0.311)			0.139 (0.435)
Intercept	0.196 (0.169)	3.100*** (0.737)	4.602*** (1.183)	0.173 (0.272)	3.077*** (0.683)	2.379** (1.163)
Observations	240	225	162	225	225	193
R^2	0.944	0.304	0.289	0.917	0.319	0.333

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Standard errors, in parentheses, are computed using the cluster bootstrap (cluster by group) with 10,000 replications. The dependent variable for all regressions is *Group Contributions*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A4. Analysis of within-group heterogeneity in pledged contributions

	(1)	(2)
Two goals, certain values (2Goal)	0.563 (0.590)	0.514 (0.609)
Two goals, unknown final goal (2GoalUnk)	-0.511 (0.465)	-0.646 (0.514)
One goal, uncertain values (1Goal-Unc)	-0.100 (0.588)	-0.211 (0.582)
Two goals, uncertain values (2Goal-Unc)	-0.324 (0.479)	-0.311 (0.526)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	0.136 (0.617)	-0.015 (0.622)
Age		-0.052 (0.066)
Male		0.234 (0.228)
GPA		-0.138 (0.236)
Risk Averse		-0.469^{***} (0.161)
Intercept	1.623^{***} (0.447)	3.201^{*} (1.917)
Controls for order effects?	No	Yes
Observations	5,080	5,080
R^2	0.011	0.024

Notes: *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Standard errors clustered by group in parentheses. The dependent variable for all regressions is *Contribution Variance*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A5. Effects of scenario characteristics on the within-group heterogeneity in pledged contributions

	1Goal	2Goal	2GoalUnk	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc
Final Goal	0.109** (0.049)	0.171*** (0.041)	0.108*** (0.040)	0.137*** (0.039)	0.109*** (0.029)	0.125** (0.061)
Intermediate Goal		0.087 (0.056)	0.083 (0.090)		0.032 (0.038)	-0.040 (0.087)
No Stretch Goal Possible			-0.403** (0.187)			0.218 (0.242)
High Variance			0.269 (0.288)			0.372 (0.282)
Intercept	0.310 (0.319)	-0.364 (0.417)	-0.579 (0.658)	-0.125 (0.284)	-0.186 (0.300)	0.291 (0.976)
Observations	960	900	648	900	900	772
R^2	0.009	0.020	0.032	0.014	0.024	0.013

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Standard errors, in parentheses, are computed using the cluster bootstrap (cluster by group) with 10,000 replications. The dependent variable for all regressions is *Contribution Variance*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A6. Analysis of free-riding behavior

	(1)	(2)
Two goals, certain values (2Goal)	0.021 (0.031)	0.024 (0.032)
Two goals, unknown final goal (2GoalUnk)	-0.018 (0.028)	-0.016 (0.029)
One goal, uncertain values (1Goal-Unc)	-0.004 (0.032)	-0.008 (0.032)
Two goals, uncertain values (2Goal-Unc)	-0.008 (0.031)	-0.002 (0.032)
Two goals, unknown final goal, uncertain values (2GoalUnk-Unc)	-0.019 (0.033)	-0.020 (0.033)
Age		0.002 (0.004)
Male		0.028* (0.014)
GPA		0.017 (0.016)
Risk Averse		0.004 (0.015)
Intercept	0.070*** (0.025)	-0.059 (0.102)
Controls for order effects?	No	Yes
Observations	5,080	5,080
R^2	0.003	0.009

Notes: *, **, and *** indicate estimate is statistically significant at the 10%, 5%, and 1% significance levels, respectively. Standard errors clustered by group in parentheses. The dependent variable for all regressions is *Free Rider*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

Table A7. Effects of scenario characteristics on free-riding behavior

	1Goal	2Goal	2GoalUnk	1Goal-Unc	2Goal-Unc	2GoalUnk-Unc
Final Goal	-0.007** (0.003)	-0.001 (0.004)	-0.001 (0.004)	-0.004*** (0.001)	-0.001 (0.003)	-0.006 (0.005)
Intermediate Goal		-0.000 (0.006)	0.007 (0.009)		-0.007 (0.005)	-0.004 (0.005)
No Stretch Goal Possible			-0.005 (0.030)			0.005 (0.014)
High Variance			0.029 (0.022)			0.007 (0.013)
Intercept	0.151*** (0.052)	0.111*** (0.039)	0.020 (0.048)	0.109*** (0.032)	0.112*** (0.041)	0.134* (0.078)
Observations	960	900	648	900	900	772
R^2	0.006	0.000	0.006	0.002	0.003	0.006

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% significance levels, respectively. Standard errors, in parentheses, are computed using the cluster bootstrap (cluster by group) with 10,000 replications. The dependent variable for all regressions is *Free Rider*. Observations where *No Stretch Goal*=1 are excluded from the regressions.

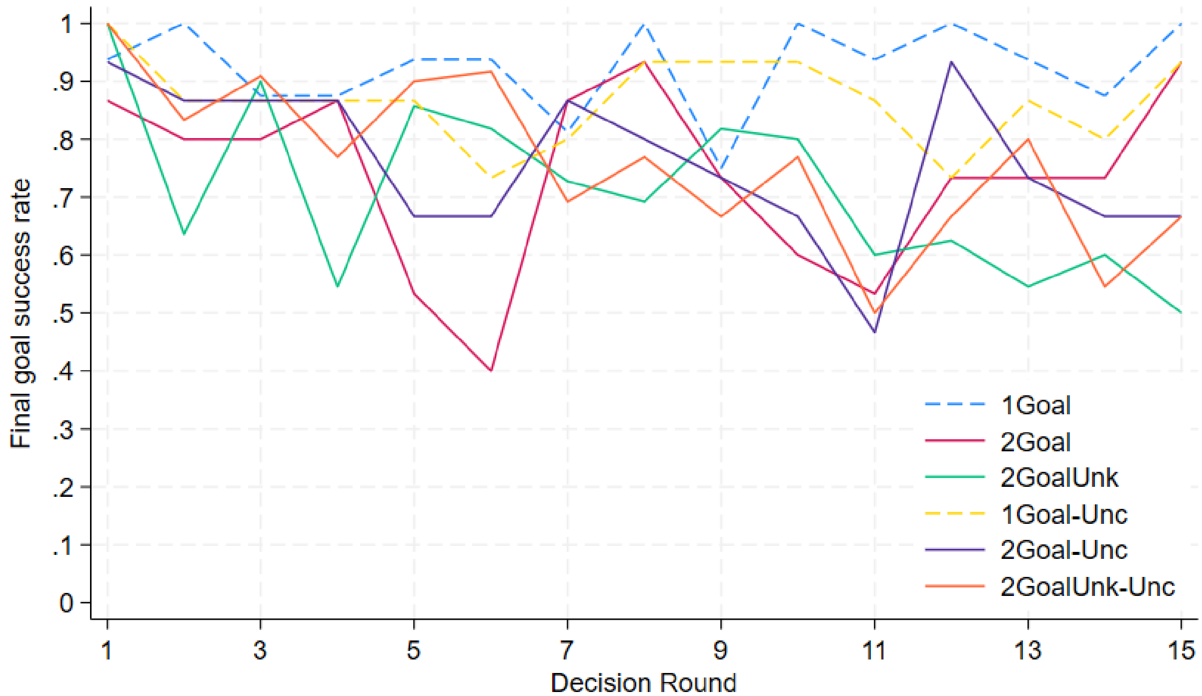


Figure A1. Final goal success rate by decision round

Notes: Observations for which *No Stretch Goal*=1 are excluded in the calculations.

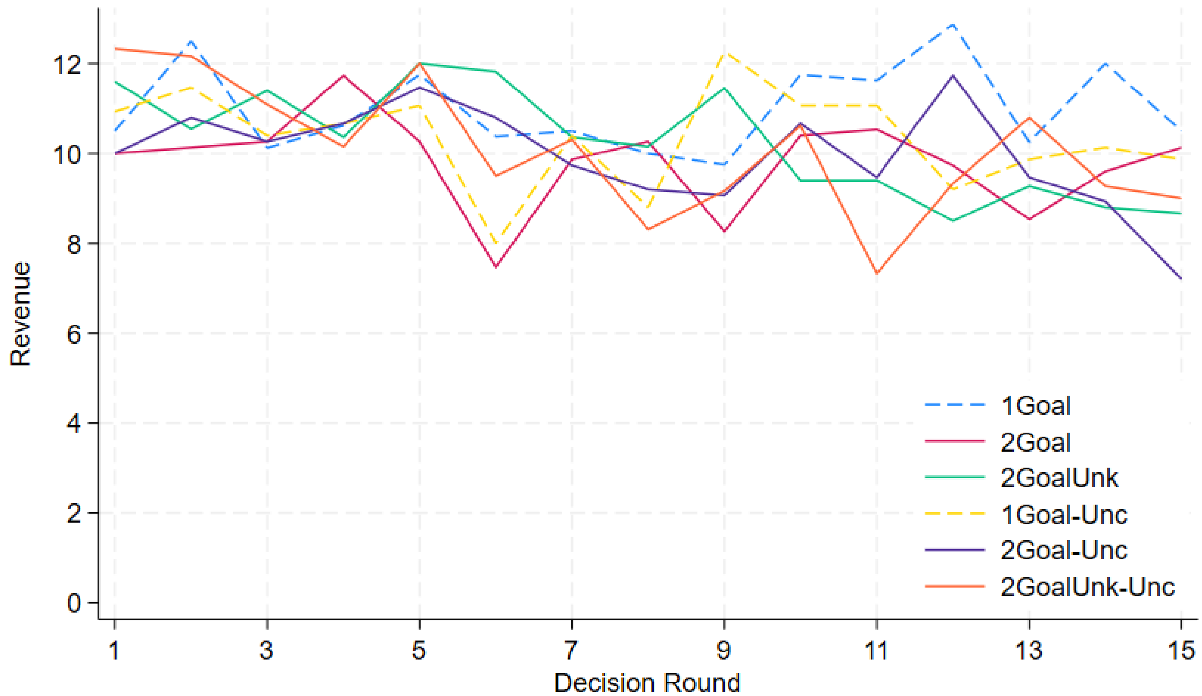


Figure A2. Revenue by decision round

Notes: Observations for which *No Stretch Goal*=1 are excluded in the calculations.

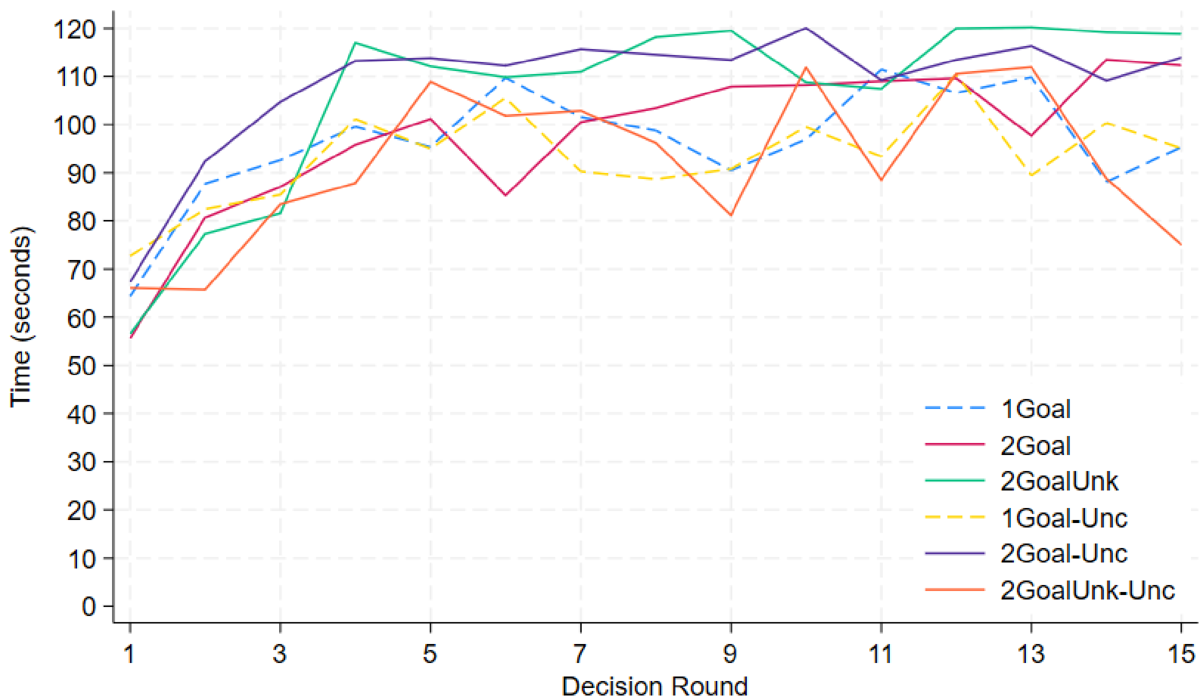


Figure A3. Time final goal reached, by treatment

Notes: Observations for which *Final Goal Reached*=0 or *No Stretch Goal*=1 are excluded in the calculations.

Appendix B. Experiment Instructions

(Note: Instructions are unaltered, with the exception of changing the task labels to reflect those used in the manuscript)

You are about to participate in an experiment in economic decision making. Please follow the instructions carefully. At any time, please feel free to raise your hand if you have a question. At the end of today's session, you will be paid your earnings privately and in cash.

You have been randomly assigned an ID number for this experiment. You will never be asked to reveal your identity to anyone. Your name will never be associated with any of your decisions. In order to keep your decisions private, please do not reveal your choices or otherwise communicate with any other participant. Importantly, please refrain from verbally reacting to events that occur during the experiment.

Today's session consists of three parts: Experiment 1, Experiment 2 and a short questionnaire. In Experiment 1, you will make a series of lottery decisions. In Experiment 2, you will be randomly sorted into groups and have the opportunity to contribute money to fund a project. If a project goal is reached, the project is funded and each player receives a payout.

Instructions for Experiment 1

Please click "Continue" and refer to your computer screen while we read the instructions.

We would like you to make a decision for each of 10 scenarios. Each scenario involves a choice between playing a lottery that pays $4 or $0 according to specified chances (Option A) or receiving $2 for sure (Option B).

You will notice that the only differences across scenarios are the chances of receiving the high or low prize for the lottery. At the end of the today's session, ONE of the 10 scenarios will be selected at random and you will be paid according to your decision for this selected scenario ONLY. Each scenario has an equal chance of being selected.

Please consider your choice for each scenario carefully. Since you do not know which scenario will be played out, it is in your best interest to treat each scenario as if it will be the one used to determine your earnings.

Before making decisions, are there any questions?

Once you are ready to submit your decisions, please click the "Submit" button.

Instructions for Experiment 2

Overview

In this experiment, all money amounts are denominated in tokens, and will be exchanged at a rate of 10 tokens to 1 US dollar at the end of the experiment.

There will be many decision rounds. You will not know the number of rounds until the experiment has ended. Each decision round is separate from the other rounds, in the sense that the decisions you make in one round will not affect the outcome or earnings of any other round.

In this experiment, participants will be randomly placed into four-person groups. You will remain in the same group for the entire experiment.

The decision setting

In each round, you are given an endowment of 8 tokens. You have the opportunity to contribute some or all your tokens towards funding a project. Any tokens not contributed are yours to keep.

If enough tokens are contributed from the group, everyone in the group receives a "payout". The payout is the same for every group member, and does not depend on how many tokens a particular person contributed.

If you contribute tokens towards a goal, but that goal is not reached, these tokens will be refunded to you. These tokens will be yours to keep.

Project goals

The project will have up to two funding goals: an intermediate goal (Goal 1), and a final goal (Goal 2). Reaching either goal results in a payout to all members of the group. The payout to the group is higher when the final goal, Goal 2, is reached.

At the start of the round, Goal 2 is uncertain, and will only be revealed if Goal 1 is reached. If Goal 1 is reached, the computer will randomly select Goal 2 from two possible options. Each option will have an equal chance of being selected.

Know that, in some decision rounds, one of the two possible options for Goal 2 is "No Goal 2". If this option is randomly selected, Goal 2 does not exist. No more contributions are possible.

Project payouts

The payout for reaching a funding goal is uncertain. At the end of the decision round, if a goal is reached, the computer will randomly select the payout from two possible amounts. Each amount will have an equal chance of being selected.

Along with these instructions we have provided you with an example of what the **decision screen** on your computer will look like. Please refer to this as we read through the instructions.

In this example,

- Goal 1 is 4 tokens. If 4 tokens are contributed from the group, this goal is reached, and each group member receives a payout of either 3 or 7 (each with a 50% chance).
- Goal 2 is either 10 or 14 tokens (each with a 50% chance) and is revealed only if Goal 1 is reached.
- The payout associated with Goal 2 is either 8 or 12 (each with a 50% chance). If this funding goal is reached, each group member receives a payout of either of 8 or 12 tokens (each with a 50% chance).

How to contribute tokens

To contribute tokens, you enter the number of tokens you would like to contribute and click the SUBMIT button. Once you do so, you will see progress made towards the funding goal on the right side of the screen.

After your first contribution, you have the opportunity to contribute additional tokens. To do so, you follow the same procedure: enter the amount you want to contribute and click the SUBMIT button. You do not have the opportunity to alter your original contribution or otherwise take back tokens you previously contributed.

When necessary, the computer will limit the amount you can contribute to make sure you do not contribute more than what is needed to reach the next goal, and to make sure you do not contribute more than your endowment.

Timer

There is a timer on the upper right corner of the screen. You will have 2 minutes to make your decisions. During those 2 minutes, you can contribute tokens to the project fund. After 2 minutes, the round will end regardless of whether any goals have been reached.

Calculating your earnings

In each round, there are three possible outcomes: (1) no goal is reached, (2) only Goal 1 is reached, or (3) Goal 2 is reached. We will discuss your earnings in each case.

No goal reached. If there are not enough contributions to reach Goal 1, there are no payouts to the group. Any contributions you made towards Goal 1 will be refunded to you. Your earnings are then equal to the 8 tokens you started with.

Your earnings = Endowment (8 tokens)

ONLY Goal 1 reached. Each group member receives the Goal 1 payout. All contributions you made towards Goal 1 will be subtracted to calculate your earnings. If you contributed any tokens after Goal 1 was reached, these are refunded to you.

Your earnings = Endowment + Goal 1 payout – tokens YOU contributed

Goal 2 reached. Every group member receives the Goal 2 payout. All contributions you made will be subtracted to calculate your earnings.

Your earnings = Endowment + Goal 2 payout – tokens YOU contributed

At the end of each decision round you will be shown a **results screen** that summarizes the outcomes from the round, along with a calculation of your earnings.

Proceeding through the experiment

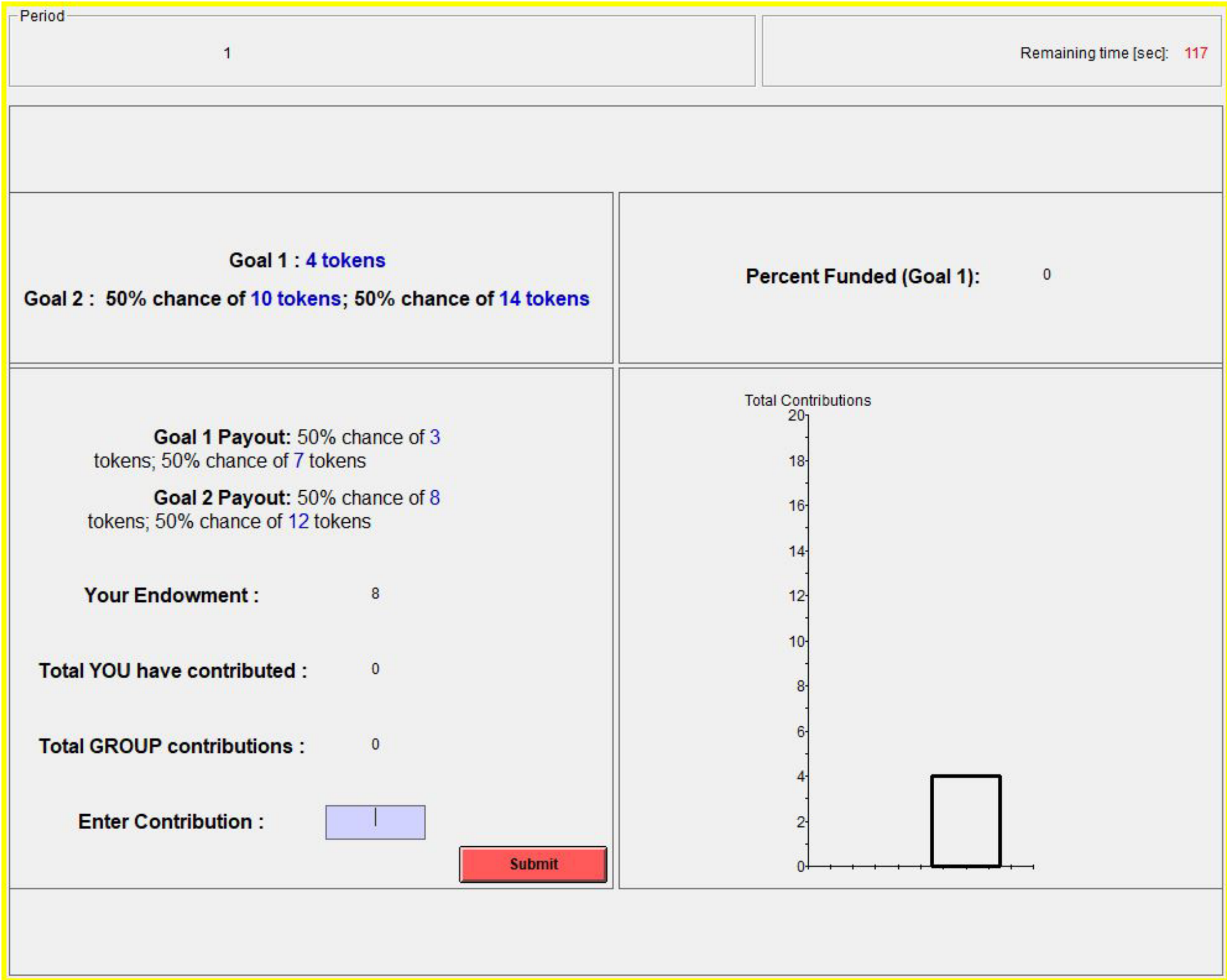
At the start of each decision round, you will be informed of the project goals and payouts in effect. Know that the project goals and payouts may differ from one round to the next, so pay close attention to this information.

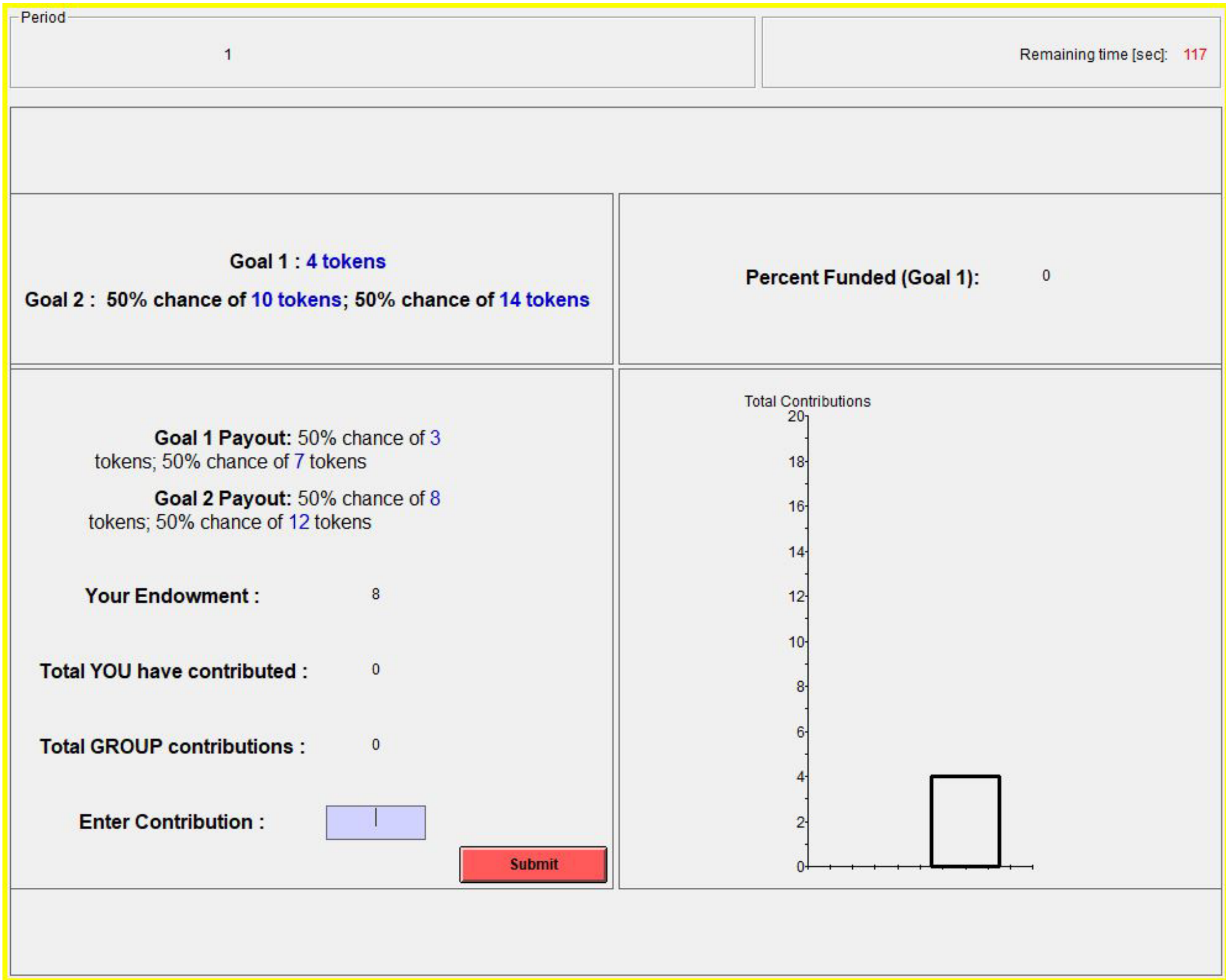
We realize that we have just provided you with plenty of information to think about. Before we proceed to the paid decision rounds, we will go through a training round to better familiarize you with the procedures.

Aside from decisions in this training round, you will be paid based on the outcome of each decision round. This means that it is very important to consider each decision prior to making it.

Before we proceed to the training round, are there any questions?

Example decision screen.




Period
1
Remaining time [sec]: 117
Goal 1 : 4 tokens
Goal 2 : 50% chance of 10 tokens; 50% chance of 14 tokens
Percent Funded (Goal 1): 0
Goal 1 Payout: 50% chance of 3 tokens; 50% chance of 7 tokens
Goal 2 Payout: 50% chance of 8 tokens; 50% chance of 12 tokens
Your Endowment : 8
Total YOU have contributed : 0
Total GROUP contributions : 0
Enter Contribution :
Submit
Total Contributions
20
18
16
14
12
10
8
6
4
2
0